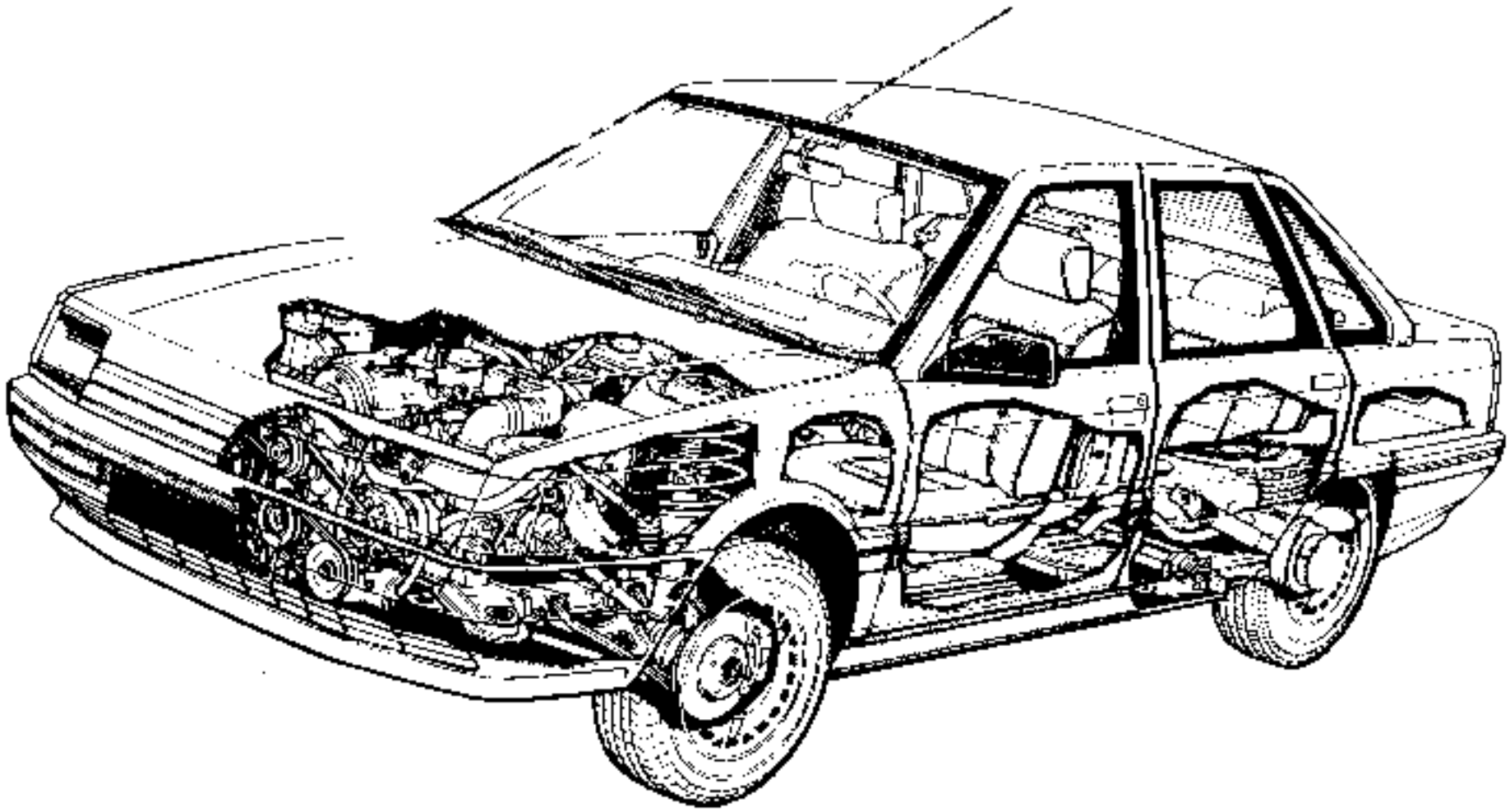
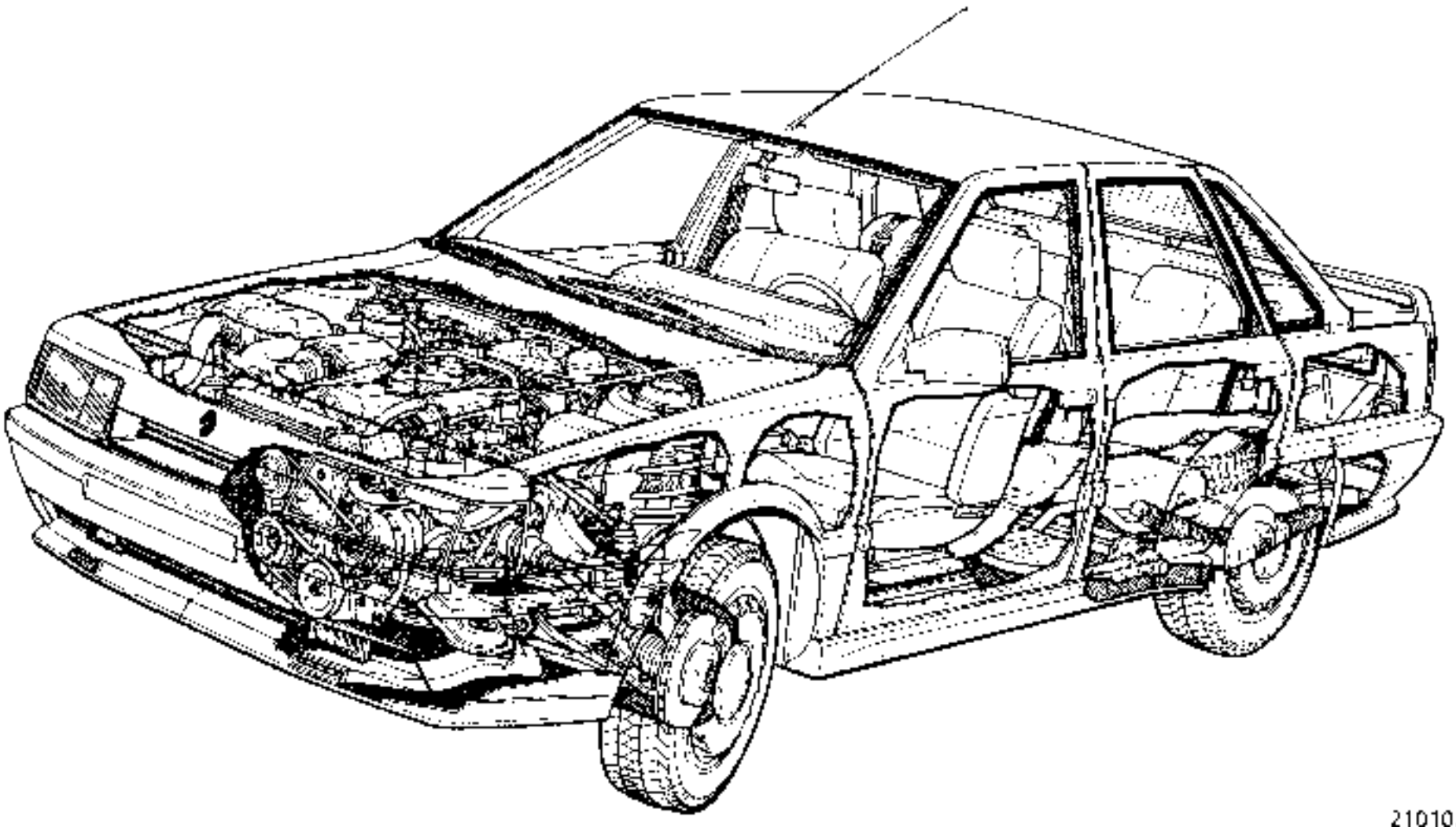
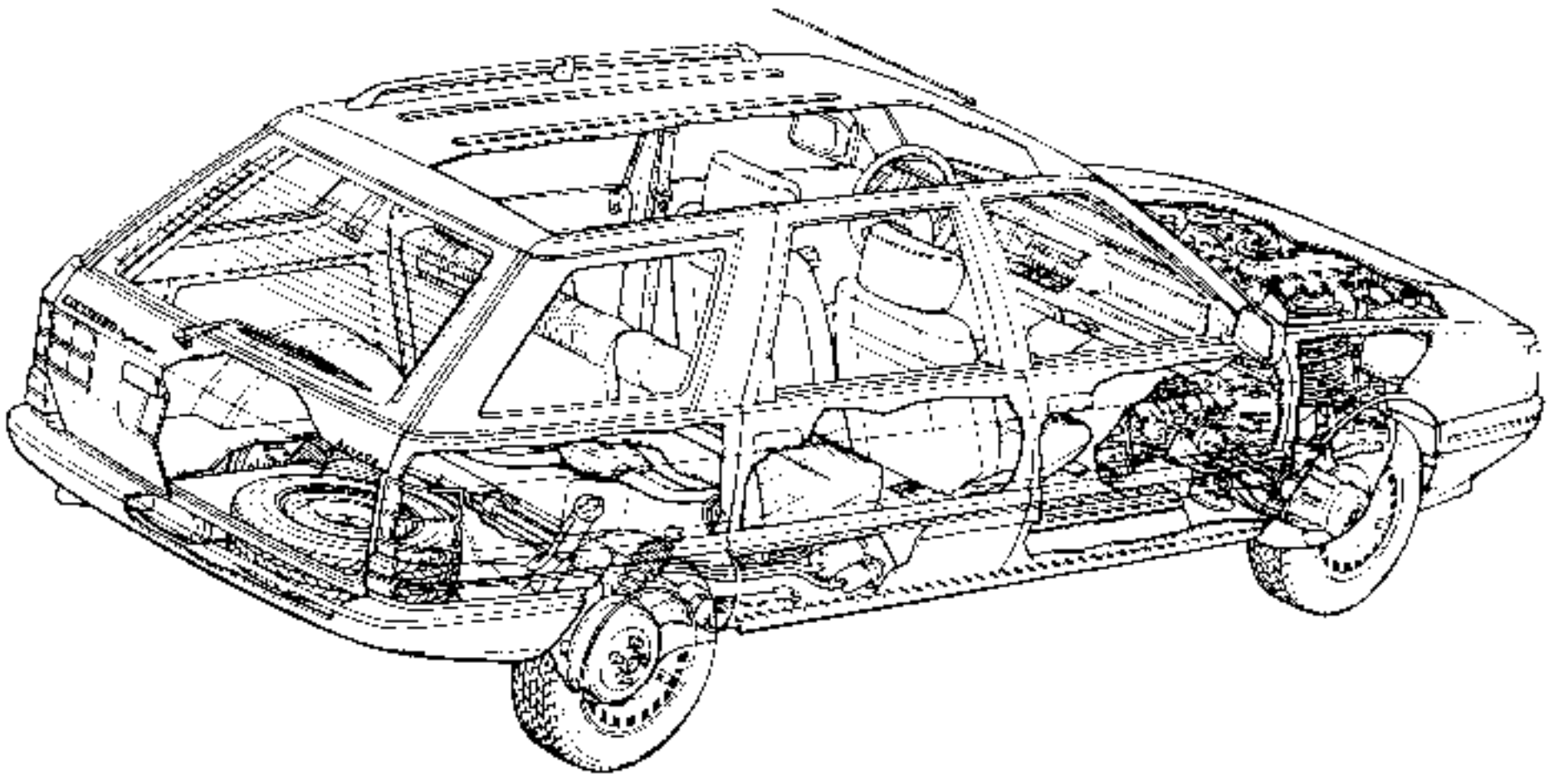


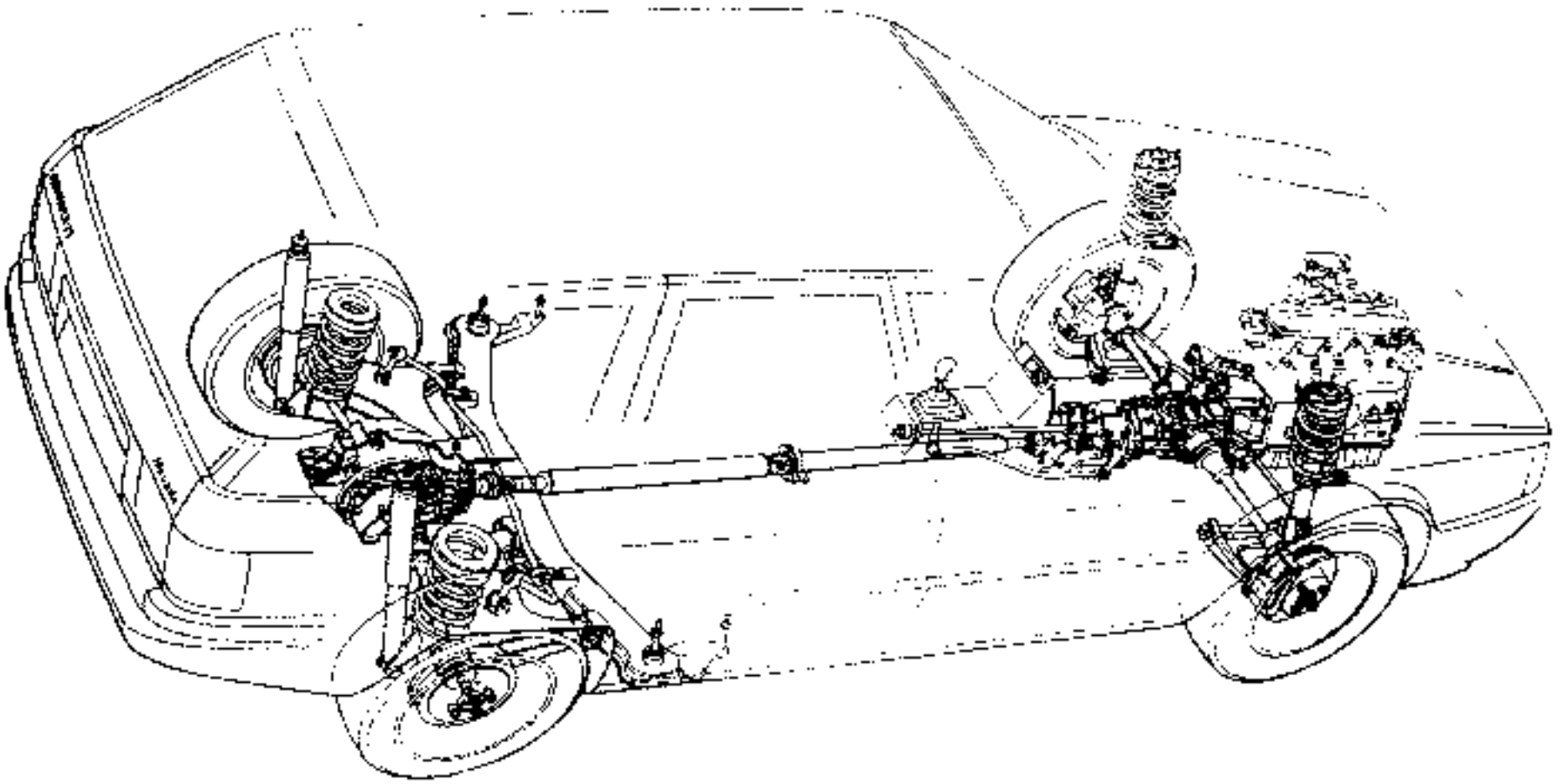
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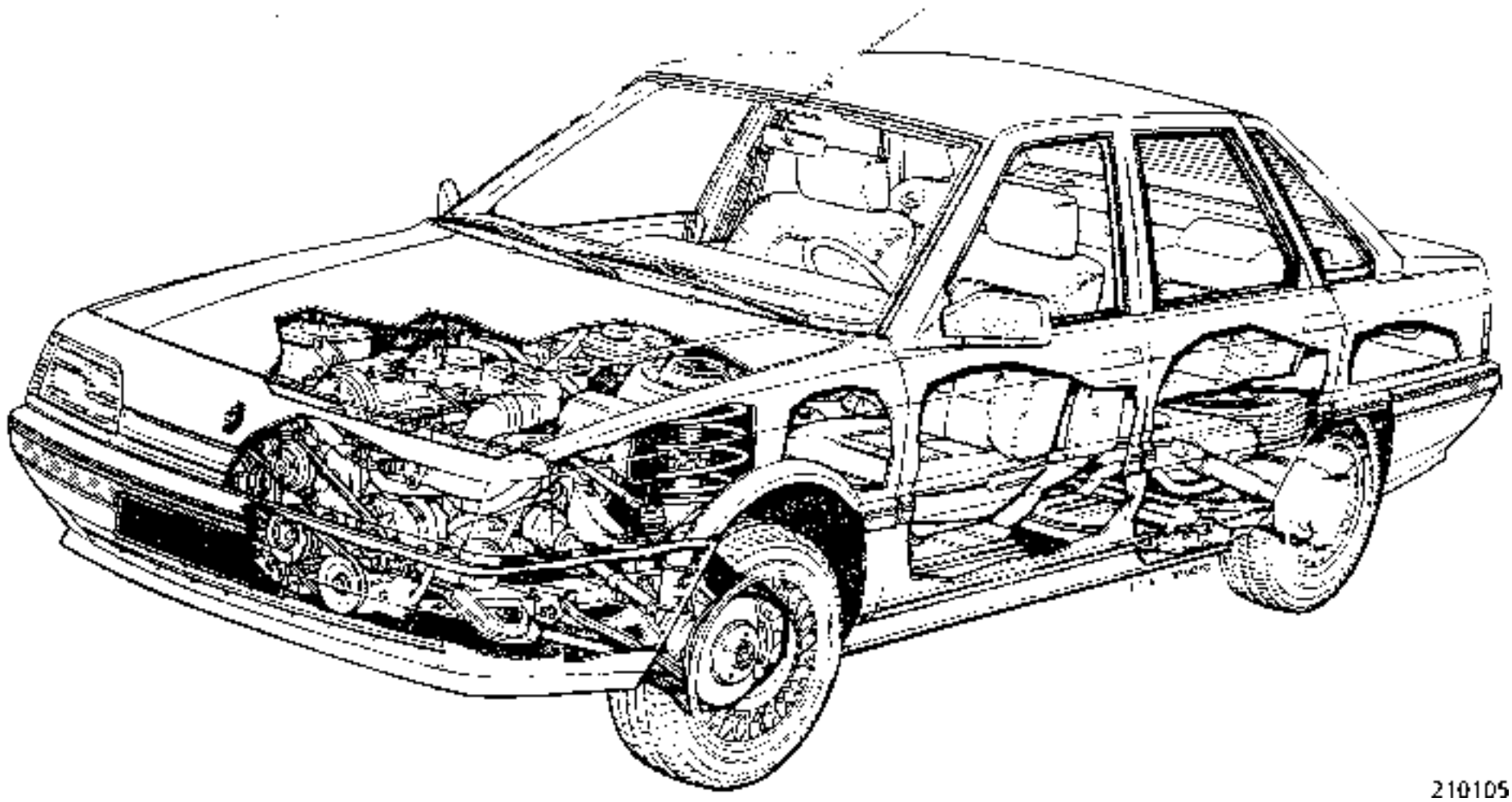
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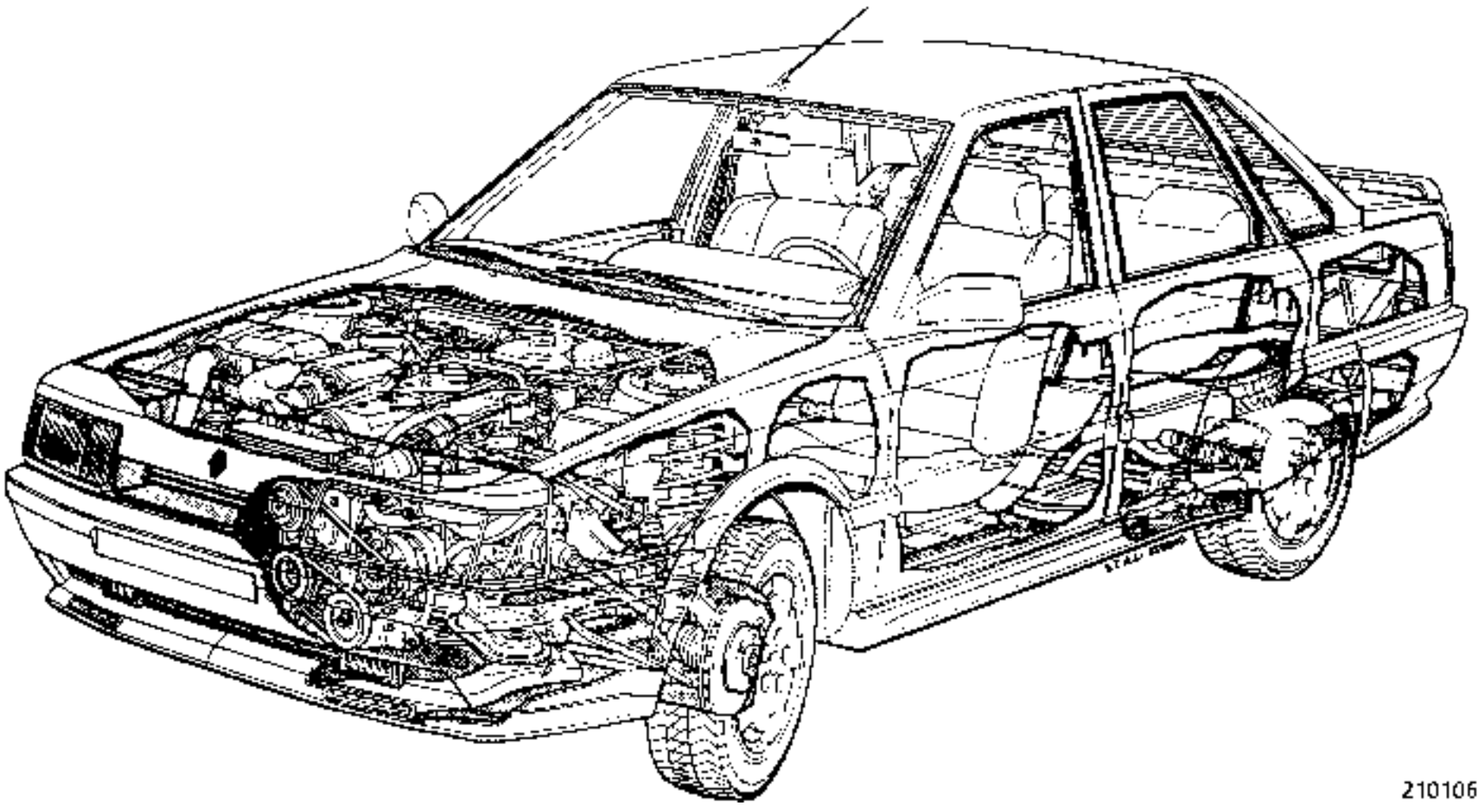
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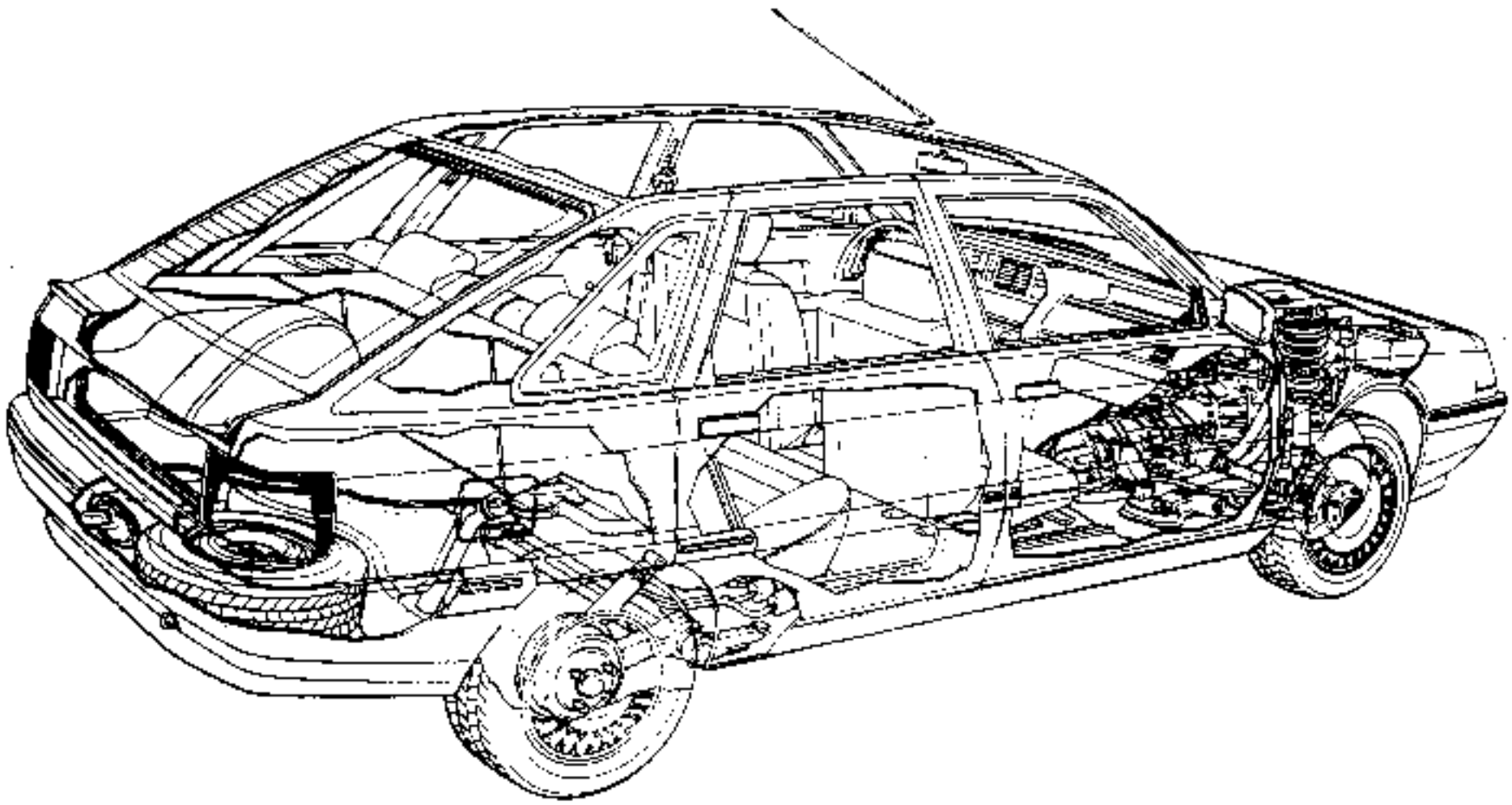
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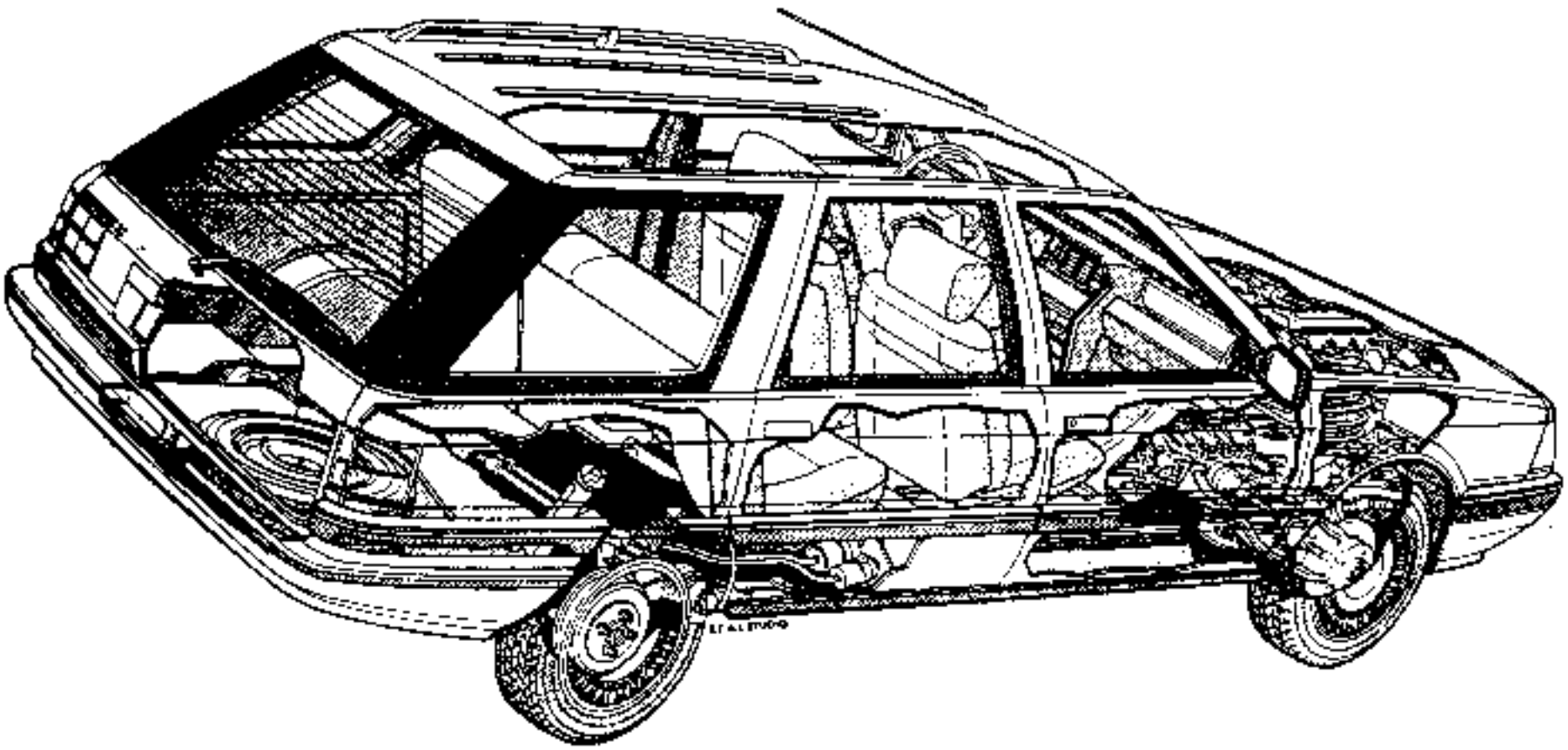
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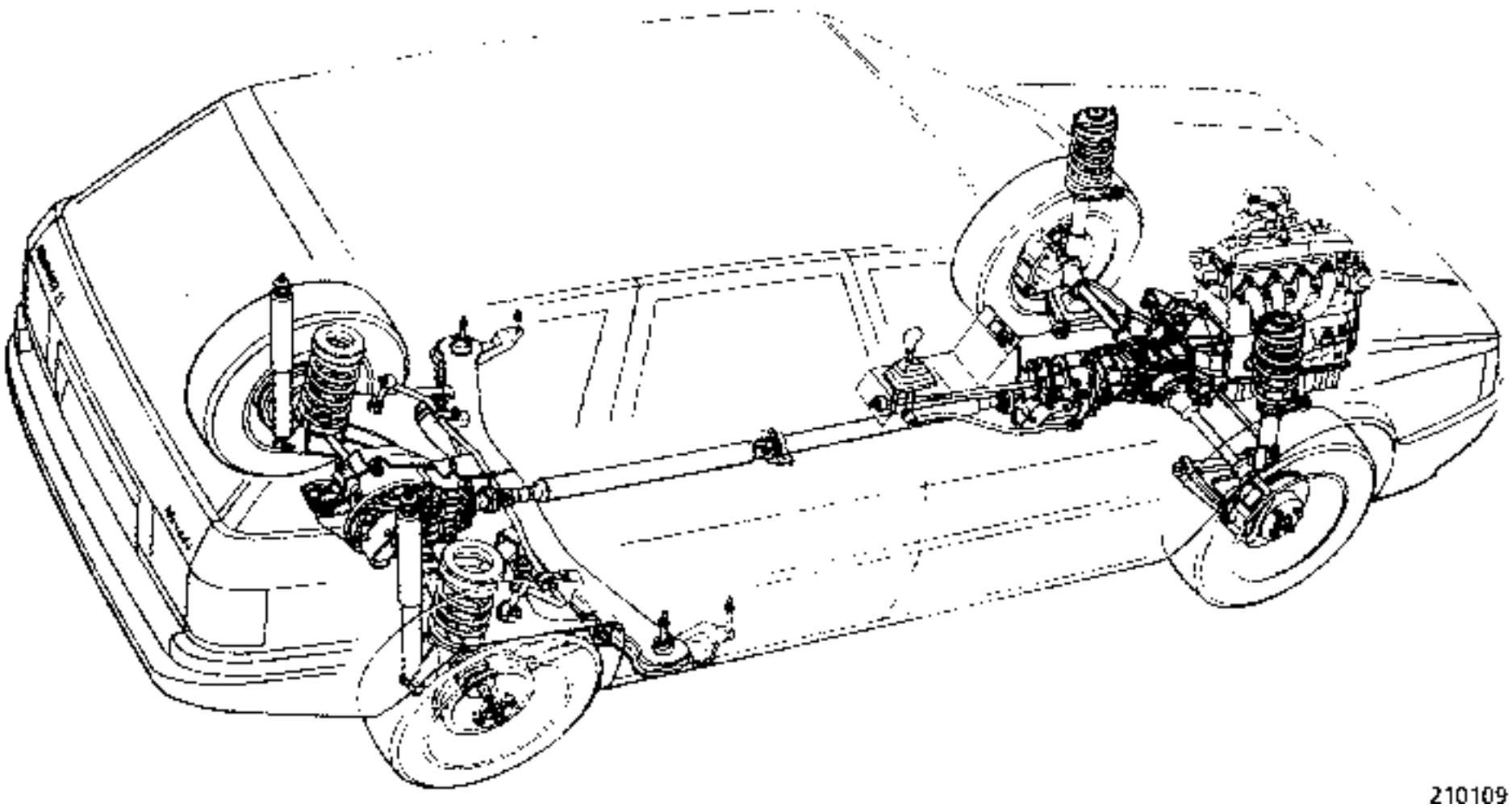
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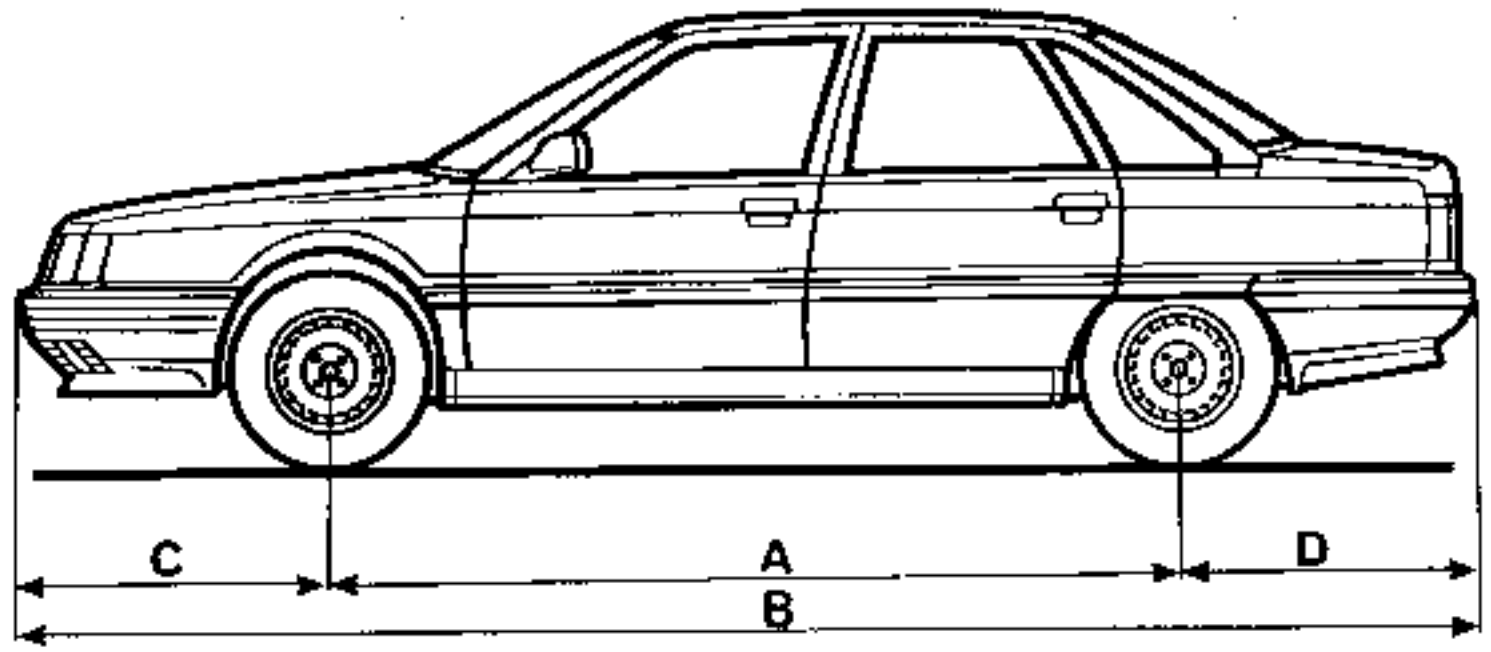
21D1D7

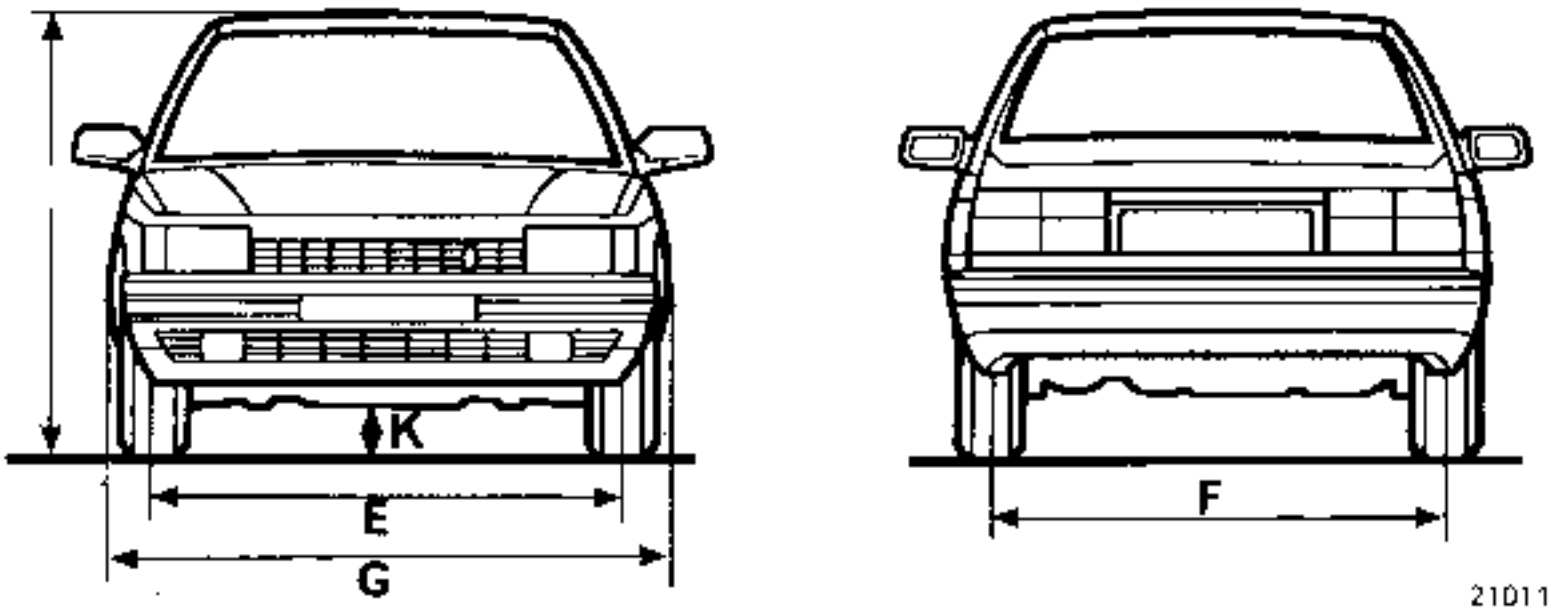


210108



210109

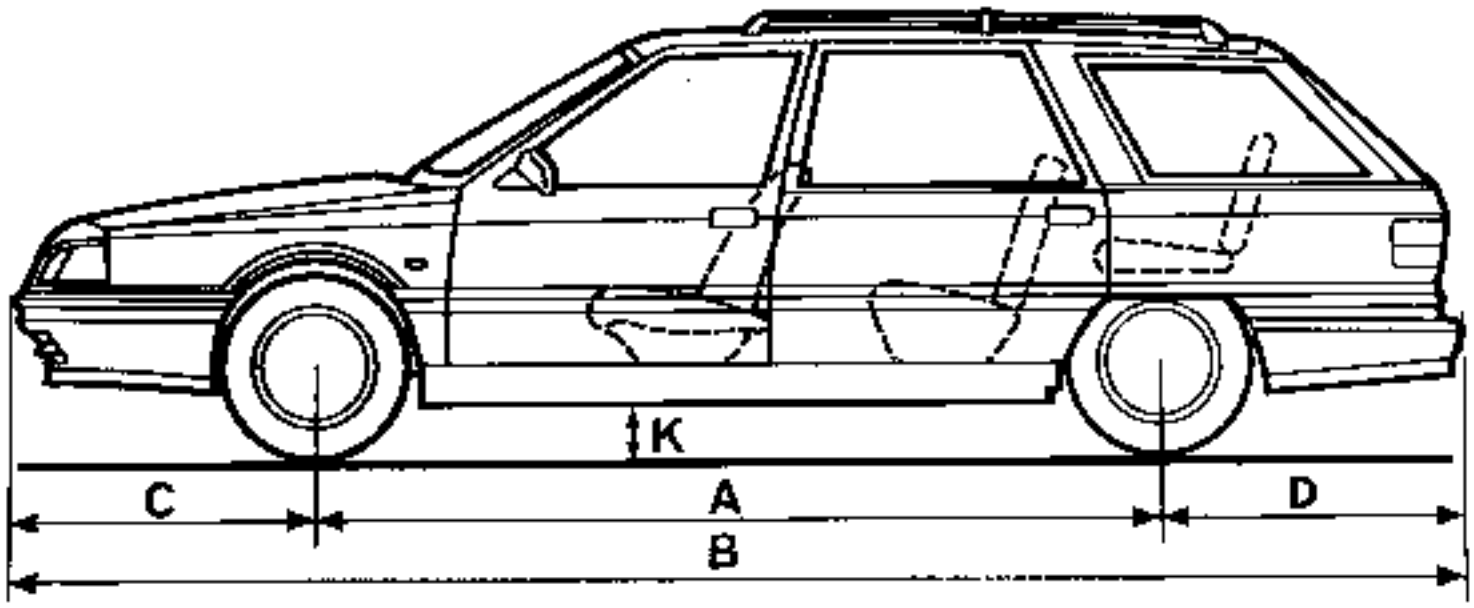


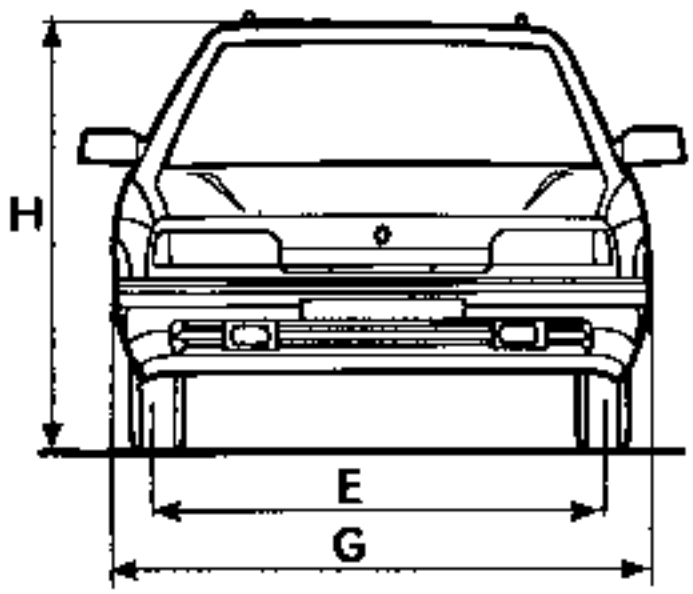


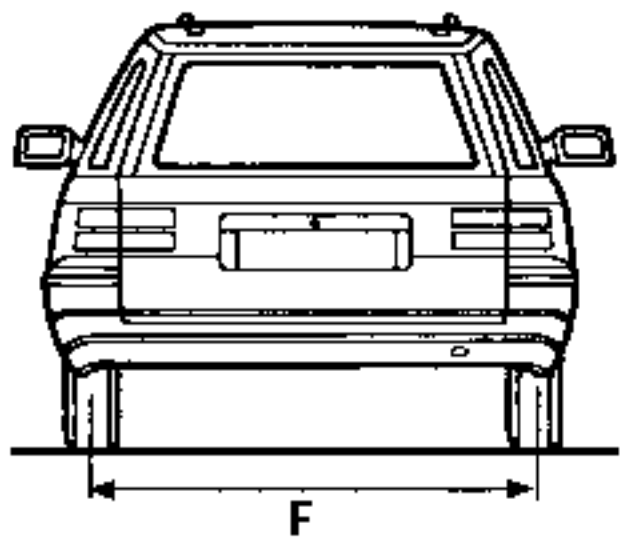
210110

VERSION		TL	TS	GTL	GTS	TSE	GTX	TI	TXE	2L Turbo	XD	GTD	Turbo D	Turbo DX
A	Wheelbase	2 659					2 600			2 597	2 600			
B	Overall length	4 462					4 465		4 462	4 498	4 462			
C	Front overhang	878					937			967	938		937	
D	Rear overhang	925					928		925	934	925			
E	Front track	1 429					1 454			1 450			1 455	
F	Rear track	1 402					1 406			1 402	1 406			
G	Overall width	1 706	1 715								1 706	1 715		
H	Height, unladen	1 414								1 385	1 414			
K	Ground clearance, laden	⇒ 120 laden												

Dimensions in mm



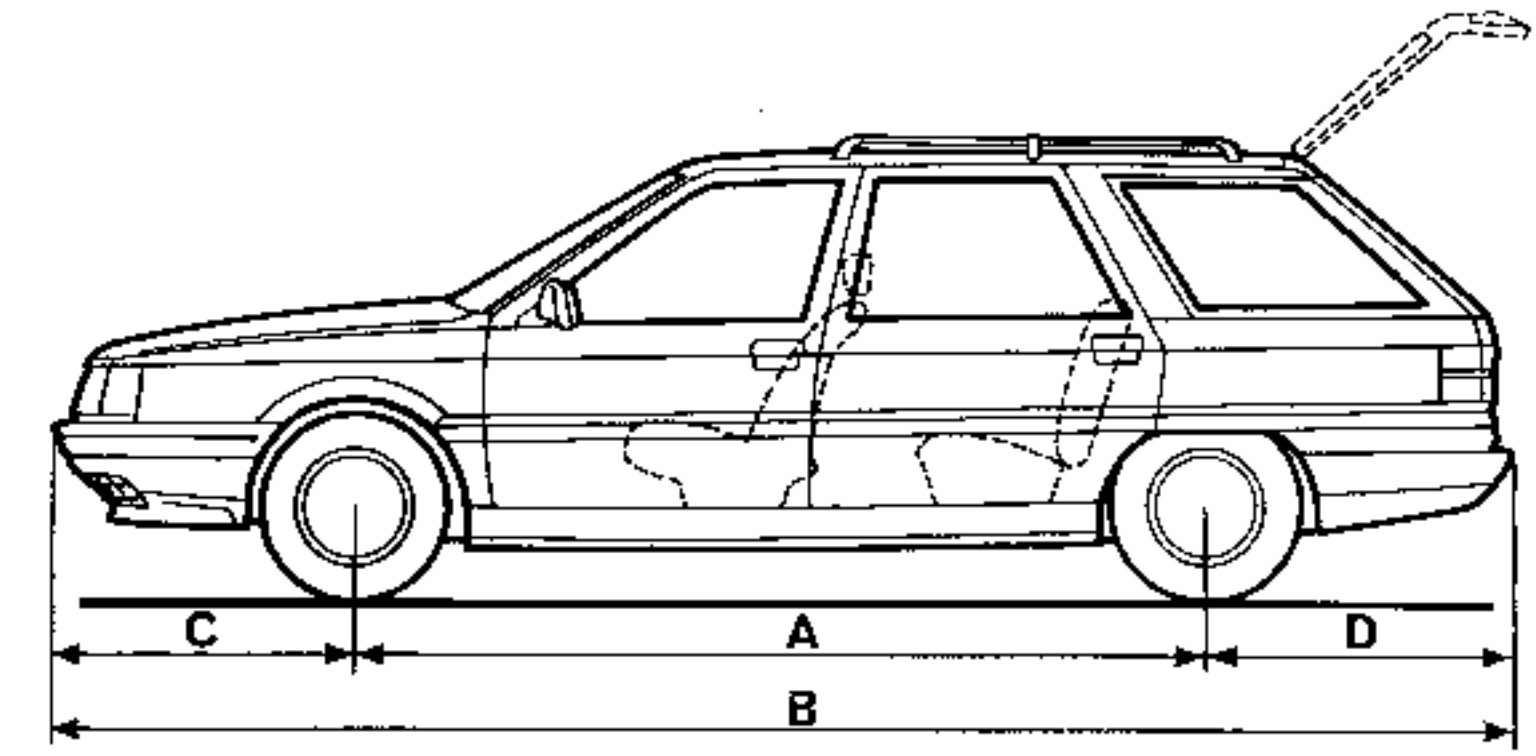


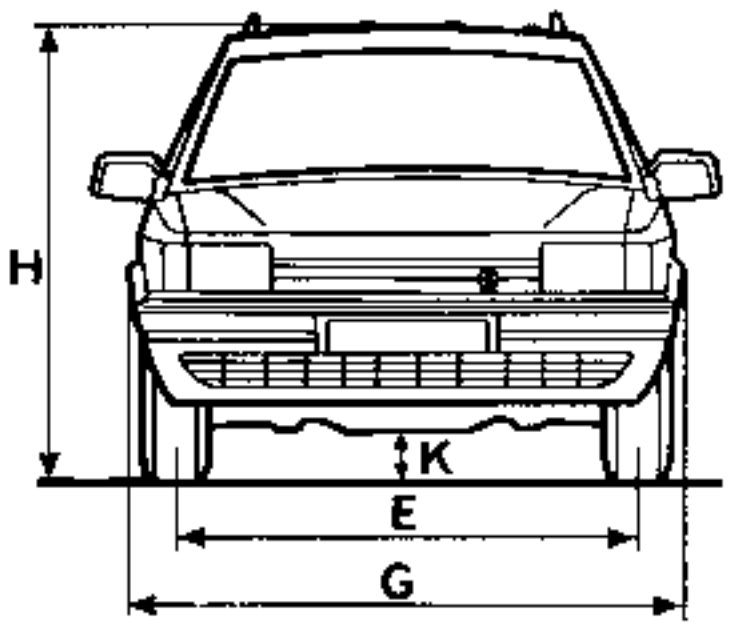


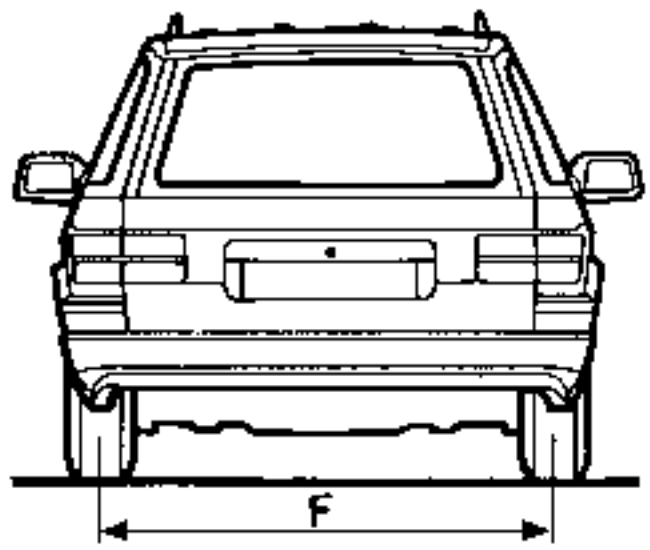
210111

VERSION		JL	GTL	TD	GTS	GTX	TXE	SD	GSD	TD	GTD	Turbo D	Turbo DX	GTX 4×4	GTX 4×4
A	Wheelbase	2 809				2 750		2 809		2 750				2 744	
B	Overall length	4 693													
C	Front overhang	925				984		925		984					
D	Rear overhang	959												965	
E	Front track	1 430				1 454		1 430		1 454					
F	Rear track	1 400 (1 408 with A.B.S.)												1 423	
G	Overall width	1 726													
H	Height, unladen	1 425 (1 427 - 5 seats)				1 430		1 425 (1 427 - 5 seats)		(Utility : 1 421) 1 430				1 450	
K	Ground clearance, laden	≥ 120													

Dimensions in mm



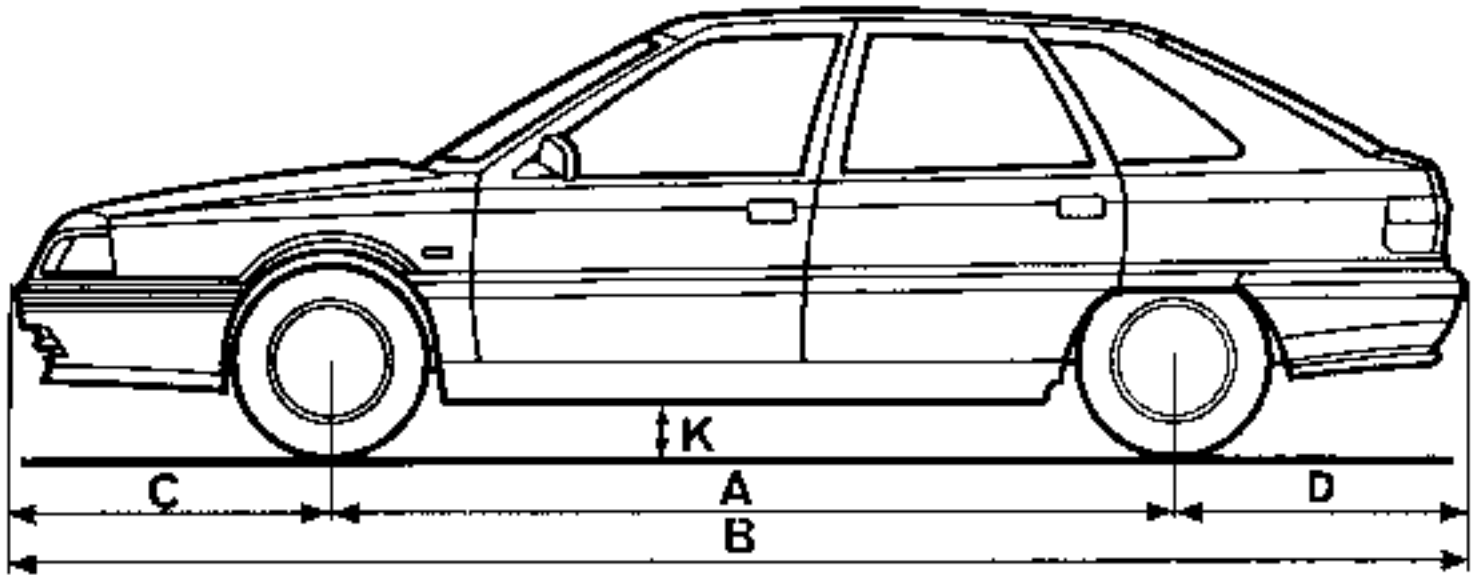


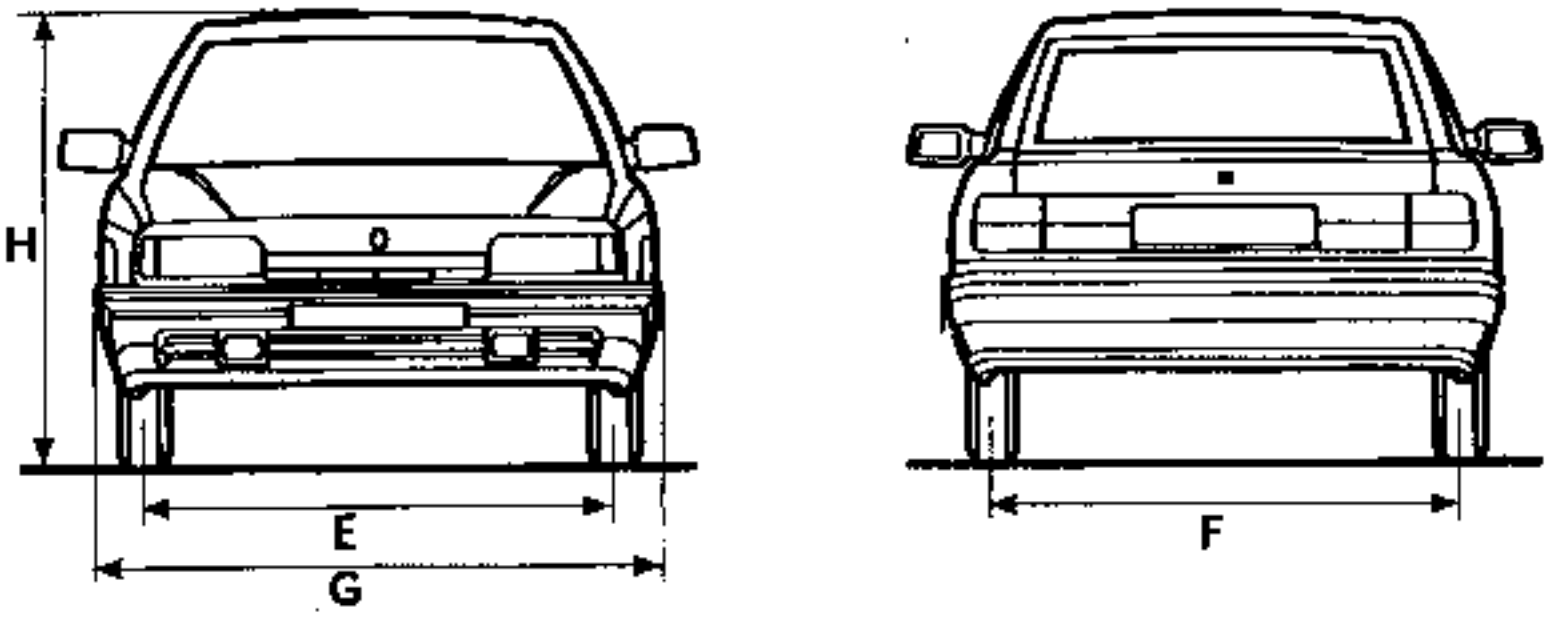


210112

VERSION	TL	TS	GTS	GTX	TXE	TD	GTD	Turbo D	Turbo DX	GTX 4×4	GTD 4×4
A Wheelbase	2 809			2 750						2 742	
B Overall length	4 644										
C Front overhang	878			937							
D Rear overhang	957									965	964
E Front track	1 429			1 454		1 449		1 454		1 454	1 449
F Rear track	1 406									1 423	
G Overall width	1 722										
H Height, unladen	1 427			1 430		1 421		1 430		1 440	1 431
K Ground clearance, laden	≥ 120										

Dimensions in mm.

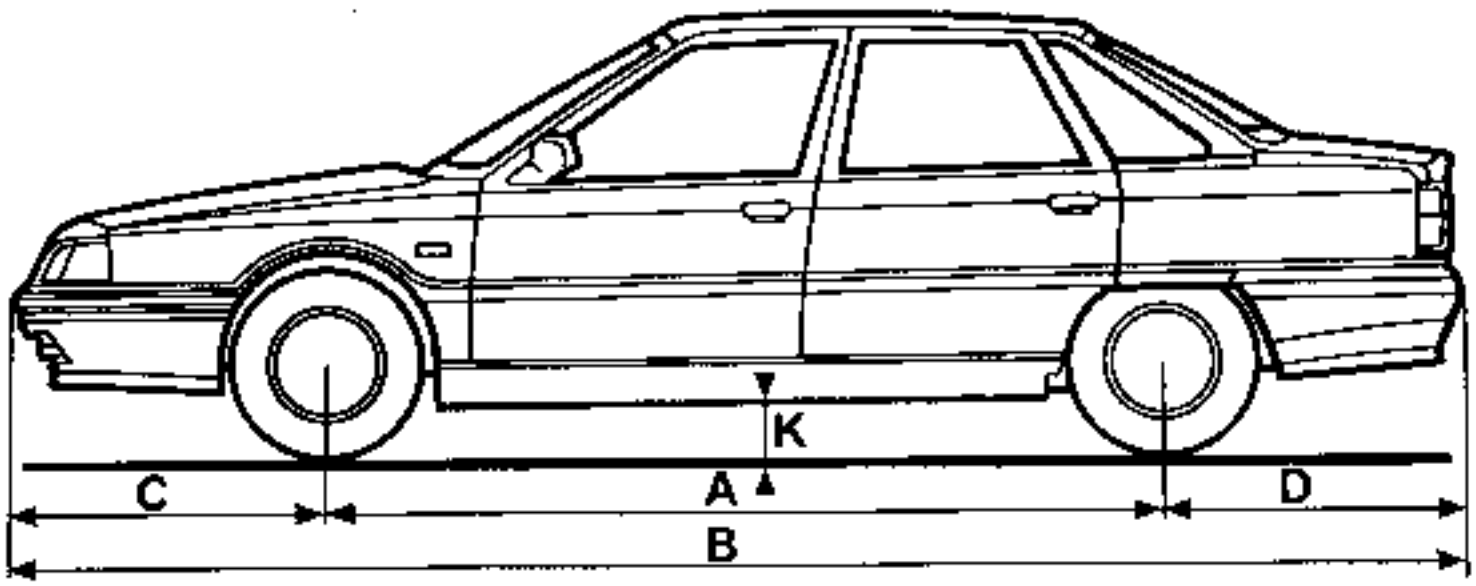


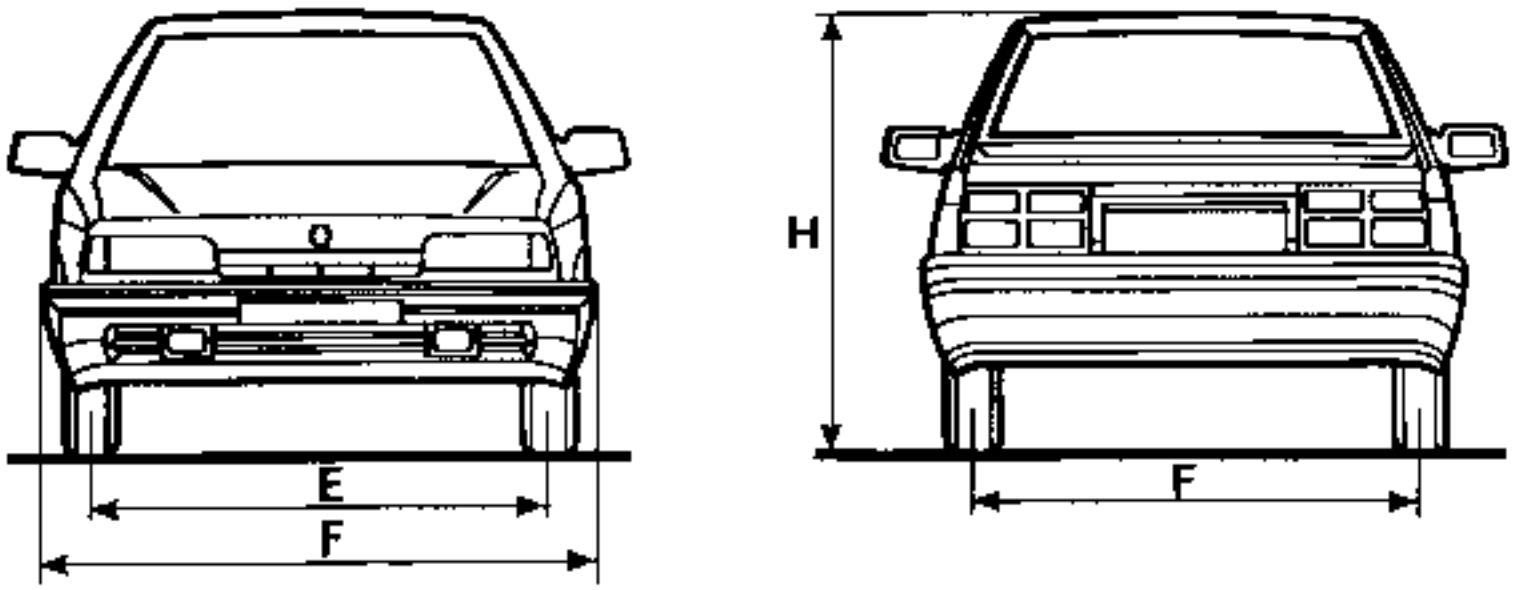


210113

VERSION	TL	GTL	TS	GTS	TSE	TX	GTX	TXE	TXI	SD	GSD	TD	GTD	Turbo D	Turbo DX	TXI 4×4
A Wheelbase	2 659					2 600				2 659		2 600				2 594
B Overall length	4 461															
C Front overhang	925					984				925		984				
D Rear overhang	877															883
E Front track	1 435					1 454				1 435		1 454				
F Rear track	1 400 (1 408 with ABS)															1 423
G Overall width	1 726															
H Height, unladen	1 400					1 390				1 395		1 390		1 385		1 425
K Ground clearance laden	≥ 120															

Dimensions in mm





210114

VERSION	TL	GTL	TS	GTS	TSE	TX	GTX	TXE	TXI	ZL Turbo	SD	GSD	TD	GTD	Turbo D	Turbo DX	TXI 4x4	ZL Turbo 4x4
A Wheelbase	2 659					2 600					2 659		2 600				2 594	2 590
B Overall length	4 528									4 510	4 528							4 510
C Front overhang	925					984				966	925		984					966
D Rear overhang	944																950	954
E Front track	1 435					1 454				1 445	1 435		1 454					1 445
F Rear track	1 400 (1 408 with ABS)									1 396	1 400 (1 408 with ABS)						1 423	
G Overall width	1 726									1 722	1 726							1 722
H Height, empty	1 415									1 385	1 415			1 400			1 425	
K Ground clearance,laden	≥ 120																	

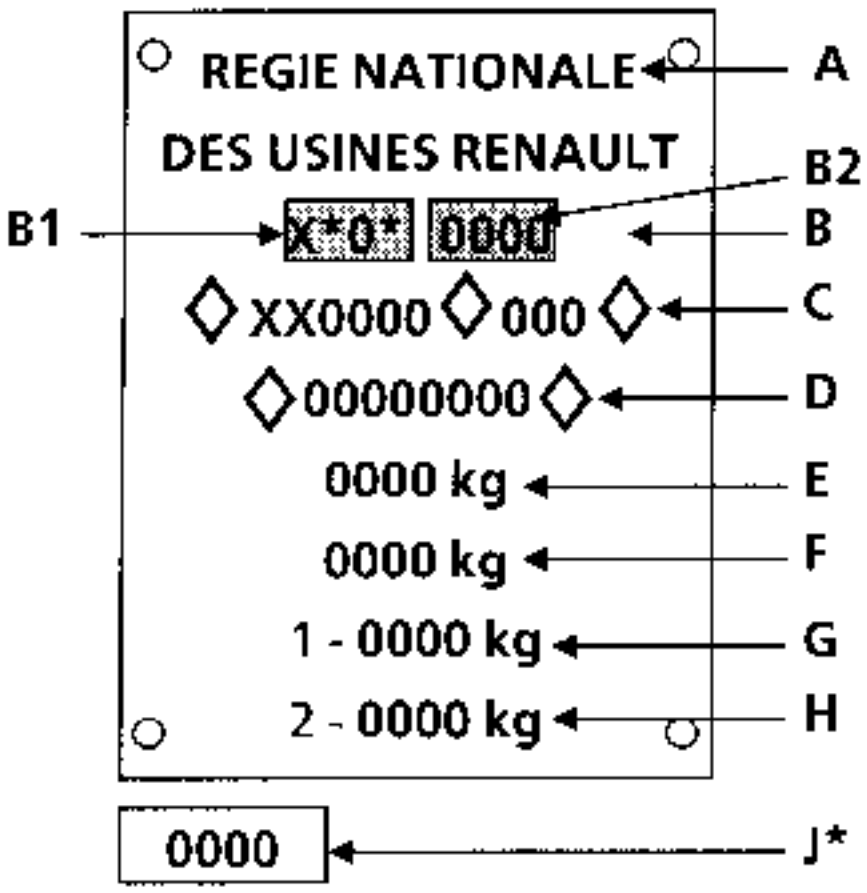
Dimensions in mm.

Vehicle type	Engine		Clutch type	Gearbox type
	Type	Capacity (cc)		
B/L/K 480	J8S	2068	200 CP 3 500	NG9
B/L/K/S 481	F2N	1721	200 CP 4 000 (or 425)	JB2 - JB3
B/L/K/S 482	F2N	1721	200 CP 4 000 (or 425)	JB2 - JB3
B/L/K 483	J7R	1995	215 DT 4 900 (or 475)	NG9
B/L/K 484	F2N	1721	200 CP 4 000	JB3
L 485	J7R Turbo	1995	235 CP 6 250	UN1 013
B/L/K/S 486	J8S	2068	200 CP 3 500 (or 375)	NG9
B/L/K 487	J8S	2068	215 DT 4 900	NG9
B/L/K 488	J8S Turbo	2068	215 DT 4 900 (or 475)	NG9
L 489	J6R	1995	215 DT 4 900 (or 475)	NG9
B/L/K 48 A	J8S	2068	215 DT 4 900	NG9
B/L/K 48 C	J7R	1995	215 DT 4 900	NG9
B/L 48 D	C2J	1397	180 CP 3 300	JB1
B/L/K 48 E	F3N	1721	200 CP 4 000	JB3
B/L/K 48 F	F3N	1721	200 CP 4 000	JB3
B/L/K/S 48 H/I	F8Q	1870	200 CPV 4 000	JB3
B/L/K 48 J	F2R	1965	200 CP 4 000 (or 425)	JB3
B/L/K 48 K	J7T	2165	215 DT 4 900	NG9
L 48 L	J7R	1995	235 CP 6 250	UN7
L/K 48 M	F2N	1721	200 CP 4 000	JB3
L/K 48 N	F2N	1721	200 CP 4 000	JB3
B/L/K 48 O	J8S	2068	200 CP 3 500	NG9
B/L/K 48 P	J8S	2068	215 DT 4 900	NG9
B/L 48 Q B/L 48 Y	J7R 12S	1995	215 CP 4 500	NG9
B/L/K 48 R	J7R	1995	215 DT 4 900	NG9 - UN7
B/L/K/S 48 V	J8S –	2068	200 CP 3 500	NG9
B/L/K 48 W	J8S Turbo	2068	215 DT 4 900	NG9
K 483 : 4 x 4	J7R	1995	215 DT 4 900	NG7
K 486 : 4 x 4	J8S	2068	200 CP 3 500	NG7
K 48 K : 4 x 4	J7T	2165	215 DT 4 900	NG7
B/L/K 483 AT	J7R	1995	Converter	MJ3 AR4
B/L/K 48K AT	J7T	2165	Converter	MJ3 AR4
L 489 AT	J6R	1995	Converter	MJ3
B/L/K/S 482 AT	F2N	1721	Converter	AD4
B/L/K 48 E AT	F3N	1721	Converter	AD4
B/L/K 48 C AT	J7R	1995	Converter	AR4

Equipment version numbers

	Good road		Poor road		Special equipment	
Up to JUNE 89	LH drive series 100	RH drive series 600	LH drive series 200	RH drive series 700	LH drive series 200	RH drive series 700
	Good road				Cross country	
Since JUNE 89	LH drive series 10 to 49	RH drive series 70 to 89			LH drive series 50 to 69	RH drive series 90 to 99

The vehicle is identified by one or two plates: one rectangular plate and one oval plate on the front RH shock absorber turret



Rectangular plate*

This shows :

At A : The manufacturer's name

At B : The EEC type approval number comprising:

- At B1 : The identification number for the country that granted EC type approval
- At B2 : The type approval number associated with the French type code

At C : The vehicle type code preceded by the manufacturer's worldwide identification code (for example, VF1 is Renault France)

At D : Chassis number

At E : Maximum permissible weight

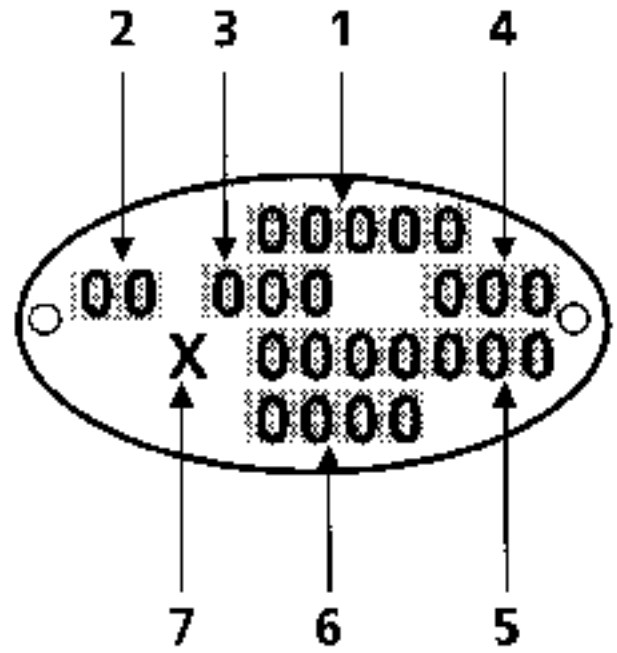
At F : The total train weight

At G : Maximum permissible front axle loading

At H : Maximum permissible rear axle loading

At J*: The model year or the paint identification code

*** Note**: The plate shown above is in its most complete form. Certain of these items may not be displayed on some export models.



OVAL PLATE

This shows:

At 1 : The vehicle type

At 2 : Any special features*

At 3 : The basic equipment version*

At 4 : Options

At 5 : The fabrication number

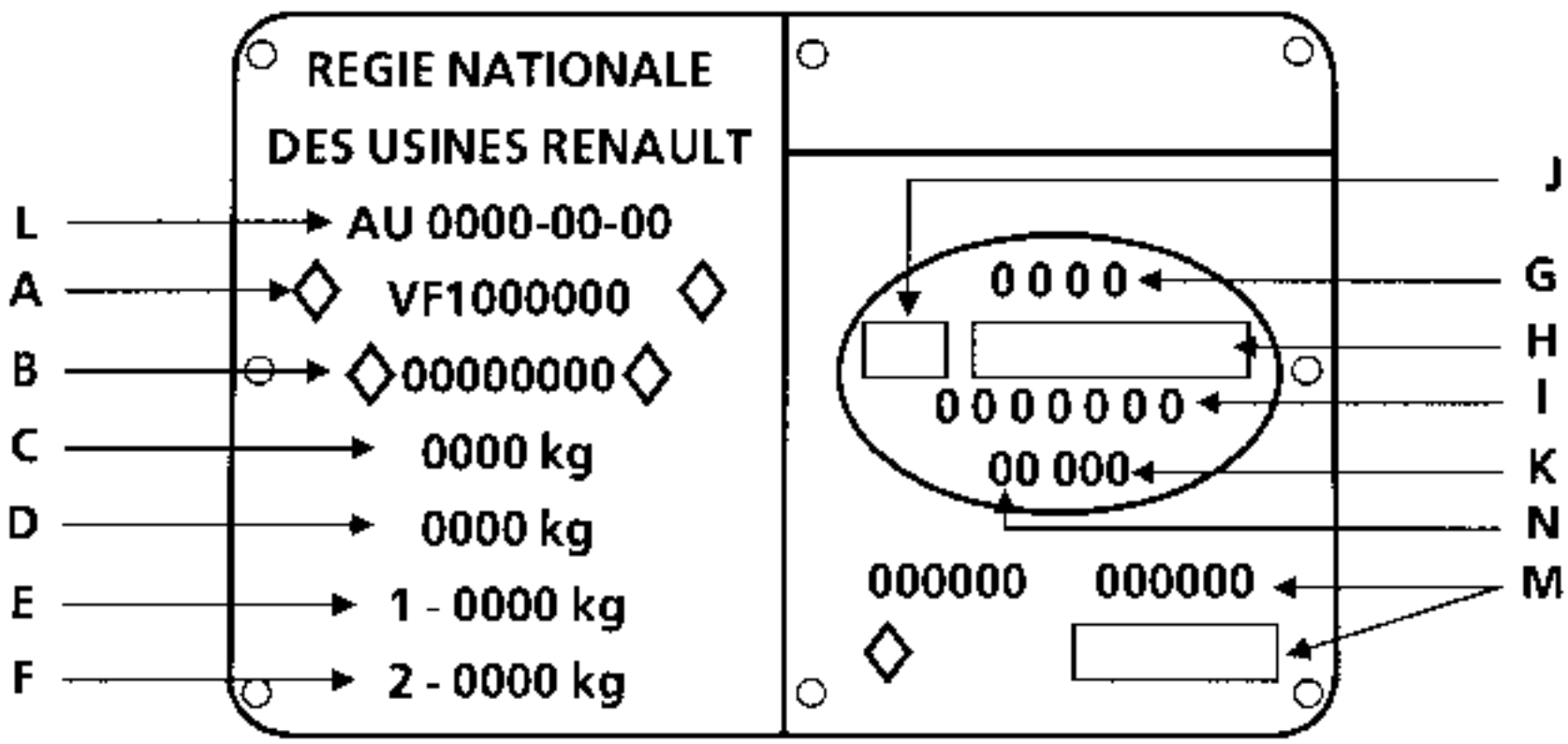
At 6 : The model year* or paint identification code*

At 7 : The factory at which the vehicle was assembled.

- A Portugal
- B Batilly
- C Creil
- D Douai
- E Spain
- F Flins
- G Grand Couronne
- G Yugoslavia
- H Haren
- J Billancourt
- K Dieppe
- Q A.M.C.
- S Sandouville
- T Matra
- U Maubeuge
- W Ireland
- X Heuliez

* DEPENDING ON THE COUNTRY OR VERSION.

Single plate* until 1991 model

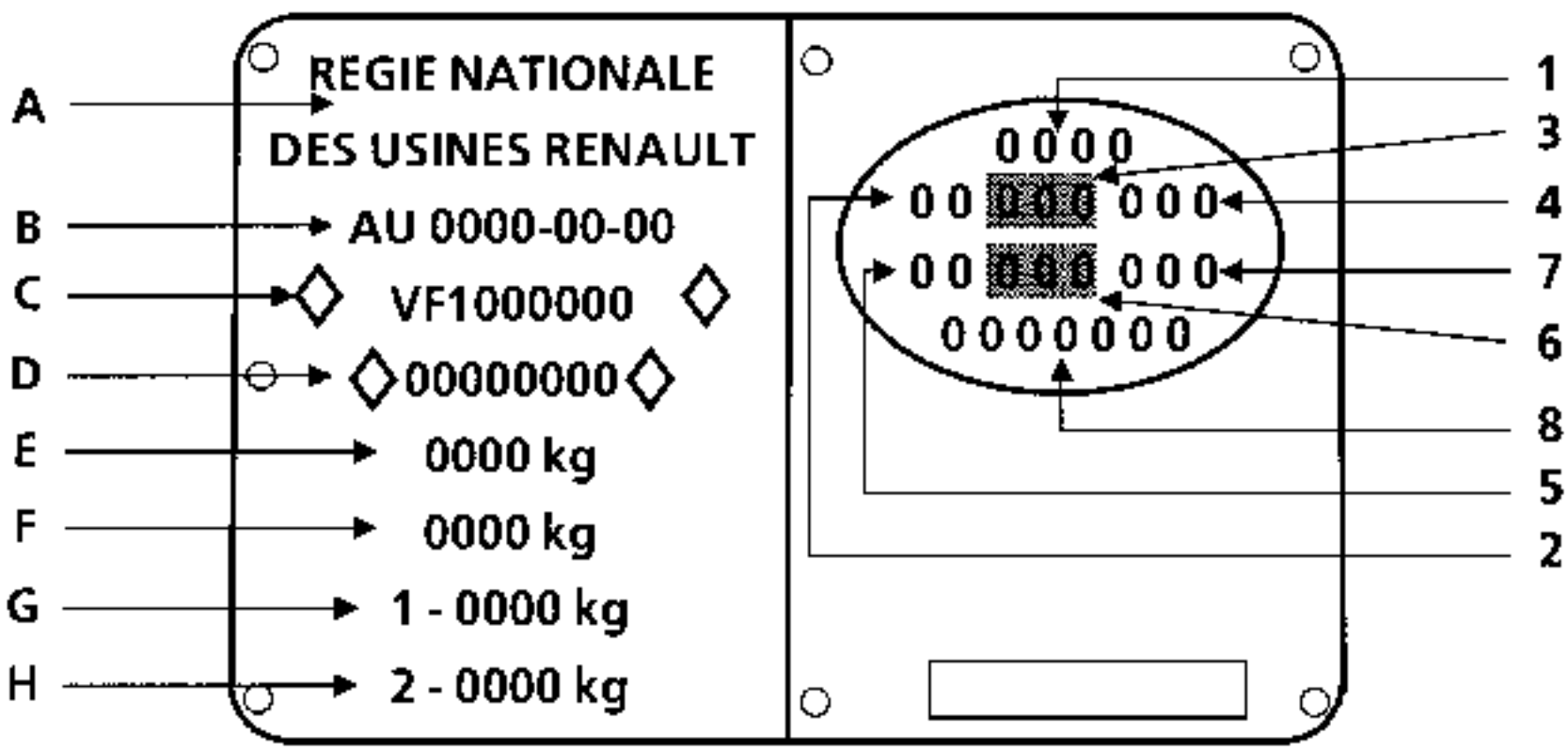


It shows:

At A : The vehicle type code (VF1 corresponds to Renault France)
At B : The chassis number
At C : The maximum permissible weight (GVW)
At D : The total train weight (TTW)
At E : The maximum permissible front axle loading
At F : The maximum permissible rear axle loading
At G : The vehicle type number
At H : The equipment version and option number
At I : The fabrication number
At J : Any special features
At K : The original paint reference code *
At L : The EC type approval number
At M : Any additional inscriptions
At N : Trim code (optional).

* Certain of these items of information may not be displayed on some export models.

Single plate* from the 1992 model onwards



This shows :

At A : The manufacturer's name
At B : The EC type approval number
At C : The vehicle type code preceded by the manufacturer's world-wide identification code (for example, VF1 is RENAULT FRANCE),
At D : The chassis number
At E : The maximum permissible weight (GVW)
At F : The total train weight (TTW)
At G : The maximum permissible front axle loading
At H : The maximum permissible rear axle loading
At 1 : The vehicle type
At 2 : The first figure indicates the gearbox or heavy options,
the second figure shows the equipment level
At 3 : The technical equipment number
At 4 : Optional factory fitted equipment
At 5 : Trim code
At 6 : Paint reference code
At 7 : The equipment level
At 8 : A letter indicating the factory of manufacture followed by the fabrication number.

IMPORTANT: The seven characters in the fabrication number cannot be split. For vehicles manufactured before this date the fabrication number contains seven figures.

* Certain of these items of information may not be displayed on some export models.

ESSENTIAL SPECIAL TOOLS	
Cha. 280-02	**Pad for fitting trolley jacks**
Cha. 408-02	**Socket for fitting to trolley jack**

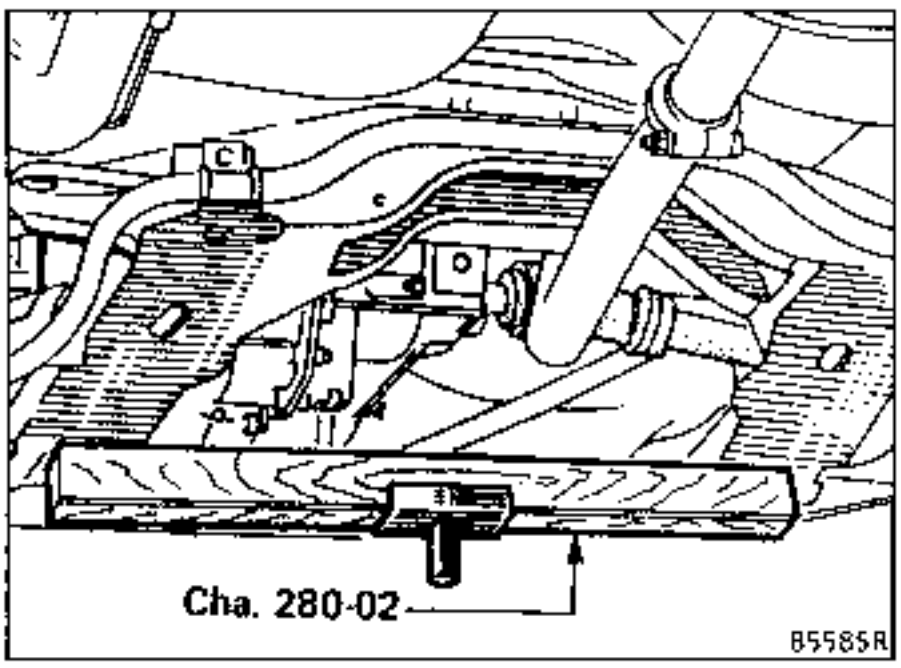
It is forbidden to lift the vehicle by taking the load under the front suspension arms. If necessary, fit socket **Cha. 408-02** to the trolley jack as an adaptor for pad **Cha. 280-02**.

LIFTING WITH A TROLLEY JACK FROM THE FRONT

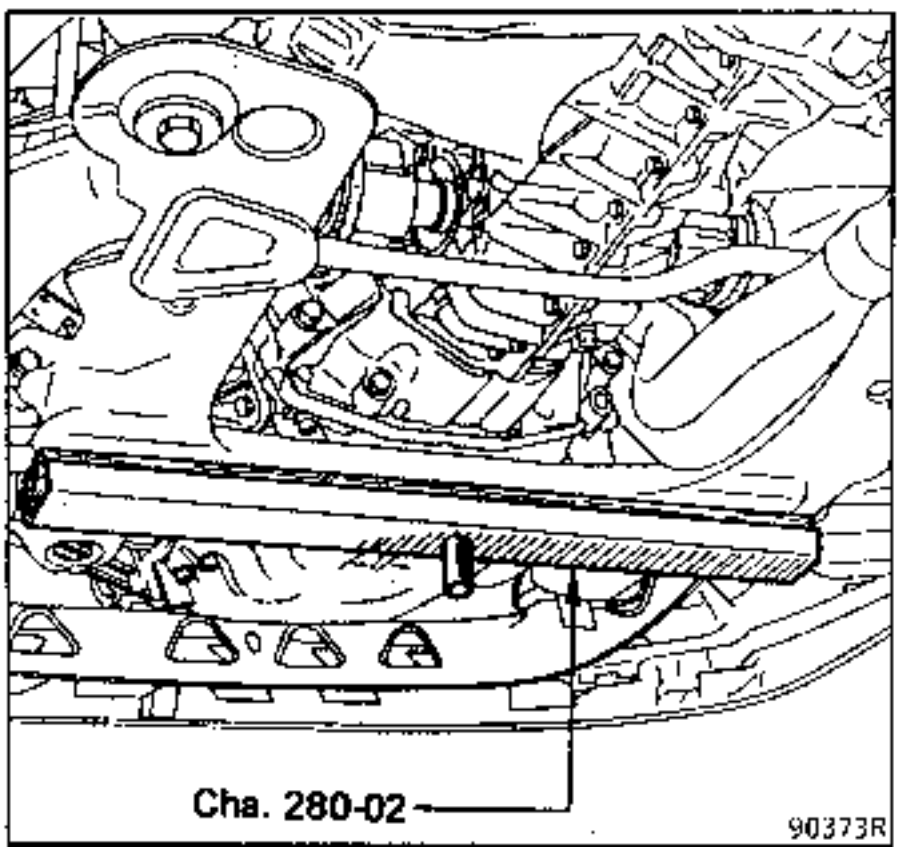
Apply the handbrake or place chocks behind the rear wheels.

Use pad **Cha. 280-02**.
Take the load under the front sub-frame.
Ensure that the pad does not touch the gearbox or the exhaust downpipe.

Transverse engines



Longitudinal engines

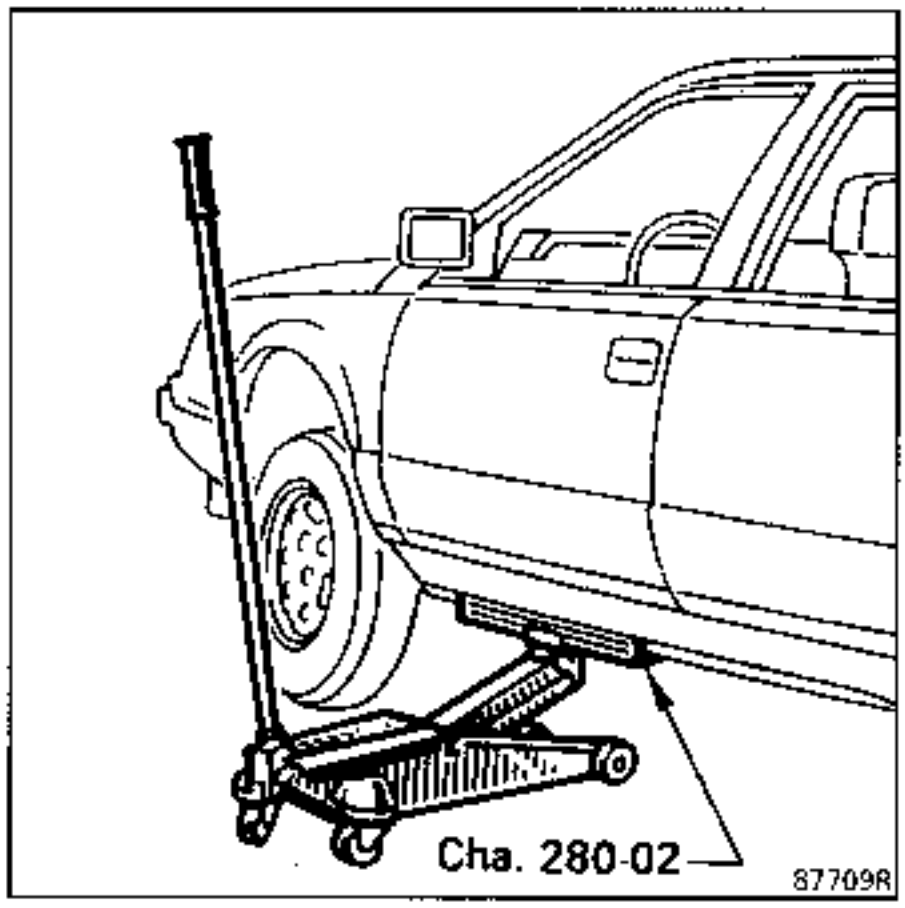


LIFTING WITH A TROLLEY JACK FROM THE SIDE

Use pad **Cha. 280-02**.

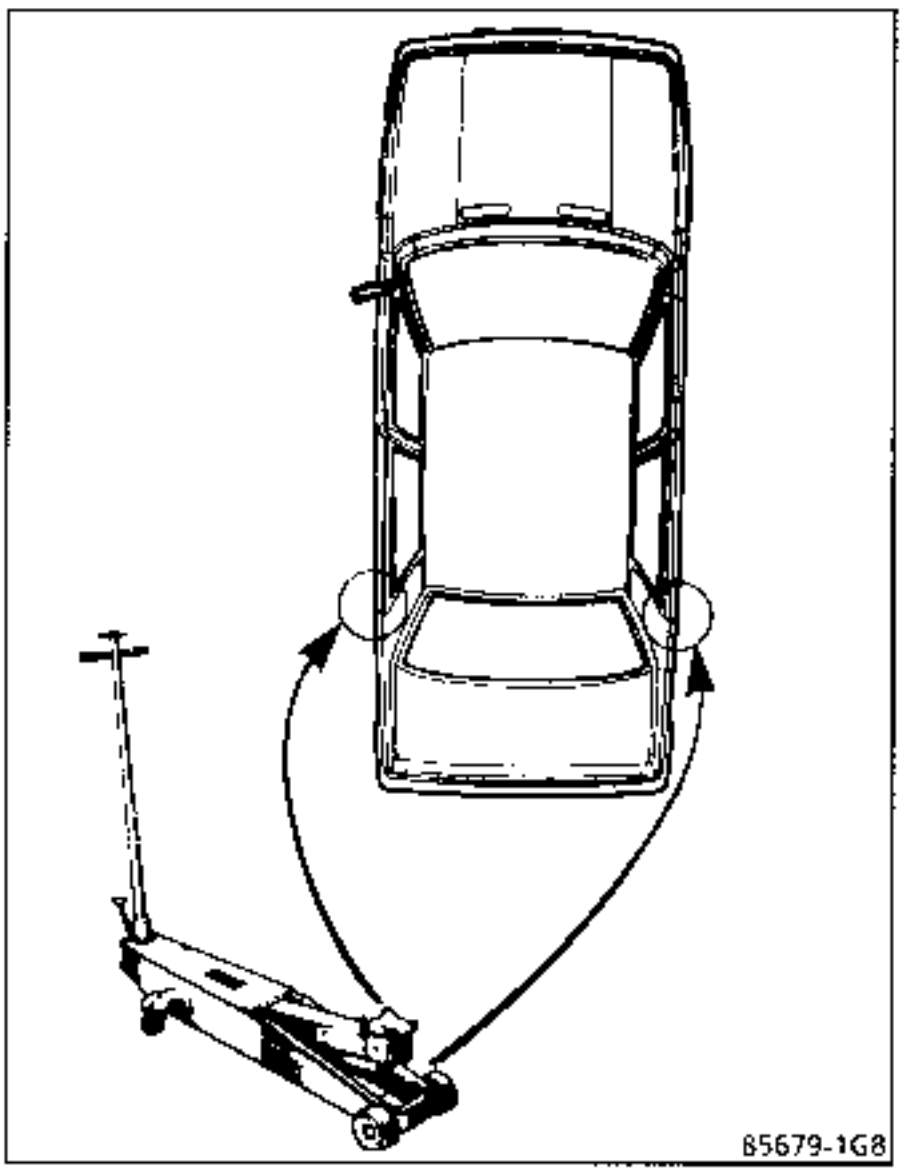
Take the load on the body sill under the front door.

Ensure that the **body sill** flange **is located** in the slot in the pad.

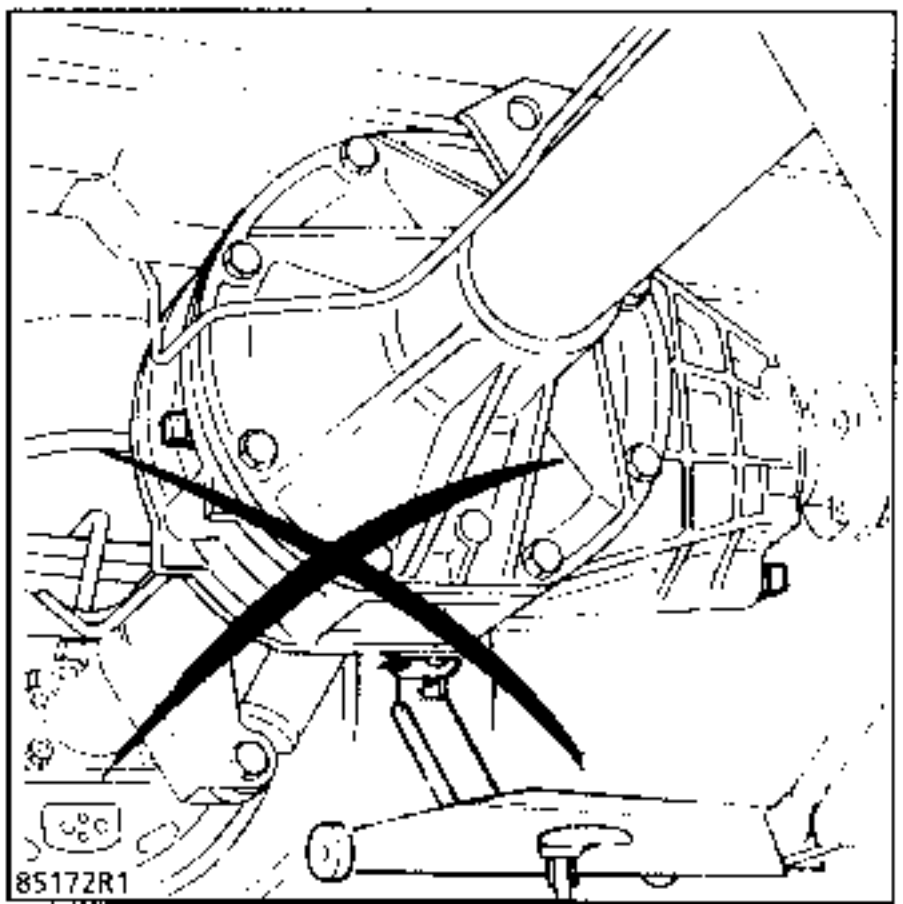


LIFTING WITH A TROLLEY JACK FROM THE REAR

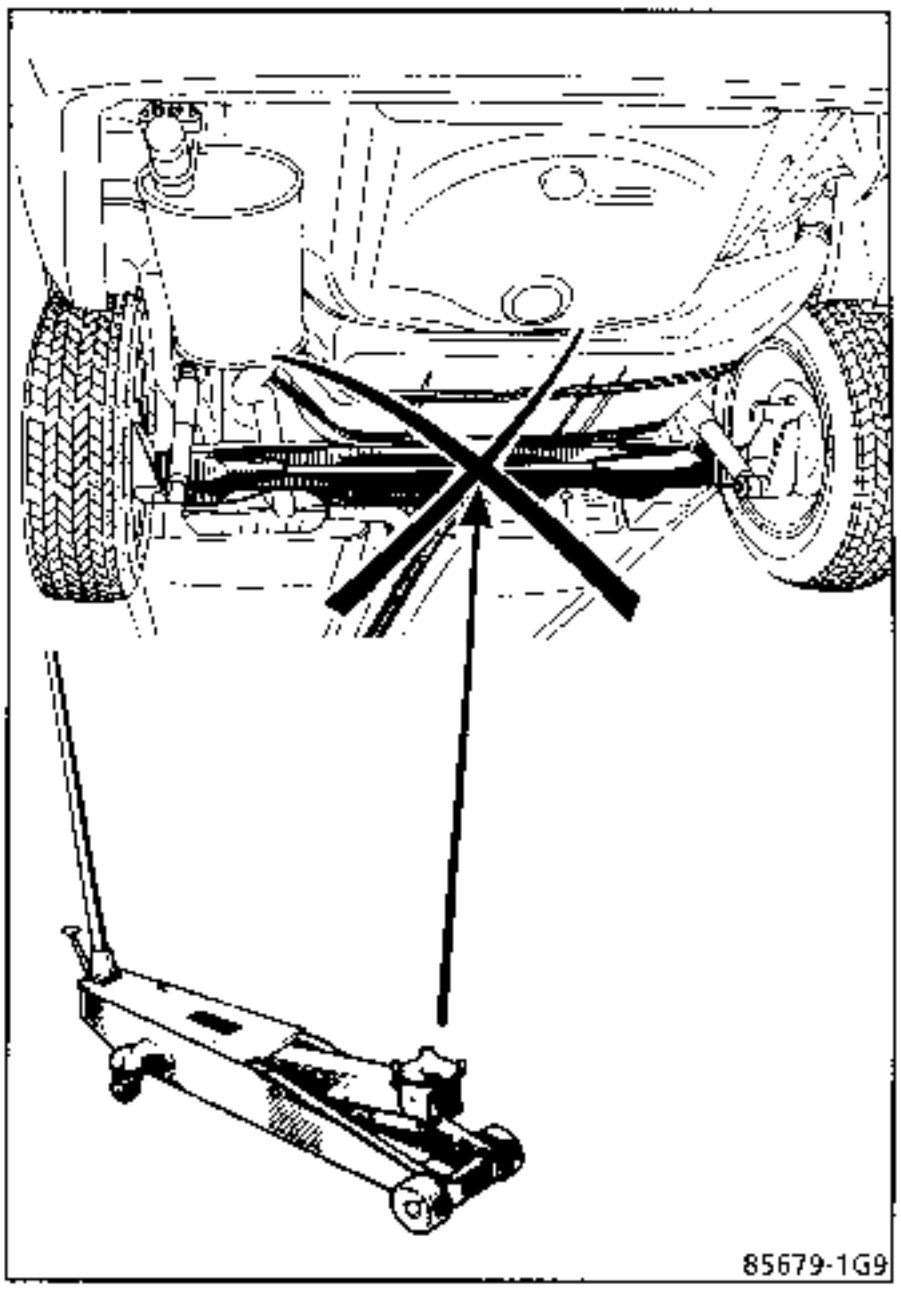
It is **FORBIDDEN** to lift the rear of the vehicle taking the load under the rear axle. Lift each wheel separately, taking the load at the jacking points provided for the vehicle jack.



NEVER LIFT A VEHICLE BY TAKING THE LOAD UNDER THE FINAL DRIVE UNIT

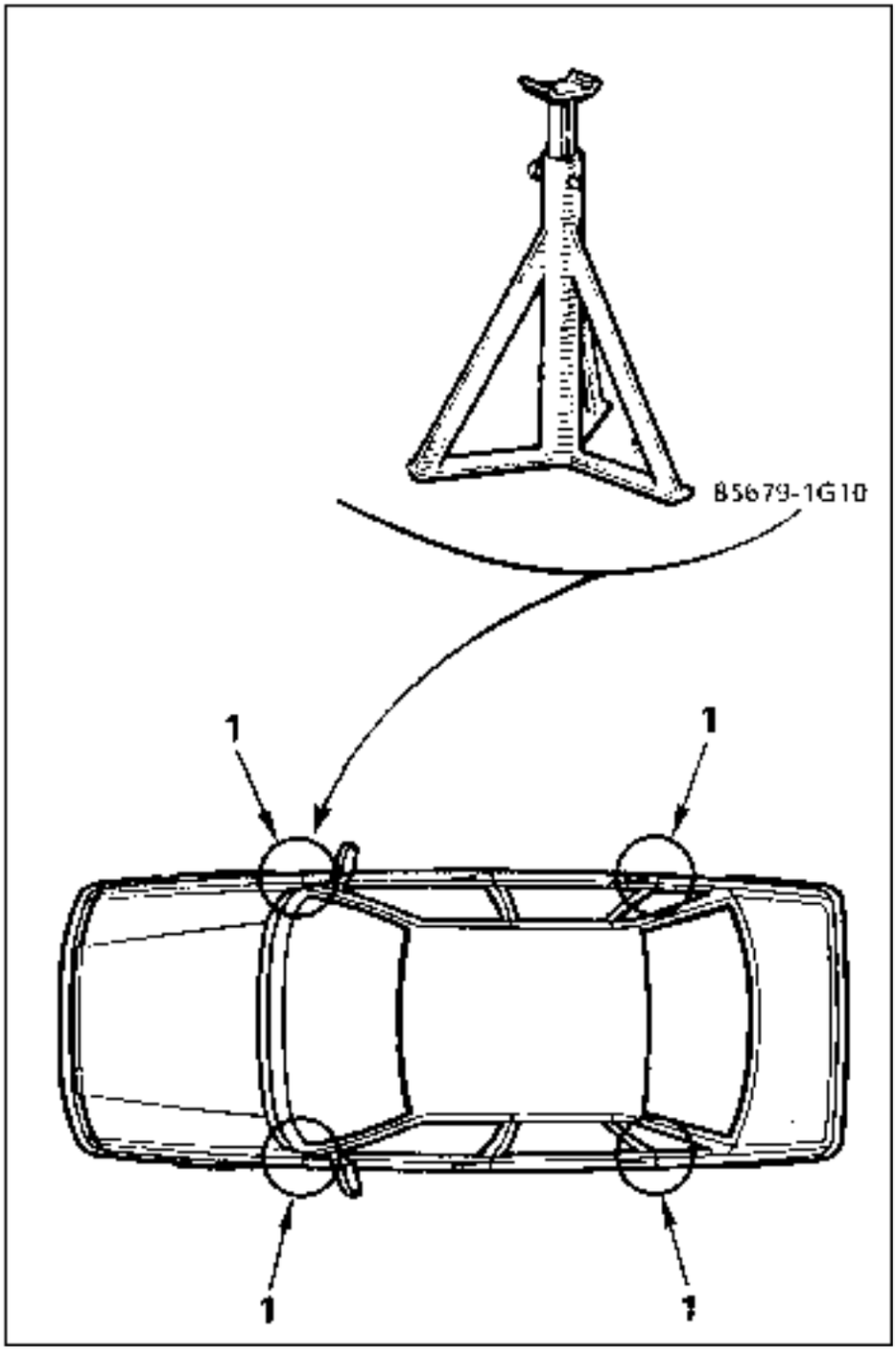


It is **FORBIDDEN** to place the jack under the rear axle V section to lift the vehicle .



If the vehicle is to be supported on stands they must be placed under the jacking points (1) provided for lifting the vehicle with its own jack.

Place the stands under the rear of the vehicle by lifting it from the side.



SAFETY INSTRUCTIONS

Several sets of circumstances must be considered:

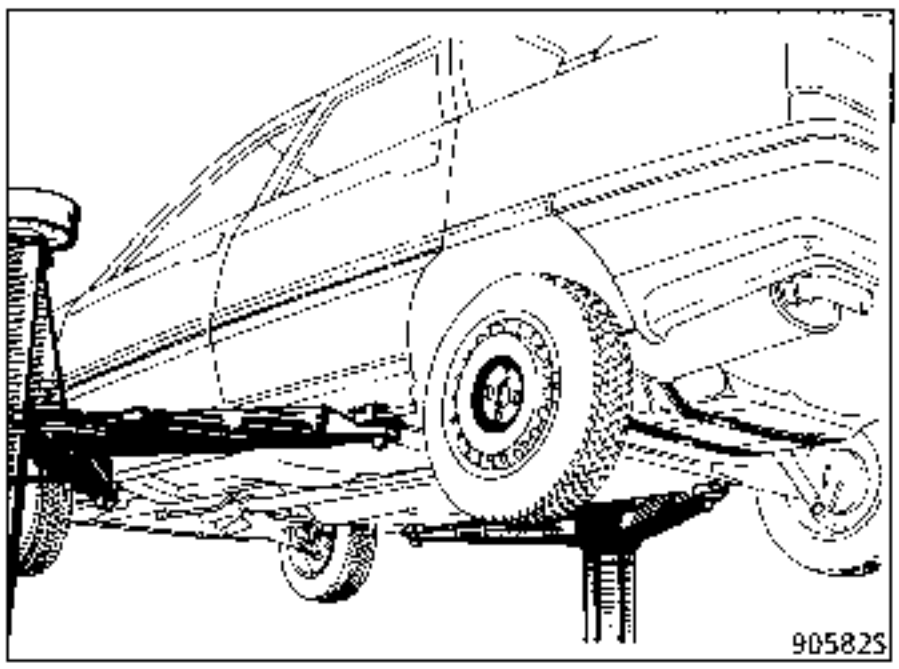
1. SPECIAL CASE OF REMOVING - REFITTING POWER UNIT ASSEMBLY STILL SECURED TO ITS SUB-FRAME

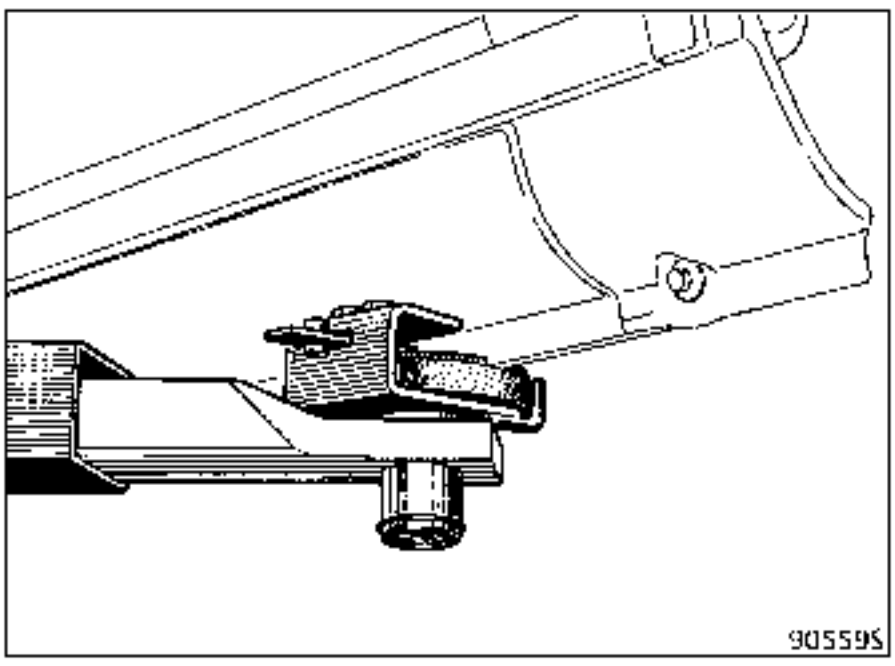
Before all else, could you please note that this operation **is only to be carried out** if **body repair operations re**quire it (replacing a side member for example, that is to say if the vehicle is to be mounted on the jig bench).

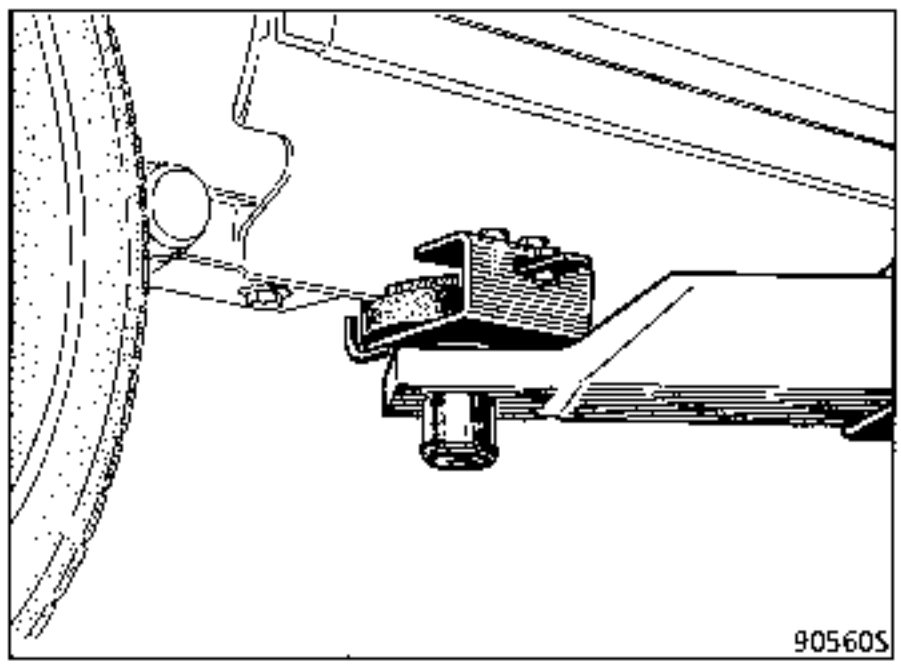
In this specific case, **the vehicle body must first** be secured to the arms of the two column lift.

The FOG company markets a set of special pads for this purpose.
Part No. FOG 449 B111 - 449 8411.
or CHEMICO, Part No. 39 2550 0001
or SCHENCH, Part No. 776 6B4

These must be placed under the jacking points and clipped into the apertures in the body sill flanges.







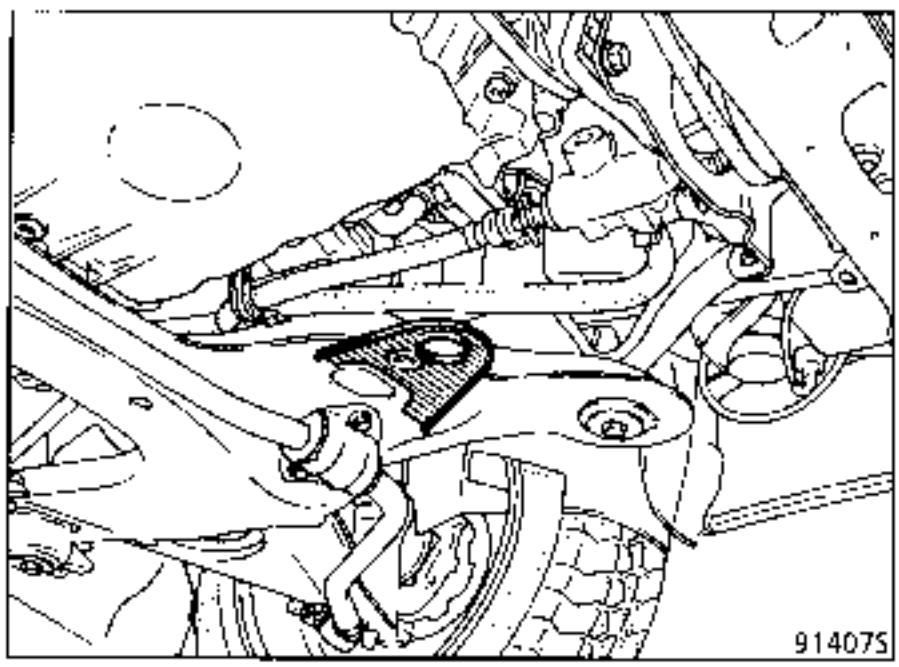
2. FOR ALL OTHER CASES OF LIFTING THE VEHICLE (carrying out operations under the vehicle without removing component units)

The lifting pads must **always** be placed **under the vehicle jacking points.**

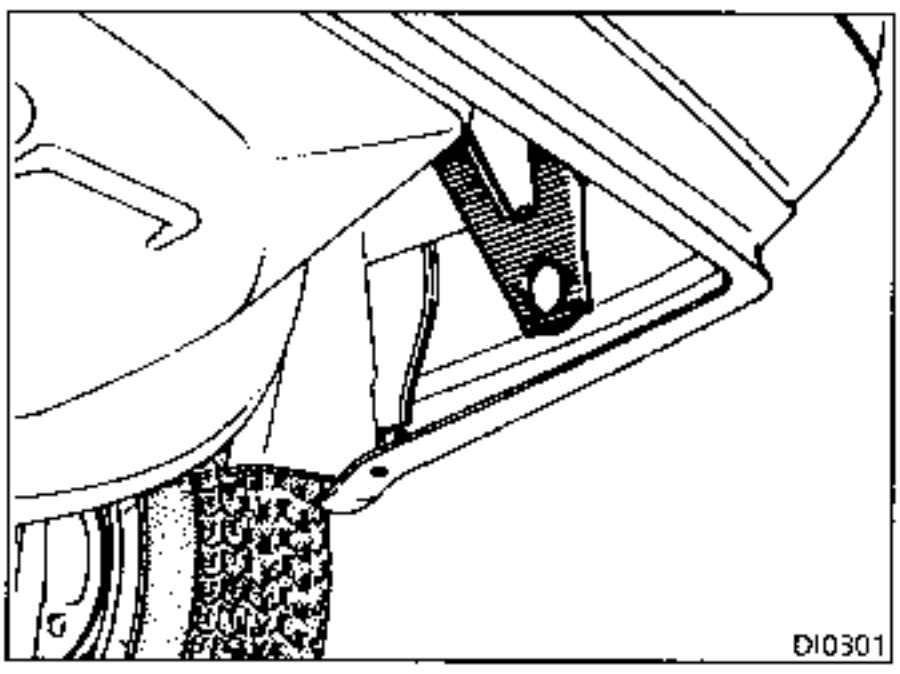
IMPORTANT: *Take great care when positioning the front right-hand pad to avoid damaging the fuel pipes (which are inside the black plastic cover).*

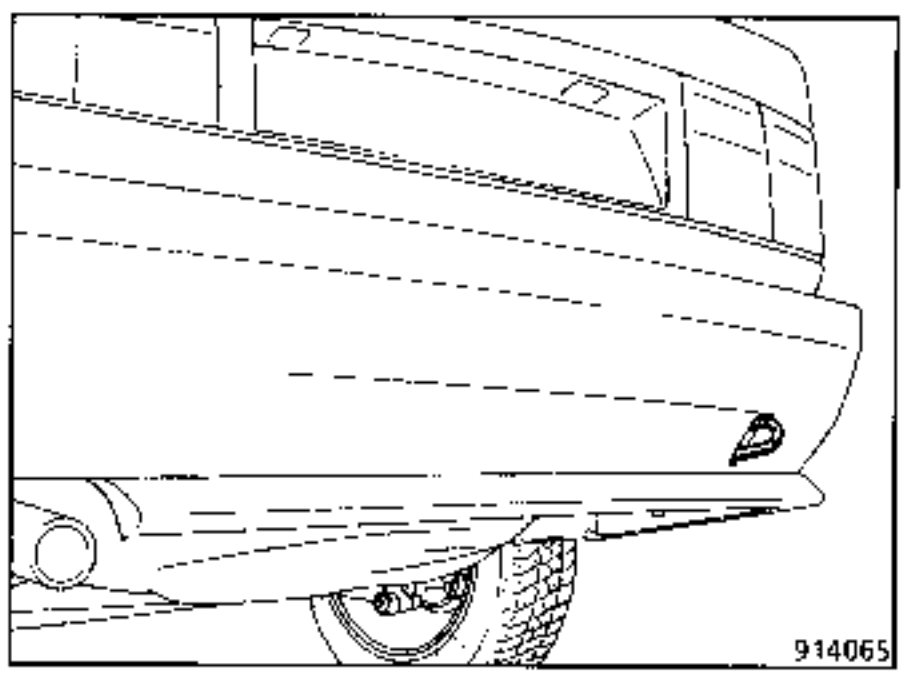
The towing eyes are only to be used for towing the vehicle on the road. Under no circumstances are they to be used to pull the vehicle out of a ditch or for any other similar operation. Neither are they to be used for lifting the vehicle, either directly or indirectly.

FRONT



REAR





The design of this vehicle (the fact that there is a permanent drive to all four wheels without any possibility of disconnecting it) means that the front and the rear wheels must always turn at roughly the same speed: **if not, THE VISCOUS COUPLING MAY BE IRREPARABLY DAMAGED.**

This is why, in the case of breakdown, THE VEHICLE **MUST BE TRANSPORTED :**

- **ON A PLATFORM (with all four wheels stationary),**
- **BY TOWING, ON ALL FOUR WHEELS (if such an operation is authorised by the regulations of the country concerned).**

IT IS FORBIDDEN TO TOW THE VEHICLE :

- WITH THE REAR AXLE LIFTED.
- WITH THE FRONT AXLE LIFTED.

ATTENTION :

If, for any exceptional reason, it must be towed with the front wheels lifted, IT IS ESSENTIAL FIRST TO REMOVE THE LONGITUDINAL TRANSMISSION SHAFT (see section 29).

Conventional 4 × 4 : when towing this type of vehicle, the differential must be in the unlocked position. It is preferable to deliver the vehicle in the 4x2 configuration.

WHEN THE VEHICLE IS BEING DRIVEN

The automatic transmission is pressure-lubricated and therefore is only lubricated if the engine is running.

Consequently, there is a risk of serious damage to the transmission if the following instructions are not observed:

- Never allow the vehicle to coast with the ignition switched off (down an incline, for example). We cannot emphasise enough the dangers of such a practice.
- Never push the vehicle (for example, to a filling station) without first taking the precautions described in the section "Towing the vehicle".

Furthermore, as the wheels are only driven when the engine is running, it is impossible to start an automatic transmission vehicle by pushing it.

Neither must the wheels be dynamically balanced whilst still on the vehicle.

TOWING

The front of the car must be lifted. If this is not possible, under exceptional conditions the vehicle can be towed with its wheels on the ground as long as the following requirements are adhered to:

On vehicles with MJ-AD4 automatic transmissions

1. Pour an additional two litres of transmission fluid to the transmission (ELF Renaultmatic D2 or Mobil ATF 220),

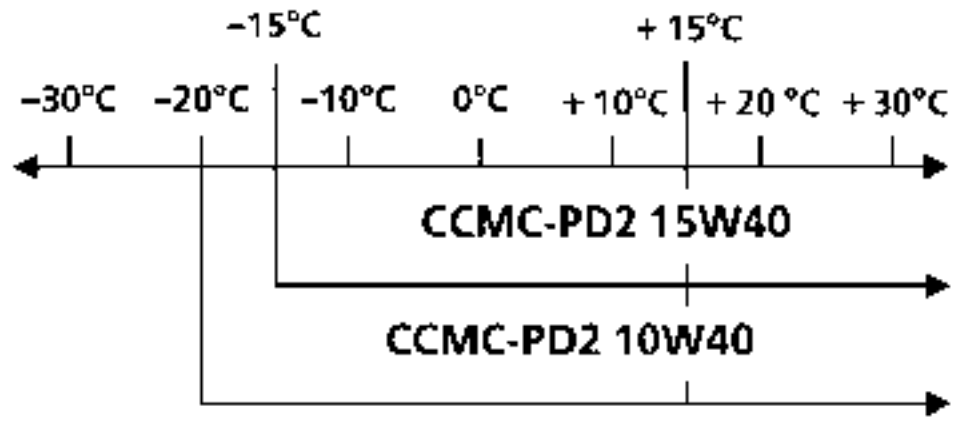
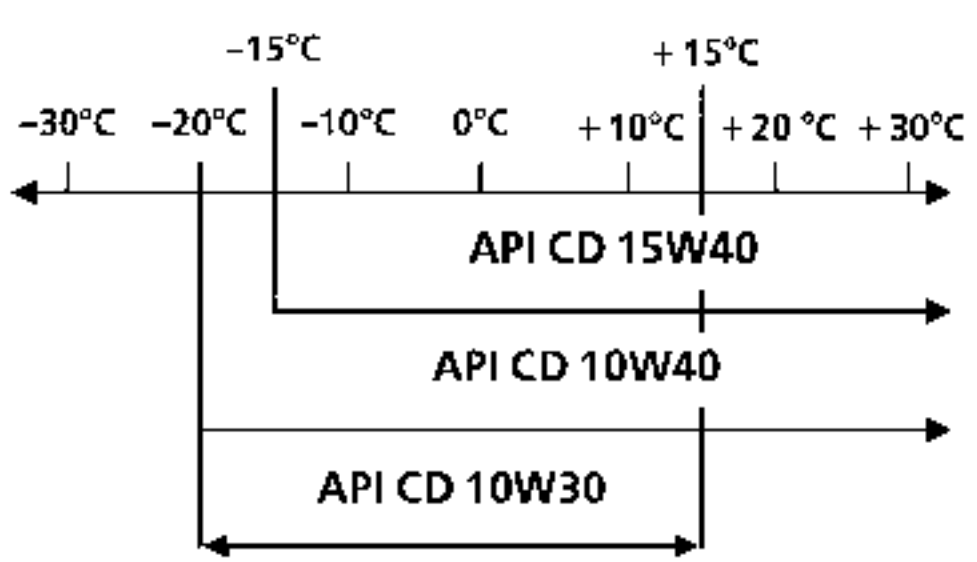
2. Do not tow the vehicle at speeds above 20 mph (30 km/h) and for a distance of no more than 30 miles (50 km) (with the shift lever in N).

Do not forget to remove the excess transmission fluid after this operation.

On vehicles with AR4 automatic transmission

The vehicle must not be towed at speeds of more than 25 mph (40 km/h) and the distance must be no more than 15 miles (25 km).

Unit	Capacity in litres	Grade	Special features
Petrol engines (oil) C2J F2N F3N F2R J7R J6R J7T J7R 12S turbo	At oil changes 3 4.8 4.8 4.8 6 6 6 5 (plus 0.5 litre for the oil filter)	EC countries PETROL (except Turbo and Biturbo) −15°C −30°C −20°C −10°C 0°C +10°C +20 °C +30°C CCMC-G4 15W40 - 15W50 CCMC-G5 10W30 - 10W40 - 10W50 CCMC-G5 5W30 CCMC-G5 5W40 - 5W50 PETROL Turbo and Biturbo −15°C +15°C −30°C −20°C −10°C 0°C +10°C +20 °C +30°C CCMC-G4 15W50 CCMC-G5 10W50 CCMC-G5 5W40 - 5W50	
		Other countries PETROL −15°C −30°C −20°C −10°C 0°C +10°C +20 °C +30°C API SG 15W40 API SH 15W40 API SG 10W40 API SH 10W40 API SG 10W30 API SH 10W30 API SG 5W30 API SH 5W30	

Unit	Capacity in litres	Grade	Special features
Diesel engine (oil) J8S F8Q	At oil changes 5.6 5 (plus 0.5 litre for the oil filter)	EC countries DIESEL (All types)  	
		Other countries DIESEL  	

Unit	Capacity in litres	Grade	Special features
Gearbox UN1 UN7 JB1 JB2 JB3 NG7 NG9	 3 3.35 3.4 3.25 3.4 2.4 2.2	All countries : Tranself TRX 80W or TRX 75W80W (Standards API GL5 or MIL-L 2105C or D)	
MJ3	6	Box : ELF Renault Matic D2 or Mobil ATF 220	
AR4	5.7	Box : ELF Renault Matic D2 or Mobil ATF 220	Final drive : ELF tranself TRX 80W
AD4	5.7		
Braking system	0.7 ABS 1.2	SAE J 1703 and DOT 3 or DOT 4	Brake fluids must be of a type approved by our design office.
Fuel tank	66 or 62 (4 x 4)	See driver's hand-book	
Power steering	1.1	Elf Renault matic D2 or Mobil ATF 220	

Cooling system, Engines	Capacity in litres depending on version				Grade, Special features
	Phase I	Phase II	AC	AT	
C2J	5.5	5.5	-	-	
F2N	5.2	6.4	6.4	-	
F2R	7	7	7	-	Glaceol RX (type D) Add only demineralised water.
F3N mono	4.7	6	-	-	
F3N multi	4.7	6	6	-	
F8Q	-	7	-	-	Protection down to - 21 °C for temperate, hot and cold climates.
J6R	6.8	6.8	6.8	7.2	
J7R	6.8	6.8	7	7.2	
J7R Turbo	6.2	6.2	6.2	-	
J7R 12S	-	7.1	7.1	-	Protection down to - 37 °C for very cold climates.
J7T	5.7	5.7	7	7.2	
J8S	7.1	-	-	-	
J8S Turbo	7.2	7.2	7.2	-	

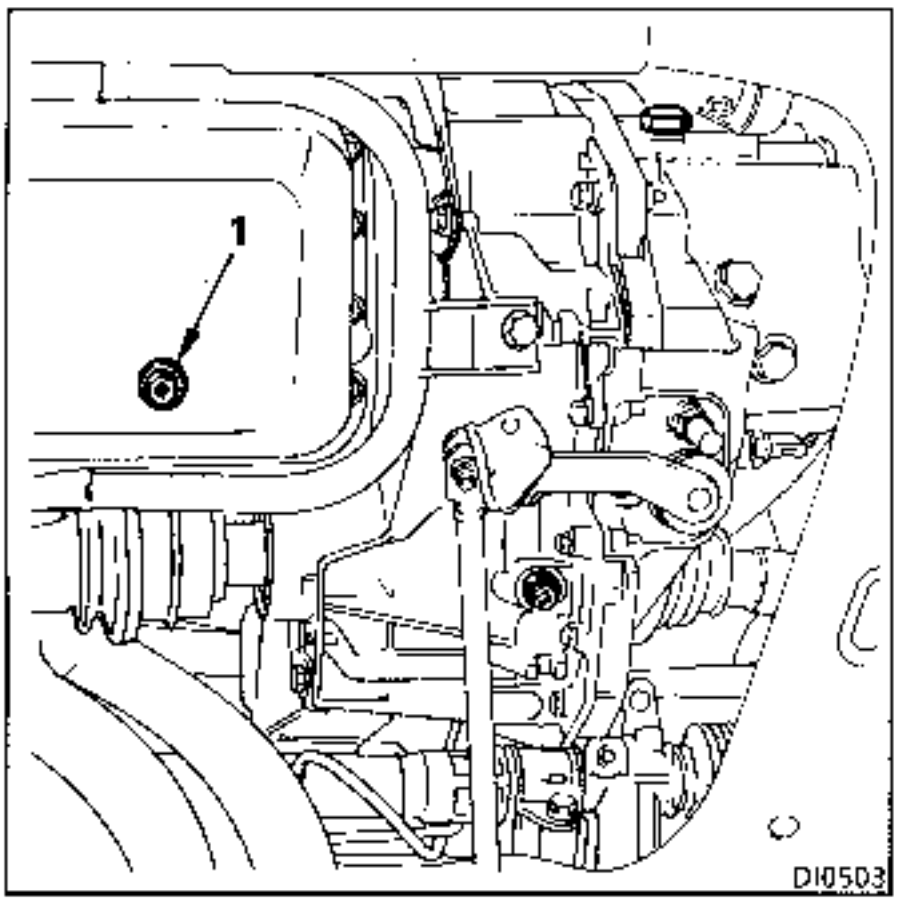
DESCRIPTION	PACK SIZE	PART NO.
GREASES		
• **MOLYKOTE "BR2"** For crankpin journals, release bearing guide tube, clutch fork trunnions, lower suspension arm bearings, torsion bar splines, steering box and transmission splines.	1 kg tin	77 01 421 145
• **MOLYKOTE "33 Medium"** Tubular rear axle bushes. Anti-roll bar bushes.	100 g tube	77 01 028 179
• **MOLYKOTE CU 7439** (High-temperature grease) Turbo etc.	1 kg tin	77 01 417 627
• **ANTI-SEIZE** (High-temperature grease) Turbo etc.	80 ml tube	77 01 422 307
• **"MOBIL CVJ" 825 Black star** or MOBIL EXF57C For drive shaft seals.	180 g sachet	77 01 366 100
• **MULTI-PURPOSE GREASE** Wheel sensor.	Aerosol	77 01 422 308
MECHANICAL UNIT SEALS		
• **"LOWAC" perfect-seal** Sealing fluid.	100 g tube	77 01 417 404
• **Mastic** For sealing exhaust pipe joints.	1.5 kg tin	77 01 421 161
• **"CAF 4/60 THIXO"**	100 g tube	77 01 421 042 77 01 404 452
• **HARDENER KIT** **"CAF 4/60 THIXO"** For bearing cap side seals.	Kit	77 01 421 080
• **AUTO blue seal** Sealing paste.	100 g tube 45 g tube	77 01 396 227 77 01 397 027

Description	PACK SIZE	PART NO.
MECHANICAL UNIT SEALS		
• **AUTO grey seal** Sealing compound.	100 g tube	77 01 422 750
• **LOCTITE 518** For sealing the gearbox housing.	24 ml syringe	77 01 421 162
• **Leak detector**	Aerosol	77 11 143 071
ADHESIVES		
• **"LOCTITE - FRENETANCH"** For locking bolts while still permitting their removal.	24 cc flask	77 01 394 070
• "LOCTITE - **FRENBLOC"** For locking bolts.	24 cc flask	77 01 394 071
• "LOCTITE SCEBLOC" For bonding bearings.	24 cc flask	77 01 394 072
• "LOCTITE AUTOFORM" For bonding the flywheel to the crankshaft.	50 cc flask	77 01 400 309
CLEANERS - LUBRICANTS		
• "NETELEC" Release and lubricating agent.	150 g aerosol	77 01 408 464
• **NC1 cleaning agent** For cleaning electrical contacts.	Aerosol	77 01 422 379
• Carburettor cleaner.	250 ml can 300 ml aerosol can	77 01 393 112 77 01 393 111
• Injector cleaner.	355 ml can	77 01 423 189
• Super-concentrate release agent.	500 ml aerosol can	77 01 408 466
• **"DECAPJOINT" (FRAMET)** for cleaning aluminium cylinder head gasket faces.	Aerosol	77 01 405 952
• Brake cleaning agent.	400 ml aerosol can	77 01 421 282

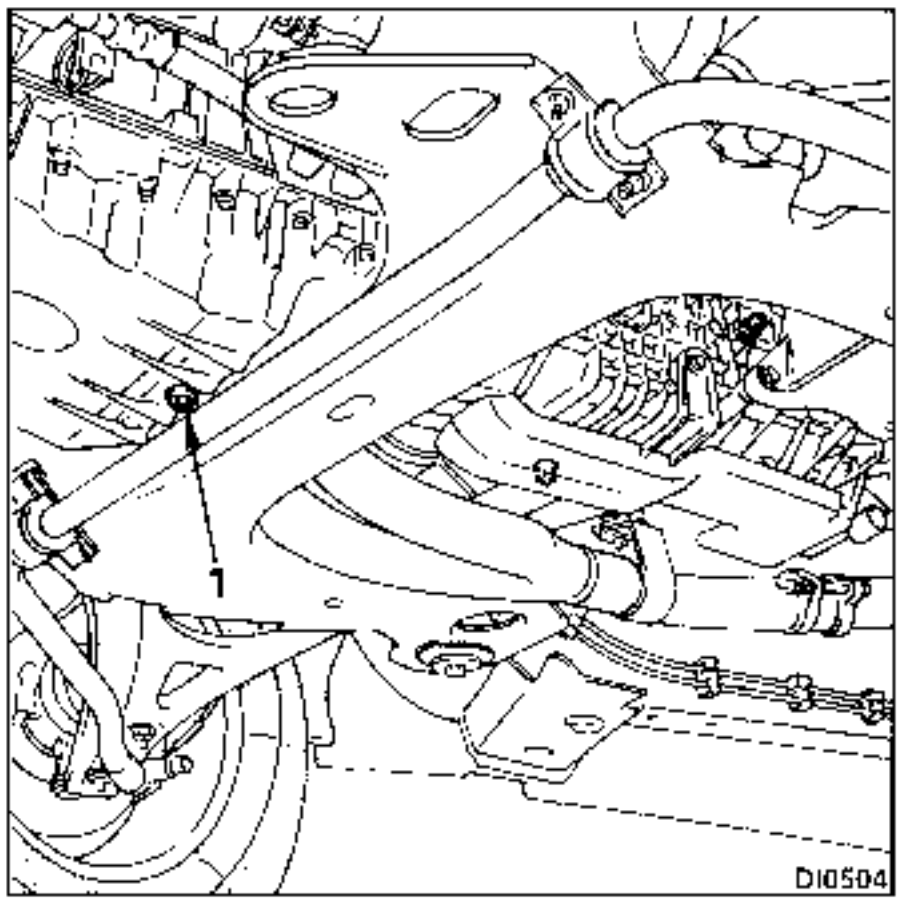
DESCRIPTION	PACK SIZE	MPR No.
VARNISHES		
• "CIRCUIT PLUS" Varnish for repairing heated rear screens	Flask	77 01 421 135
• "CONTACT PLUS" Varnish for repairing heated rear screen blade terminals	Kit	77 01 422 752
BRAKES		
• Brake fluid	0.5 litre flask DOT4	77 01 421 940
AIR CONDITIONING		
• ELF RIMA 100 compressor oil SANDEN SP20 compressor oil	250 ml (R12) 250 ml (R134a)	77 01 417 655 77 11 143 700

ESSENTIAL SPECIAL TOOLING
Engine drain plug spanner

DRAINING : Plug (1)



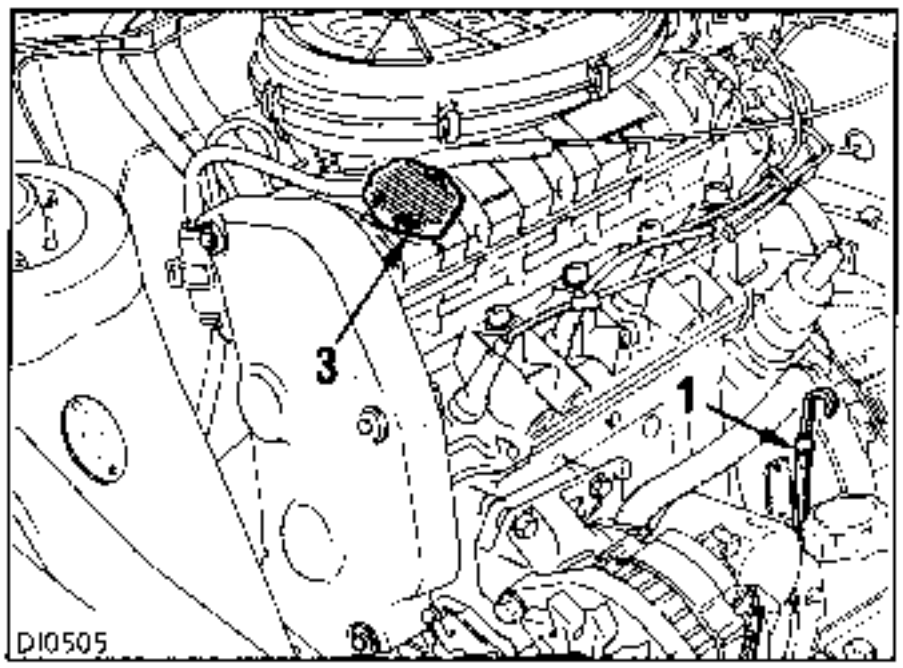
TRANSVERSE ENGINES



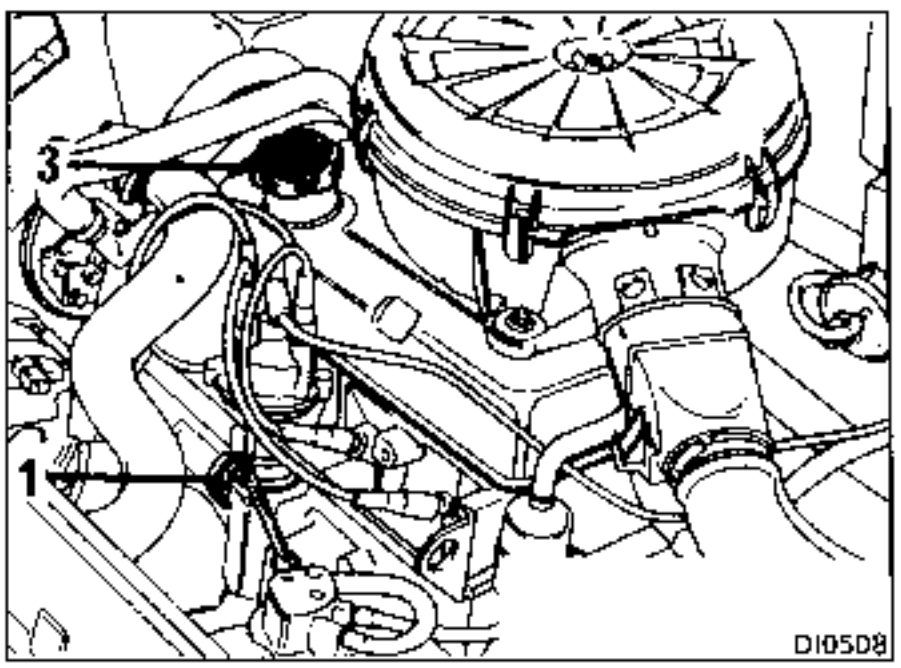
LONGITUDINAL ENGINES

FILLING : Drain plug **(3)**, dipstick **(1)**

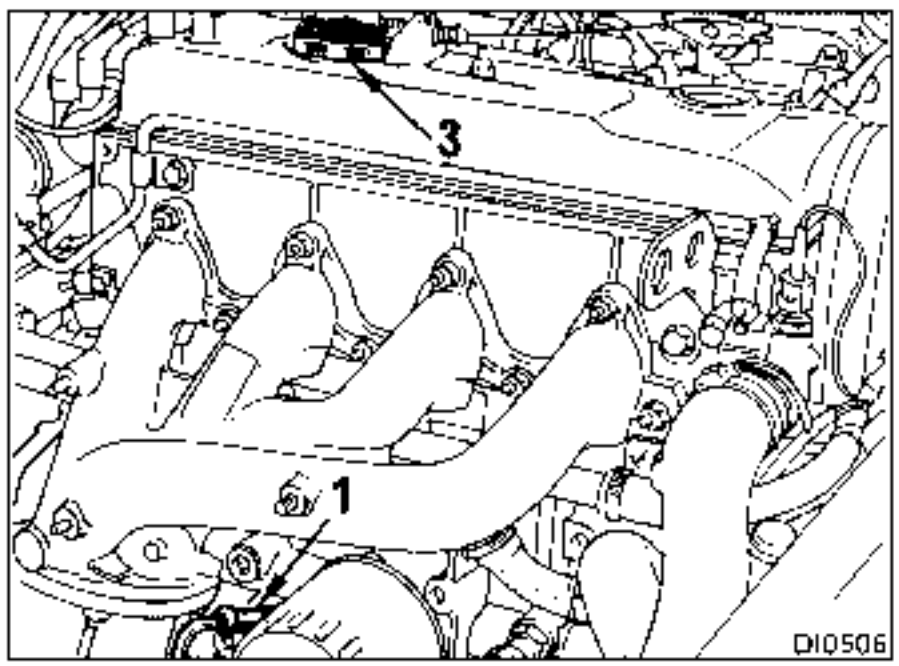
F2N - F2R ENGINES



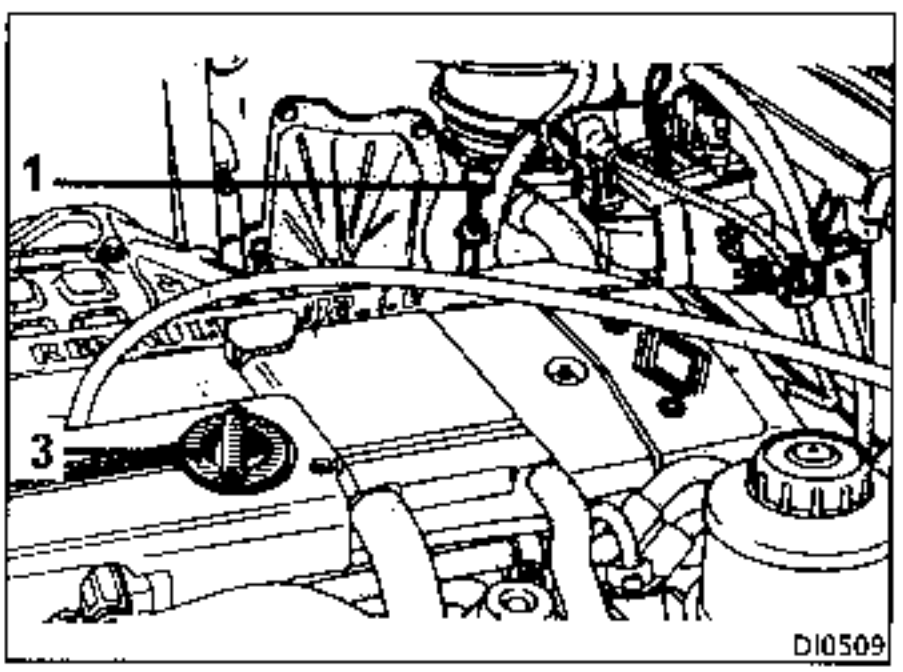
C2J ENGINE



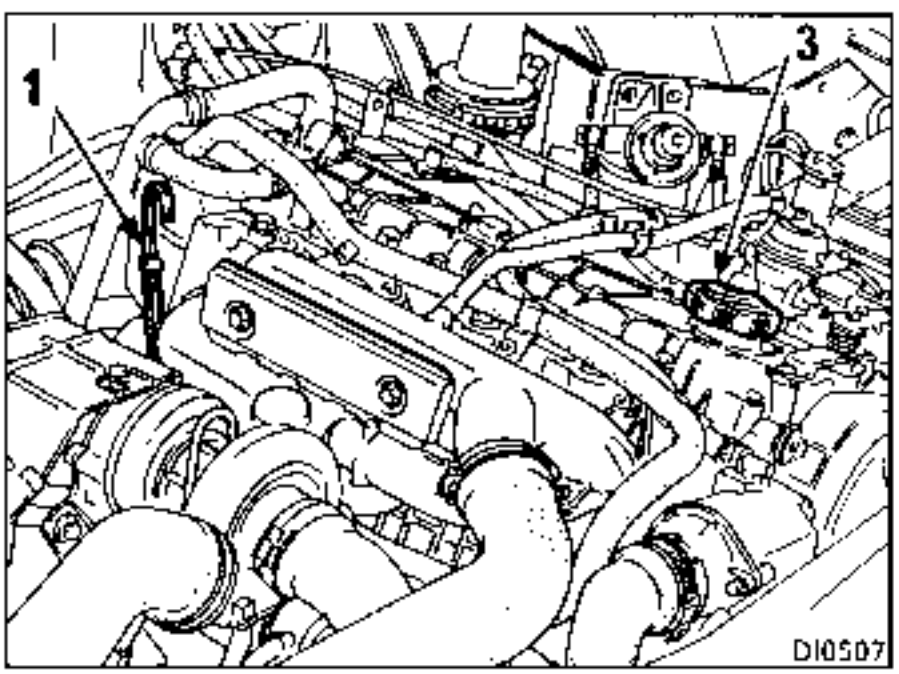
J7R - J6R - J7T ENGINES



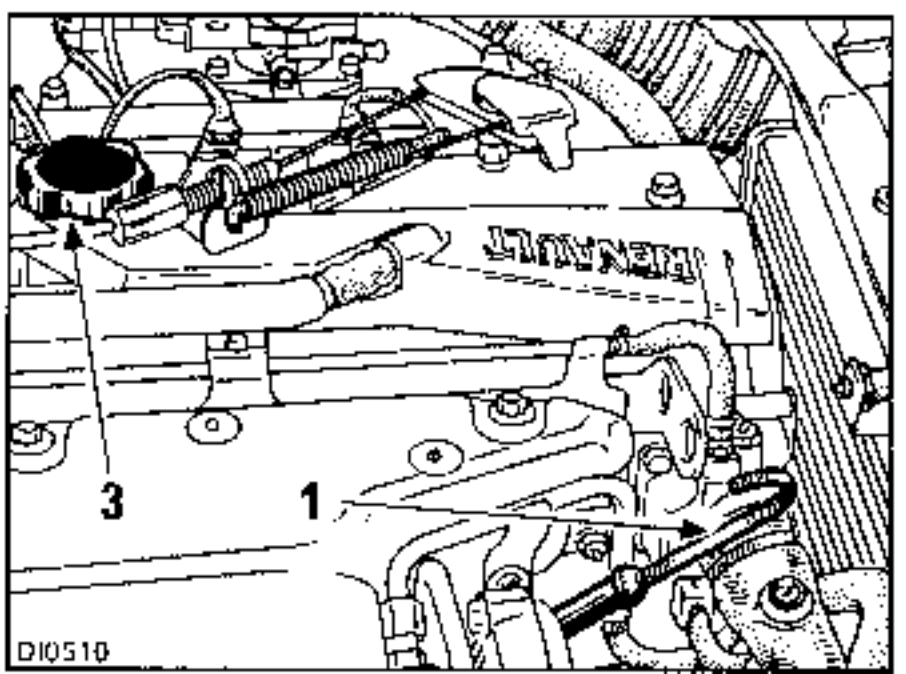
J7R 12-valve engine



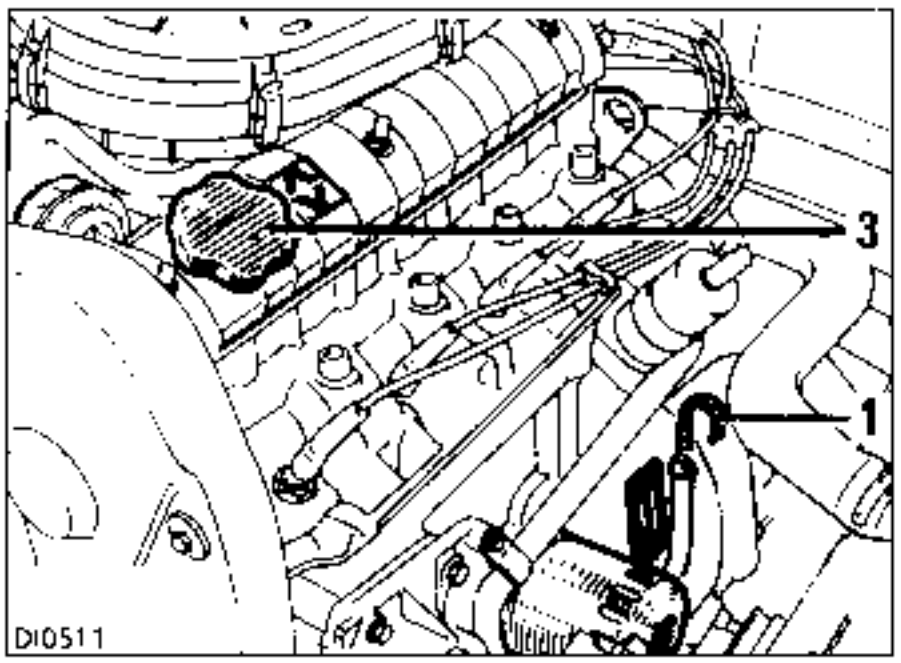
J8S TURBO ENGINE



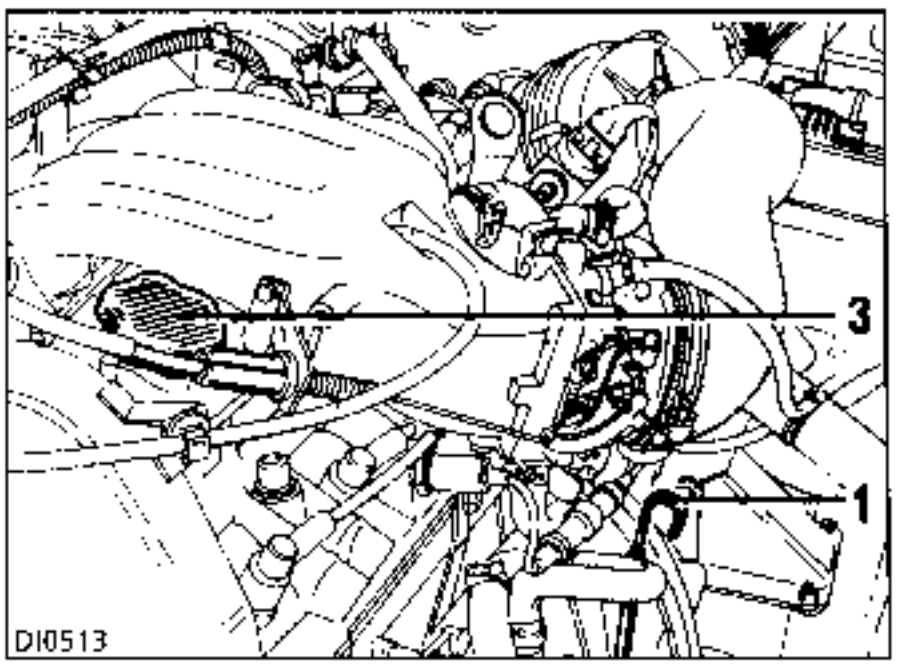
J7R TURBO ENGINE



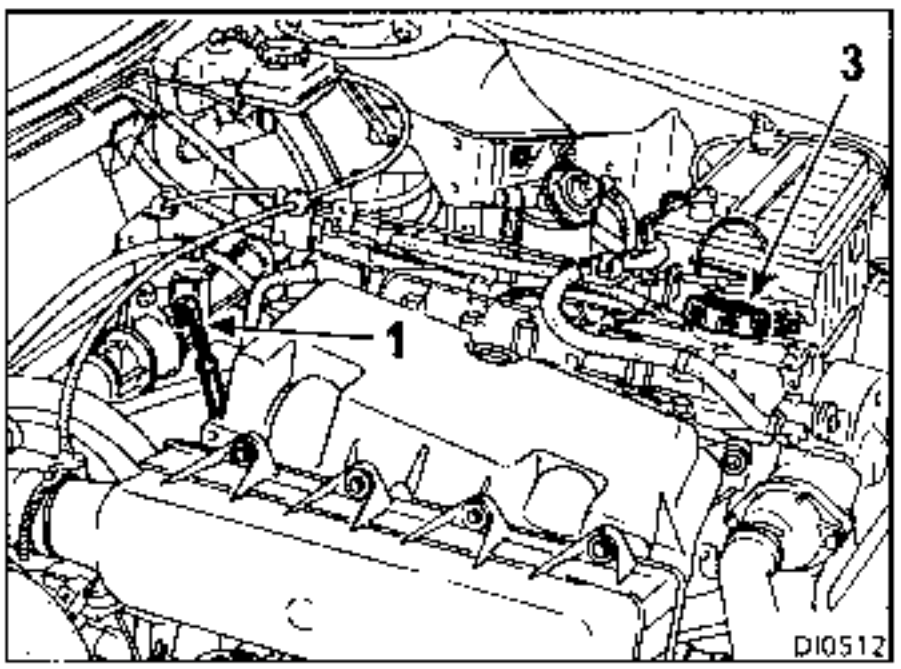
F3N MONOPOINT ENGINE



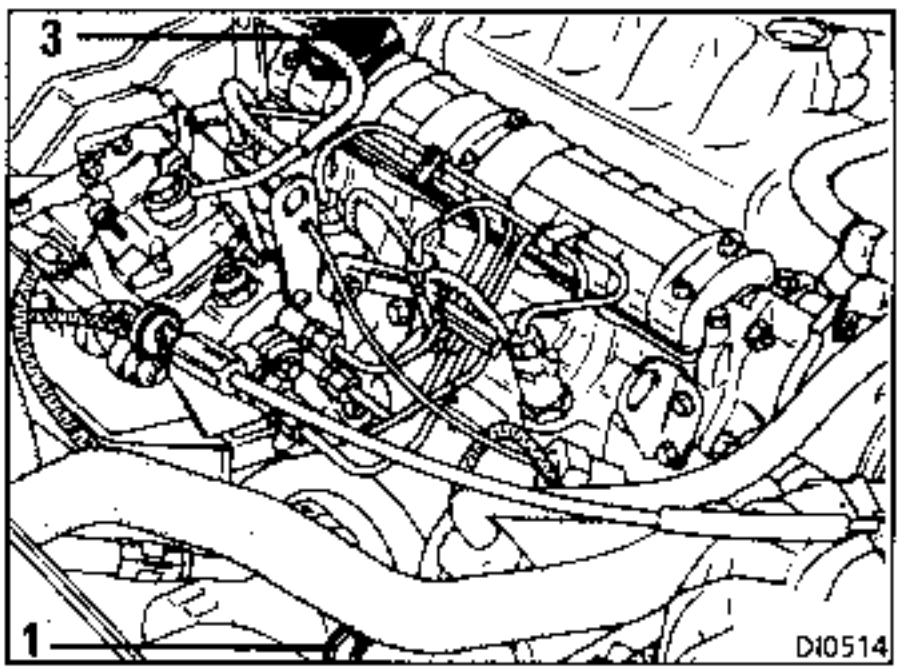
F3N MULTIPOINT ENGINE



J8S ENGINE



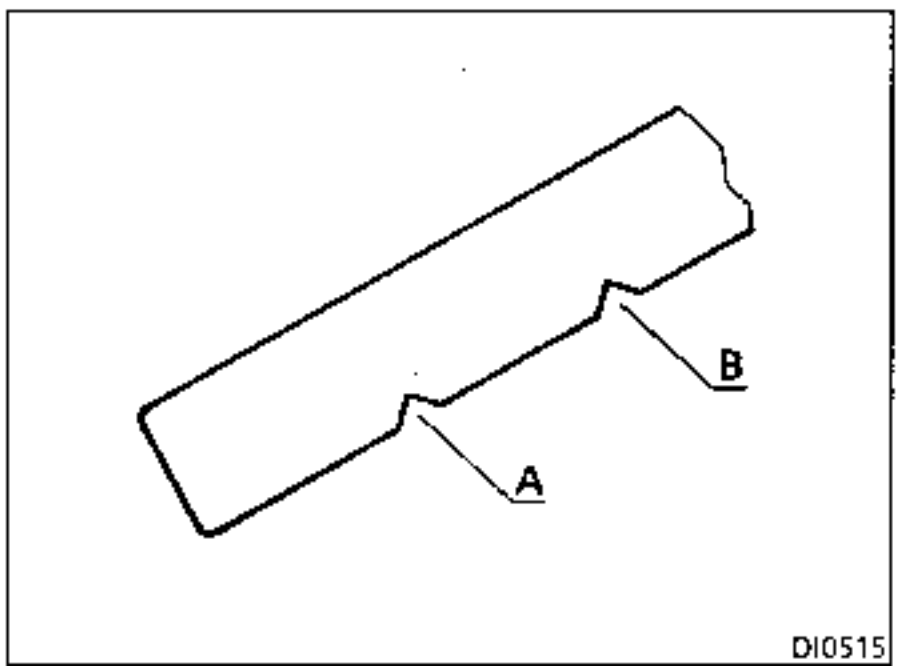
F8Q ENGINE



Dipstick (1)

(A) Min. **level**
(B) Max. level

The difference between the max. and min. levels is equivalent to approximately **2 litres** except on the type C engine where it is **1 litre.**

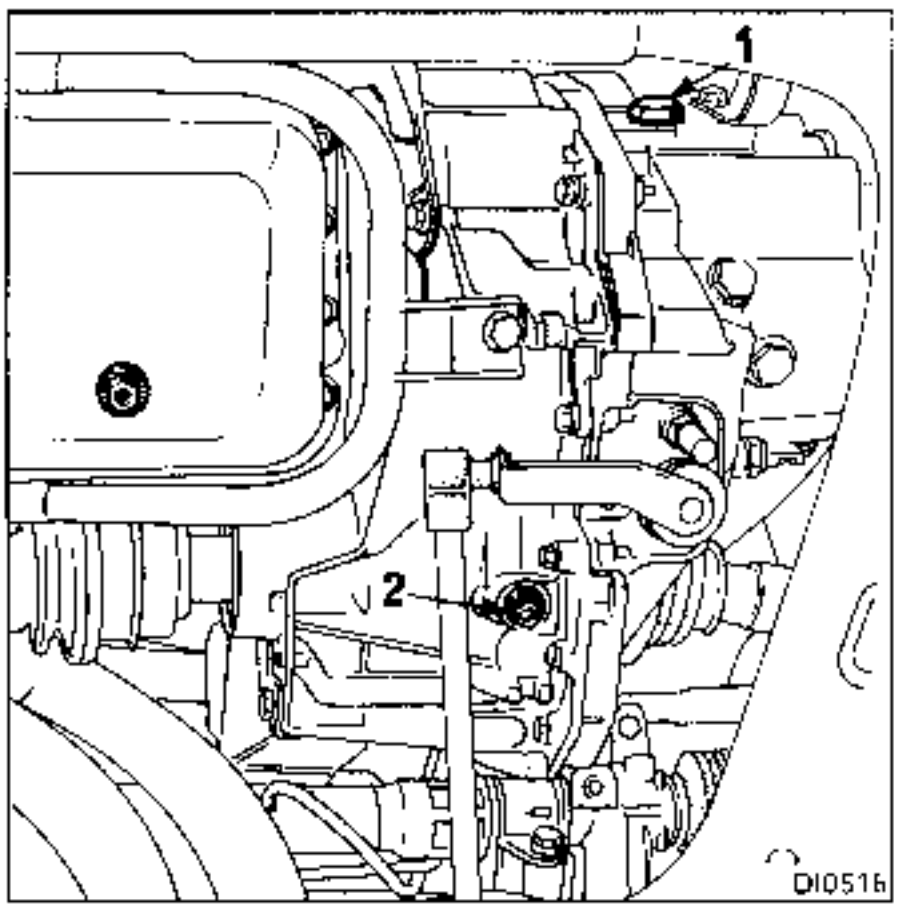


ESSENTIAL SPECIAL TOOLING
Spanner for gearbox drain plug

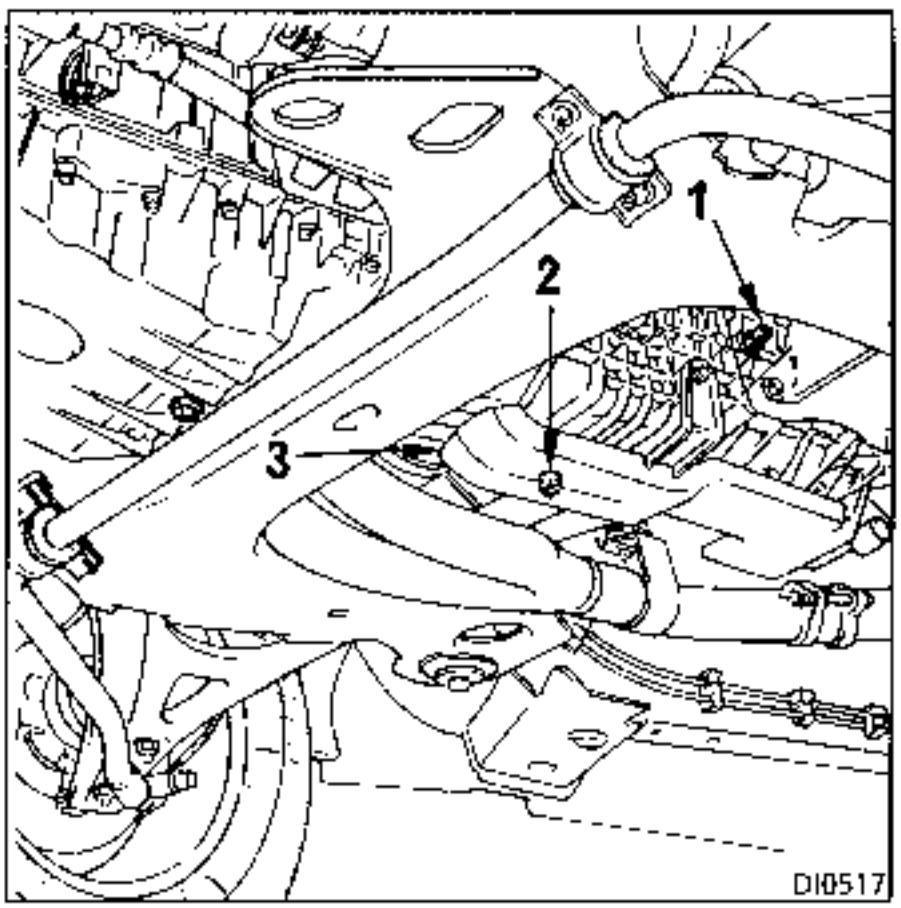
DRAINING : Plug 2

Note : On certain versions a protective plate 3 has to be removed to gain access to the drain plug 2.

TRANSVERSE ENGINES

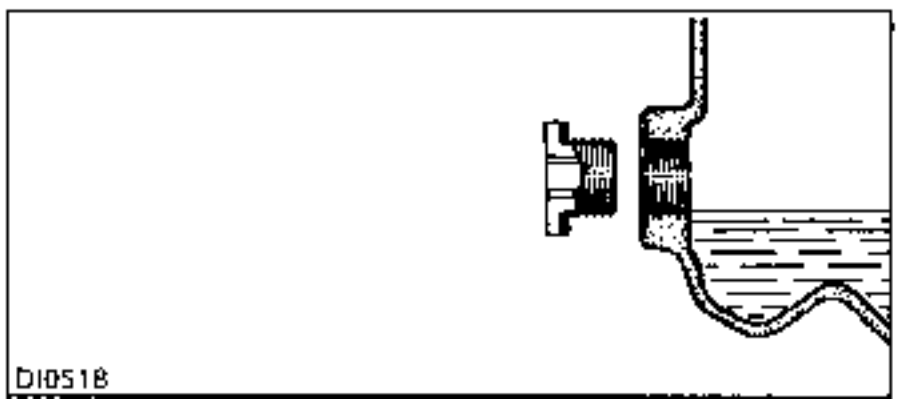


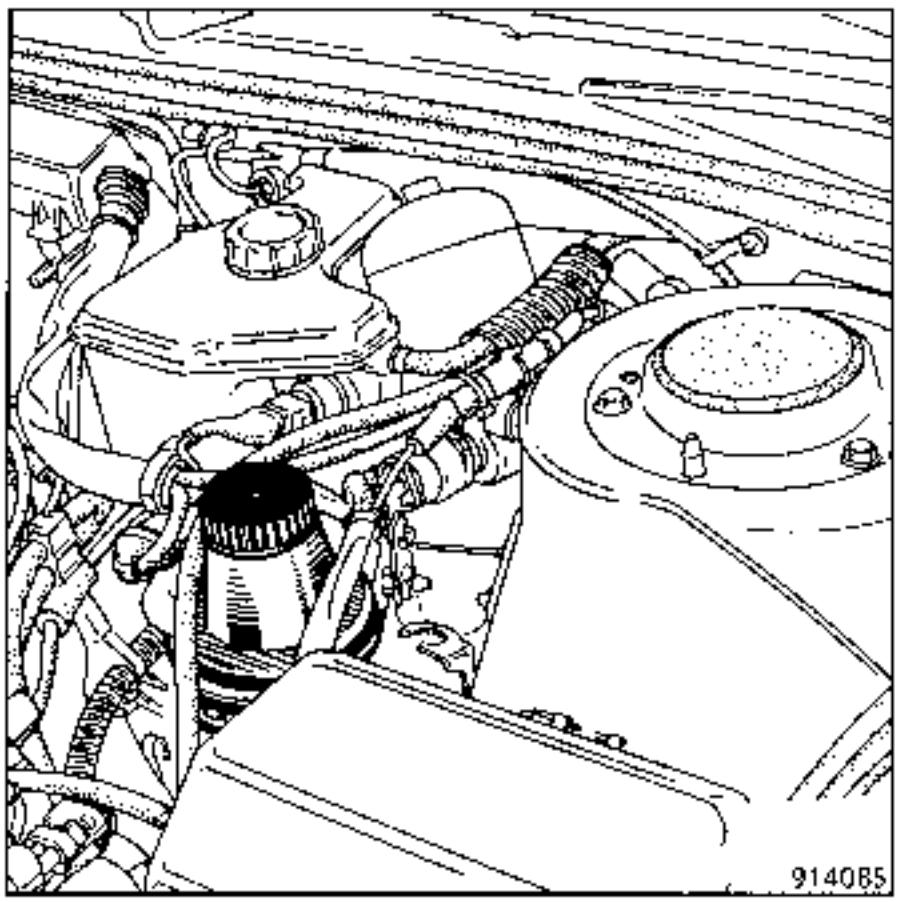
LONGITUDINAL ENGINES



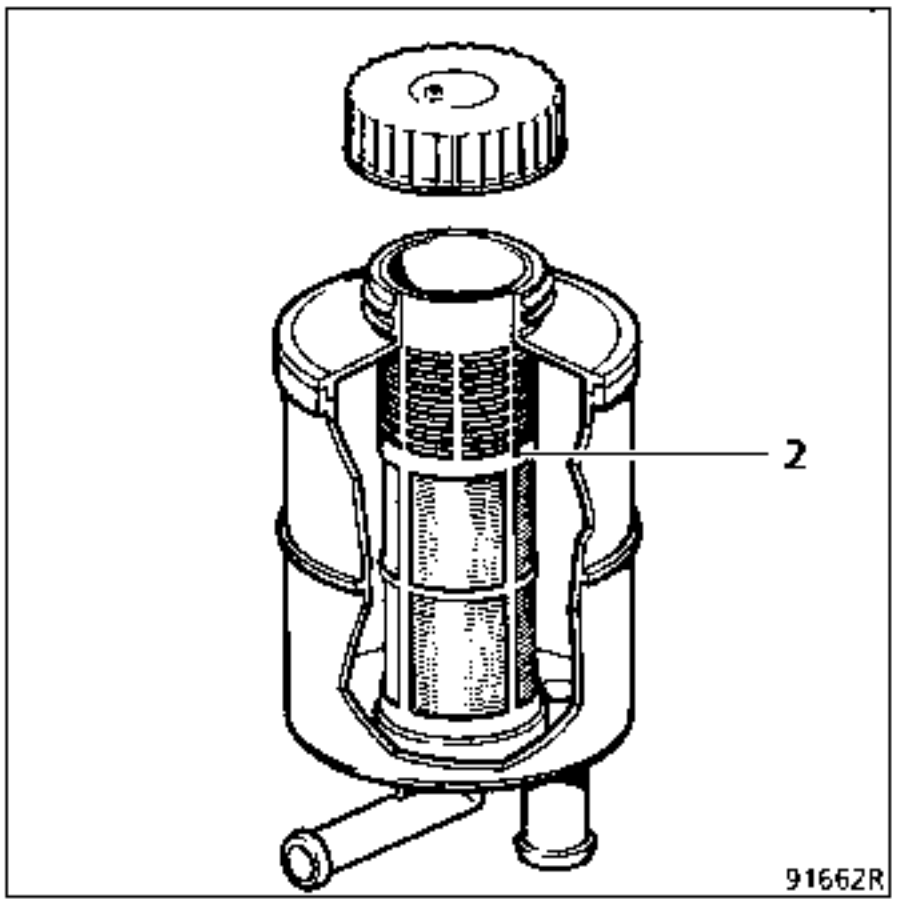
REFILLING : Plug (1)

Refill the gearbox until the oil is flush with the lower edge of the tapped hole.



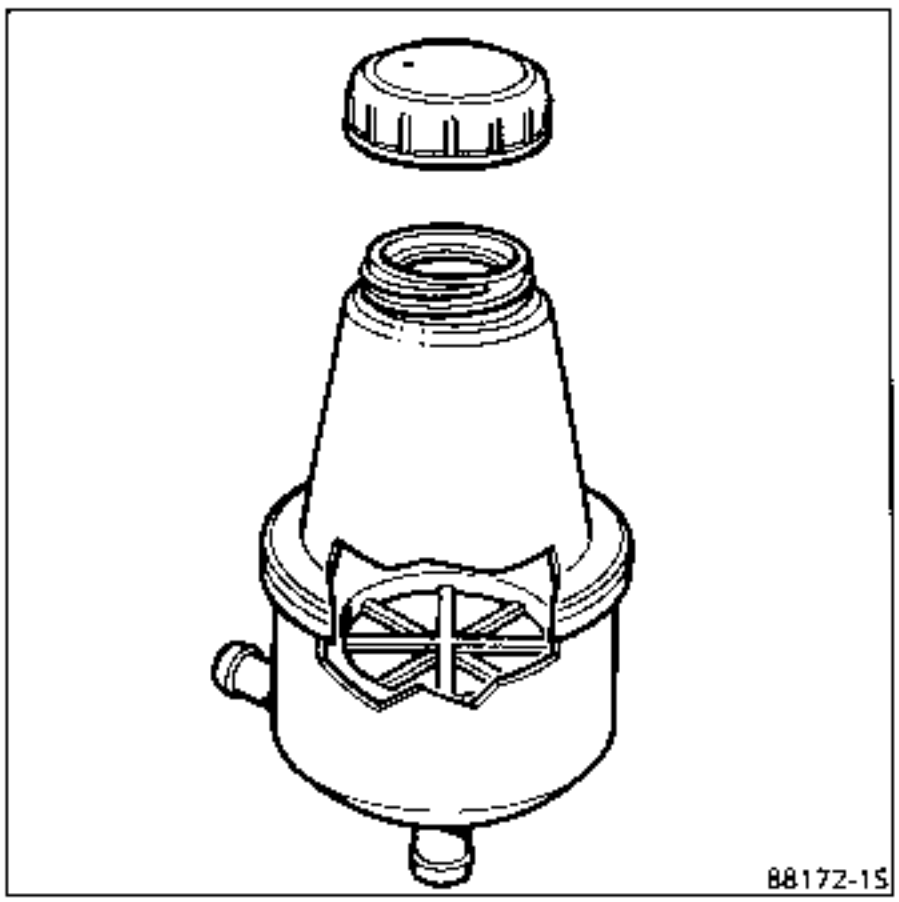


The oil must be visible in line with the pad **(2)** on the filter sleeve.

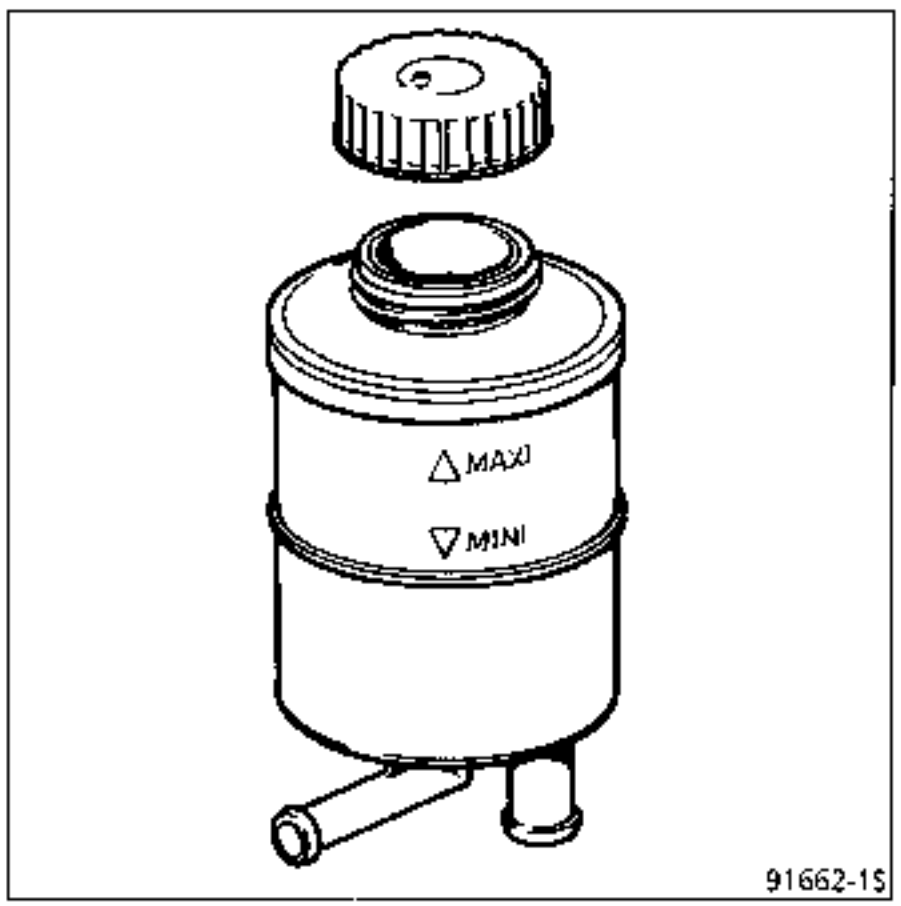


There are three types of bottle

The oil must be visible at the same level as the grille.



The oil must be visible in line with the max. level mark.

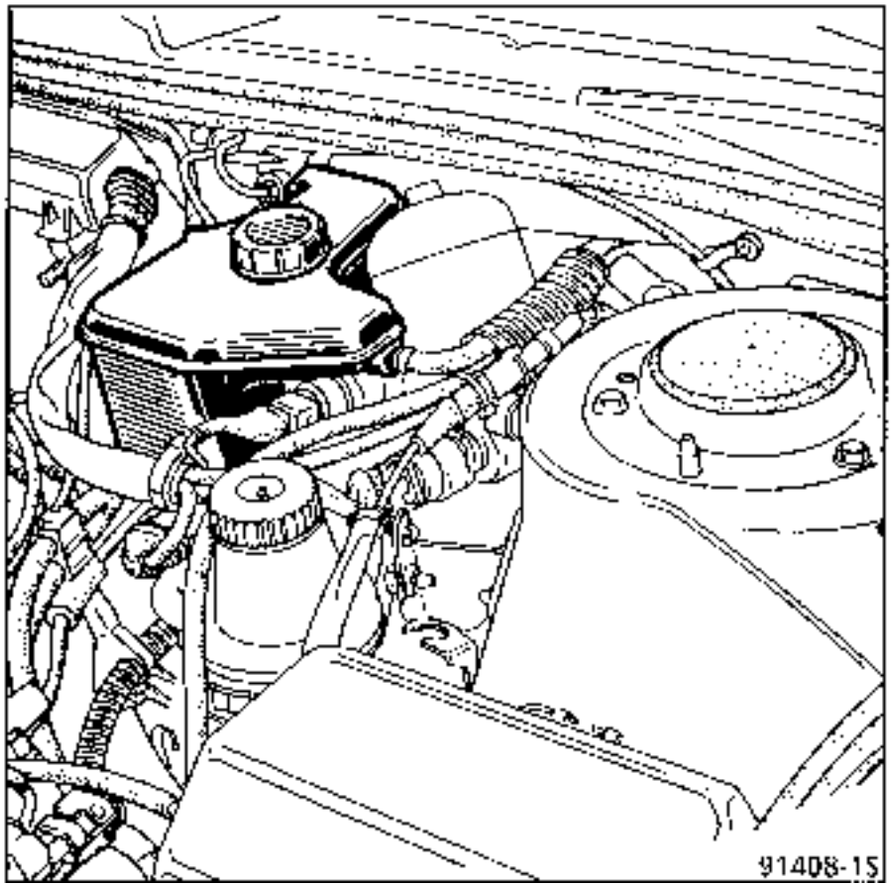


Checking the fluid level

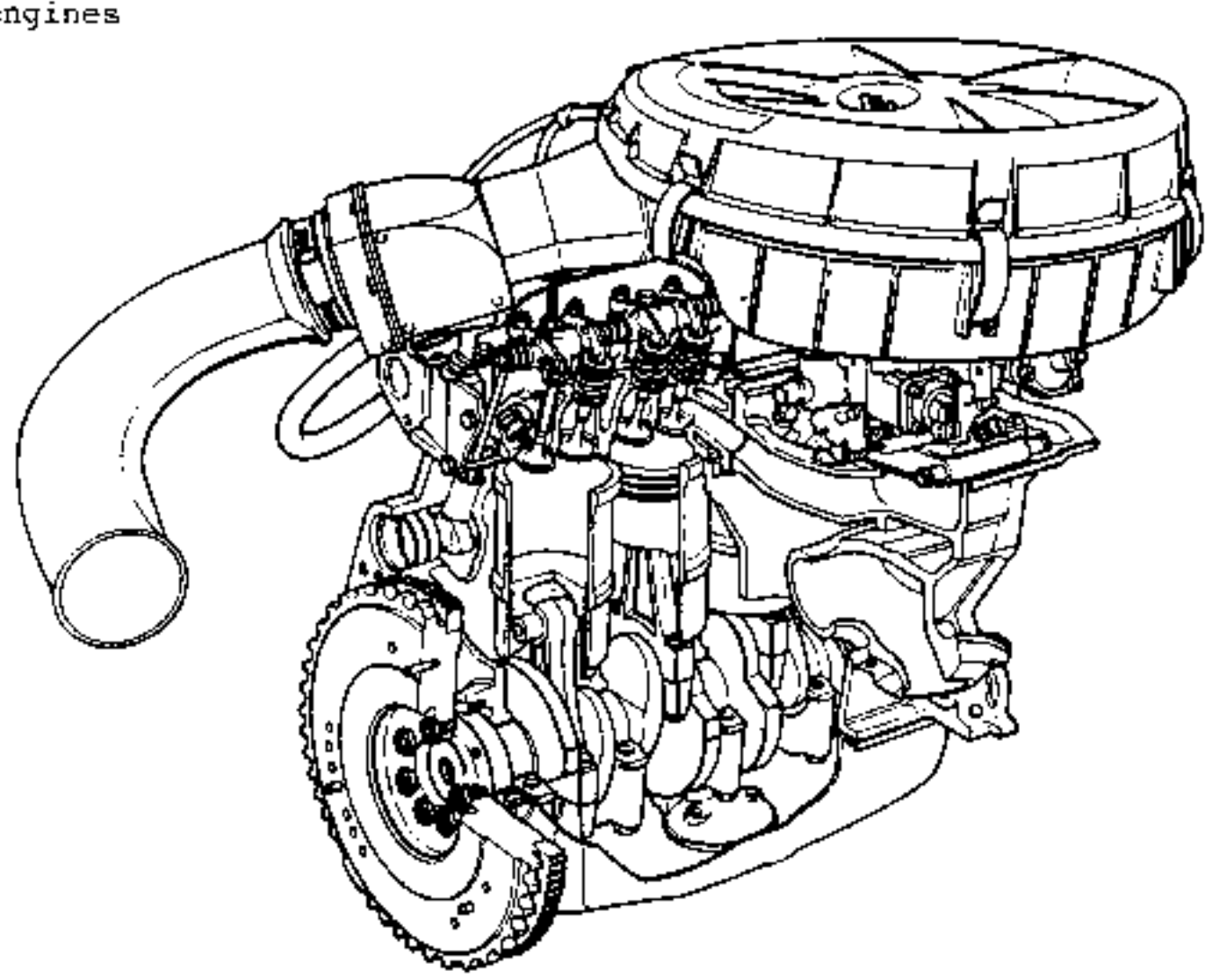
With the ignition on, press the brake pedal several times to cut in the high pressure pump.

Wait until the pump stops (the accumulator will then be full).

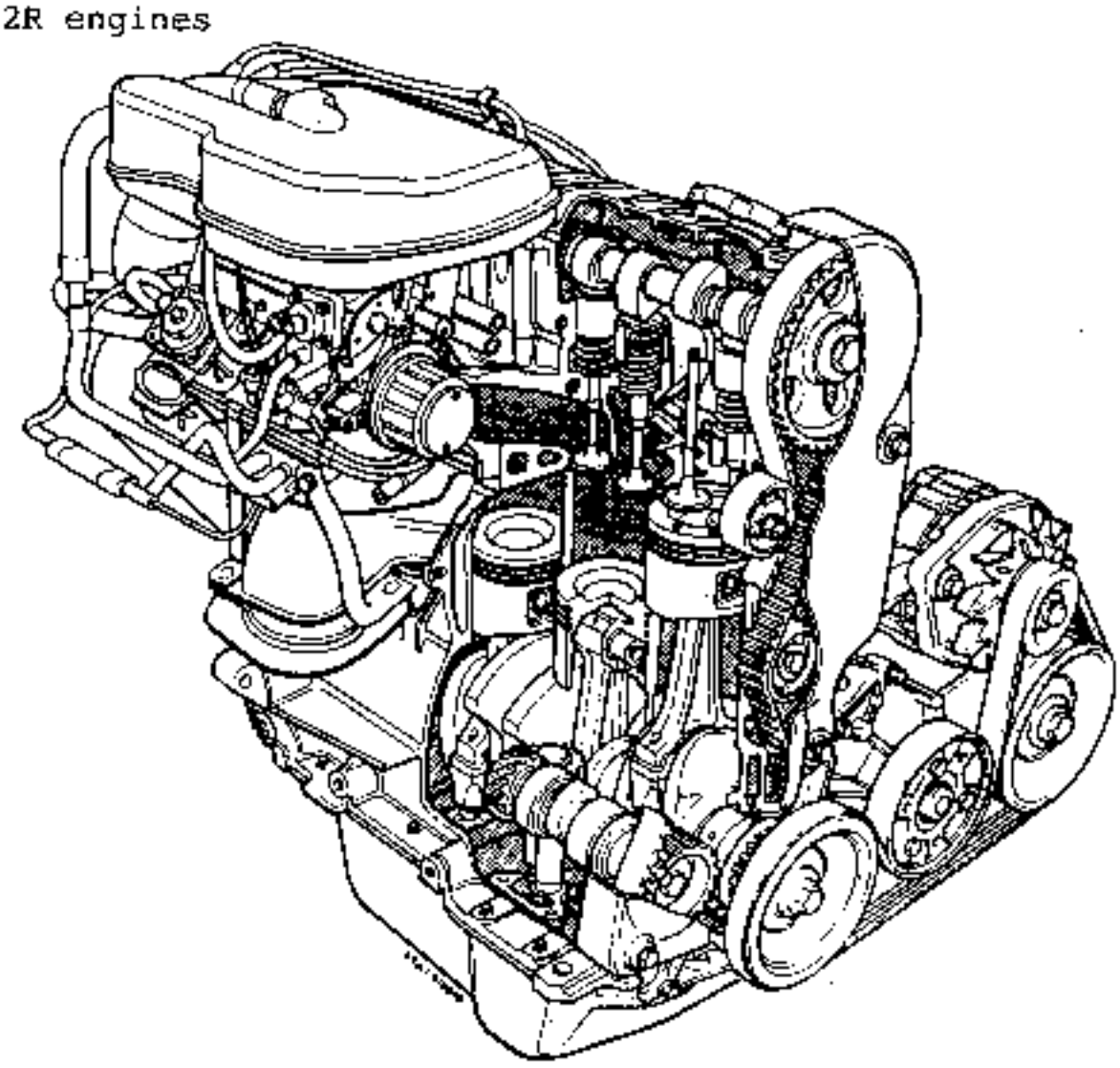
Check the level of the fluid in the bottle.



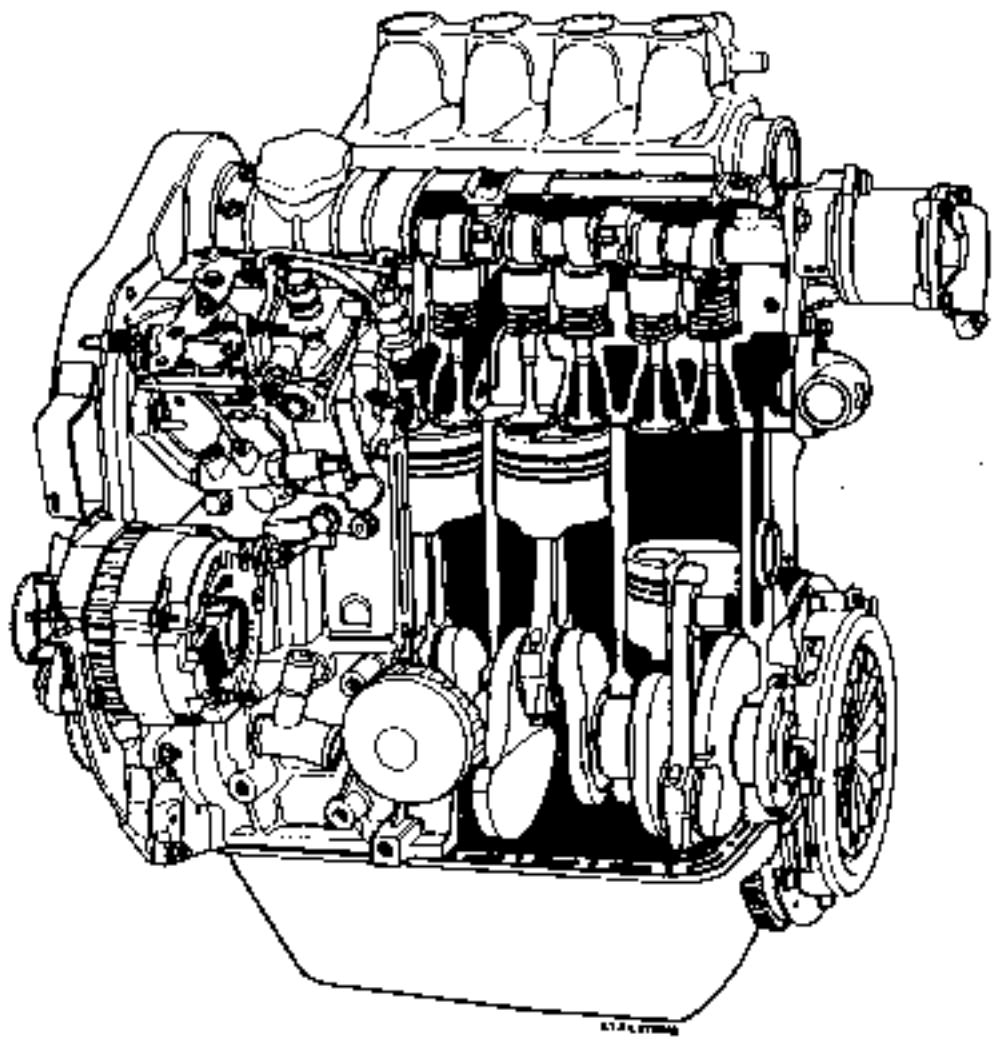
Type C engines



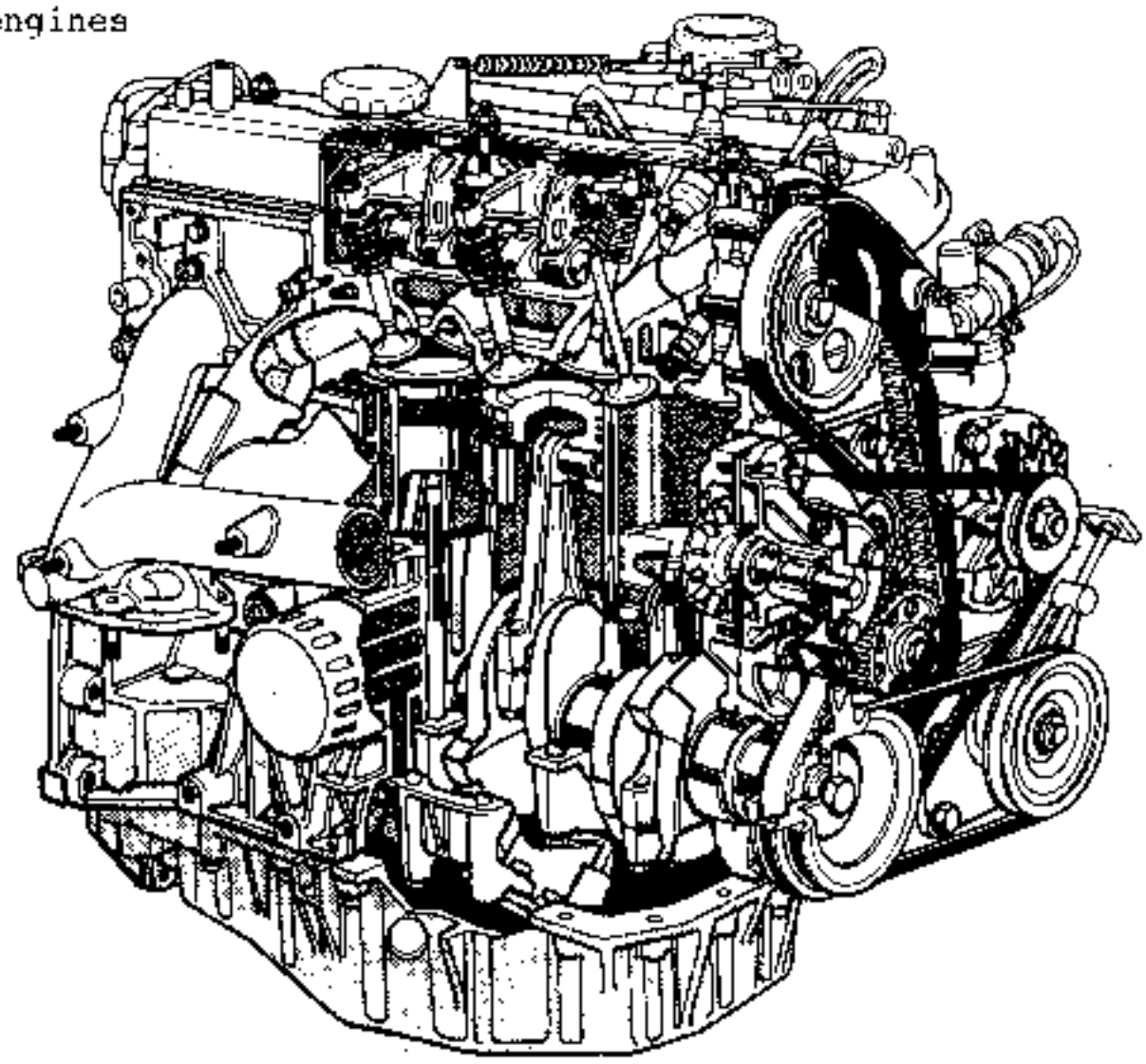
Type F2N-F3N-F2R engines



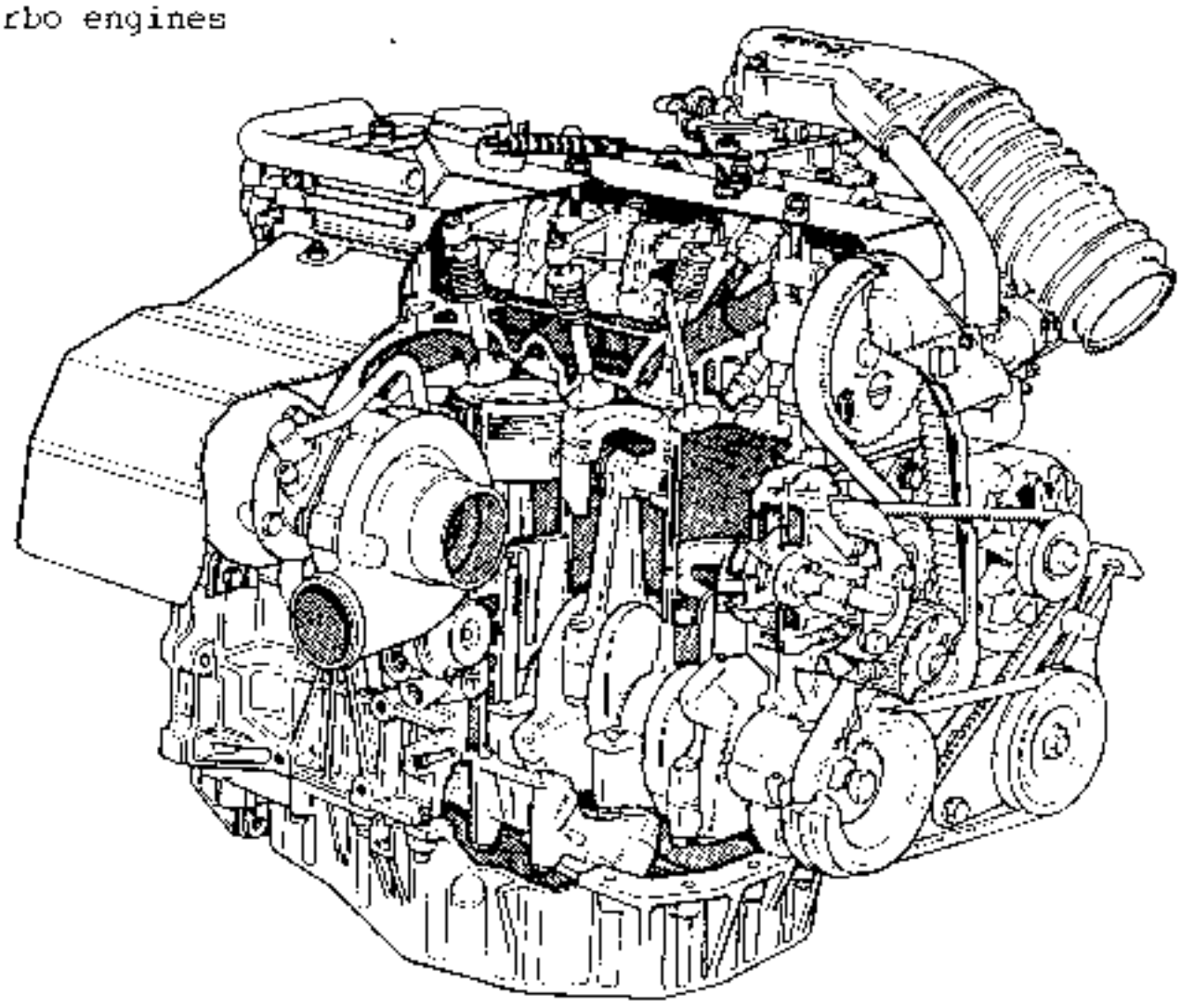
Type F8Q engines



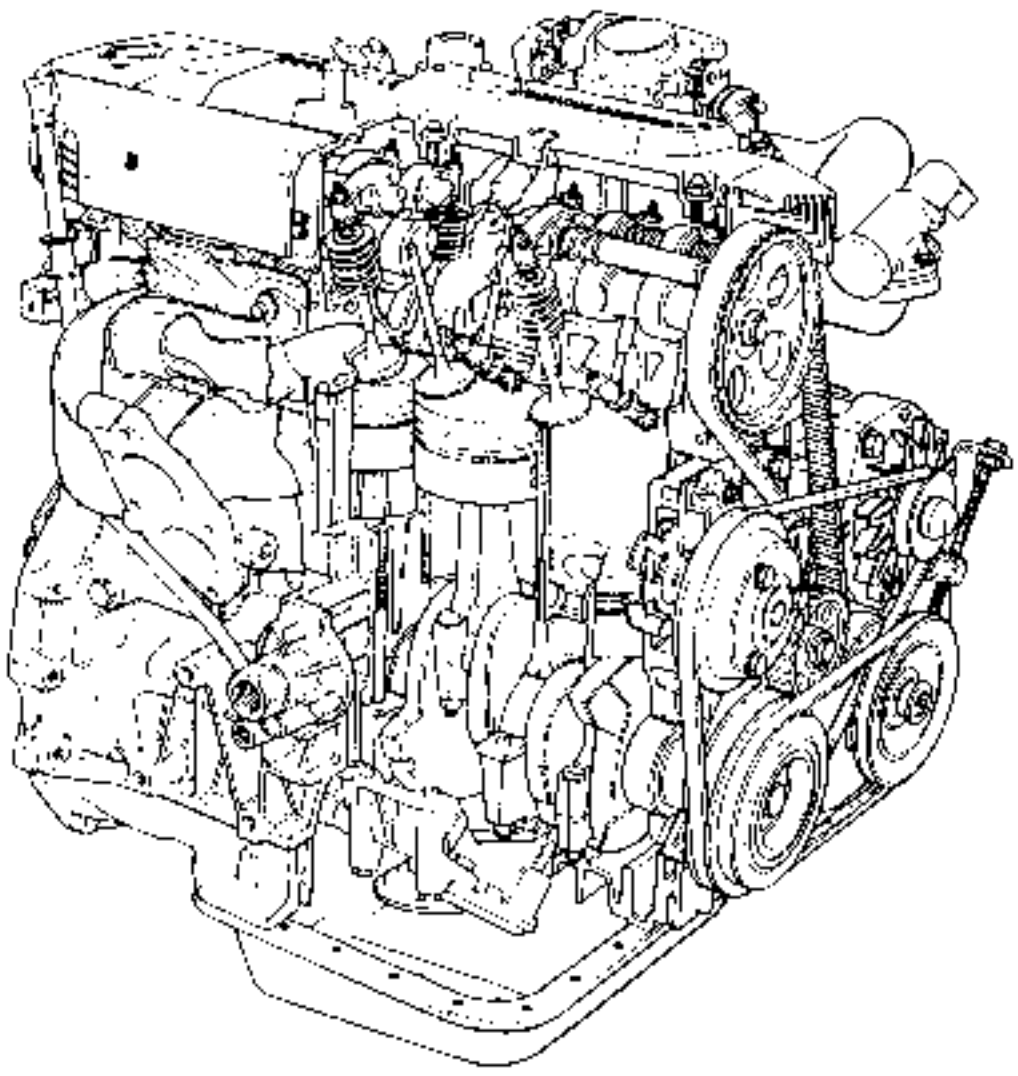
Type J6R-J7R-J7T engines



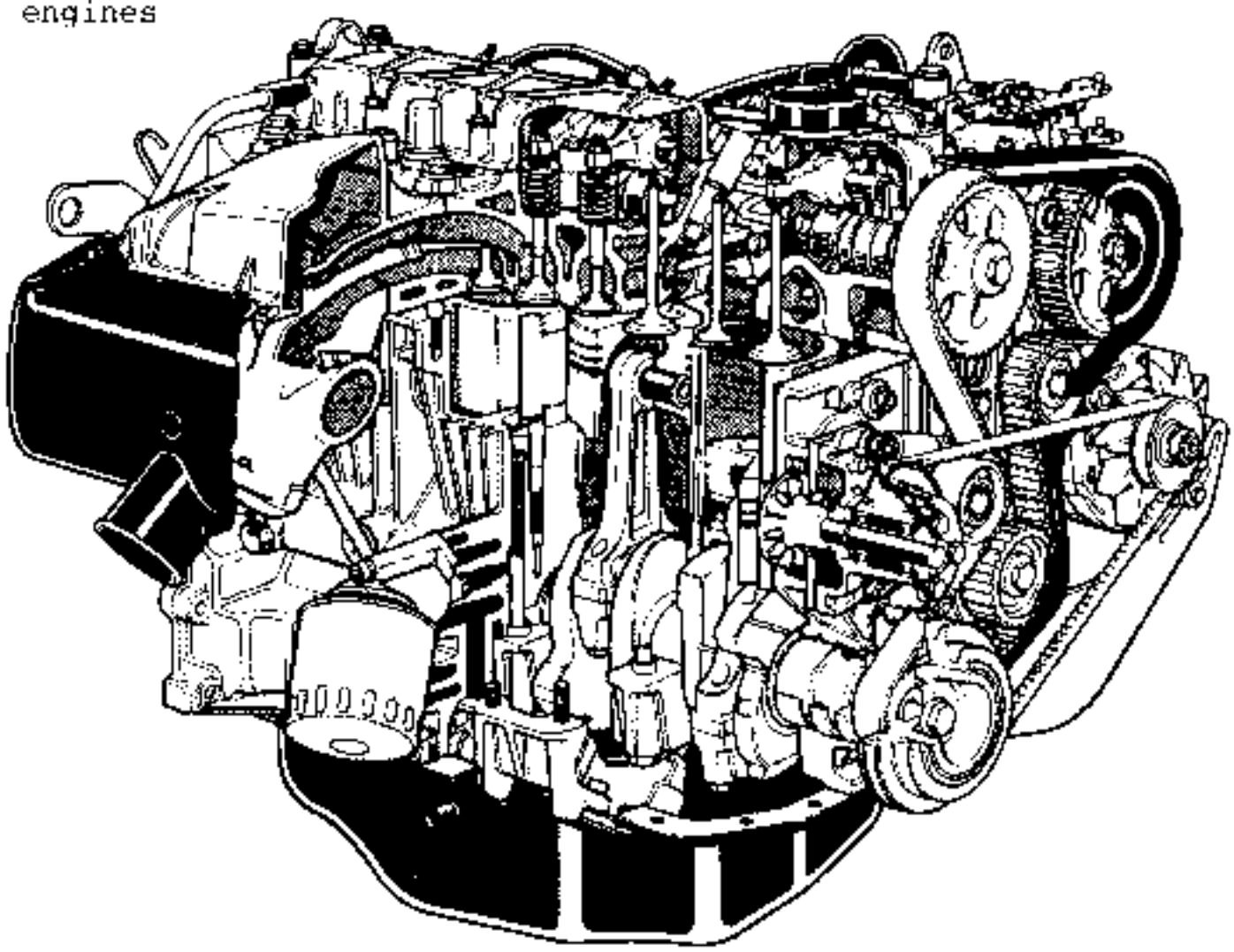
Type J7R Turbo engines



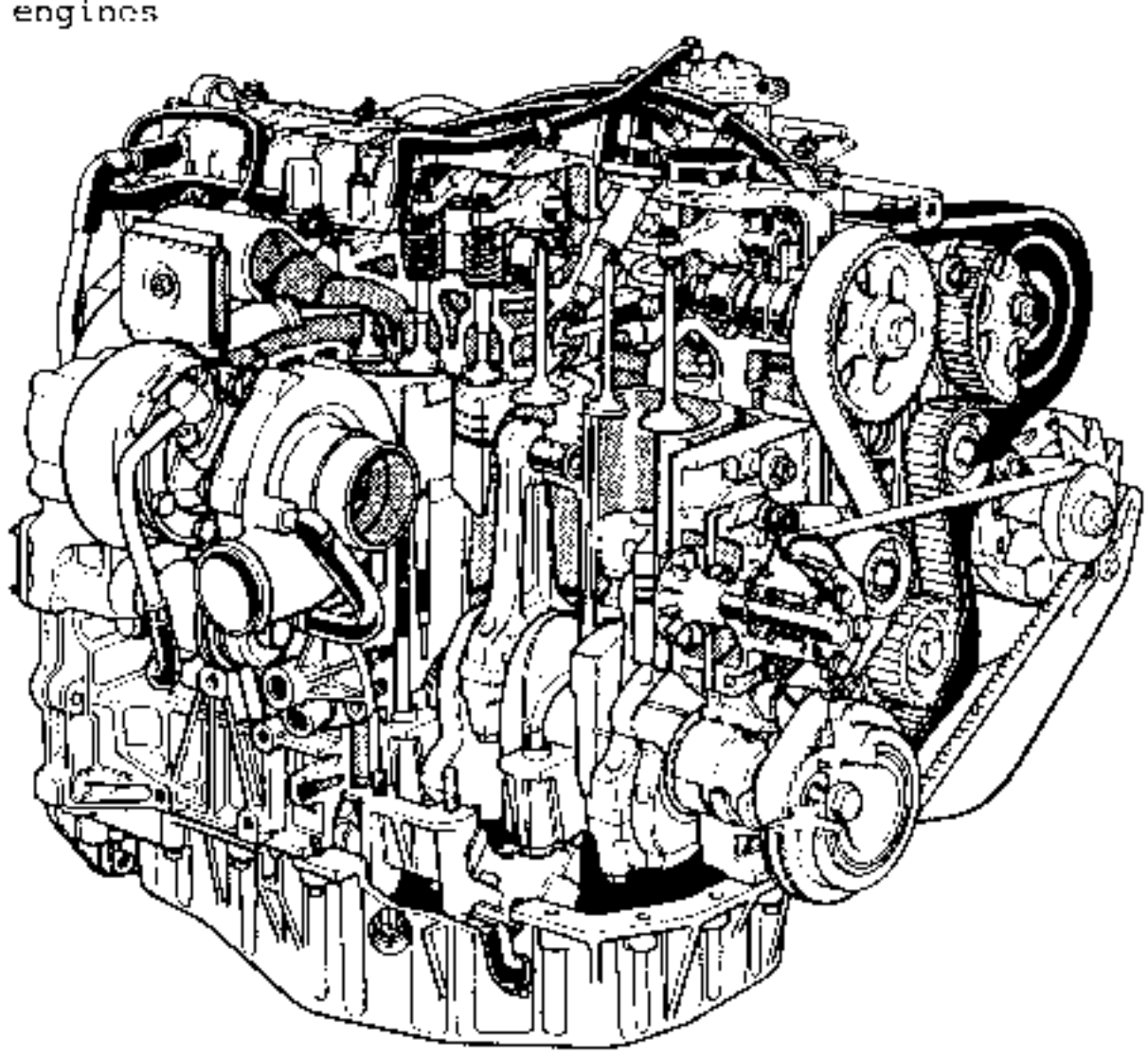
Type J7R 12 Valve engines



Type J8S engines



Type J8S Turbo engines



Type	Quantity	Unit
MOBIL no. 20 X 57 030 grease	Coating	Drive shaft splines at gearbox end. Clutch shaft splines.
CAF 4/60 THIXO	Coating	Drive shaft spring pin holes.
Loctite FRENBLOC Locking and sealing resin	Coating	Brake caliper securing bolts.
Loctite FRENETANCH Locking and sealing resin	Coating	Crankshaft pulley securing bolts.
ELF Multi	Coating	Wheel bolts.
MOLYKOTE CU. 7439	Coating	Wheel locating areas.
Exhaust pipe mastic	Coating	Sealing the exhaust system.

Vehicle type	Engine	Capacity (cm^3)	Bore (mm)	Stroke (mm)	Comp. ratio
B.L.K.S 481	F2N 712 F2N 716	1 721	81	83,5	9,25
L.K.S 482	F2N 710	1 721	81	83,5	10
B.L.K.S 482	F2N 754	1 721	81	83,5	9,5
B.L.K. 483	J7R 750	1 995	88	82	10
L 485	J7R 752	1 995	88	82	8
B.L.K.S 486	J8S 704	2 068	86	89	21,5
B.L.K 488	J8S 714	2 068	86	89	21,5
L 489	J6R 758	1 995	88	82	8,6
B.L 48 D	C2J 770	1 397	76	77	9,25
B.L.K 48 E	F3N 722	1 721	81	83,5	9,5
B.L.K 48 F	F3N 726	1 721	81	83,5	9,5
B.L.K.S 48 H	F8Q 710	1 870	80	93	21,5
B.L.K 48 J	F2R 702	1 965	82	93	8,4
B.L.K 48 K	J7T 754	2 165	88	89	9,2
L.K 48 M	F2N 750	1 721	81	83,5	9,2
L.K 48 N	F2N 752 F2N 756	1 721	81	83,5	9,5
B.L 48 Q B.L 48 Y	J7R 754	1 995	88	82	9,3
B.L.K.S 48 V	J8S 740	2 068	86	89	21,5
K 483 K 486 K 48 K } 4 x 4	J7R 750 J8S 704 J7T 754	1 995 2 068 2 165	88 86 88	82 89 89	10 21,5 9,2
B.L.K 483 BVA B.L.K 48 K BVA L 489 BVA	J7R 751 J7T 755 J6R 759	1 995 2 165 1 995	88 88 88	82 89 82	10 9,2 8,6

Engine workshop manuals to be consulted depending on the type of engine under repair.

Work-shop manual \ Engine	C2J	F2N F3N F2R	F8Q	J6R J7R J7T	J8S
Mot C	X				
Mot F (E)		X			
Mot F (D)			X		
Mot J (E)				X	
Mot J (D)					X

We have described, in the engine section of this workshop manual :

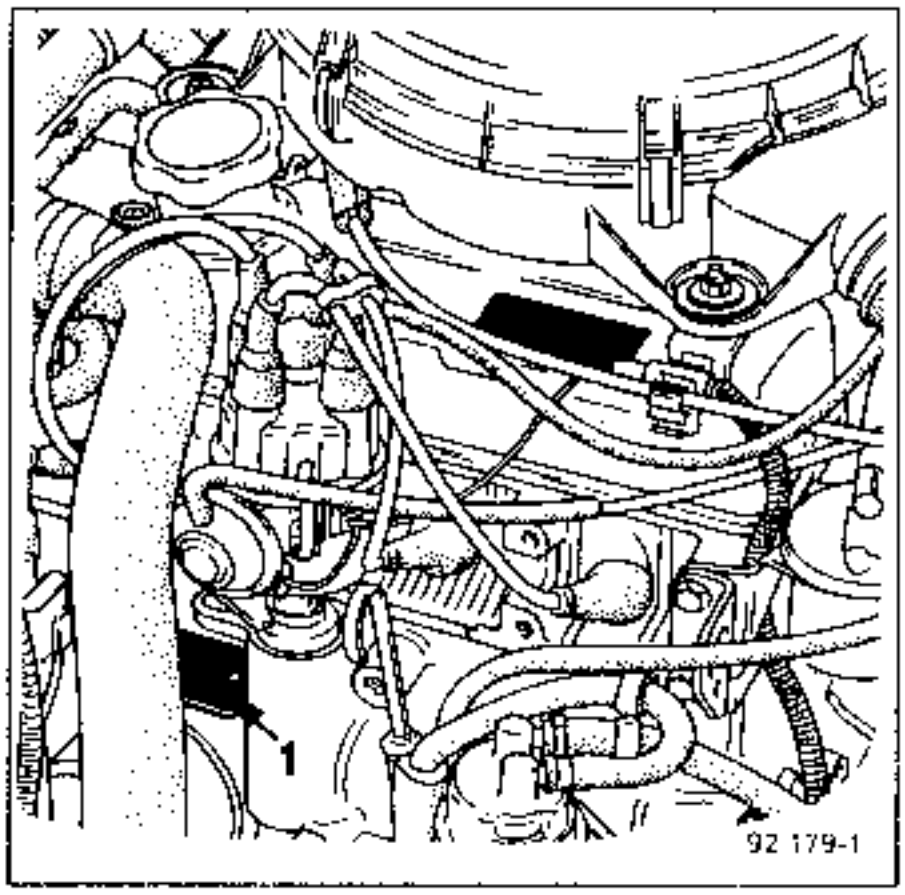
. The operations involved in removing and refitting

- the power unit assembly, to be carried out on a 2 column lift after having familiarised yourself with all the precautions to be taken. See General section,
- engine and gearbox,
- engine only.

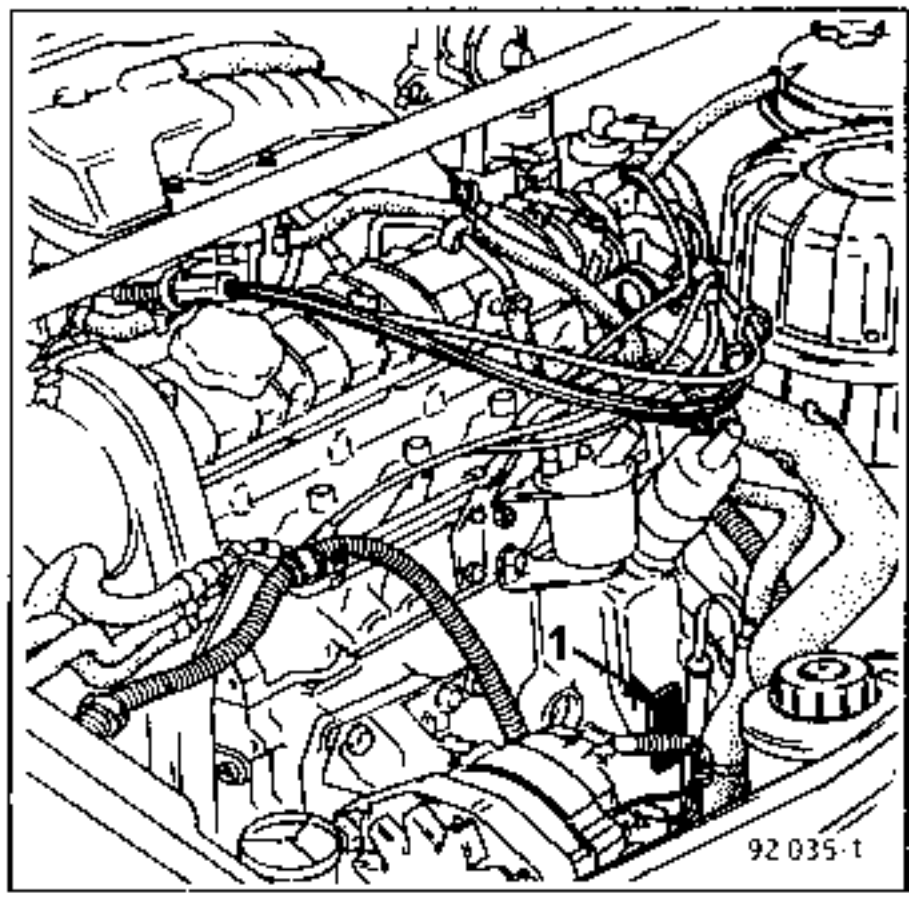
Although they can be carried out with the engine still in the vehicle, other operations such as "Replacing the cylinder head" - "Replacing the pistons and liners or pistons" will not be described in the Workshop Manual for the vehicle itself in that they are no different from those described in the engine Workshop Manual.

THE POSITION OF THE ENGINE IDENTIFICATION PLATE (1)

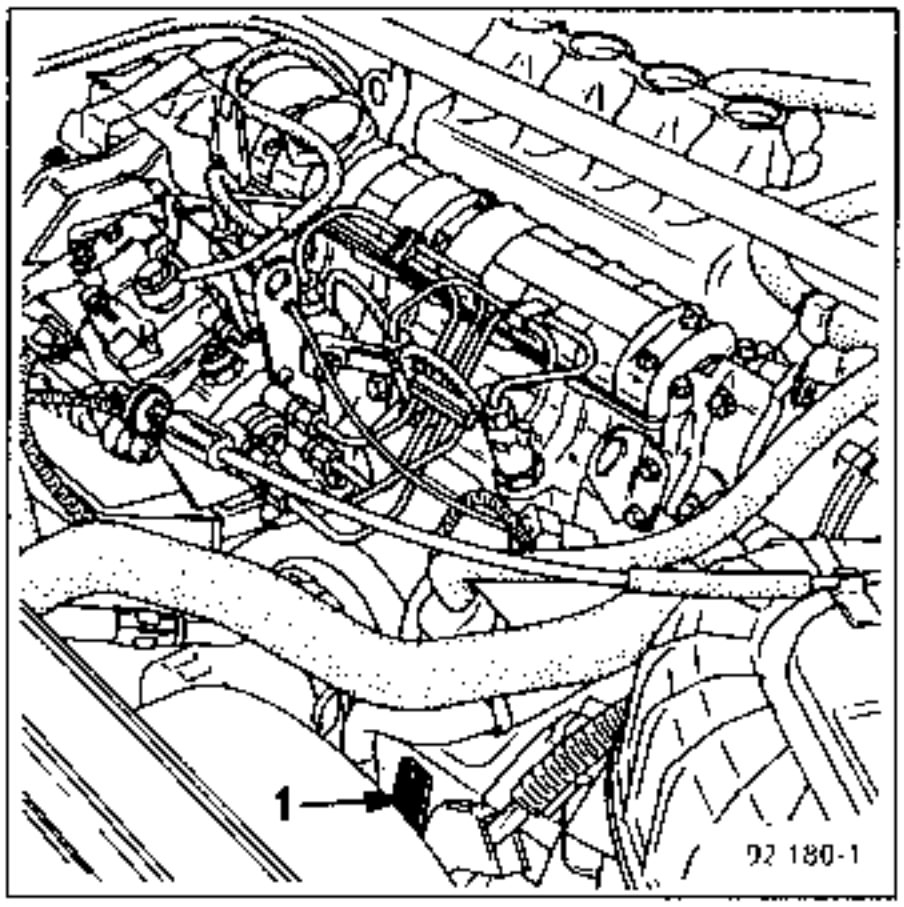
Type C engines



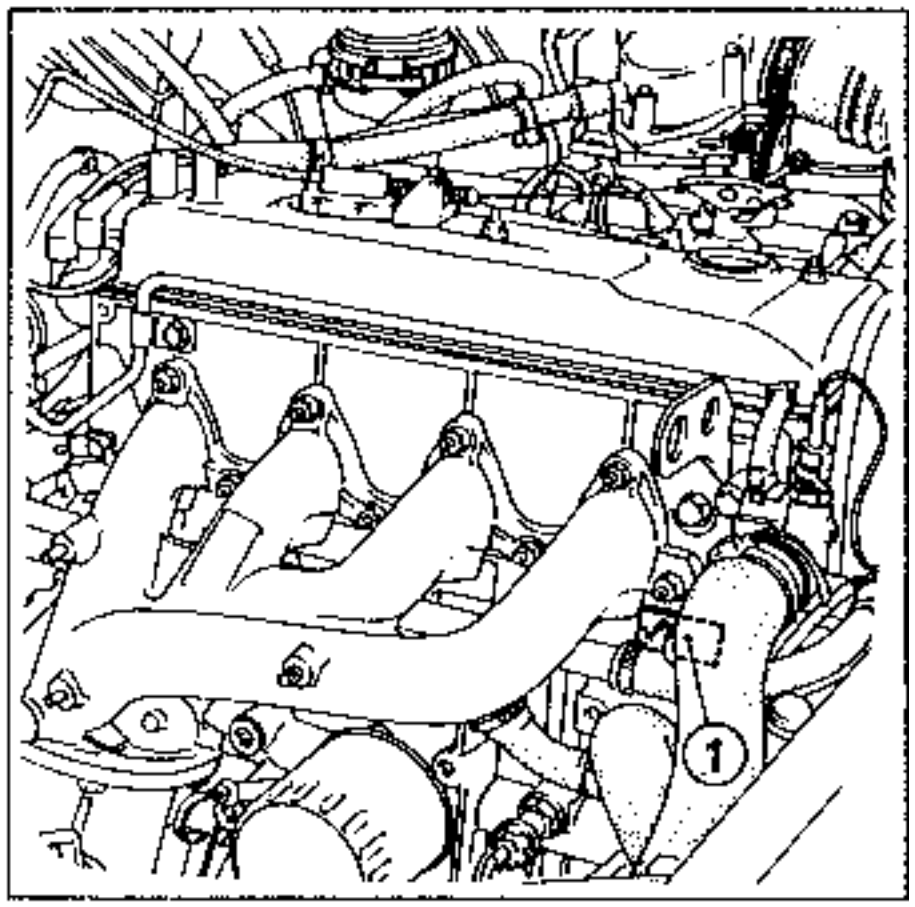
Type F2N-F3N-F2R engines



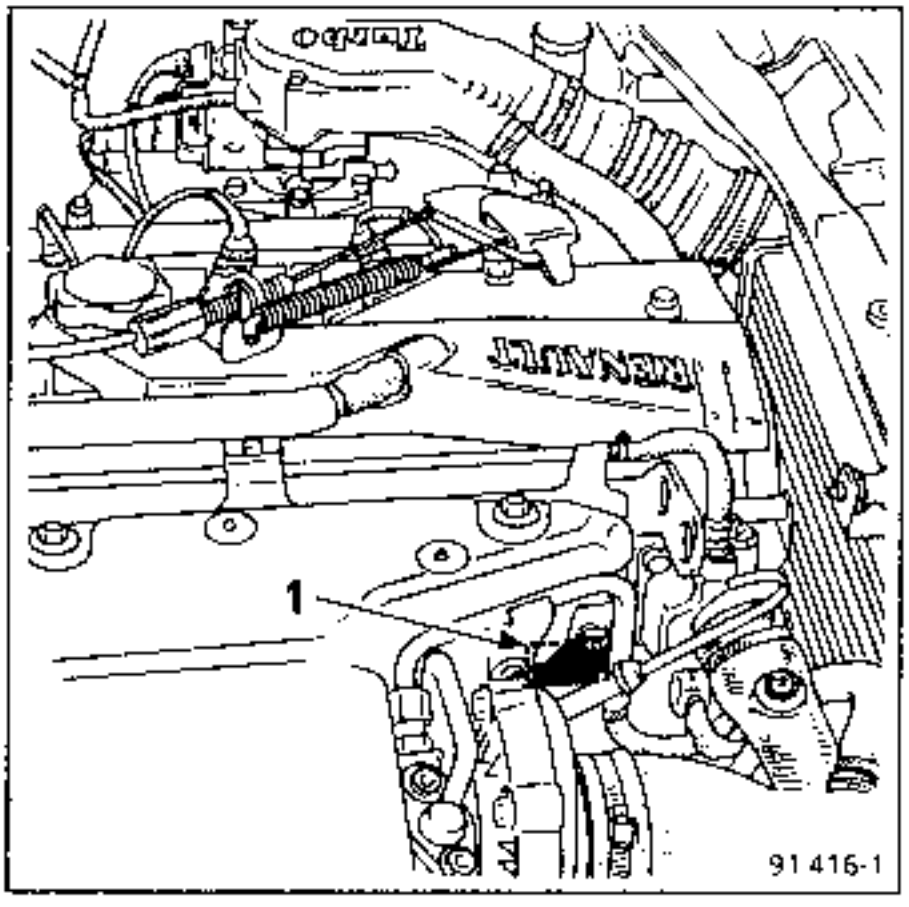
Type F8Q engines



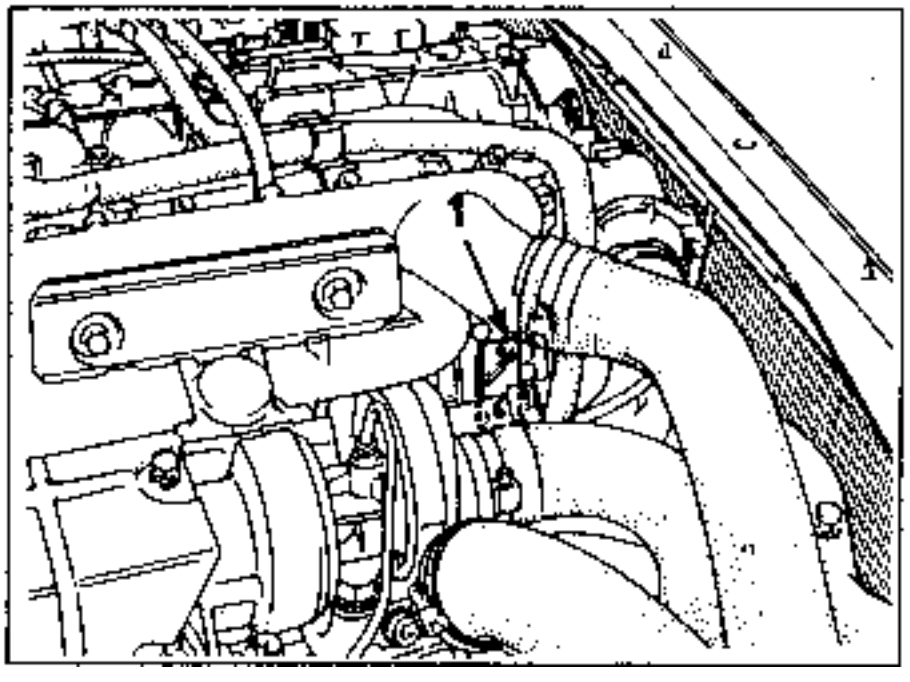
Type J7R-J7T-J6R engines



Type J7R Turbo engines



Type J8S engines



METHOD OF CHECKING

An oil consumption of up to 1 litre (1.76 pints) per 1 000 km (621 miles) is acceptable.

Check that there is no external leakage from the engine.

For the check to be effective, the engine oil must be drained under given specific conditions :

- the engine must be warm,
- place the crankshaft at top dead centre on the firing stroke of no. 1 cylinder,
- remove the dipstick and the oil filler cap.

Allow the engine to drain for at least 15 minutes.

Refit the drain plug and "seal" it (with a dab of paint across both the plug and the sump) to be able to check, later, that it has not been removed.

Using a graduated flask, measure the quantity of oil required to fill the engine :

Engine type :	**C**	**: 3.0 litres,**
	F2R-F3N-F2N	**: 4.7 litres,**
	F8Q	**: 5.0 litres,**
	J6R J7R J7T	**: 5.7 litres,**
	J7R 12 Valves	**: 5.0 litres,**
	J8S	**: 4.8 litres.**

Refit and seal the filler cap.

Ask the vehicle user to come back after he has driven the vehicle for 1 000 km (621 miles) carrying out regular checks on the oil level with the dipstick.

When the vehicle is returned, check that the drain plug and the filler cap have not been touched.

Return the engine to the same conditions :

- engine warm,
- crankshaft at top dead centre on the firing stroke of no. 1 cylinder,
- dipstick and filler cap removed.

Drain off the engine oil and measure its quantity with the graduated flask.

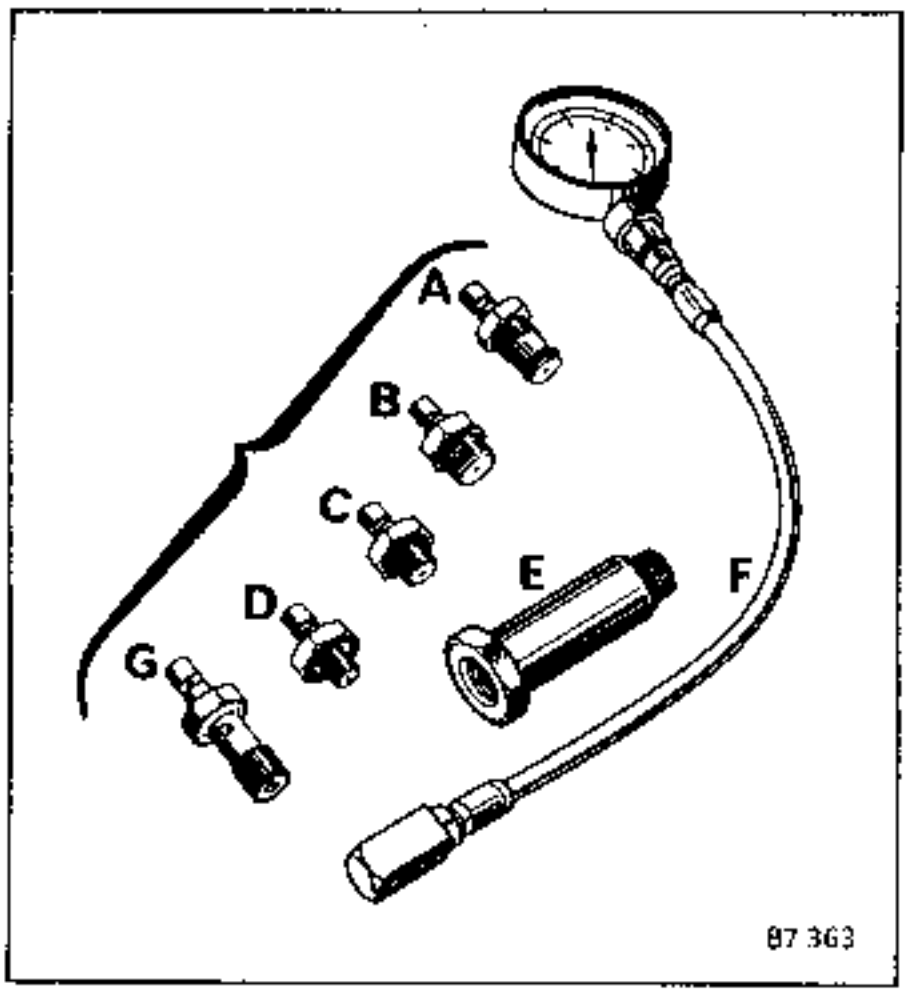
Calculate the oil consumption in litres/1 000 km if the distance covered is not exactly 1 000 km.

CHECKING

ESSENTIAL SPECIAL TOOLS	
Mot. 836-05	Oil pressure test kit

The oil pressure is to be checked when the engine is warm (approximately 80°C).

Contents of kit **Mot.836-05.**



APPLICATIONS :

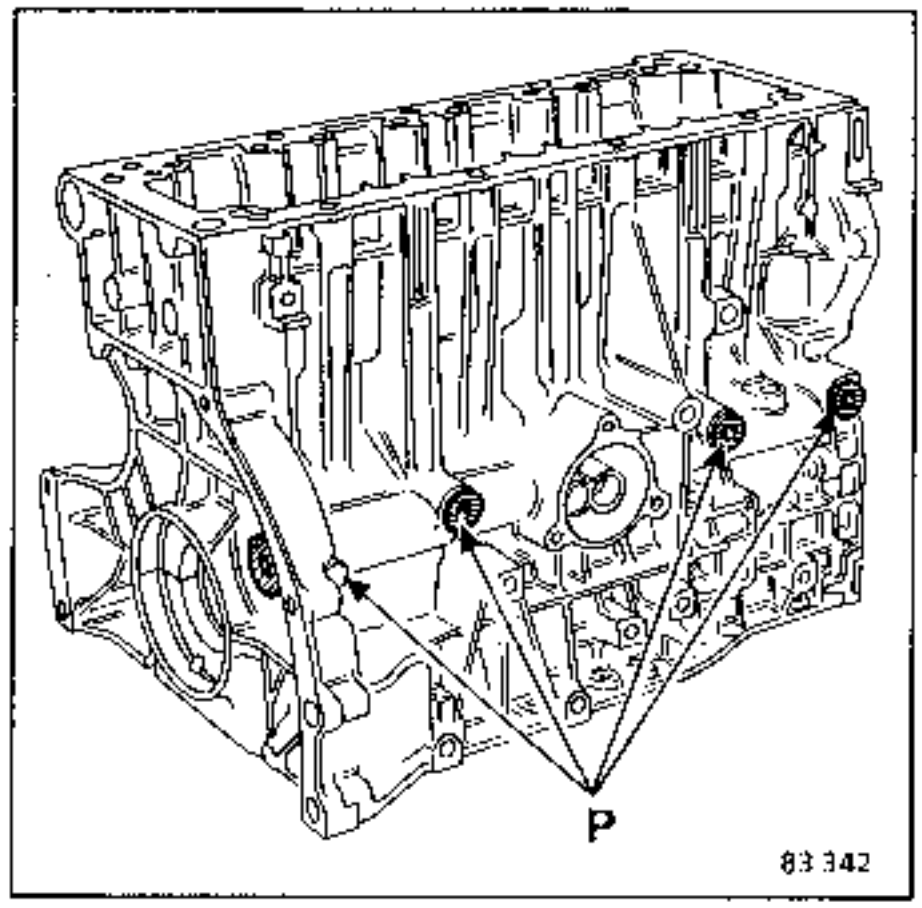
Engines Cxx : E + C + F

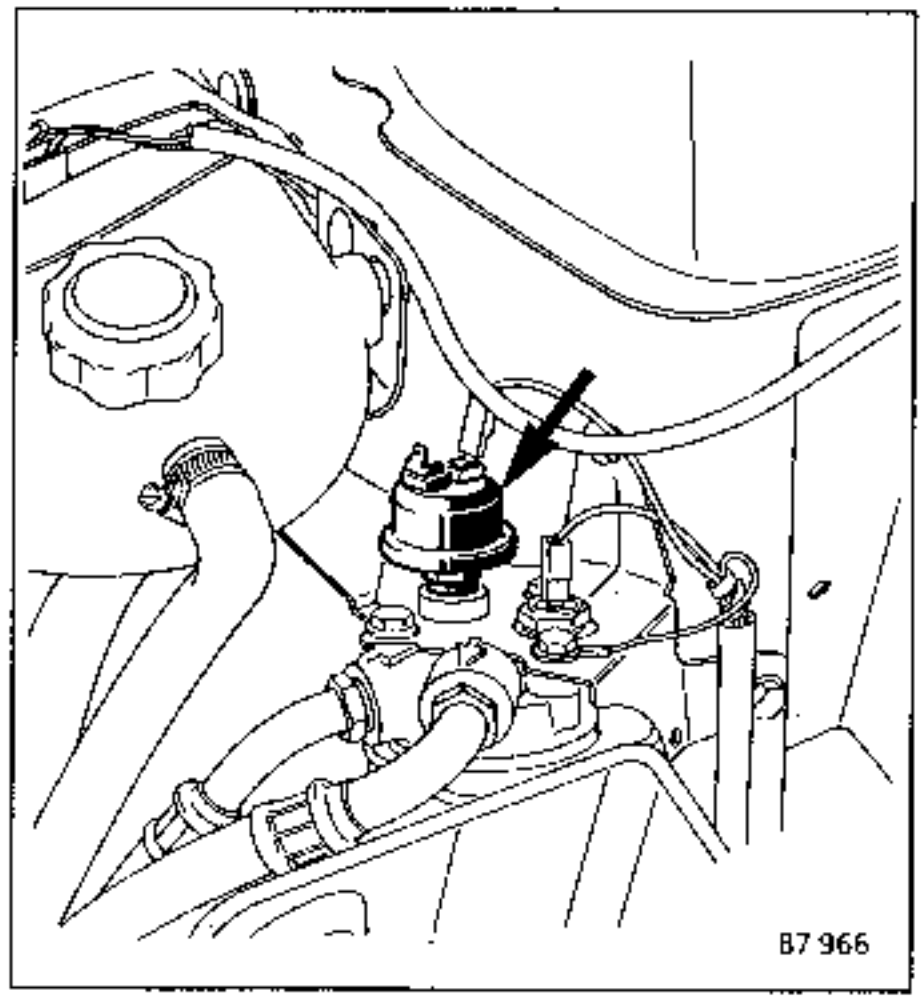
Engines Fxx : B + F

Engines Jxx : B or C + F

The oil pressure can be taken either :

- on the engine at P,
- or on the oil cooler, if the vehicle is equipped with one.



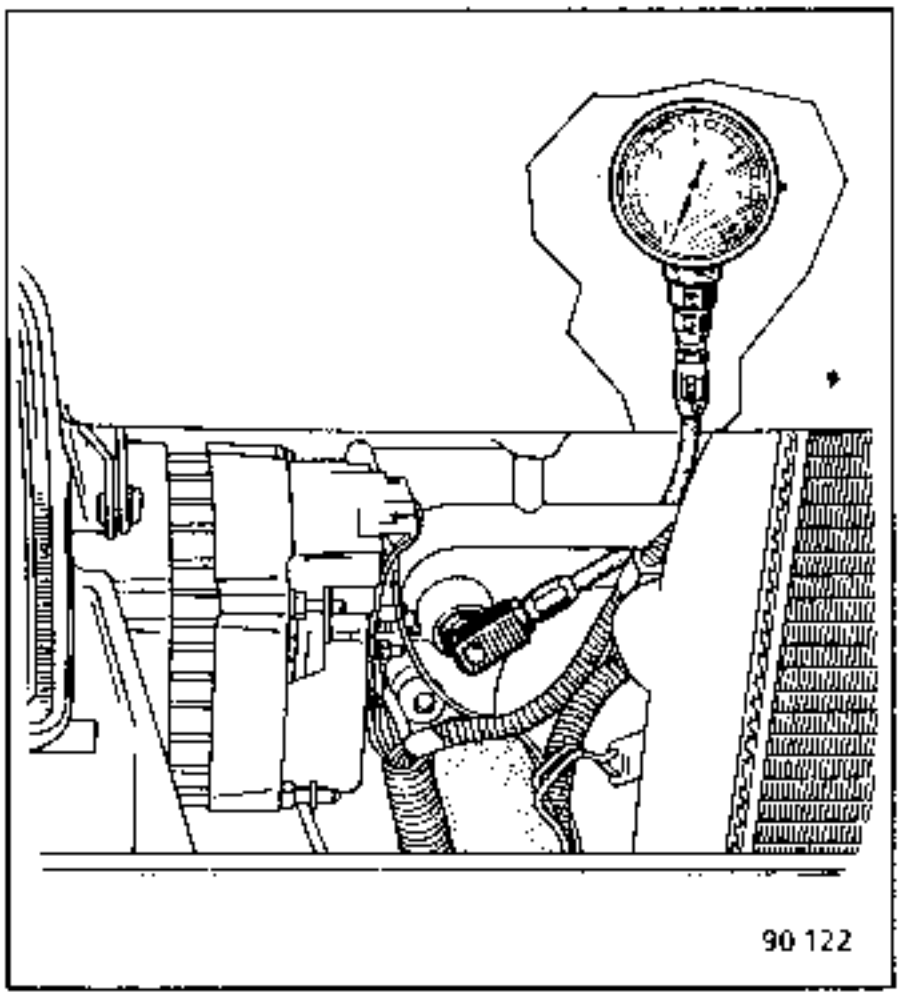


Minimum oil pressure at 80°C

- At idling speed ..... 0.8 bar min.
- At idling speed (J7R turbo engine) ..... 1.0 bar min.
- At idling speed (J7R 12 Valve engine) ..... 1.25 bar min.
- At 3 000 rpm ..... 3.0 bar min.

ENGINE TYPES : Fxx

The operation can be made easier by removing the radiator grille and the air baffle (on certain versions).

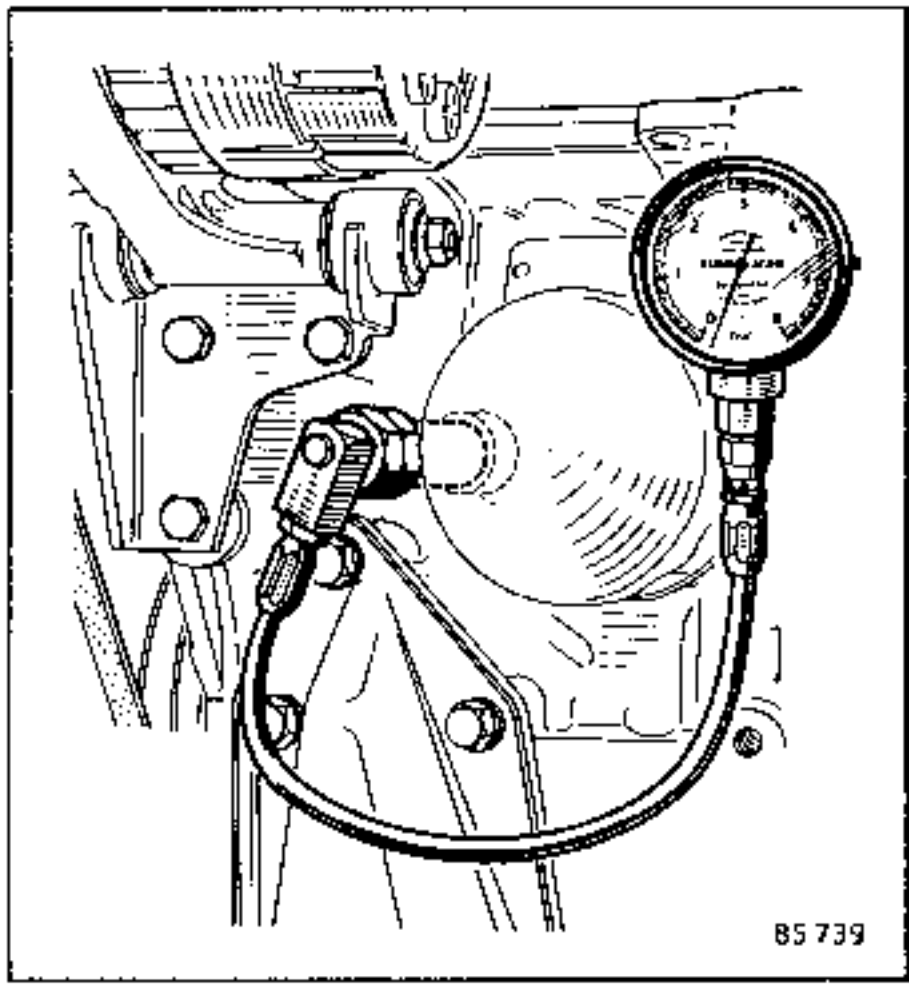


Checking :

Minimum oil pressure at 80°C

- at 1 000 rpm ..... 2 bar min.
- at 3 000 rpm ..... 3.5 bar min.

ENGINE TYPES : C



Checking :

Min. oil pressure 80°C

- at idling speed ..... 0.7 bar min.
- at 4 000 rpm ..... 3.5 bar min.

REMOVING-REFITTING

ESSENTIAL SPECIAL TOOLS	
Elé. 346-04	Belt tension tester
Mot. 878	Engine lifting equipment with chain

TIGHTENING TORQUES (in daN.m)	
Crankshaft pulley securing bolts	14
Engine mounting securing nuts	4

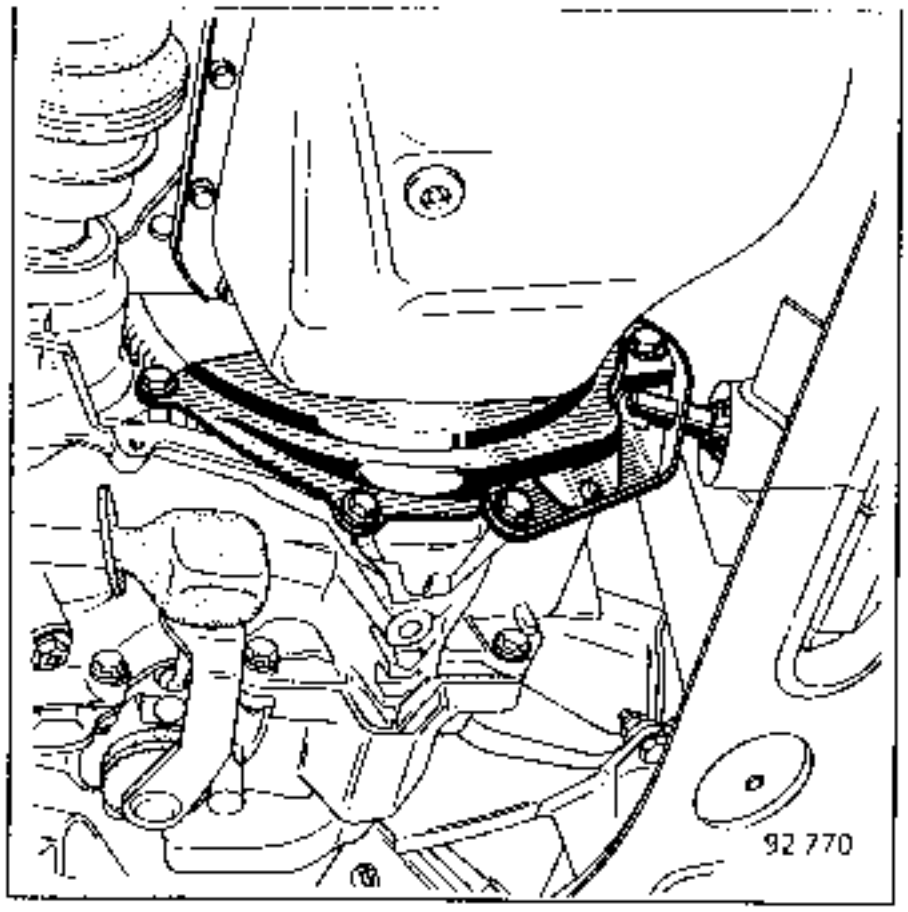
CONSUMABLES
LOCTITE FRENETANCH : Crankshaft pulley securing bolts
GREASE No. 20 : Clutch shaft splines

REMOVING

Disconnect the battery.

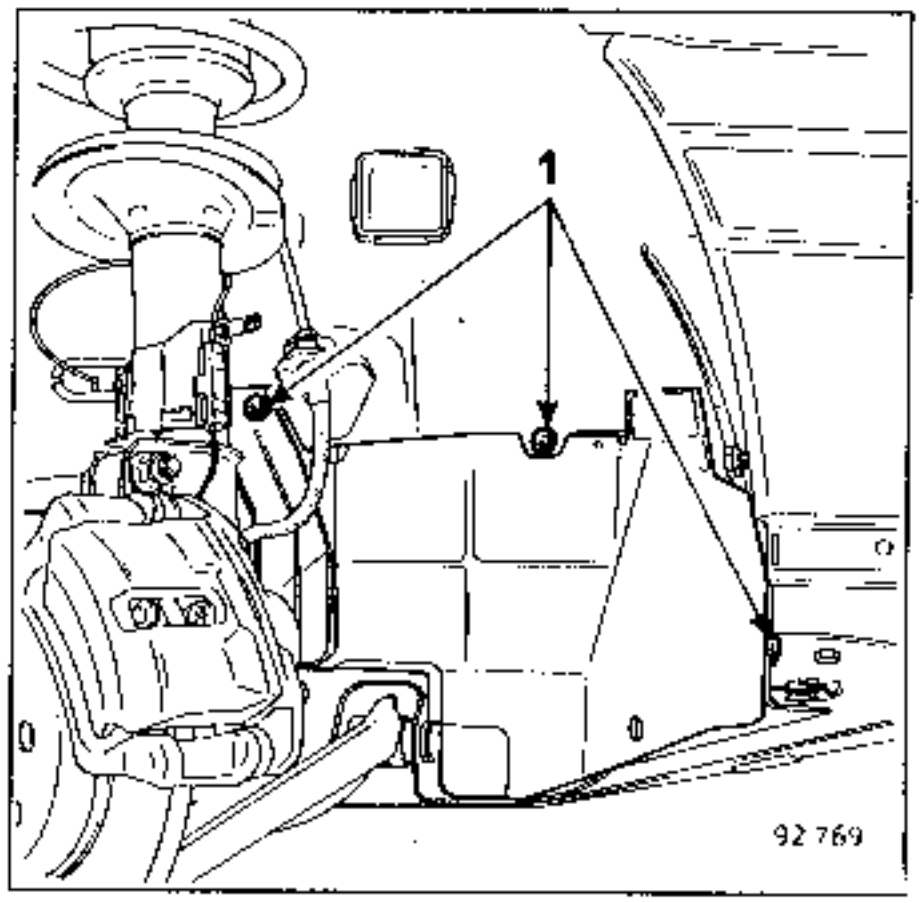
Remove :

- the air filter,
- the coolant pump-alternator drive belt,
- the engine tie bar,
- the flywheel protection plate,



- the front right hand wheel.

Drill out the rivets (1) on the protection plate.

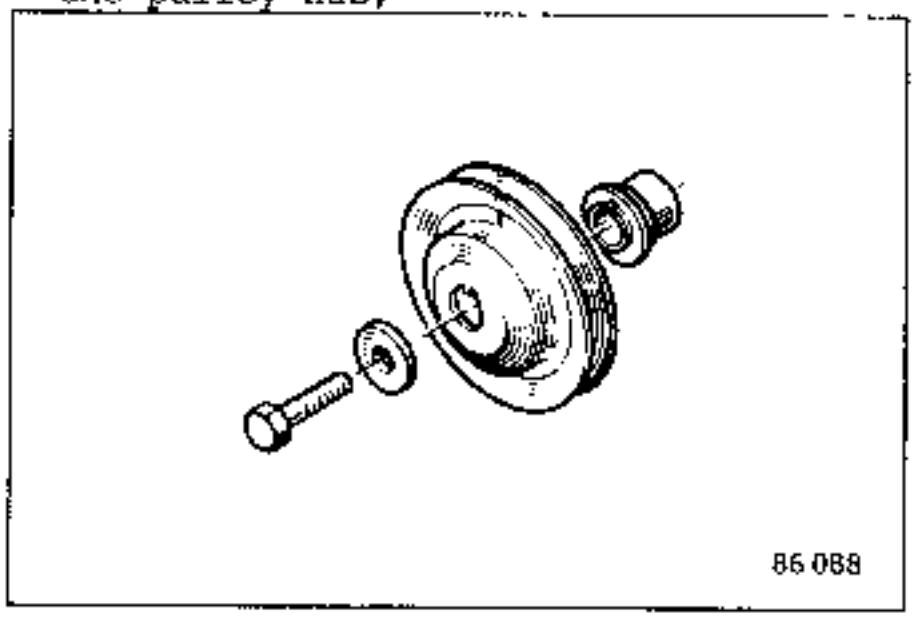


Remove the crankshaft pulley.

Place the crankshaft key at the top.

Remove :

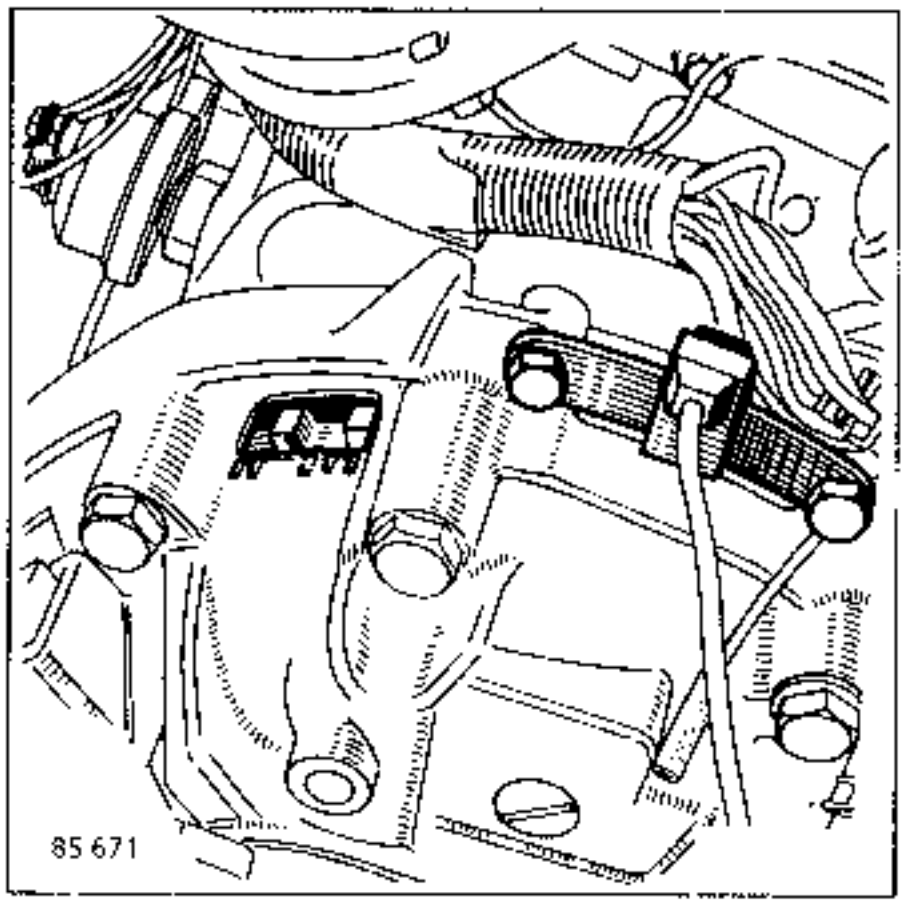
- the pulley hub,



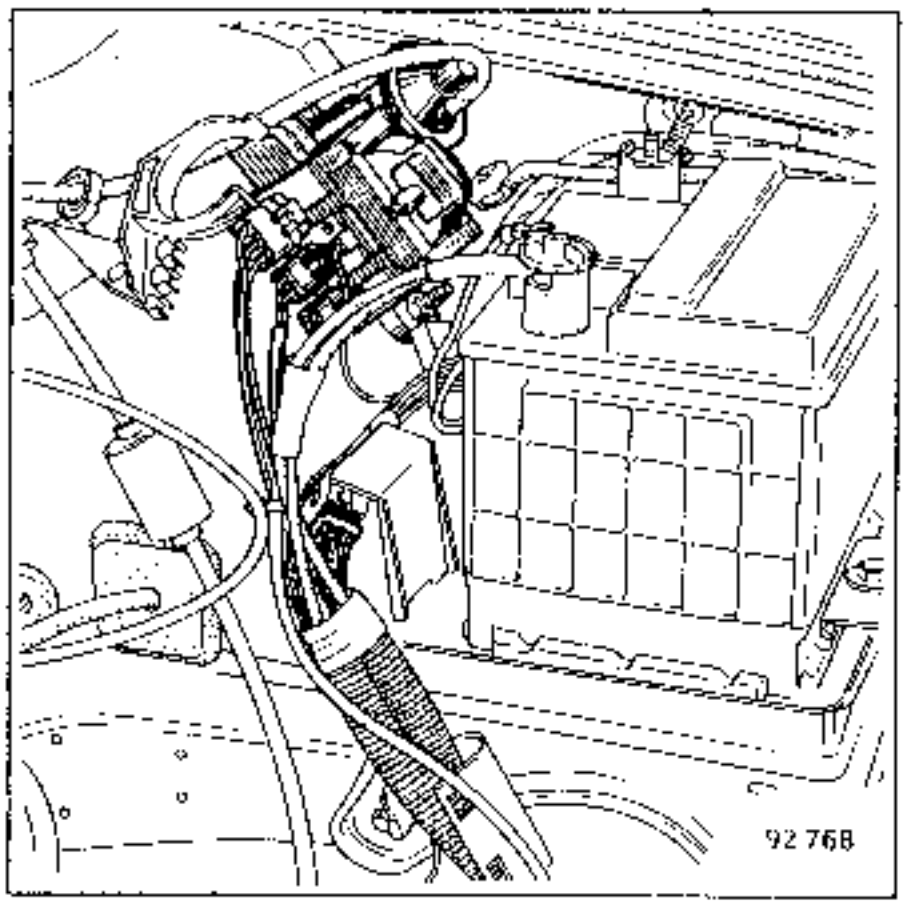
- the starter rear securing bolts and free it,
- the accelerator, choke and speedometer drive cables.

Remove :

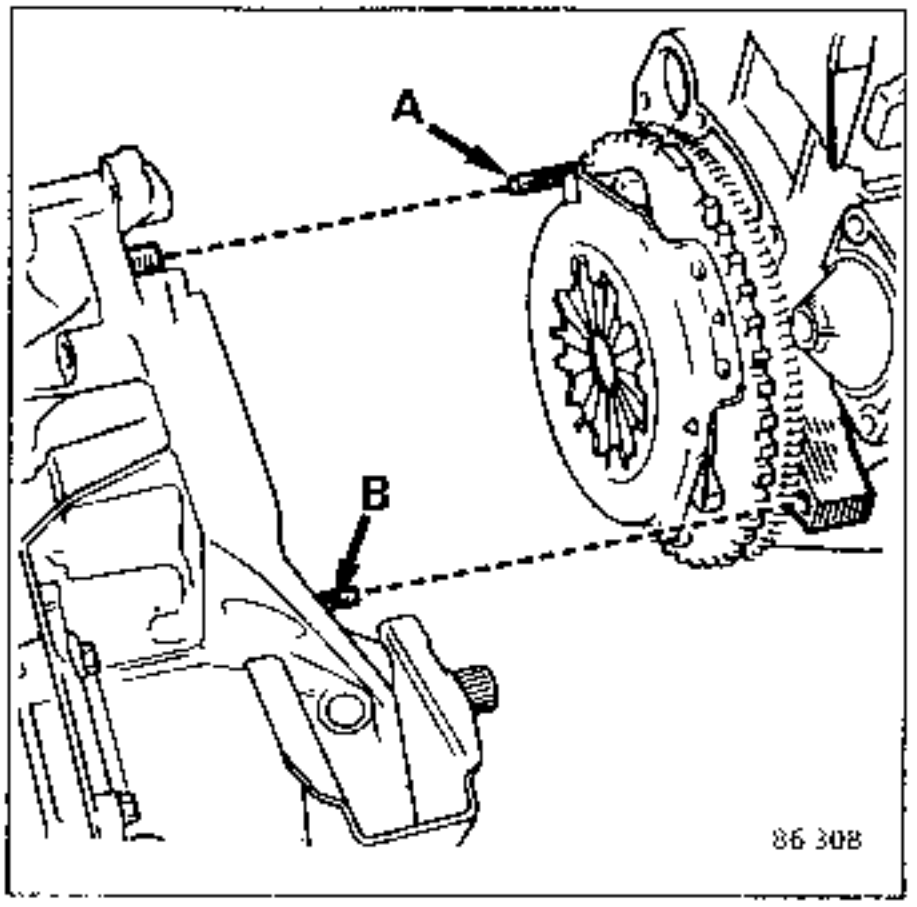
- the electronic ignition sensor,



- the heating system hoses,
- the electrical junction blocks,



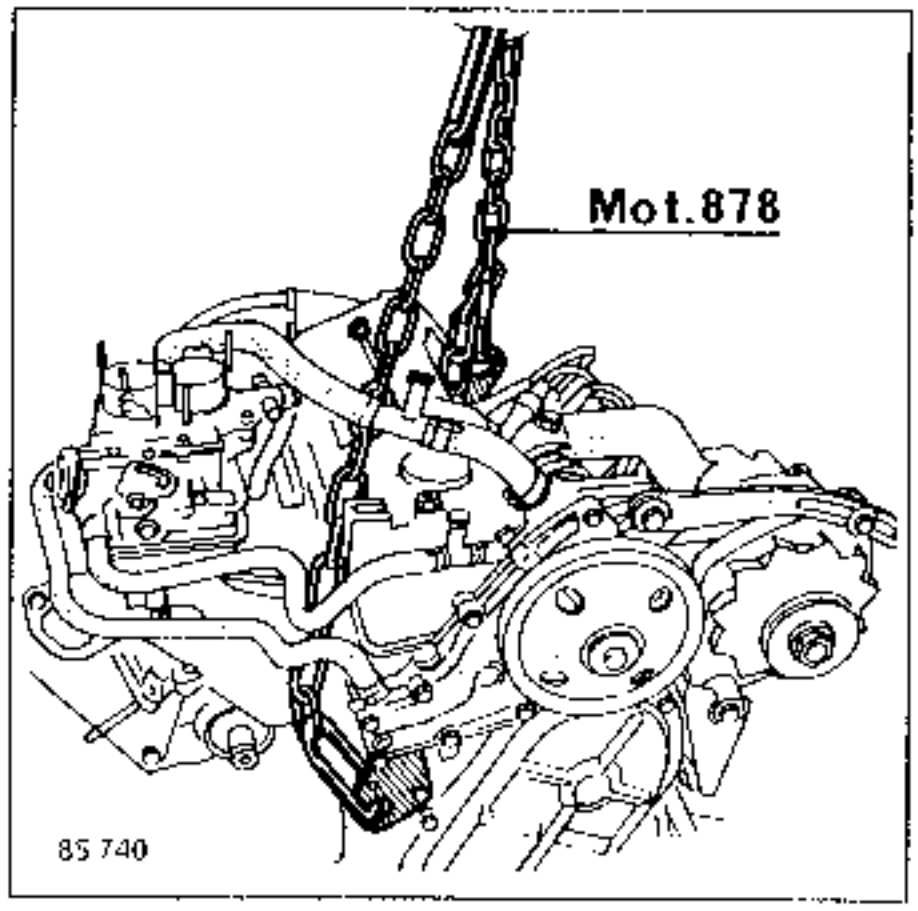
- the exhaust clamp,
- the engine to gearbox securing bolts,
- the studs (A) and (B),



- the bolts that secure the right hand engine mounting.

Using a lifting hook and the chain from tool Mot. 878, gradually lift the engine, keeping an eye on the right hand drive shaft as you do so to avoid it coming out of place.

Place a jack under the gearbox to hold it in position.



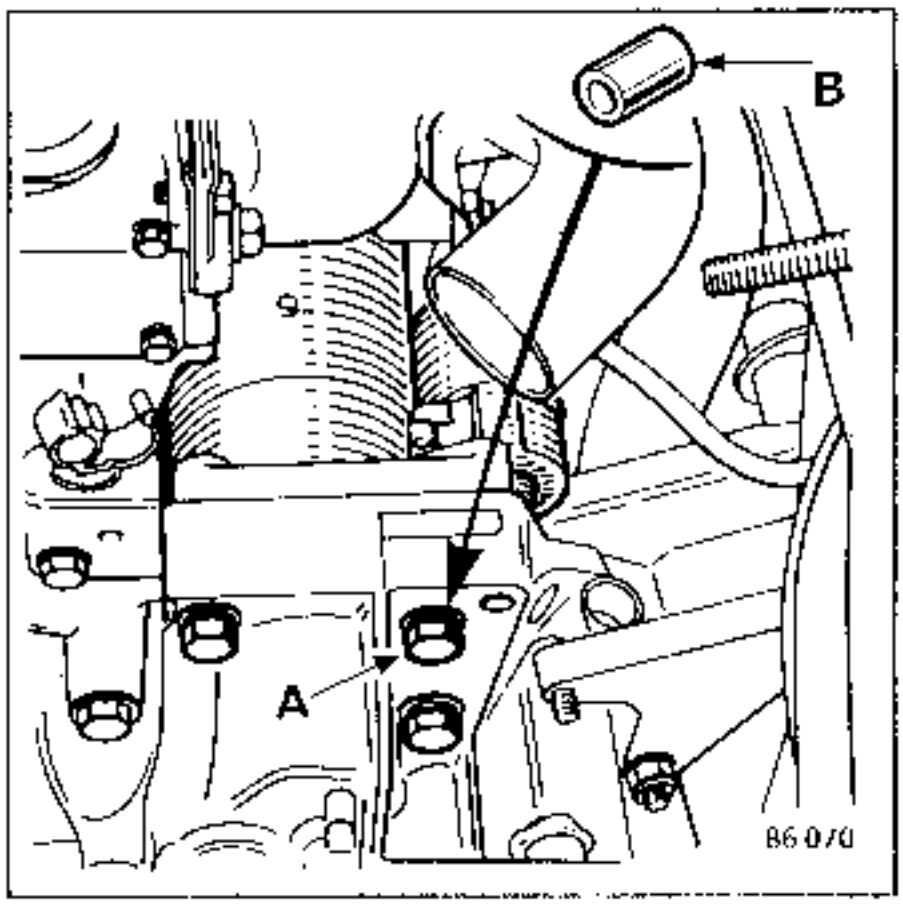
Take out the engine.

REFITTING (special points)

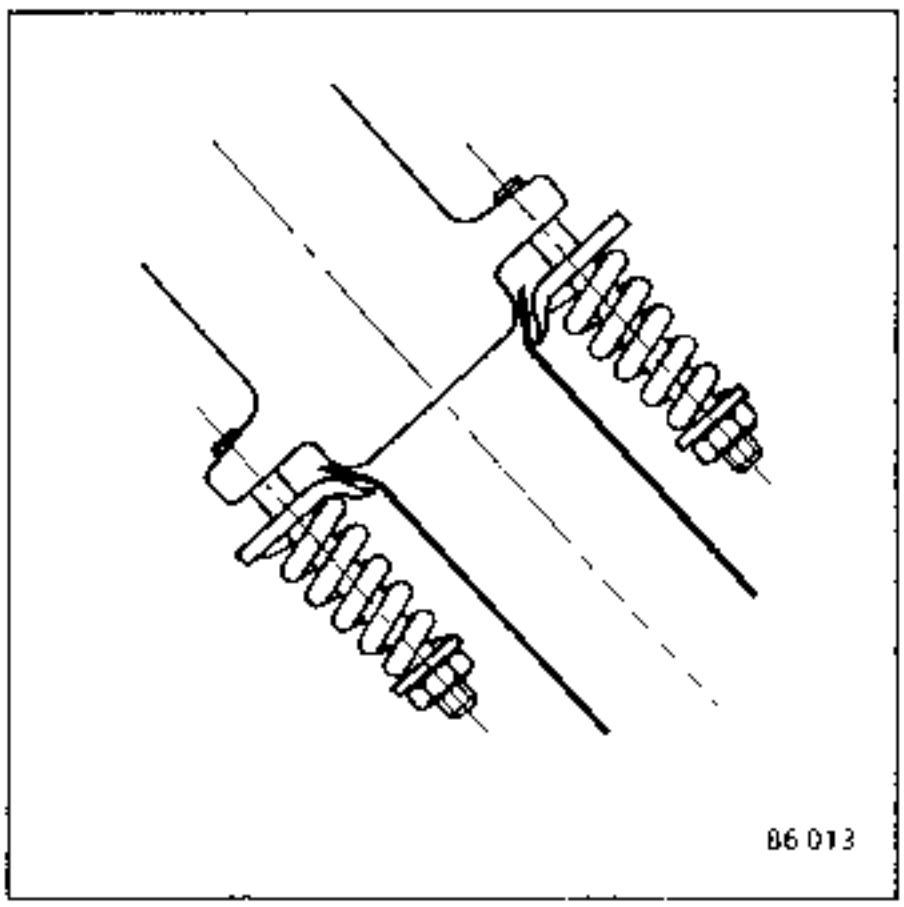
Grease the splines on the clutch shaft.

Ensure that the following are correct :

- the position in which the starter is fitted,



- the method of tightening the exhaust pipe clamp. Tighten the nuts until the springs are coil bound and then loosen them by one and a half turns.

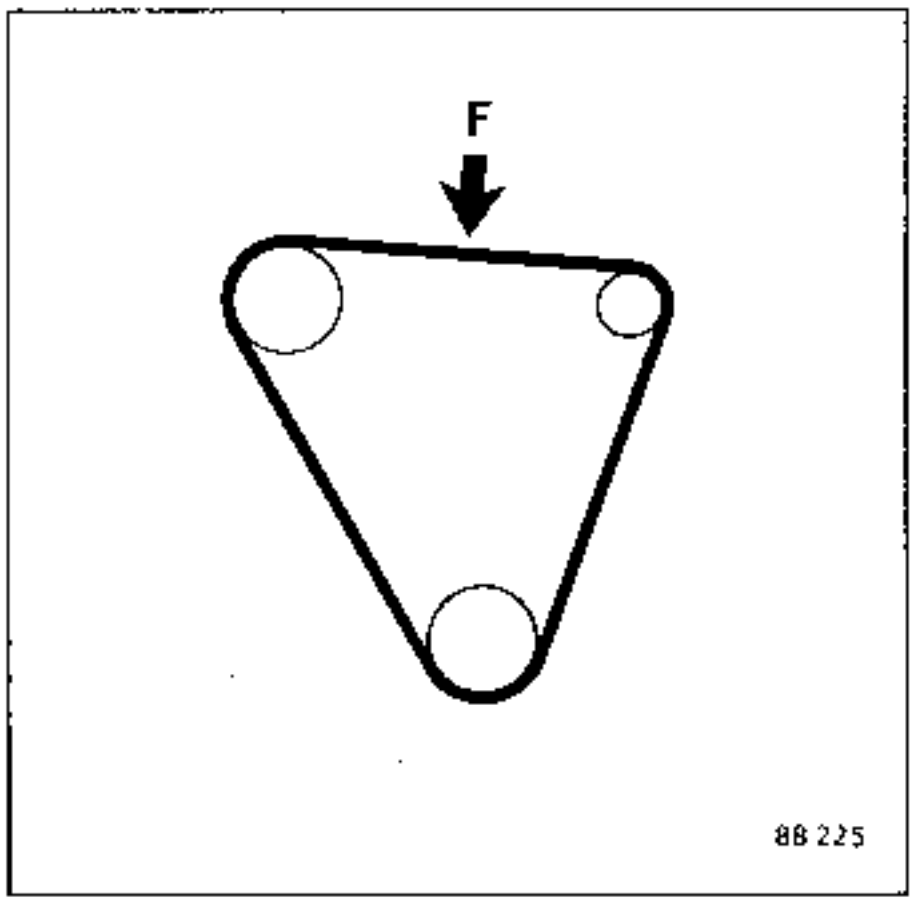


- Fill the engine with oil,

- Fill and bleed the cooling system,

- Correct the belt tension using tool Ele. 346-04 (see section 11).

Adjust the choke cable travel.



REMOVING-REFITTING

ESSENTIAL SPECIAL TOOLS	
Elé. 346-04	Belt tension tester
Mot. 878	Lifting chain and rings

THE ENGINE ALONE CAN BE REMOVED FROM ABOVE THE VEHICLE.

TIGHTENING TORQUES (in daN.m)	▽
Engine mounting bolts	4
Crankshaft pulley	10

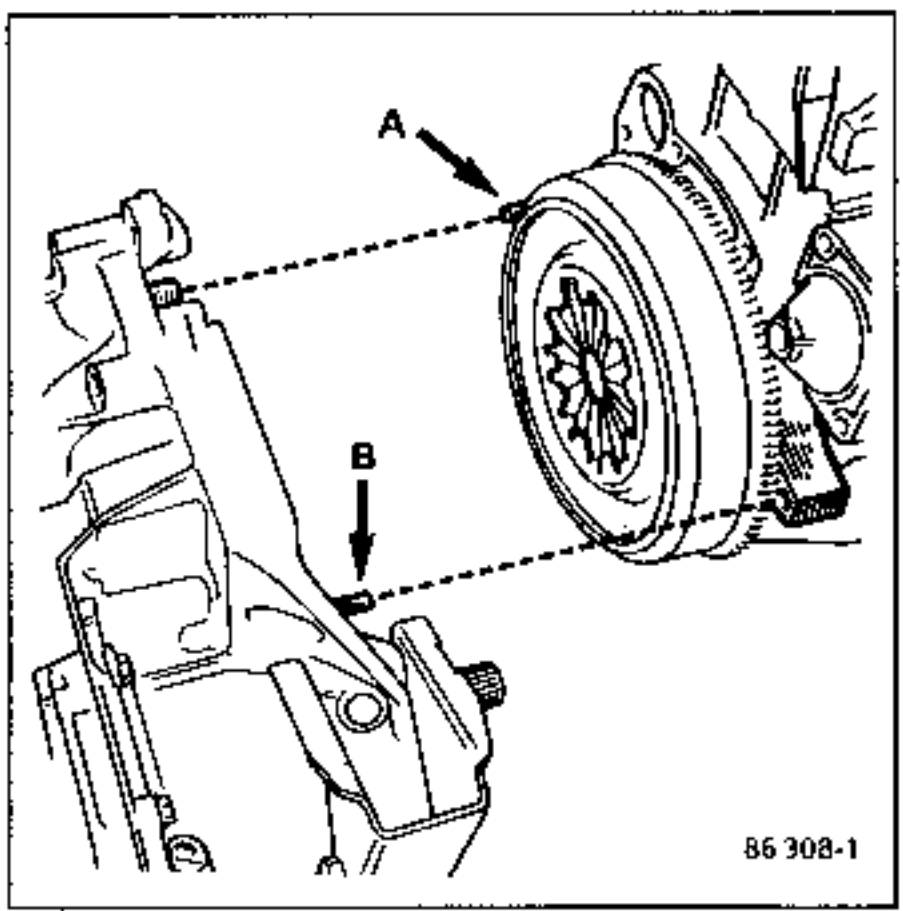
REMOVING

Disconnect :

- the battery,
- the electrical connectors,
- the cables.

Remove :

- the air filter,
- the radiator after first draining the cooling system,
- the coolant pump-alternator belt,
- the coolant pump pulley,
- the crankshaft pulley,
- the exhaust pipe clamp,
- the engine-gearbox tie rod,
- studs (A) and (B),



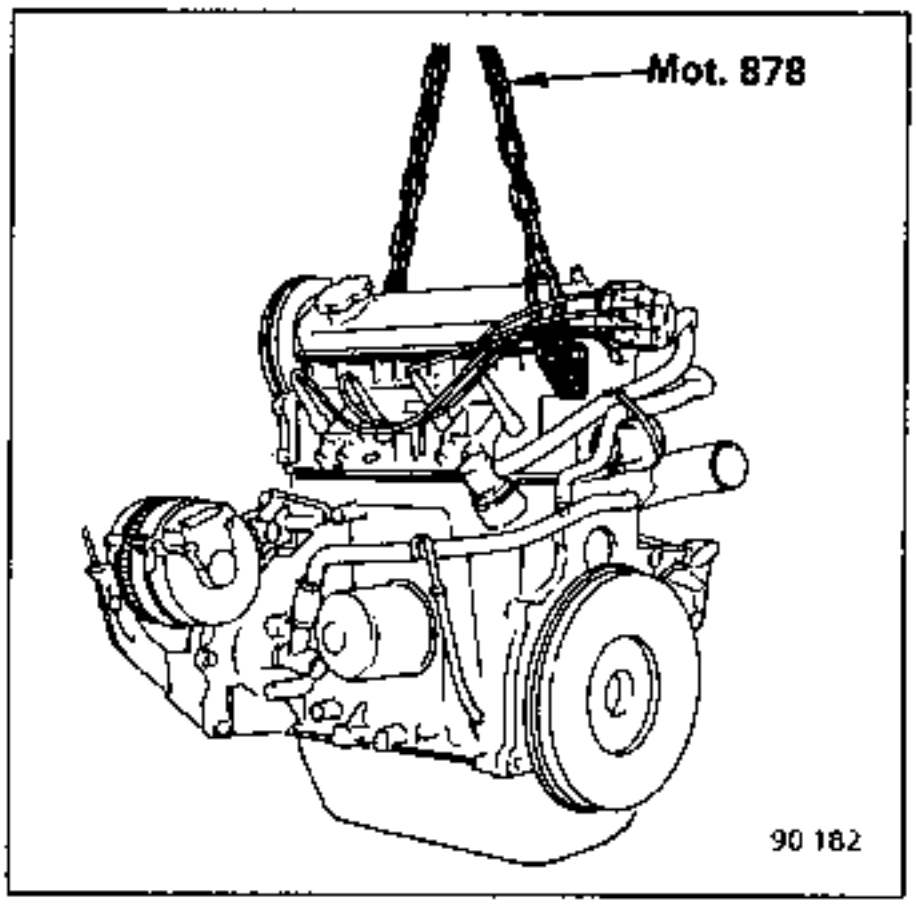
- the bolts from around the box,
- the accelerator and choke cables.

Fit a lifting hook and tool Mot.878 in place.

Remove :

- the front right hand engine mounting assembly,
- the gearbox front left hand flexible mounting.

Move the gearbox to the left and take out the engine from the engine compartment.



REFITTING (special points)

Grease the splines on the clutch shaft.

▽ Refit the pulleys by carrying out the removing operations in reverse.

- Fill the engine with oil, if necessary,
- fill and bleed the cooling system,
- retighten the exhaust pipe clamp,
- adjust the belt tension using tool Ele. 346-04.

Adjust the accelerator and choke cables.

REMOVING-REFITTING

TIGHTENING TORQUES (in daN.m)	
Brake caliper securing bolts	10
Steering universal joint sec.bolt	2,5
Wheel bolts	9
Steering ball joint nuts	4
Lower ball joint nuts	6
Lower bolts on shock absorbers	20

REMOVING

Disconnect the battery.

Remove :

- the bonnet,

- the front cross member.

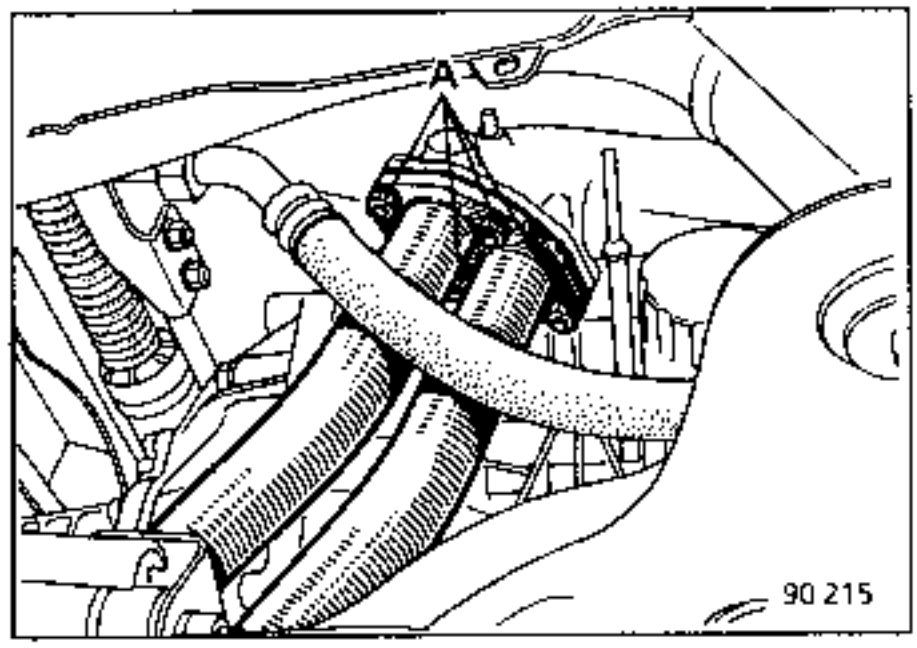
The power steering pump, placing it on one side of the vehicle (on power steering models).

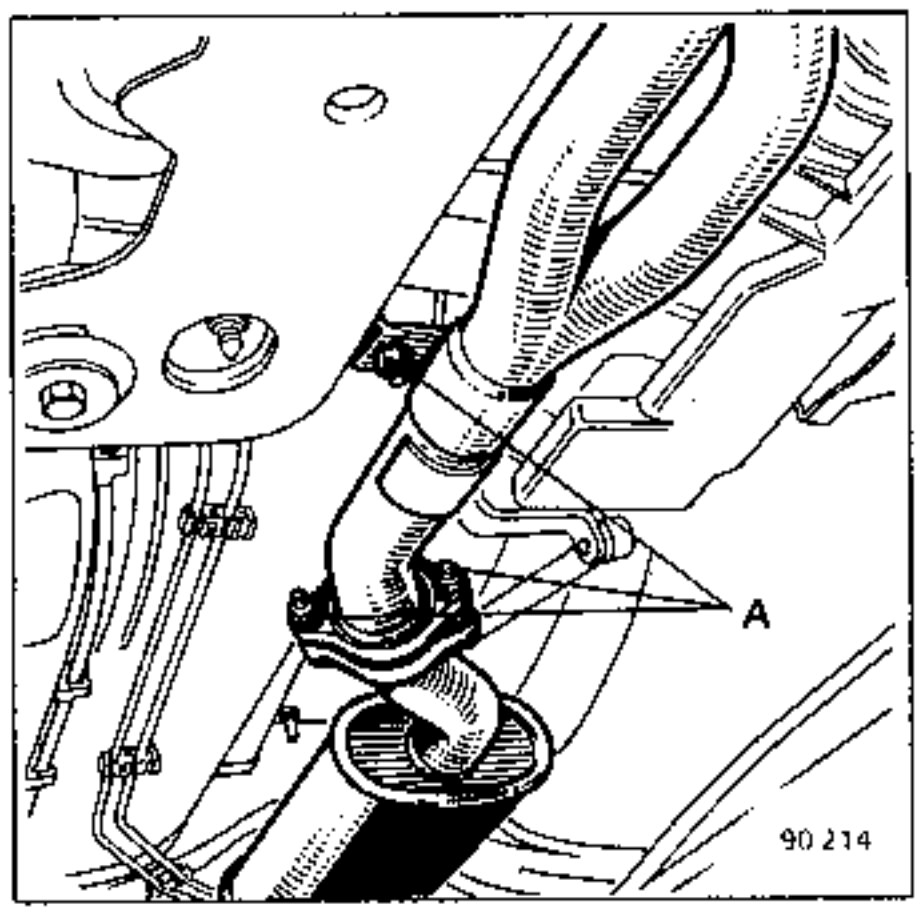
Disconnect :

- the pipes,
- the electrical connections,
- the accelerator cable,
- the clutch cable,
- the ignition sensor.

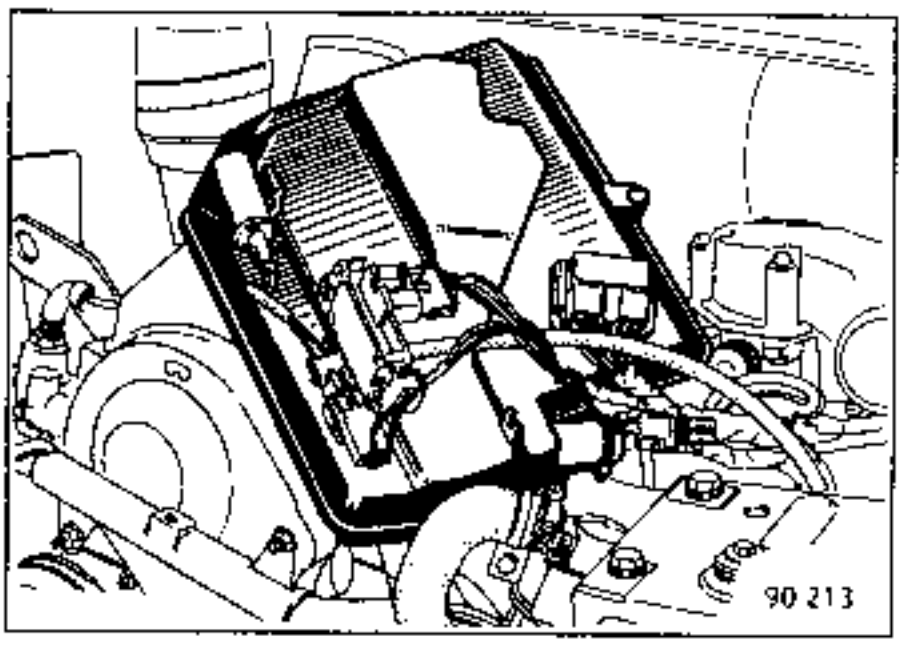
Remove :

- the exhaust down pipe at (A).





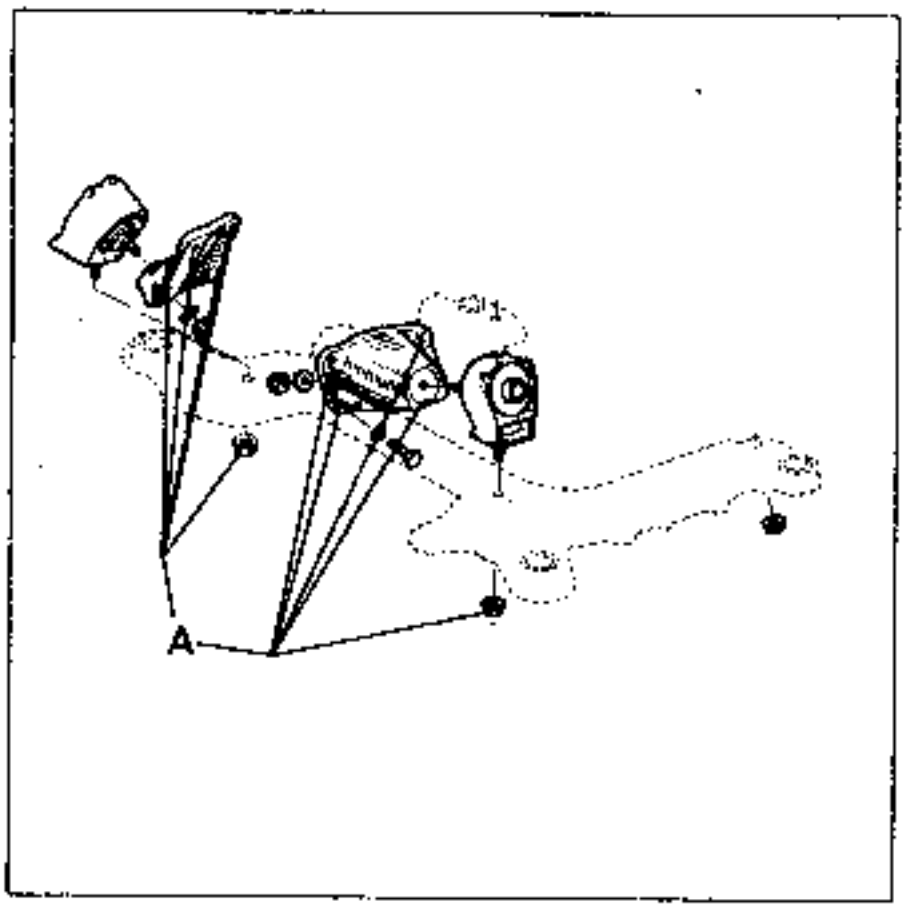
Disconnect the computer and place it on top of the engine.



Remove :

- the bolts from around the gearbox.

Remove the engine mountings at (A).



Remove the engine using tool Mot.878.

REFITTING (Special points)

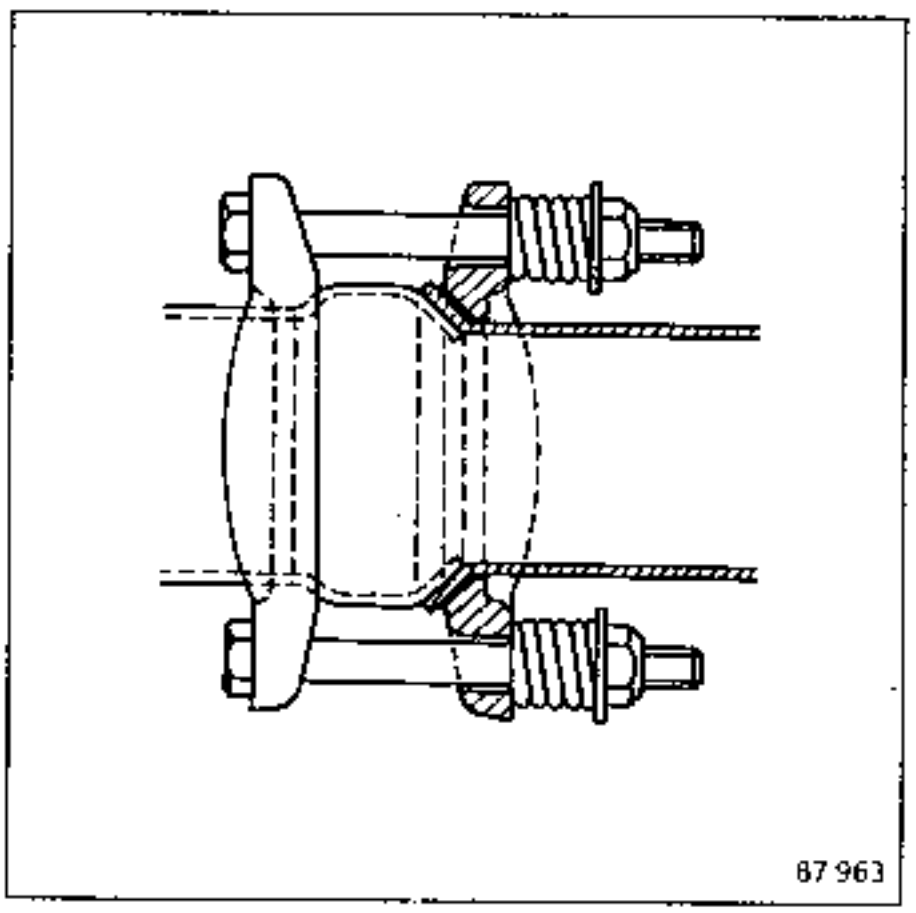
Fill the engine with oil if necessary,

- fill and bleed the cooling system.

Adjust the accelerator cable.

Tighten the exhaust pipe clamp after fitting the springs and anti-rattle bush.

The spherical joint is sufficiently tight as soon as the connection between the 2 pipes is fully sealed.



REMOVING-REFITTING

ESSENTIAL SPECIAL TOOLS
Mot. 878 Lifting chain and rings.

The engine or engine-gearbox assembly is removed from above the vehicle, after first removing its front end panel.

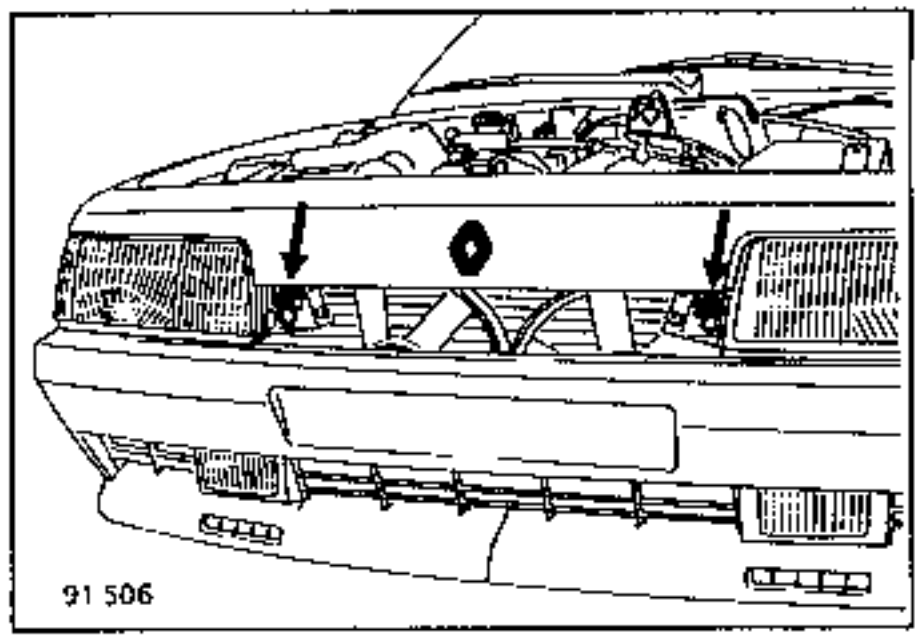
TIGHTENING TORQUES (in daN.m)	▽
Engine mounting securing bolts	4
Wheel bolts	10
Bolts around gearbox	5

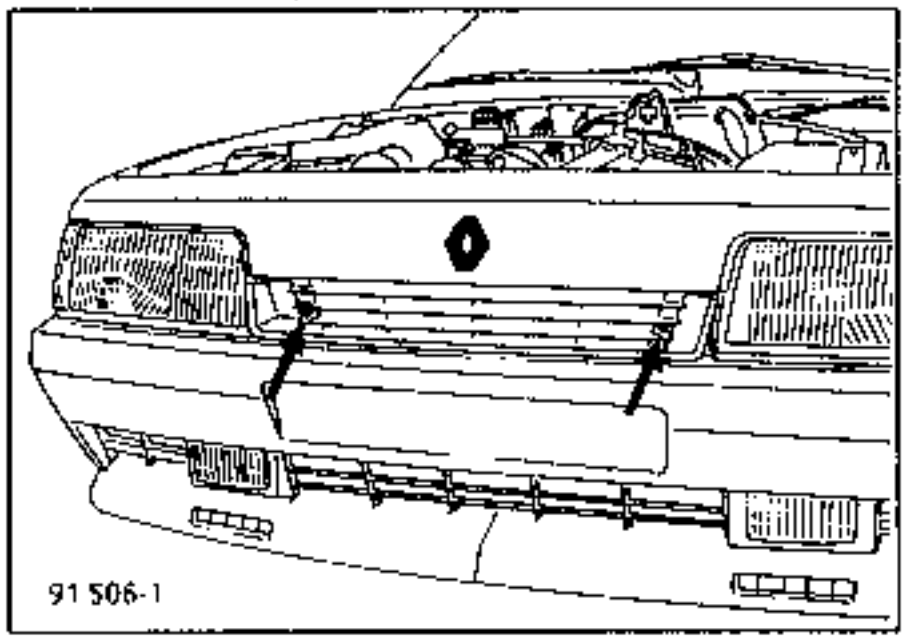
REMOVING the front end panel.

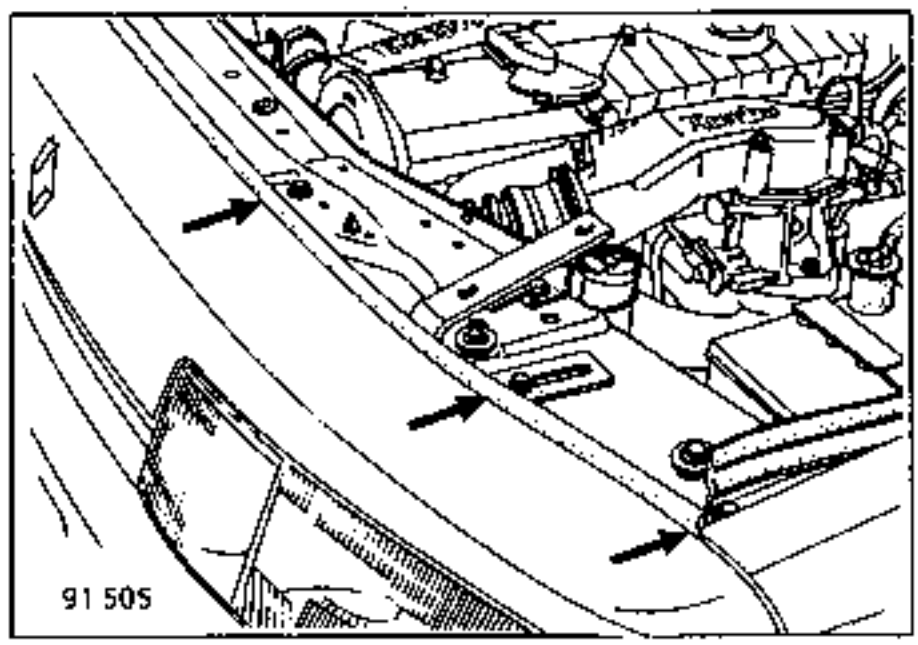
Disconnect the battery.

Remove :

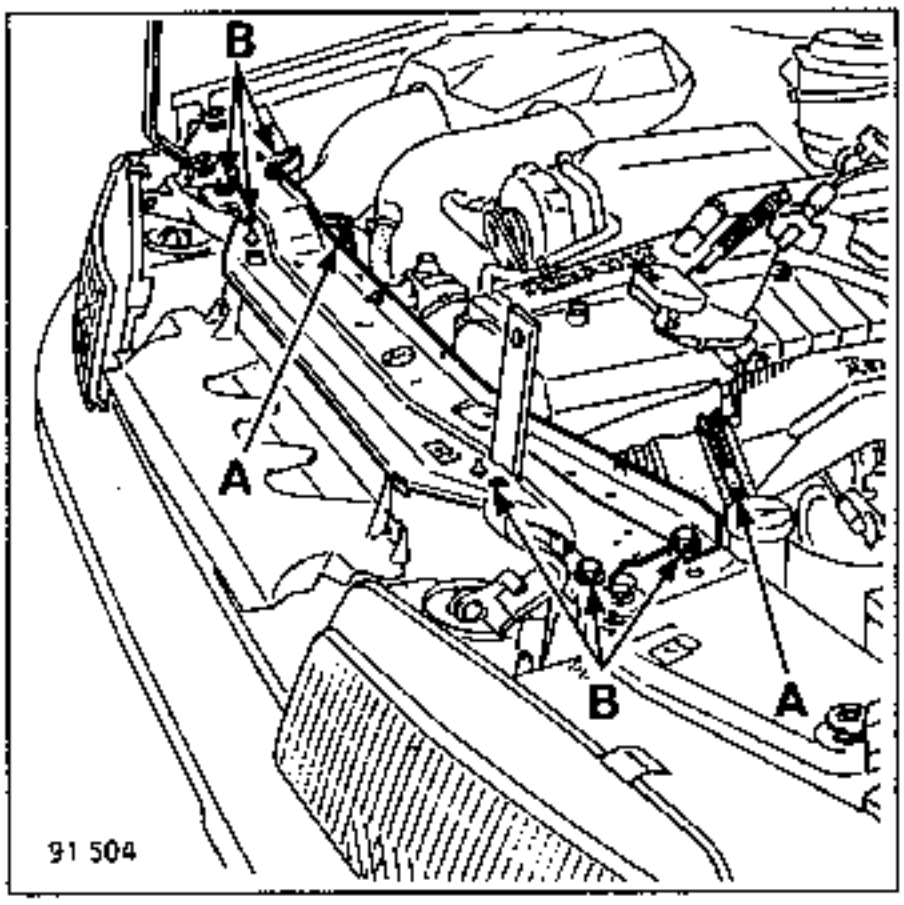
- the bonnet,
- the radiator grille,
- the panel from above the radiator grille,





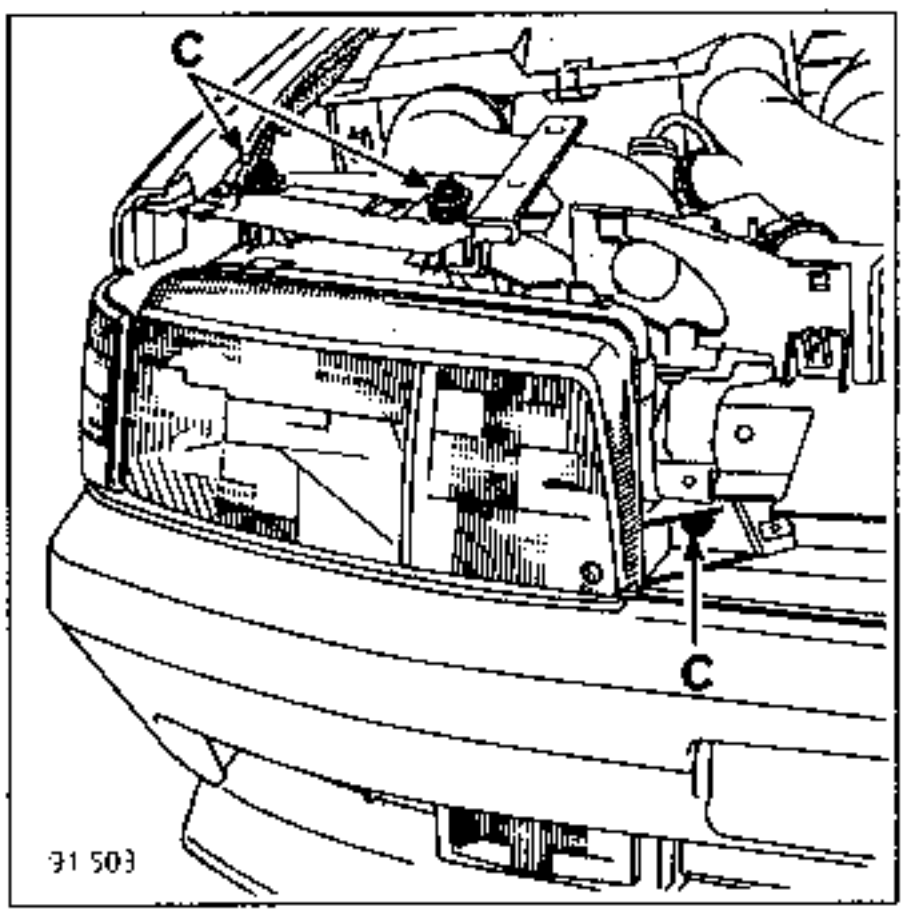


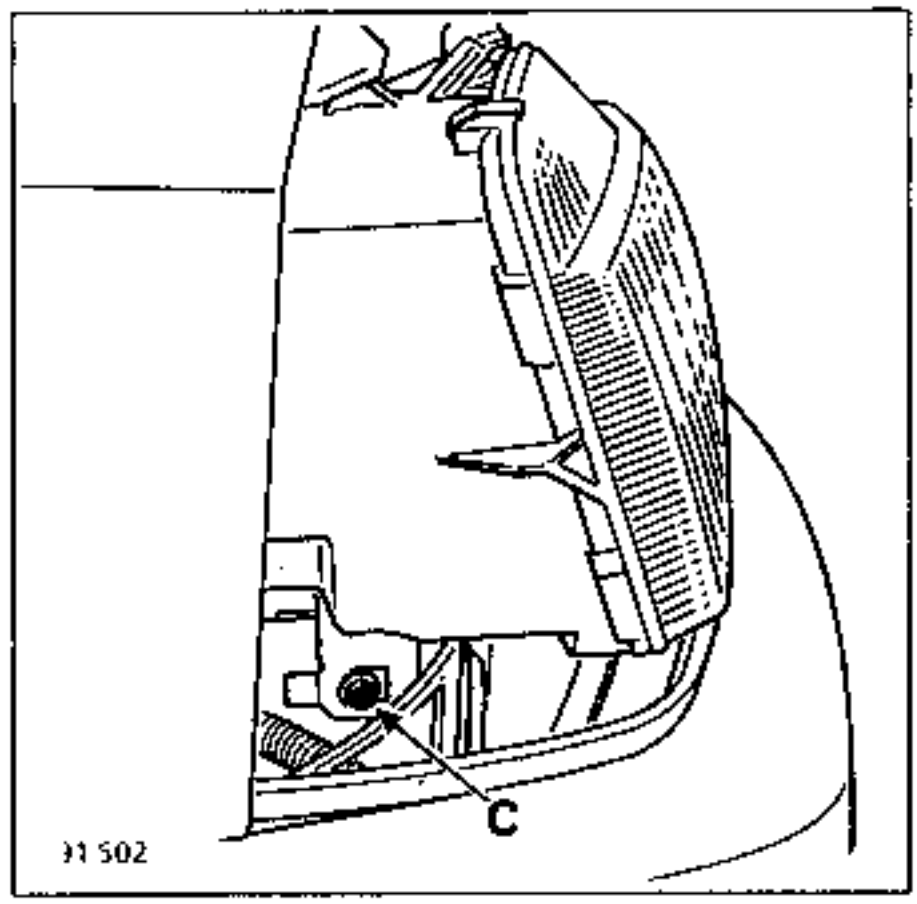
- the upper cross member including the intercooler, clips (A) and bolts (B),



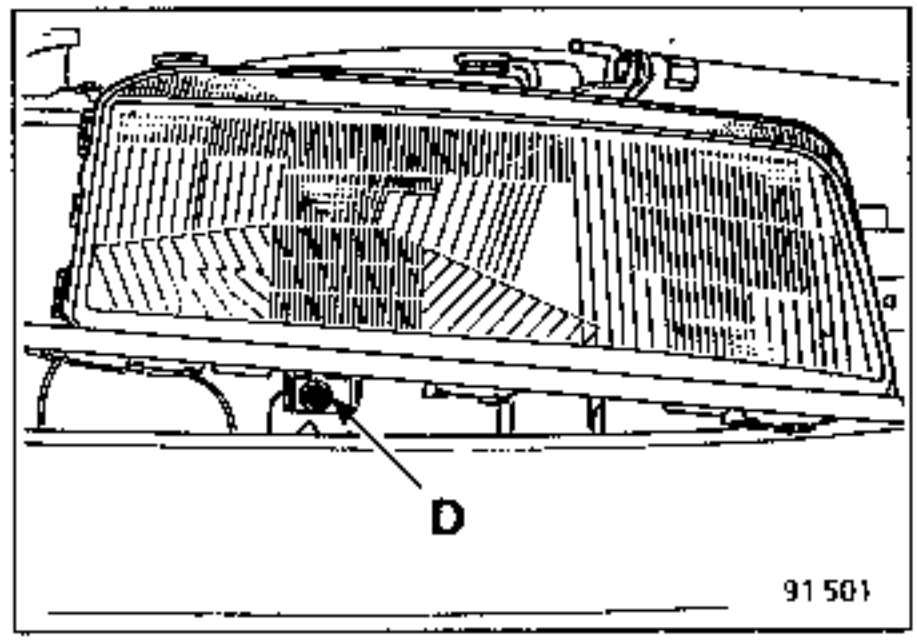
- the direction indicators,

- the headlight beam units, screws (C).

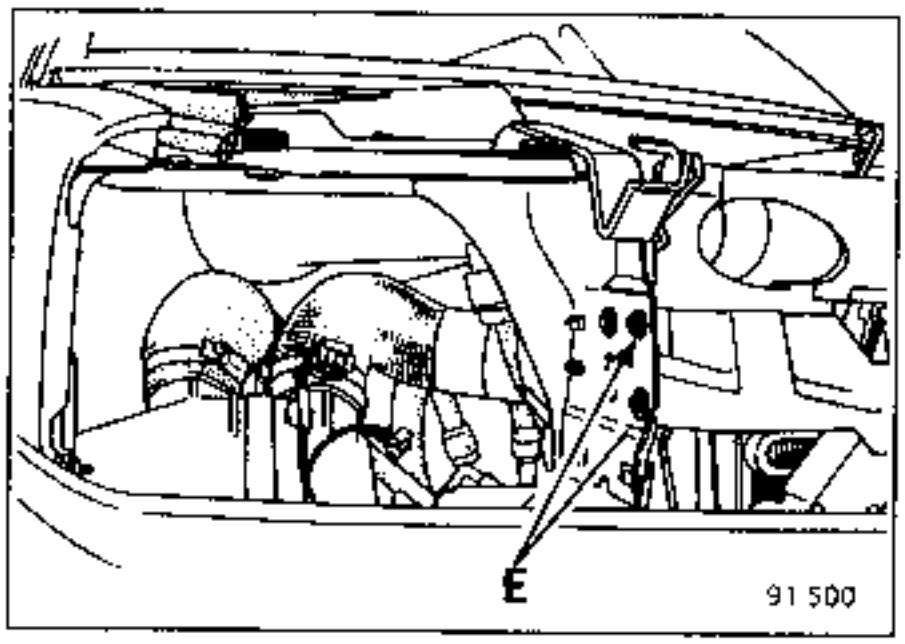




Lift the headlight and remove screw (D).



Remove the radiator grille support lugs, screws (E).



REMOVING the adjacent components

Remove :

- the air filter and the hoses,
- the air filter support casing.

Bleed the air conditioning refrigeration system at one of the unions near the radiator.

Drain the cooling system at the lower radiator hose.

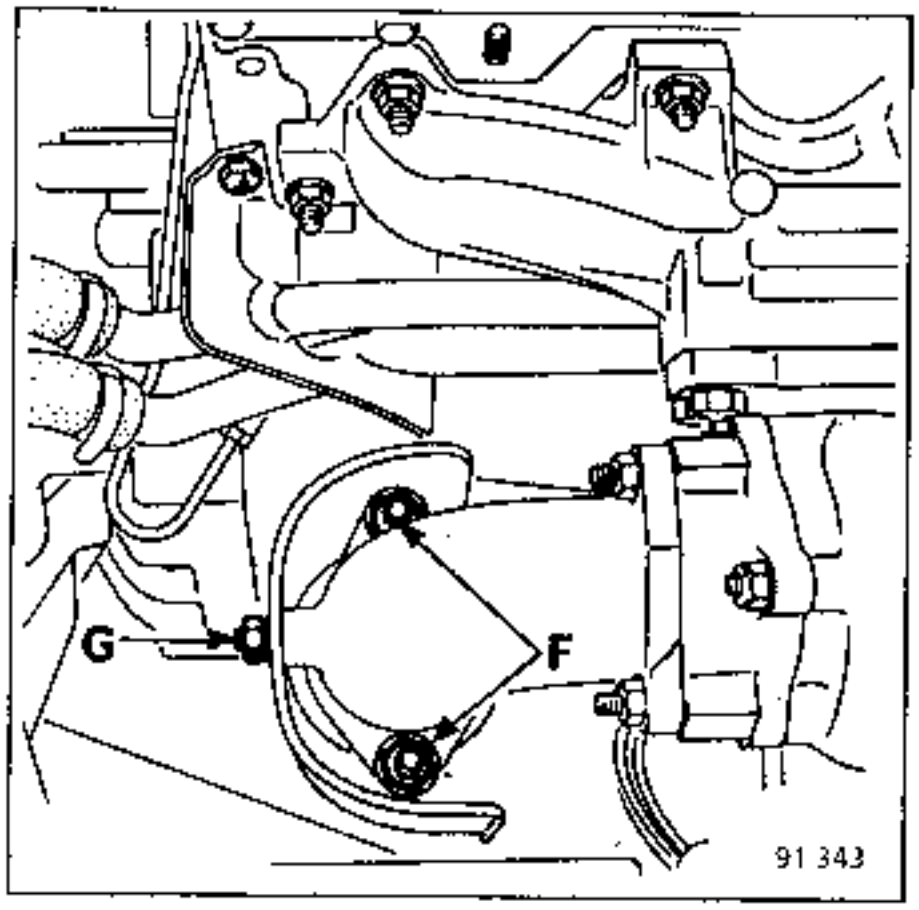
Disconnect :

- the wires supplying the electric fans (at the connection plate before the ignition switch),
- the air conditioning pipes at the radiator,
- the connectors,
- the upper radiator hose,
- the radiator mounting lugs.

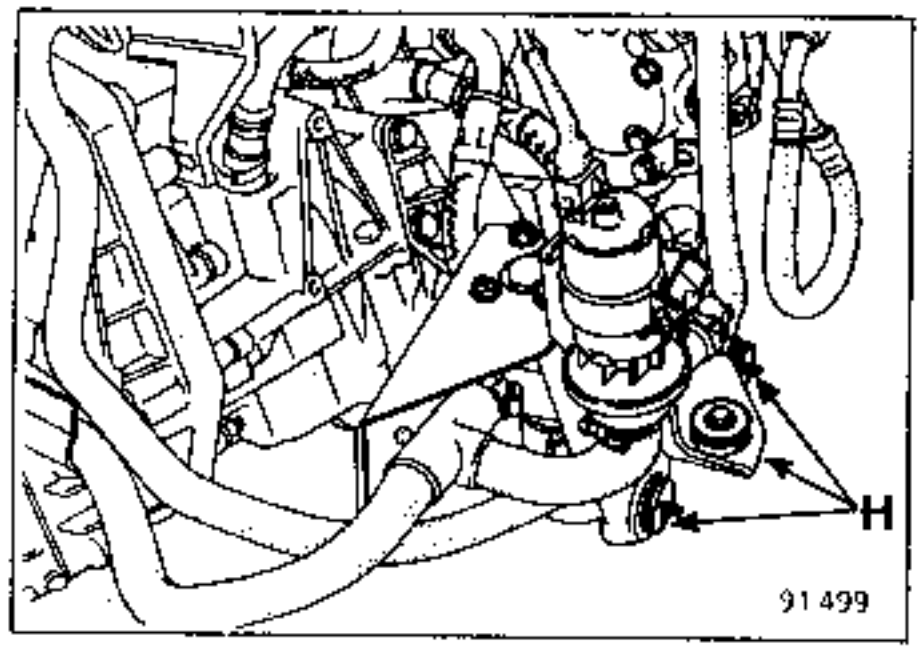
Remove the radiator, condenser and electric fan assembly.

Remove :

- the ignition unit,
- the turbocharger heat shield,
- the exhaust down pipe. To do this, unscrew nuts (F) and (G), then remove the stud at (C).

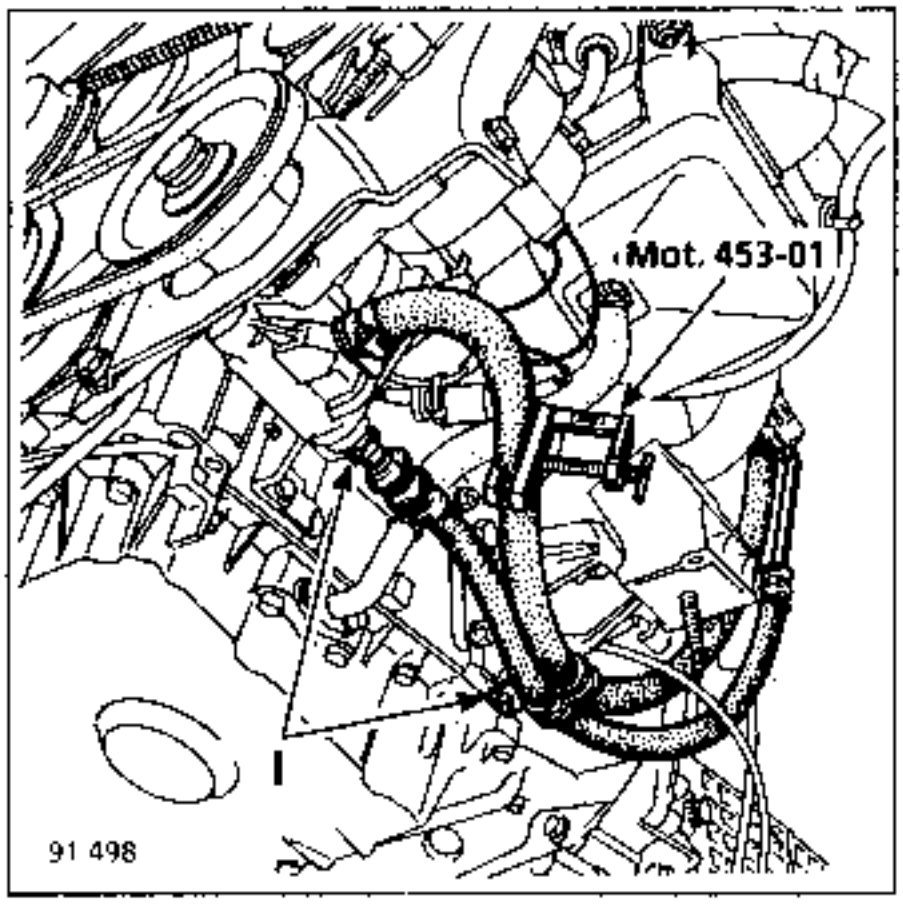


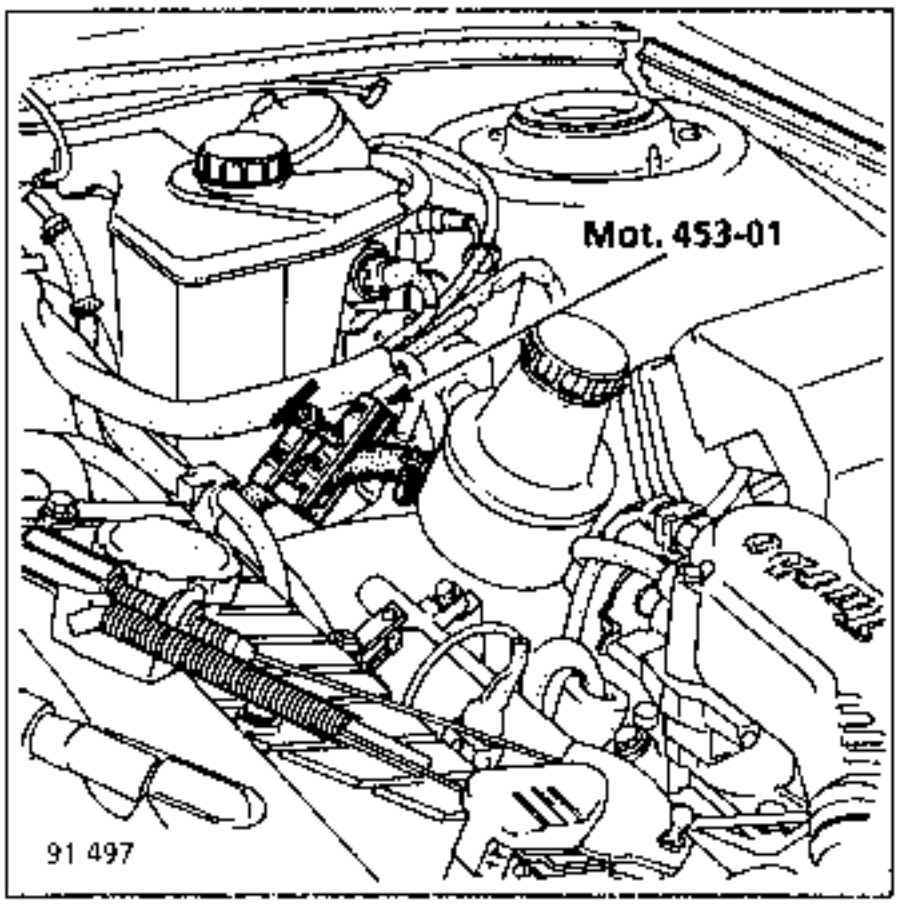
- the bolts from the lower clamp. The pipe is removed from under the vehicle,
- the air conditioning pipe at the compressor,
- the oil cooler (modine) bolts (H).



Place clamps **Mot.453-01** on the power steering reservoir output hoses.

Disconnect one of the pipes from the pump at (I) and other from the steering box and then secure the reservoir to the engine





Disconnect :

- the accelerator cable,
- the engine earthing braid,
- the fuel pipe,
- the electrical wiring and then secure the computer to the engine.

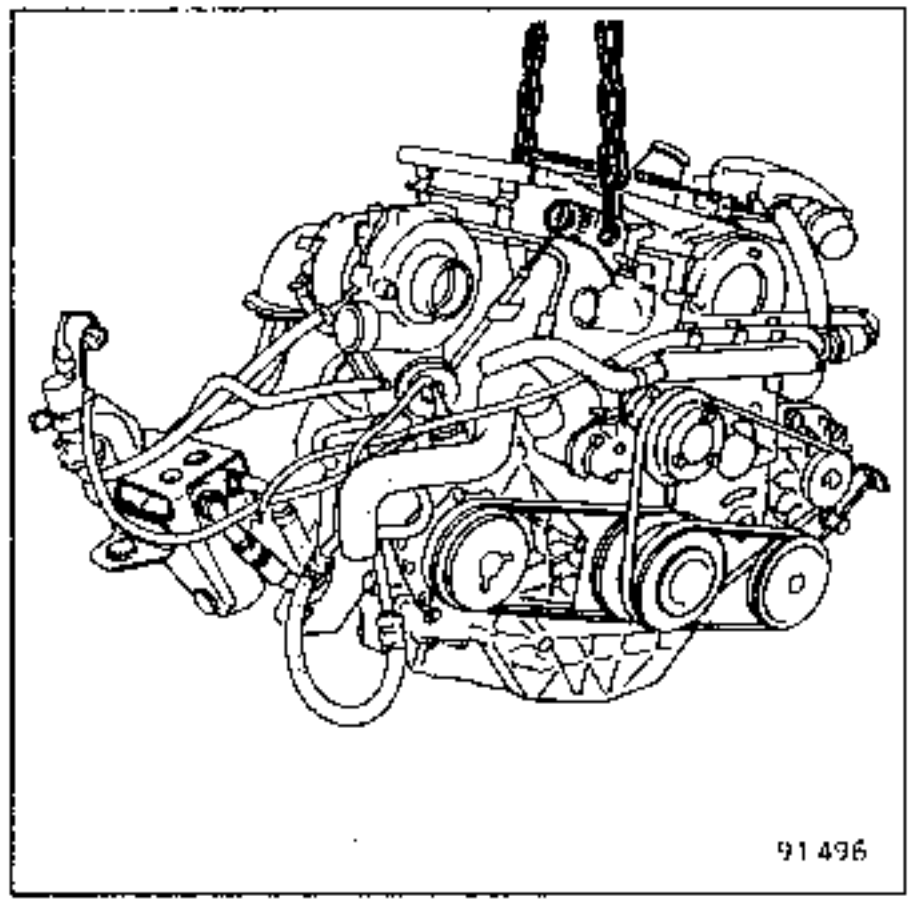
Disconnect the **TDC** sensor.

Remove :

- the bolts from round the gearbox,
- the nuts from the engine mounting pads.

Fit the chains **Mot.878** and lift the engine by its lifting rings.

NOTE : it is essential to fit the chain to the front lifting shackle through the hole nearest the engine.

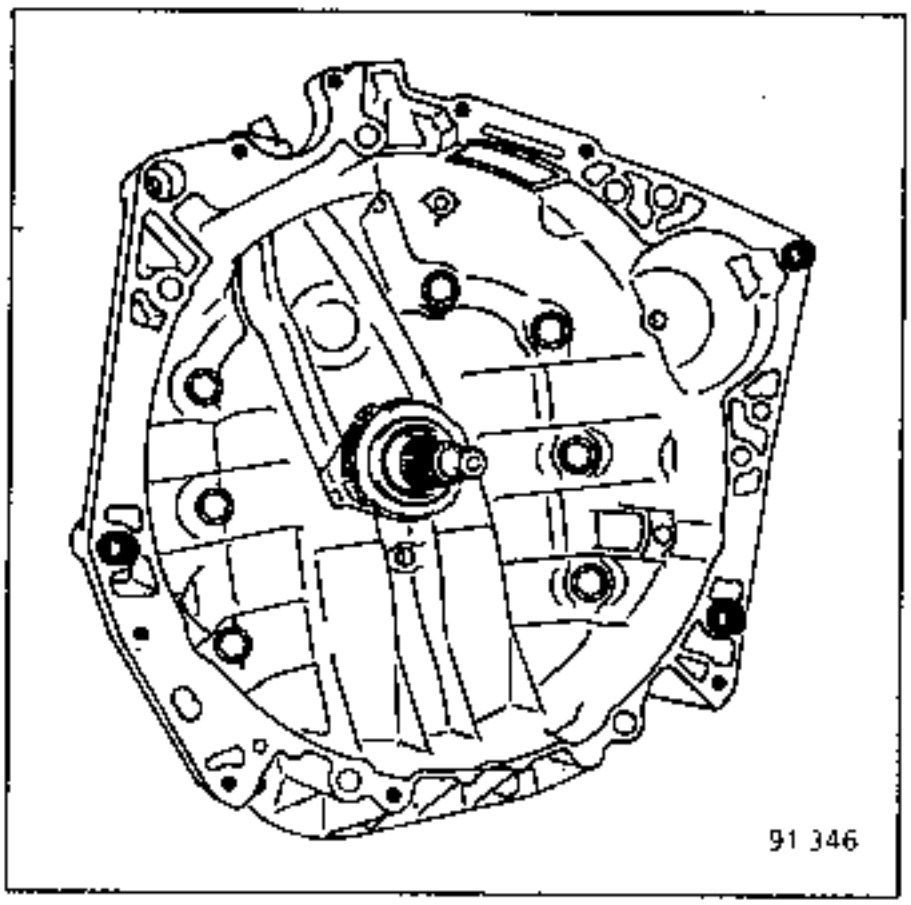


Support the gearbox with a jack.

Take out the engine.

REFITTING the engine (special points)

Before installing the engine, check that the locating dowels are in position.



Grease the splines on the primary shaft with no. 20 grease.

Lift the gearbox with a jack and fit the engine.

Fill and bleed the cooling system, the refrigeration system and the power steering system (see section concerned).

Adjust the accelerator cable.

Tighten the nuts and bolts to the specified torques.

REMOVING-REFITTING

ESSENTIAL SPECIAL TOOLS	
Mot. 878	Lifting chain and rings

TIGHTENING TORQUES (in daN.m) ▽	
Engine mounting securing bolts	4
Wheel bolts	9

The engine or engine-gearbox assembly are removed from above the vehicle after taking off the frotn end panel.

REMOVING

Place the vehicle on a lift.

Disconnect the battery.

Remove :

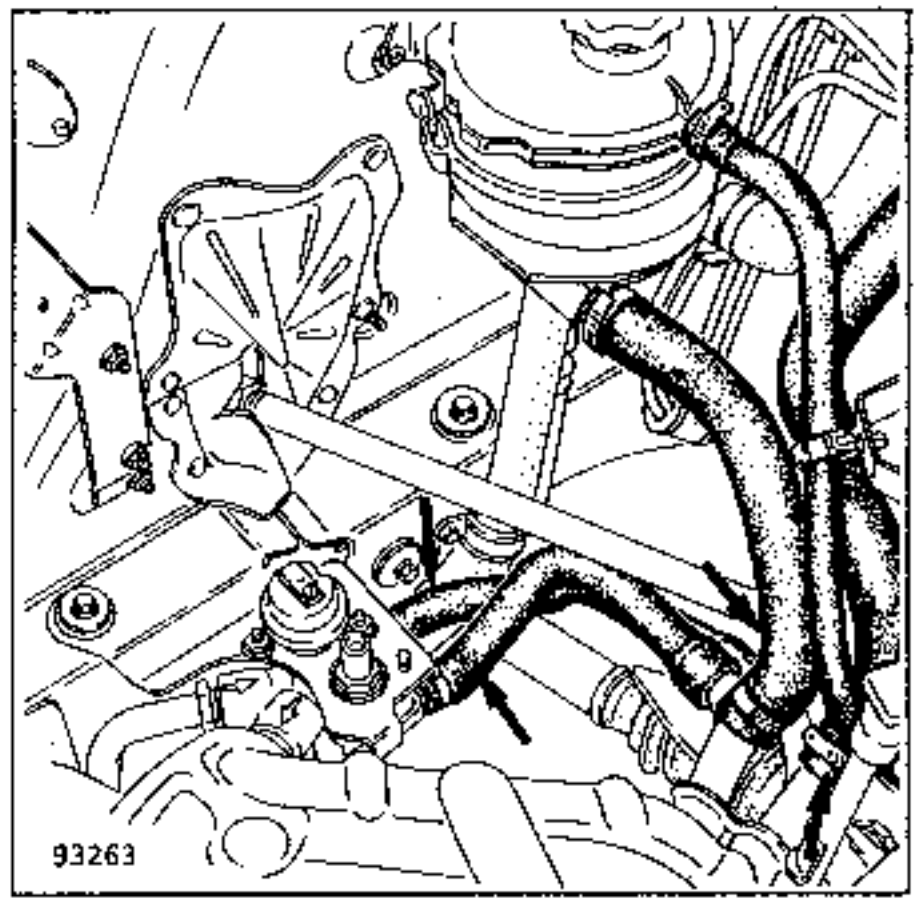
- the bonnet,
- the radiator grille and upper part of radiator grille,
- the air filter and its support,
- the protection from under the engine.

Drain :

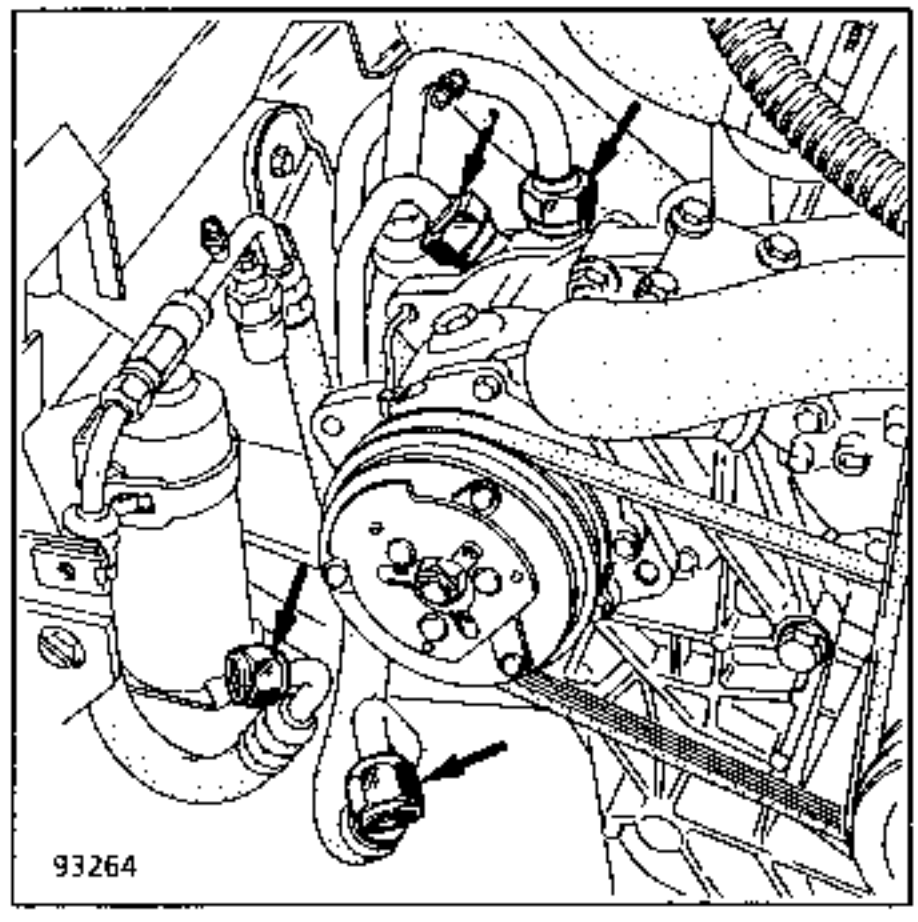
- the engine, if necessary,
- the gearbox, if necessary,
- the cooling system,

Disconnect :

- the electrical connectors (engine, radiator, gearbox),
- the accelerator cable,
- the clutch cable,
- the engine earthing braid,
- the following pipes
  - . heater, at the engine output,
  - . cooling, at the oil filter heater,

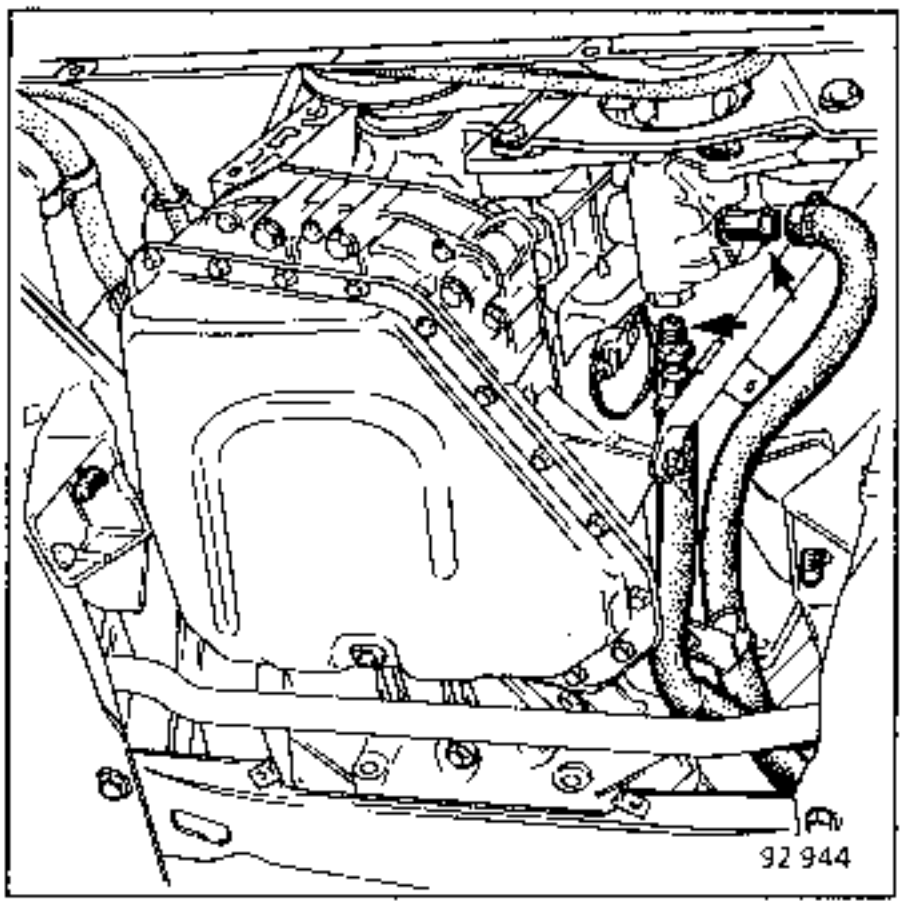


- . fuel,
- . vacuum,
- . HP and LP from the air conditioning compressor and the radiator,
- . radiator upper and lower hoses.



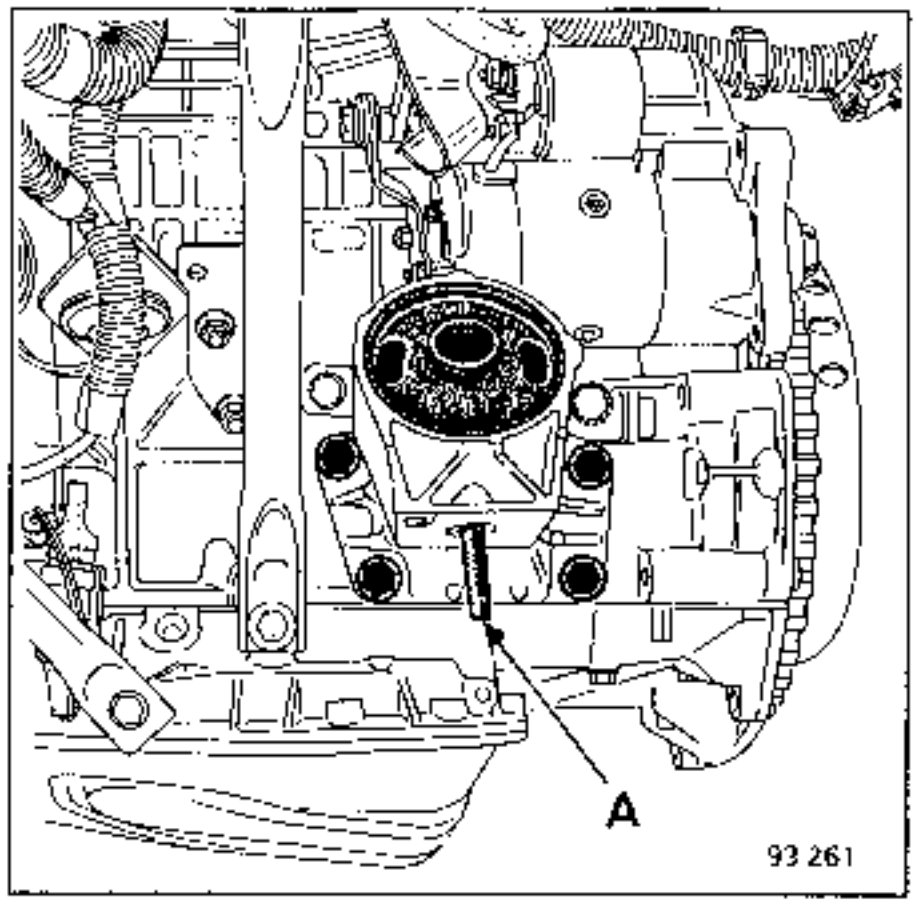
Remove :

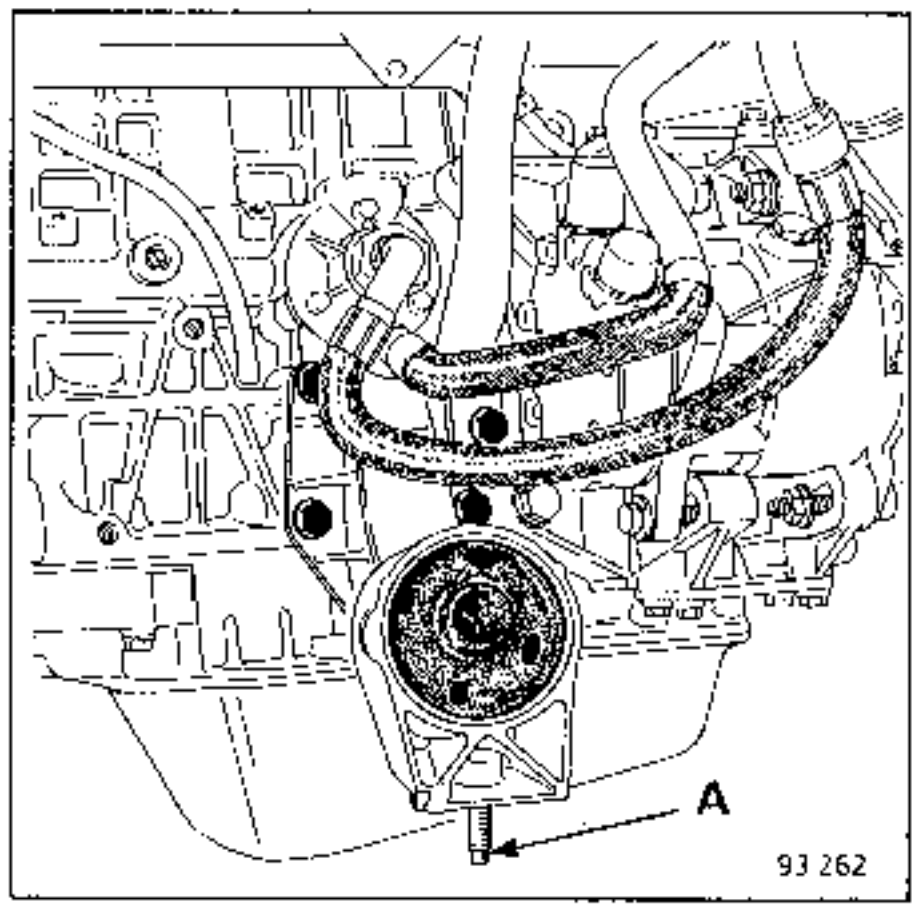
- the radiator mounting cross member,
- the radiator, condenser, electric fan assembly,
- the exhaust manifold clamp,
- the oil filter heater and its support,
- the computer which is to be secured, together with the oil filter heater, to the engine,
- the power steering pipe supports,
- the power steering pipes.



Remove :

- the **TDC** sensor,
- the bolts from round the gearbox,
- the engine mountings at (A).

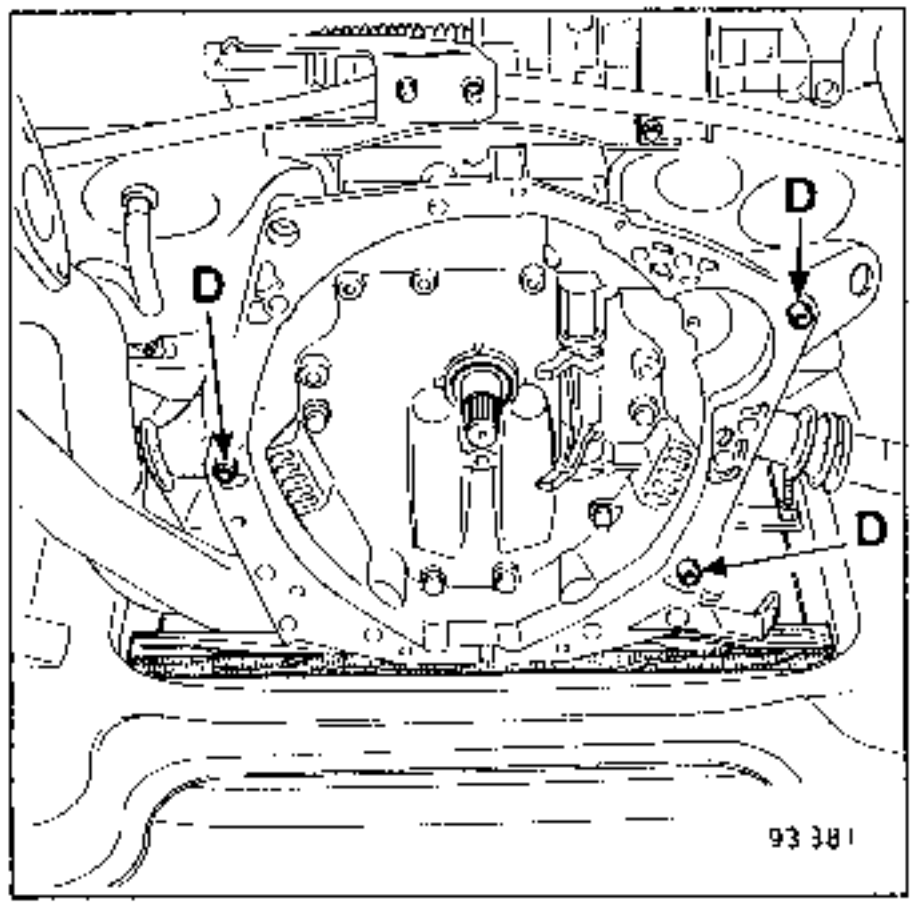




Fit the chains **Mot.878.**

Lift the engine by its lifting rings.

Support the gearbox.



Take out the engine.

REFITTING the engine - Special points

Before fitting the engine, ensure that the locating dowels (D) are in position.

Grease the splines on the primary shaft with grease no. 20.

Fill and bleed the cooling, air conditioning refrigeration and power steering systems.

Adjust the accelerator cable.

Tighten the nuts and bolts to the specified torques. ▽

REMOVING-REFITTING

ESSENTIAL SPECIAL TOOLS	
Mot. 878	Lifting chain and rings

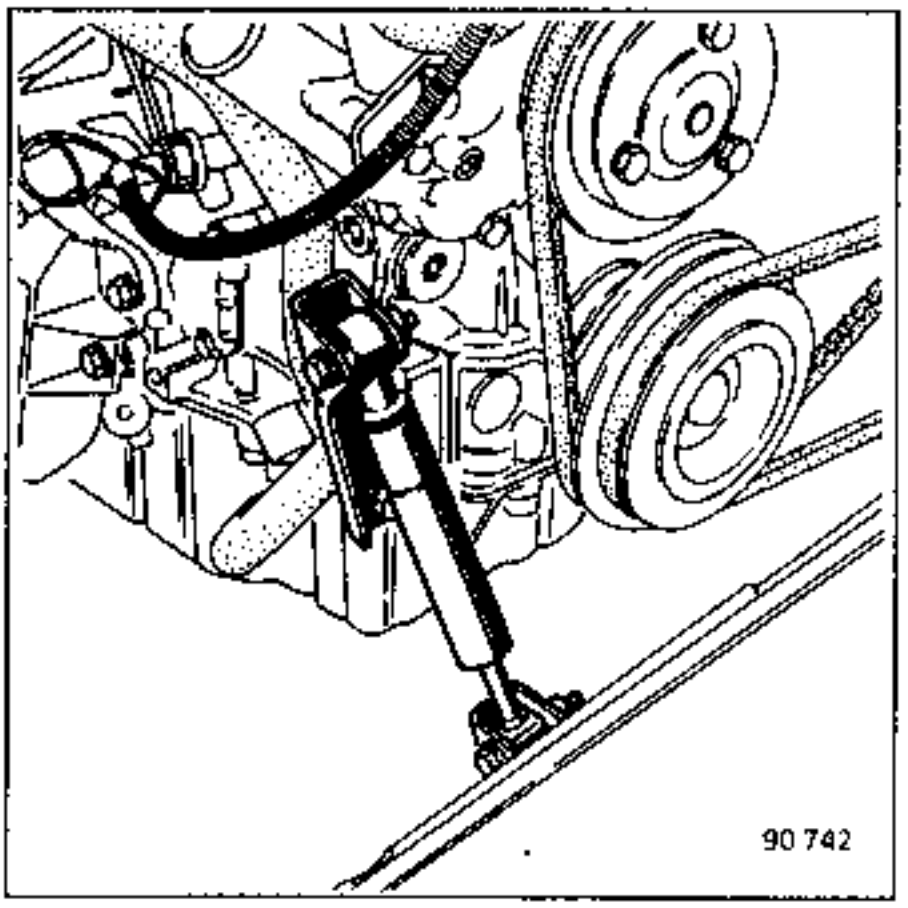
TIGHTENING TORQUES (in daN.m) ▽	
Engine mounting fastenings	4

REMOVING

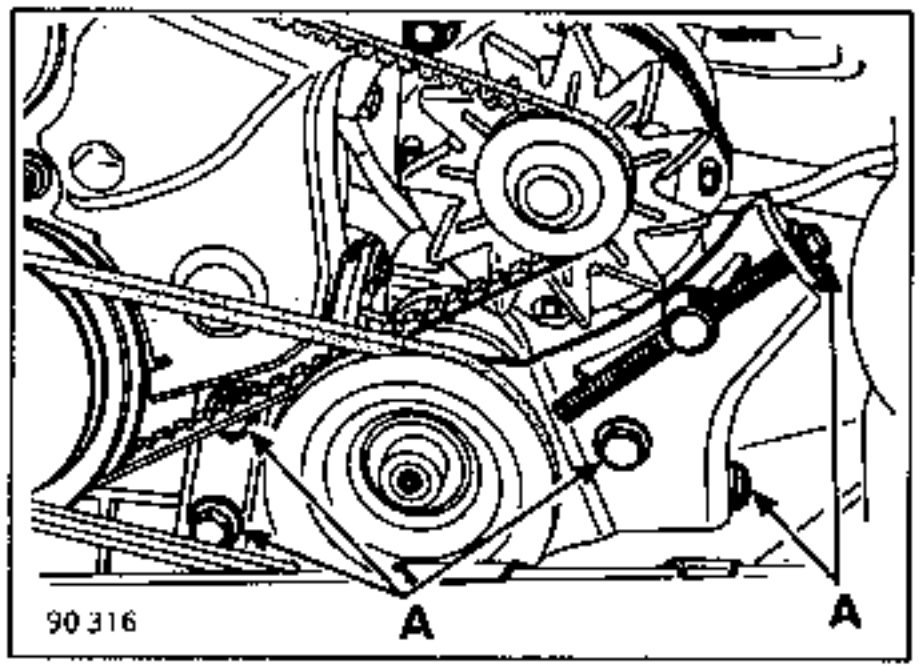
Disconnect the battery.

Remove :

- the bonnet,
- the front cross member,
- the radiator grille,
- the intercooler,
- the air filter, (for Turbo engines),
- the securing bolts from the engine damper,

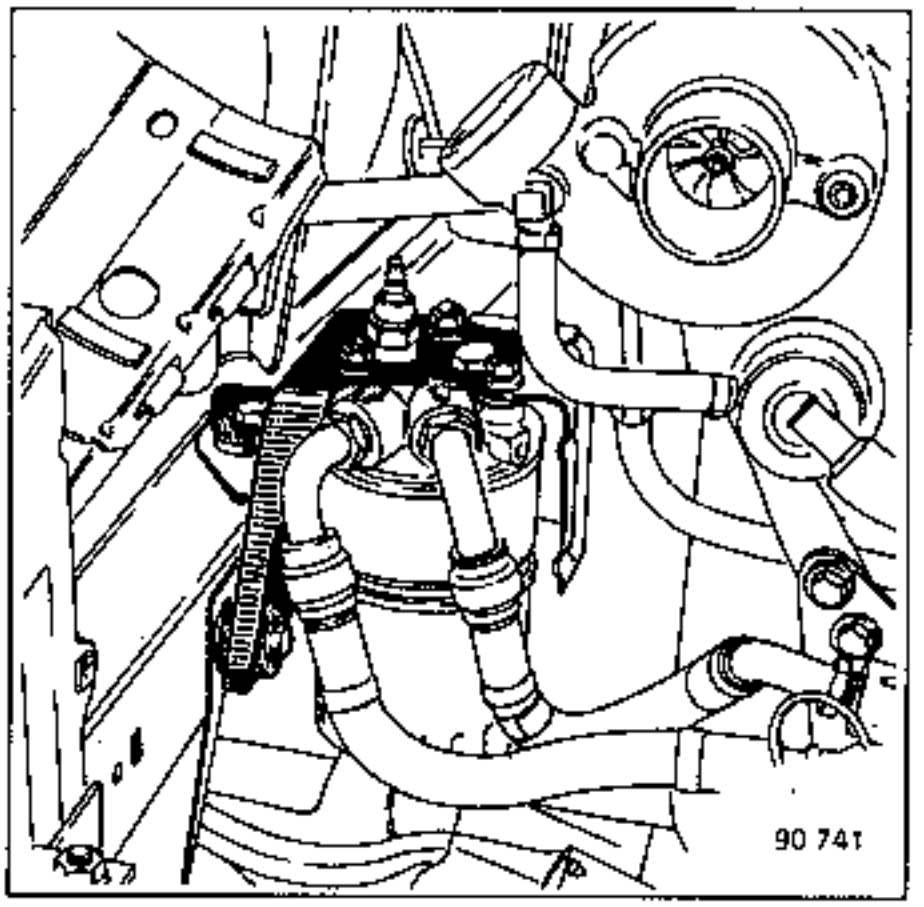


- the power steering pump securing bolts (A),



and place the pump on one side of the vehicle (on power steering versions),

- the engine oil cooler assembly.



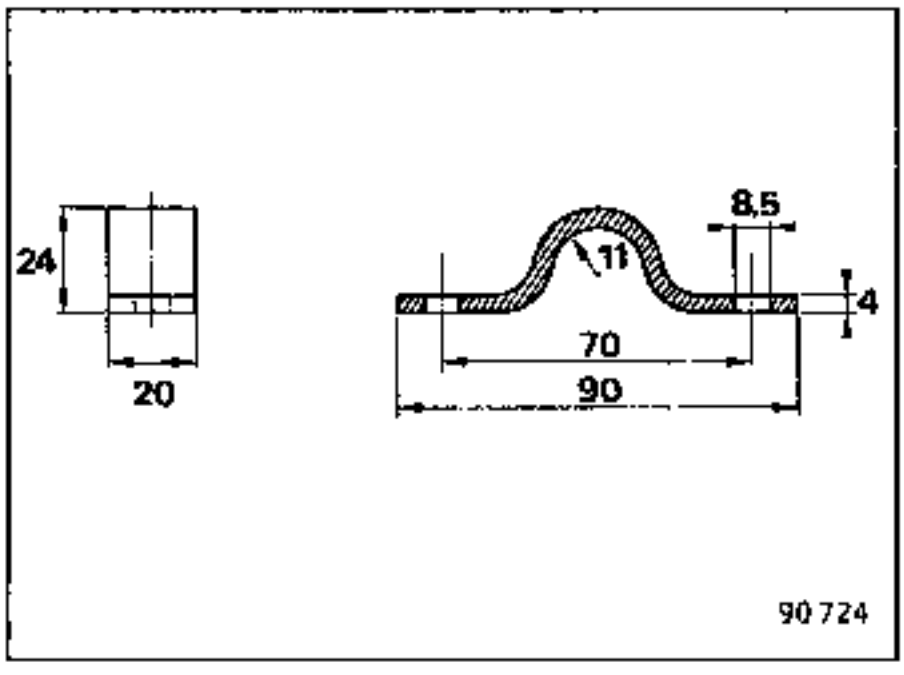
Disconnect :

- the pipes,
- the electrical connections,
- the accelerator cable,
- the clutch cable,
- the exhaust down pipe.

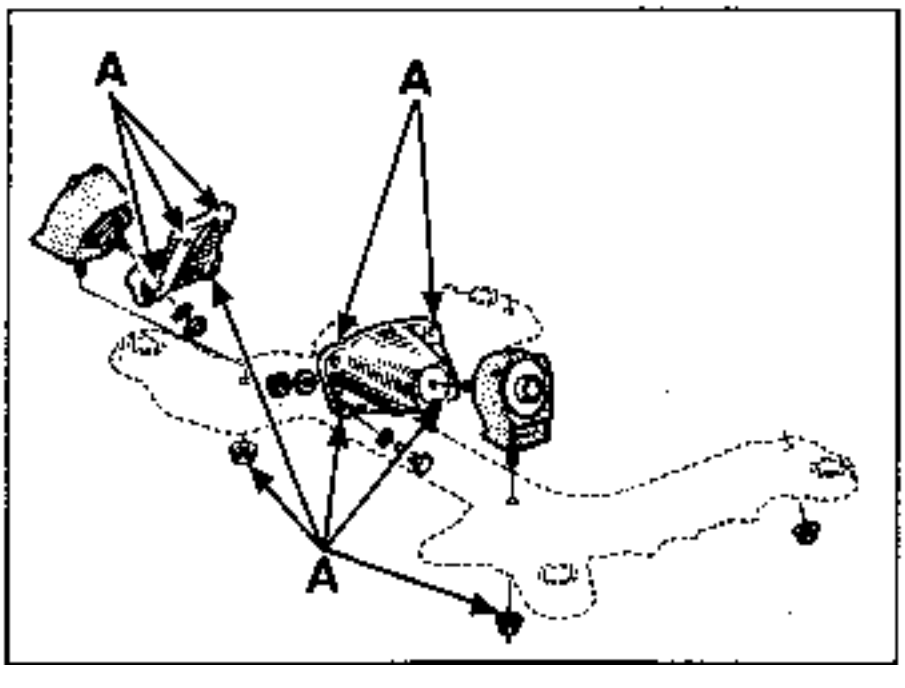
Remove :

- the starter,
- the fastenings from round the gearbox.

Fit a tool, made locally to the dimensions shown in the diagram below, to the rocker arm cover at the front of the engine :



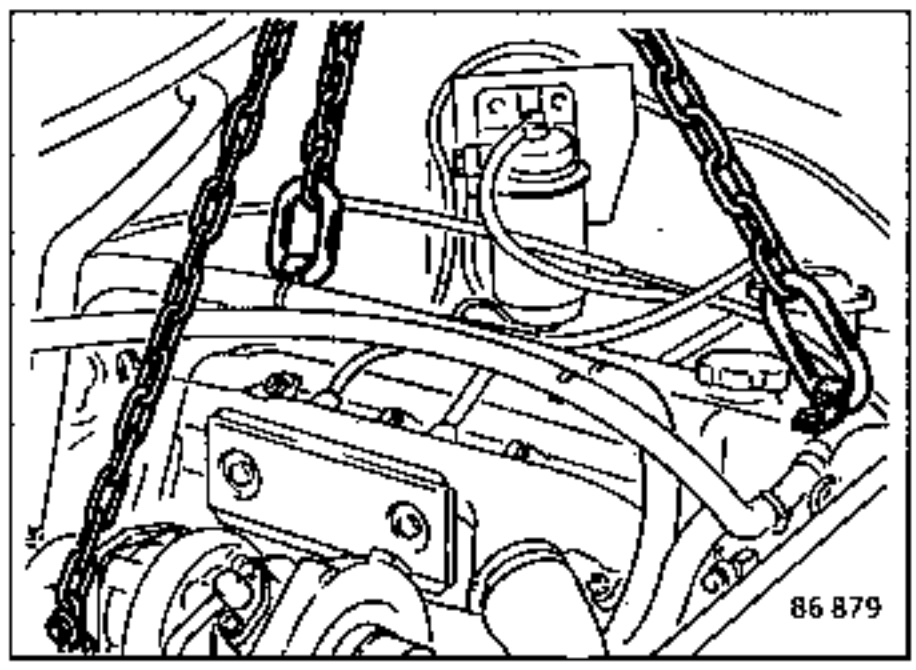
Remove the engine mountings at (A).



Remove the engine using tool **Mot.878.**

Special features of the J8S Turbo engine

To prevent the engine assembly turning fit an additional chain, securing it to the exhaust manifold.

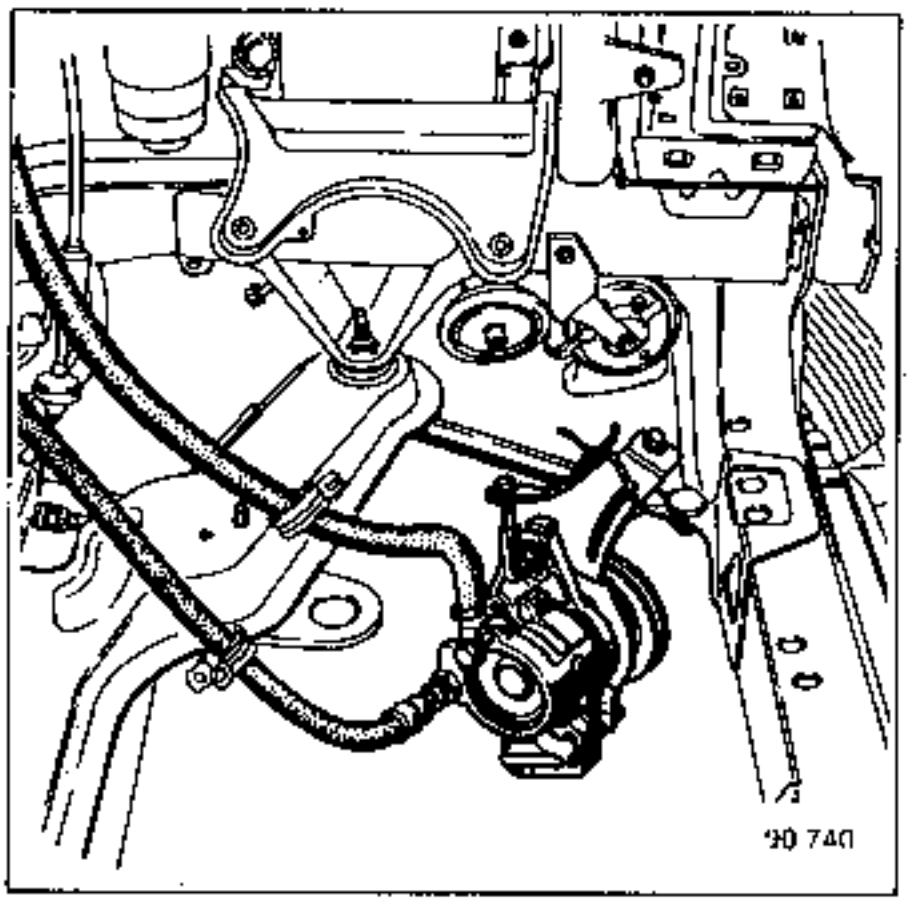


Place a jack under the gearbox.

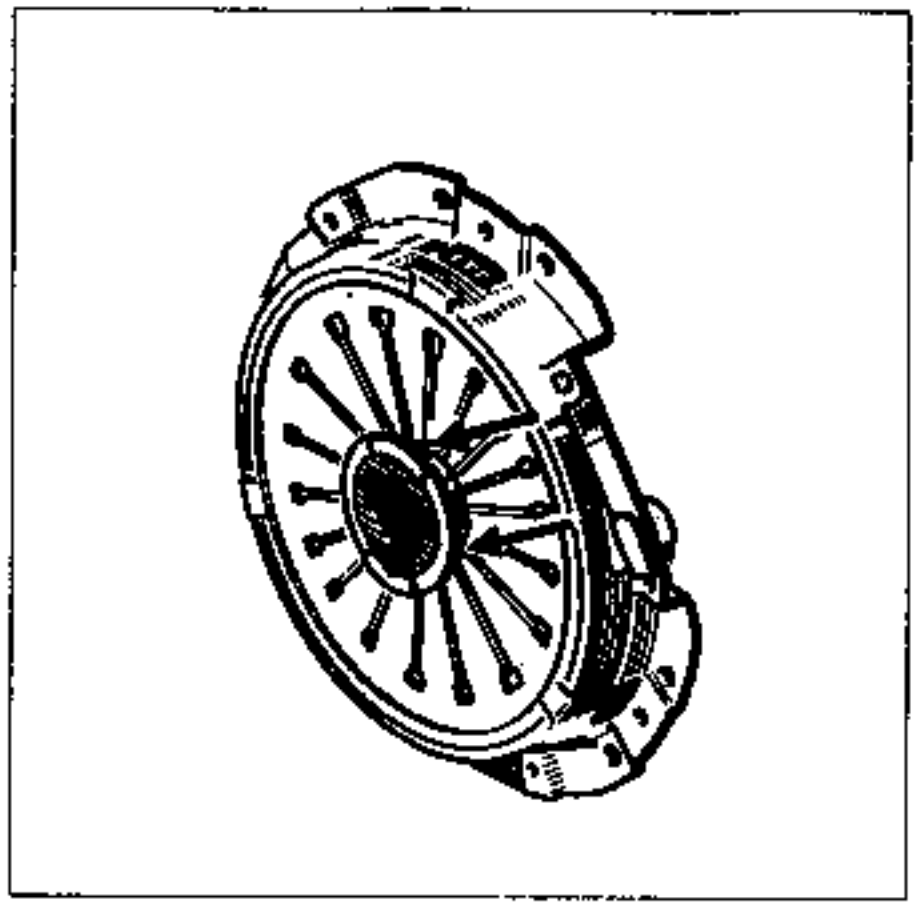
REFITTING (special features)

. Vehicles equipped with power steering

Before refitting the engine, ensure that the power steering pump pipes pass either side of the front left hand engine mounting pad.



Fit the engine, ensuring that the clutch fork lugs are correctly positioned behind the shoulder on the withdrawal bearing (the bearing is an integral part of the clutch unit).



Fill the engine with oil, if necessary, and fill and bleed the cooling system.

Adjust the accelerator cable.

Do not forget to remove the engine lifting ring (the locally manufactured tool).

REMOVING-REFITTING

ESSENTIAL SPECIAL TOOLS	
Mot. 878	Lifting chain and rings
B.Vi. 31-01	Spring pin punches
T.Av. 476	Ball joint extractor

TIGHTENING TORQUES (in daN.m) ▽	
Brake caliper securing bolts	10
Shock absorber securing bolts	8
Steering ball joint	4
Wheel bolts	8
Drive shaft bellows sec. screws	2,5

CONSUMABLES
LOCTITE FRENBLOC : Brake caliper securing bolts
LOCTITE FRENETANCH Crankshaft pulley securing bolts
CAF 4/60 THIXO : Drive shaft pins
MOLYKOTE BR2 Drive shaft splines

REMOVING

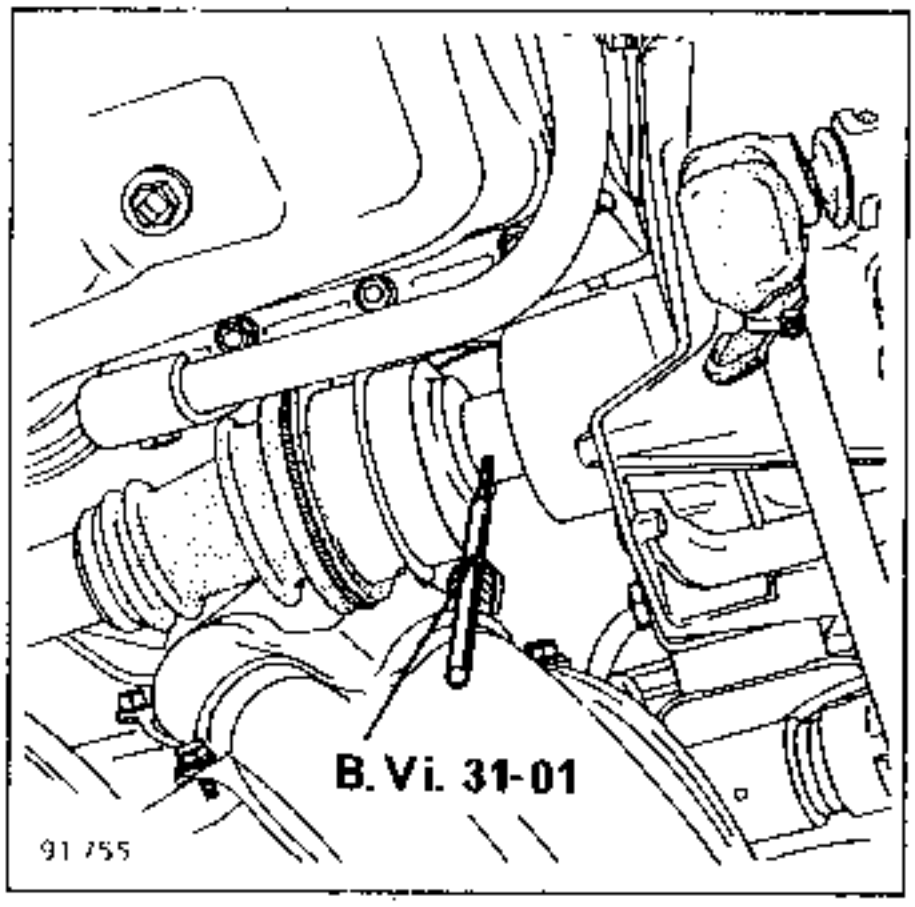
Disconnect the battery.

Drain :

- the cooling system (at the lower radiator hose),
- the gearbox oil,
- the engine oil, if necessary.

Remove :

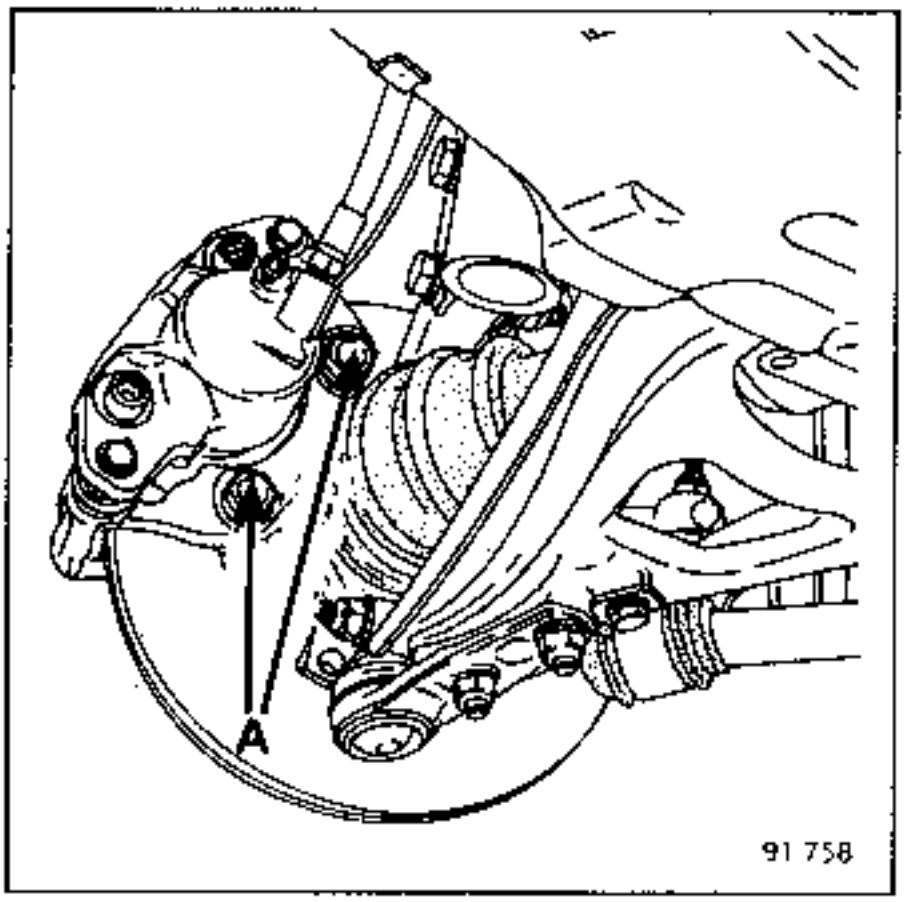
- the wheels,
- the drive shaft pin using pin punches **B.Vi.31-01**



- the two bolts that secure the bottom end of the shock absorber and free the drive shafts taking care not to damage the bellows. Secure the stub axle carrier to avoid tension being applied to the brake hose.

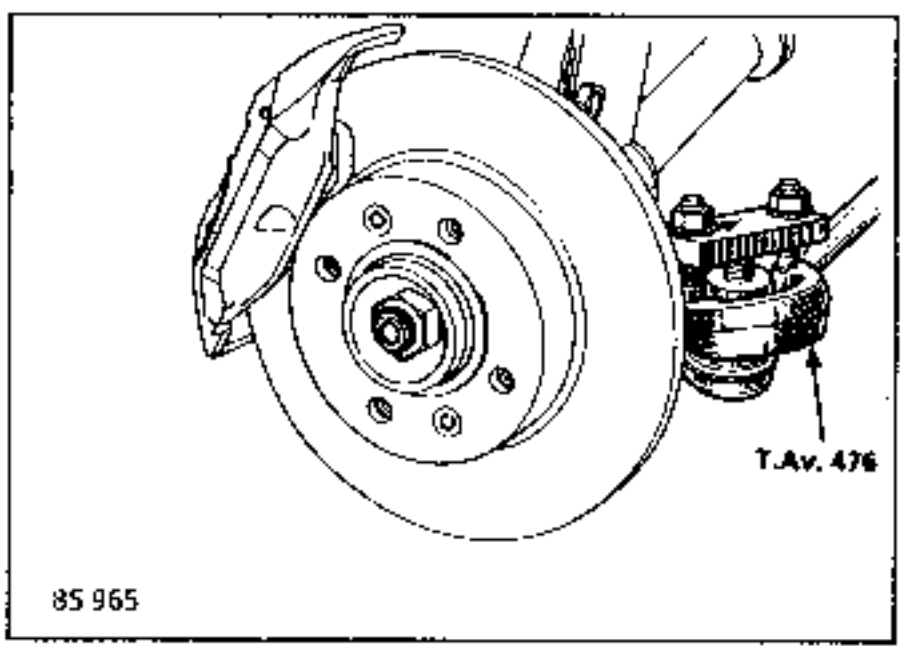
On the left hand side of the vehicle :

Remove the two caliper securing bolts (A) and secure the caliper to the suspension spring to avoid applying tension to the hose.

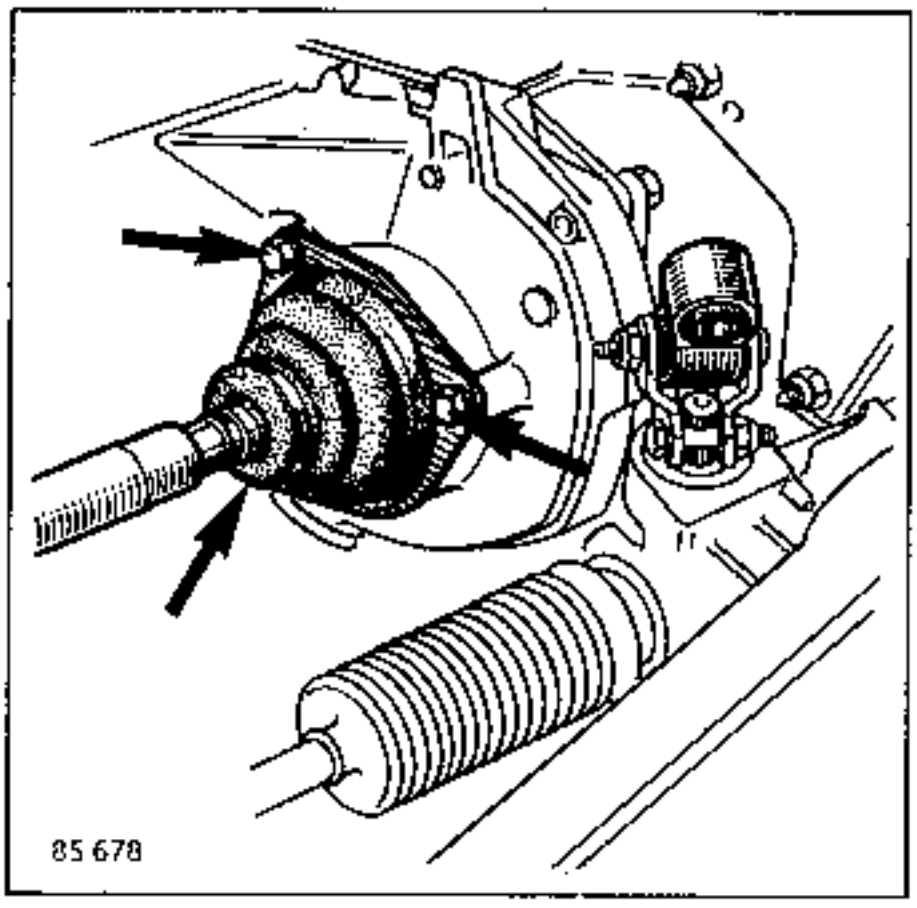


Remove :

- the steering ball joint using tool **T.Av.476,**



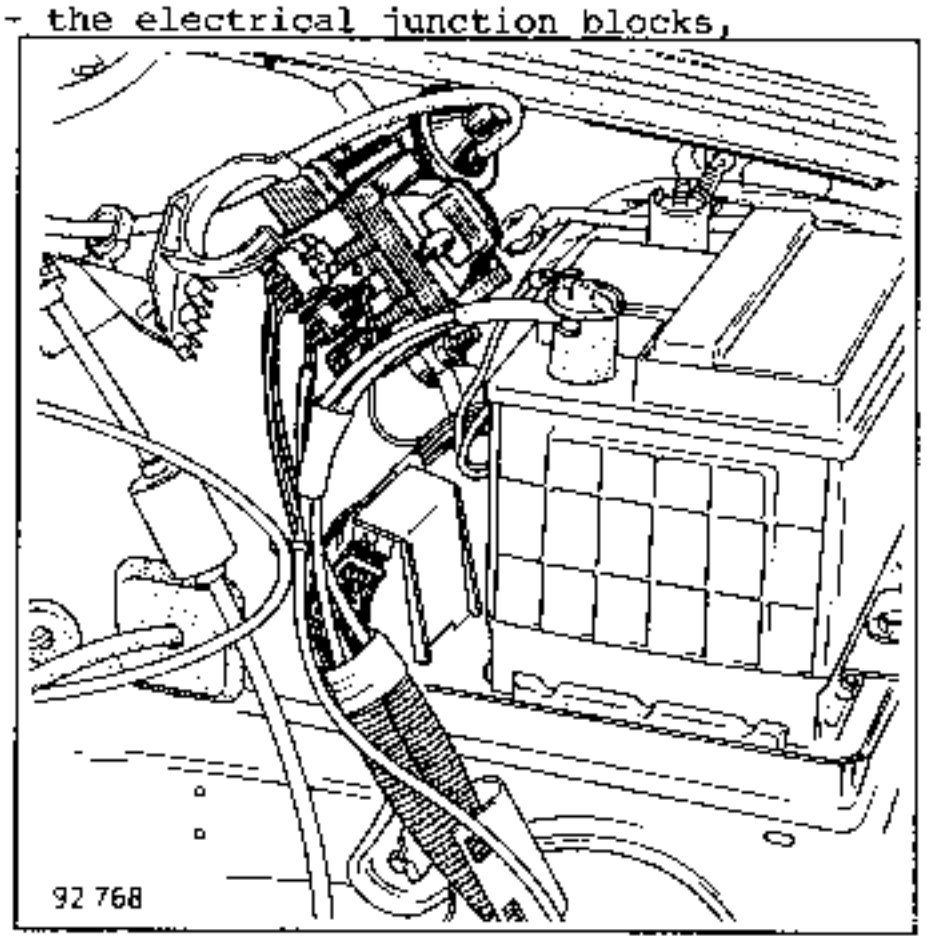
- the three screws that secure the drive shaft bellows,



- the two bolts that secure the lower end of the shock absorber and free the drive shaft.

Disconnect :

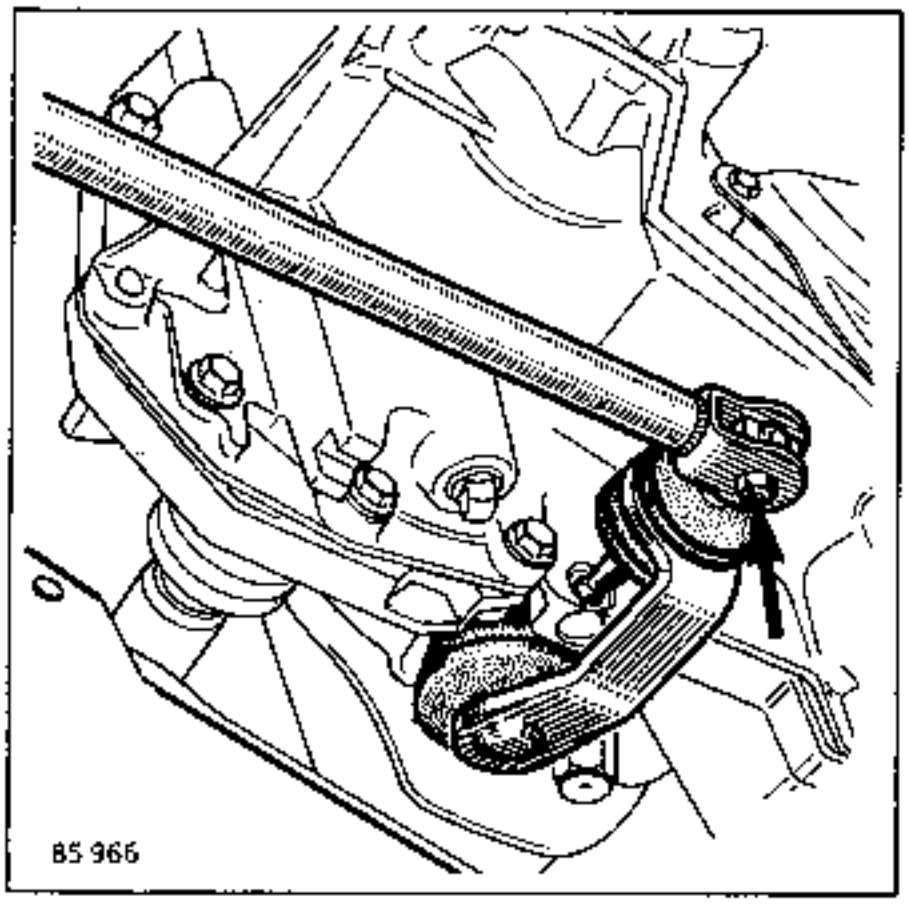
- the heater hoses at the coolant pump, the fuel lines and the brake servo vacuum pipe at the servo,
- the electrical junction blocks,



- the accelerator, choke and speedometer drive cables,
- the engine and gearbox earthing braids,
- the electronic ignition sensor.

Remove :

- The gear shift controls,



- the exhaust pipe clamp,
- the engine mounting nuts and bolts,
- the complete engine-gearbox assembly using the lifting chain **Mot.878.**

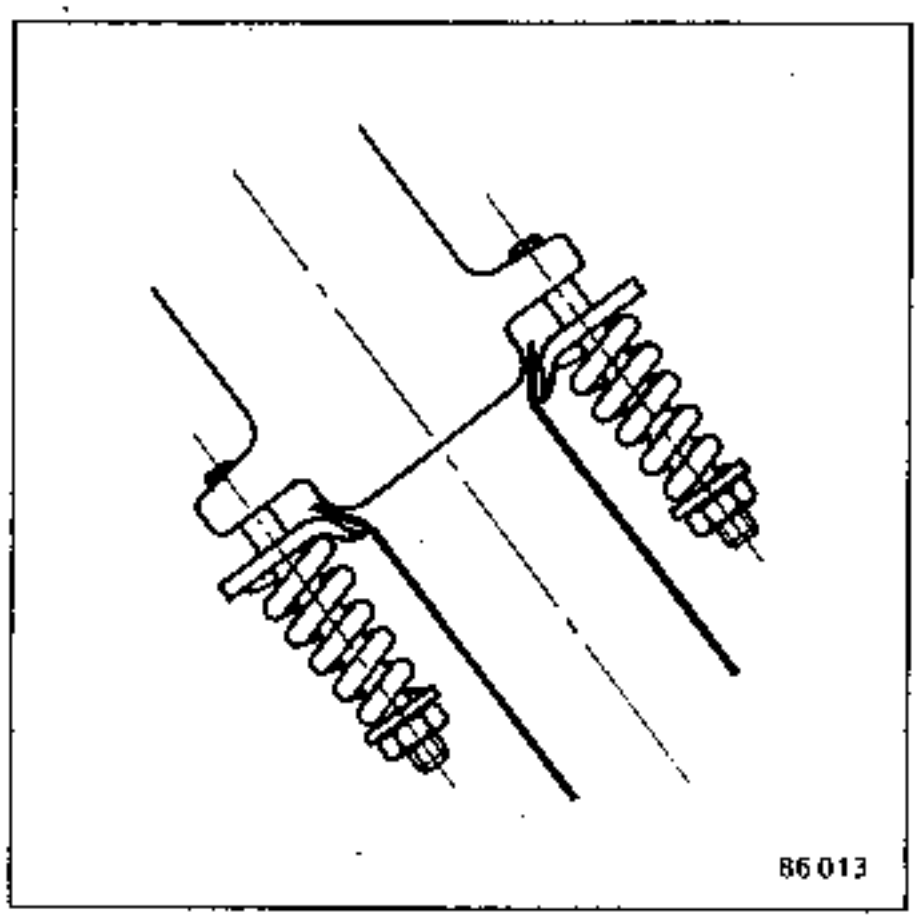
REFITTING

Coat the caliper securing bolts with **LOCTITE FRENBLOC,** fit them and tighten them to the specified torque.

Press the brake pedal a number of times to bring the psitons into contact with the brake pads.

Re-tighten thc exhaust pipe clamp.

Tighten the nuts until the springs are coil bound and then loosen them by one and a half turns. Never leave the springs coil bound.

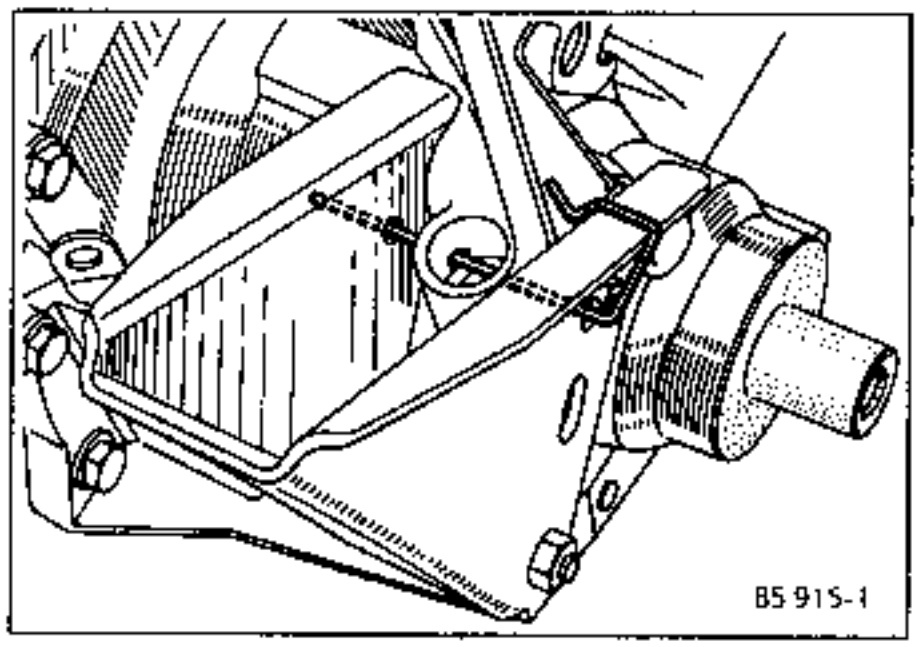


- Fill the engine and gearbox with oil (when applicable),
- fill and bleed the cooling system,

Adjust the accelerator cable and choke cable travels.

Apply **CAF 4/60 THIXO** compound to the drive shaft spring pin holes.

Fit the speedometer drive cable retaining clip.



ESSENTIAL SPECIAL TOOLS	
B.Vi. 31-01	Punches for spring pins
Mot. 878	Lifting chain and rings
T.Av. 476	Ball joint extractor

TIGHTENING TORQUES (in daN.m)	
Brake caliper securing bolts	10
Shock absorber lower securing bolts	11
Steering ball joints	4
Engine mounting securing bolts	4
Wheel bolts	9
Drive shaft bellows securing screws	2,5
Lower ball joint nuts	6

Removing the unit is a perfectly straight forward operation, however attention should be paid to the following points :

REMOVING

Disconnect :

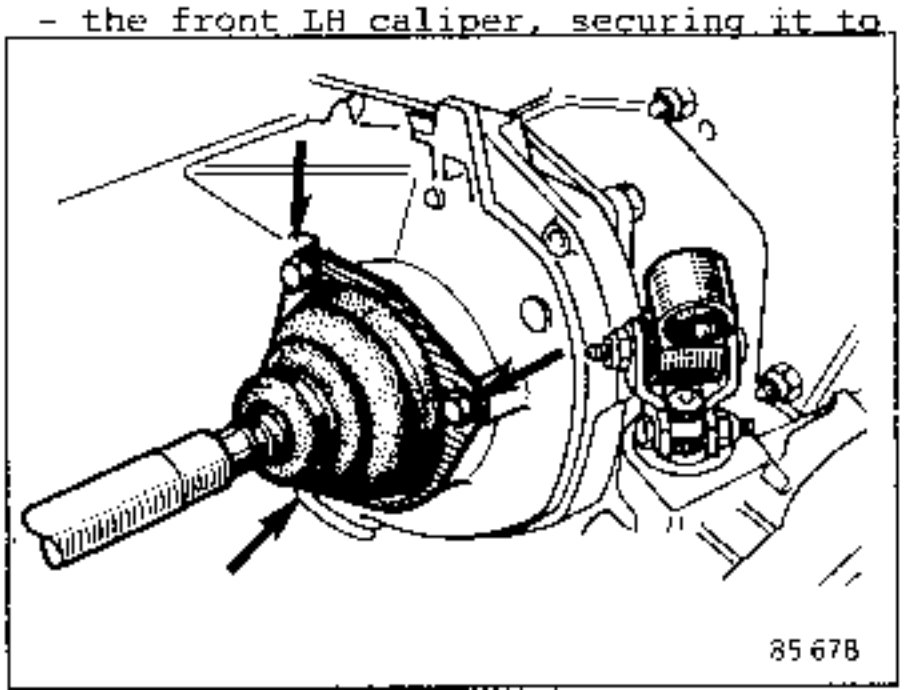
- the battery,
- the electrical connections,
- the pipes,
- the cables.

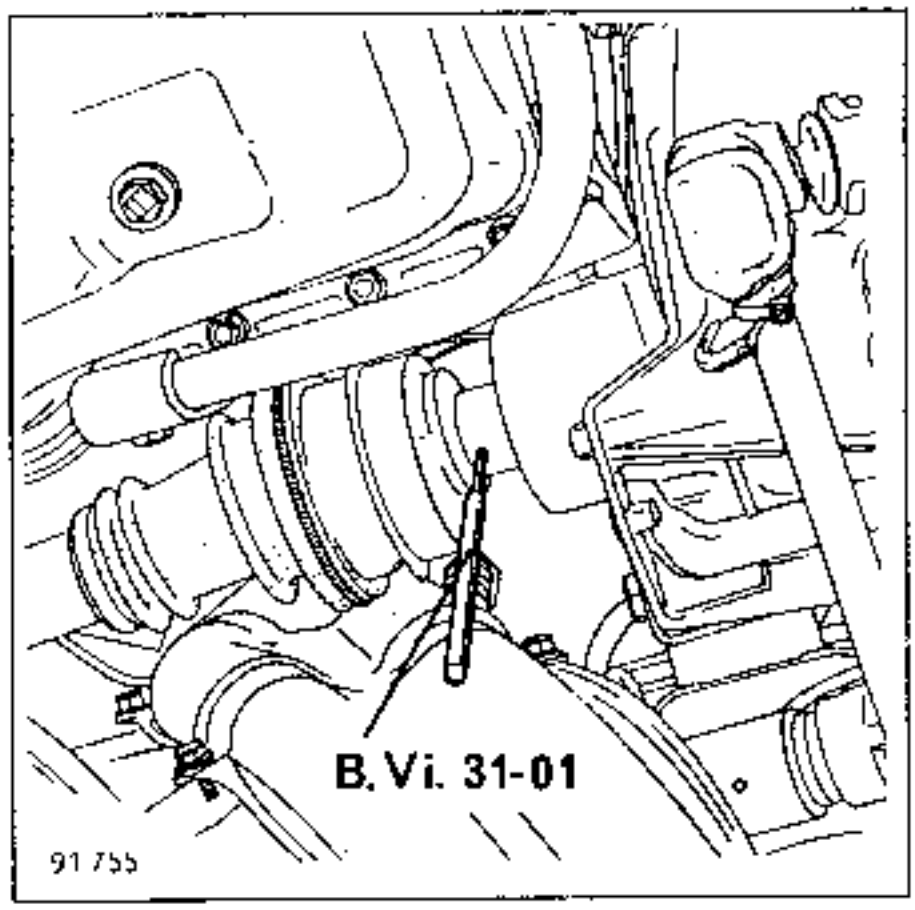
Drain :

- the gearbox,
- the engine if necessary.

Remove :

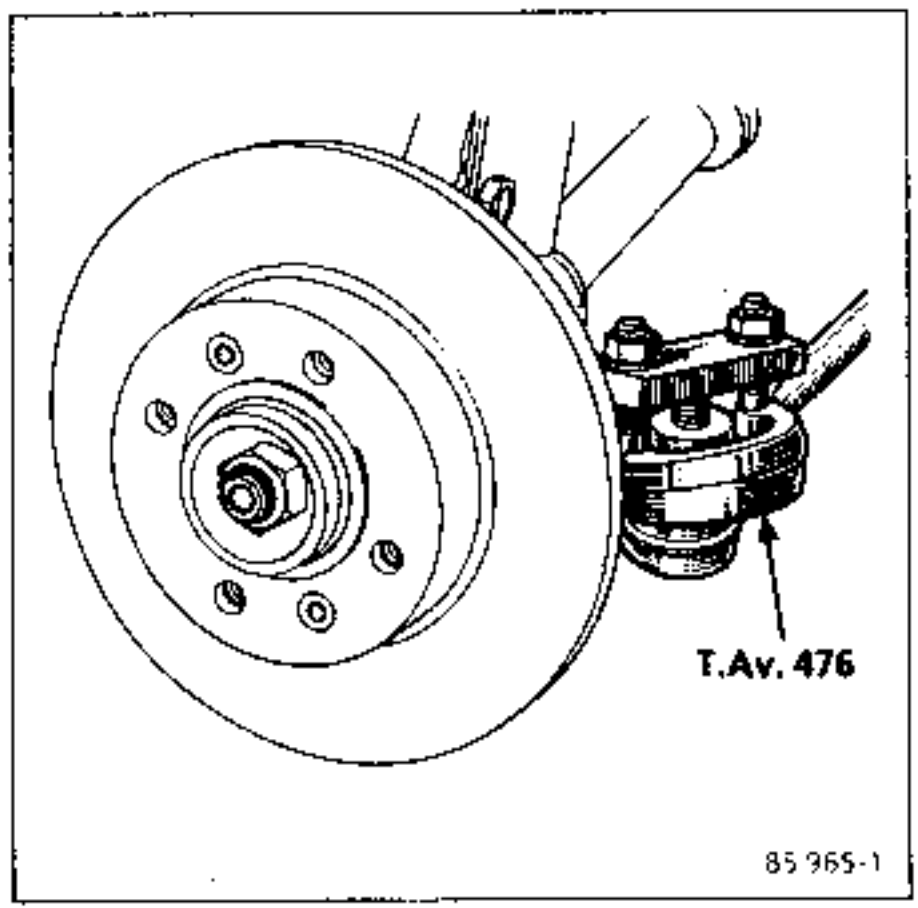
- the radiator,
- the drive shaft pin using punches **B.Vi.31-01**,
- the three screws from the front left hand bellows,
- the front LH caliper, securing it to the body.





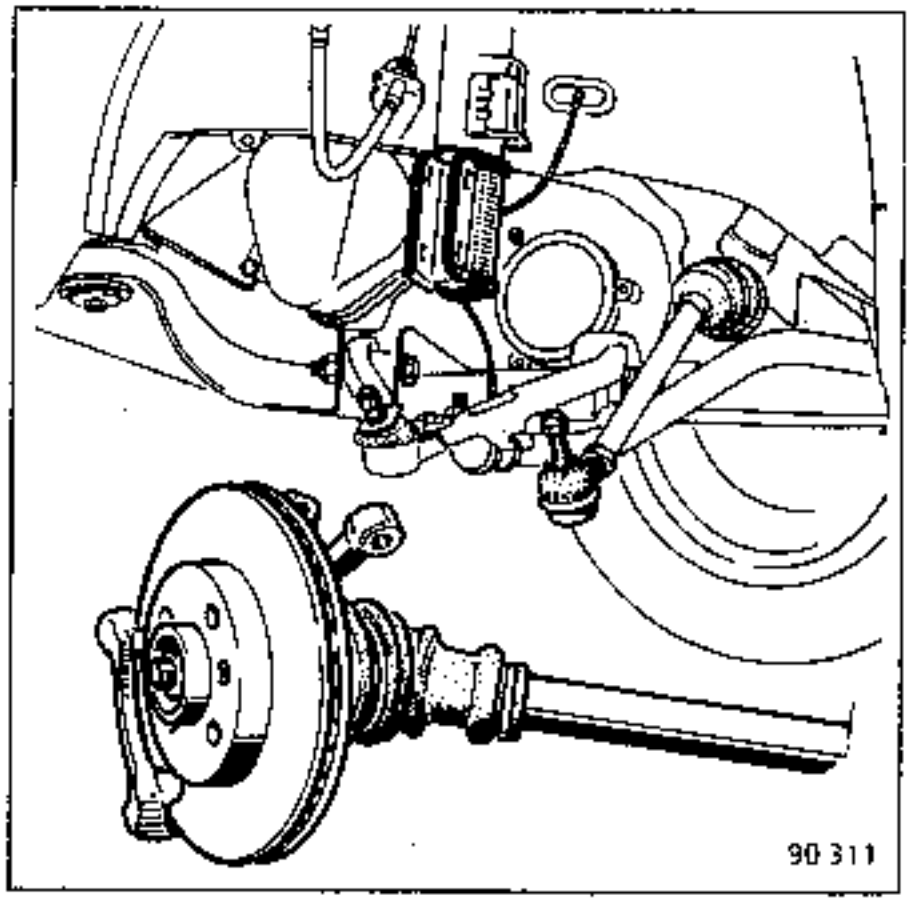
Free the drive shaft taking care not to damage its bellows at the wheel end.

Remove the steering ball joints using extractor **T.Av.476**.



Remove the bolts from the bottoms of the shock absorbers.

On the left hand side, remove the drive shaft, stub axle carrier assembly, disconnecting it at the lower ball joints. Protect the spider.



The engine-gearbox assembly is lifted out using the lifting chain and rings **Mot.878.**

REFITTING

Tighten the nuts and bolts to the specified torques.

When fitting the caliper bolts, apply Loctite Frenbloc to them and tighten them to the specified torques.

Press down the brake pedal a number of times bringing the pistons into contact with the brake pads.

- Fill the gearbox with oil,
- fill the engine with oil if necessary,
- fill and bleed the cooling system.

Retighten the exhaust pipe clamp.

Apply **CAF 4/60 THIXO** compound to the spring pin holes.

Adjust the accelerator and choke cables.

REMOVING-REFITTING

ESSENTIAL SPECIAL TOOLS	
B.Vi. 31-01	Punches for spring pins
Mot. 878	Lifting chain and rings
T.Av. 476	Ball joint extractor

TIGHTENING TORQUES (in daN.m)	
Brake caliper securing bolts	10
Shock absorber low. sec. bolts	8
Steering ball joints	4
Engine mounting securing bolts	4
Wheel bolts	9
Drive shaft bellows securing screws	2,5
Lower ball joint nuts	6
Nuts on suspension rubber bushes	2,2

REMOVING

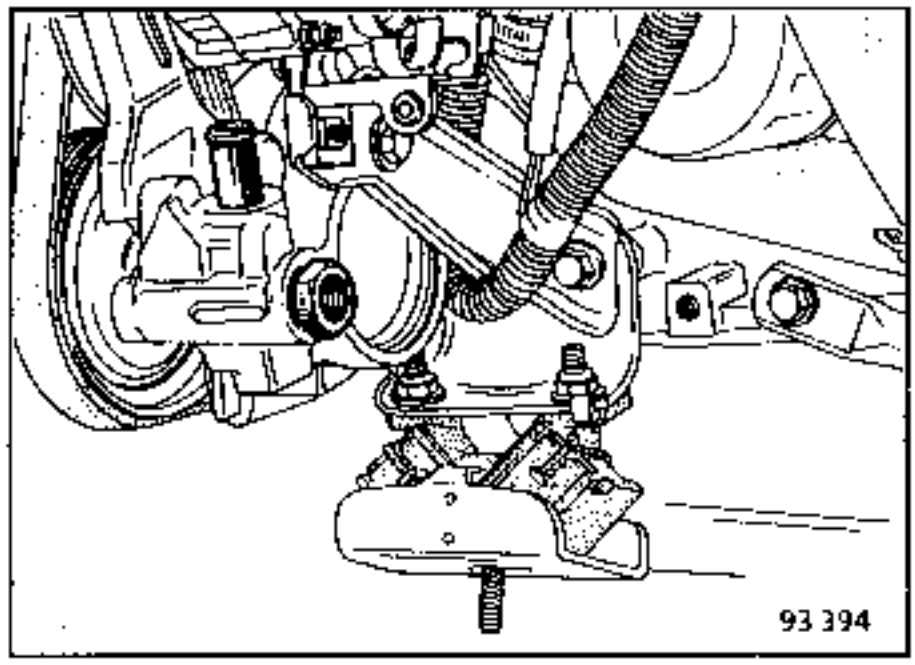
Place the vehicle on a lift and disconnect the battery.

Remove :

- the wheels,
- the protection under the gearbox,
- the gear shift control.

Drain :

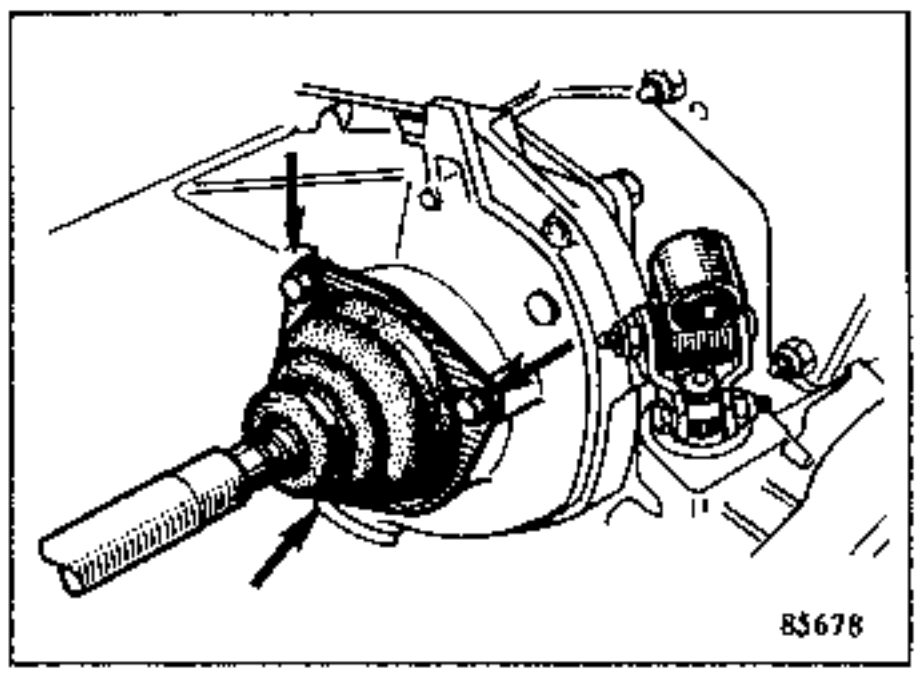
- the engine (if necessary),
- the gearbox,
- the cooling system at the upper and lower radiator hoses,
- the power steering system (on power steering models, disconnecting the pipes at the pump).



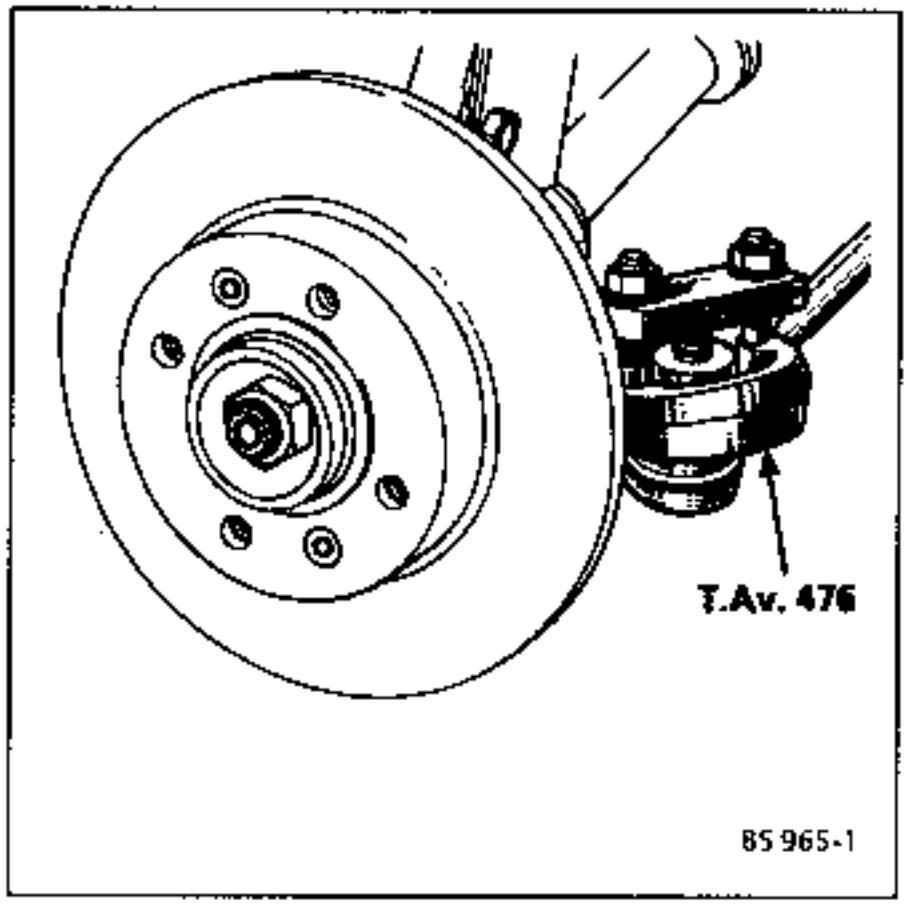
Remove :

On the left hand side

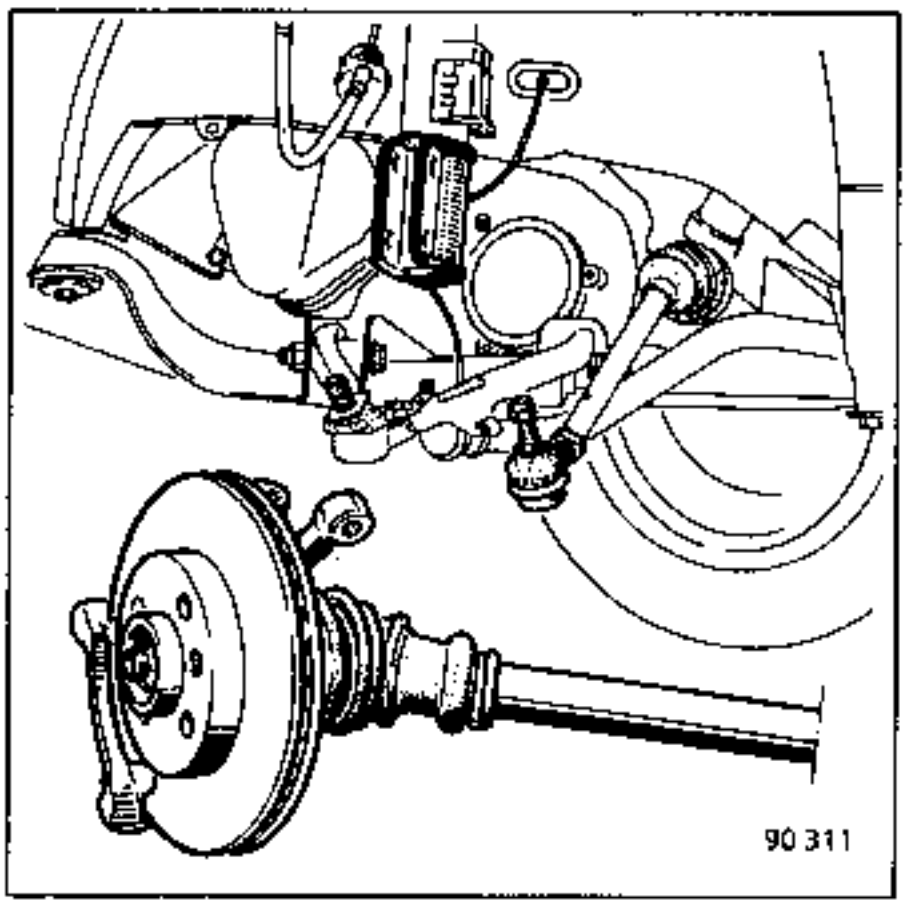
- the brake caliper and attach it to the body,
- the 3 screws from the bellows,



- the bolt on the lower ball joint,
- the steering ball joint using extractor **T.Av.476.**

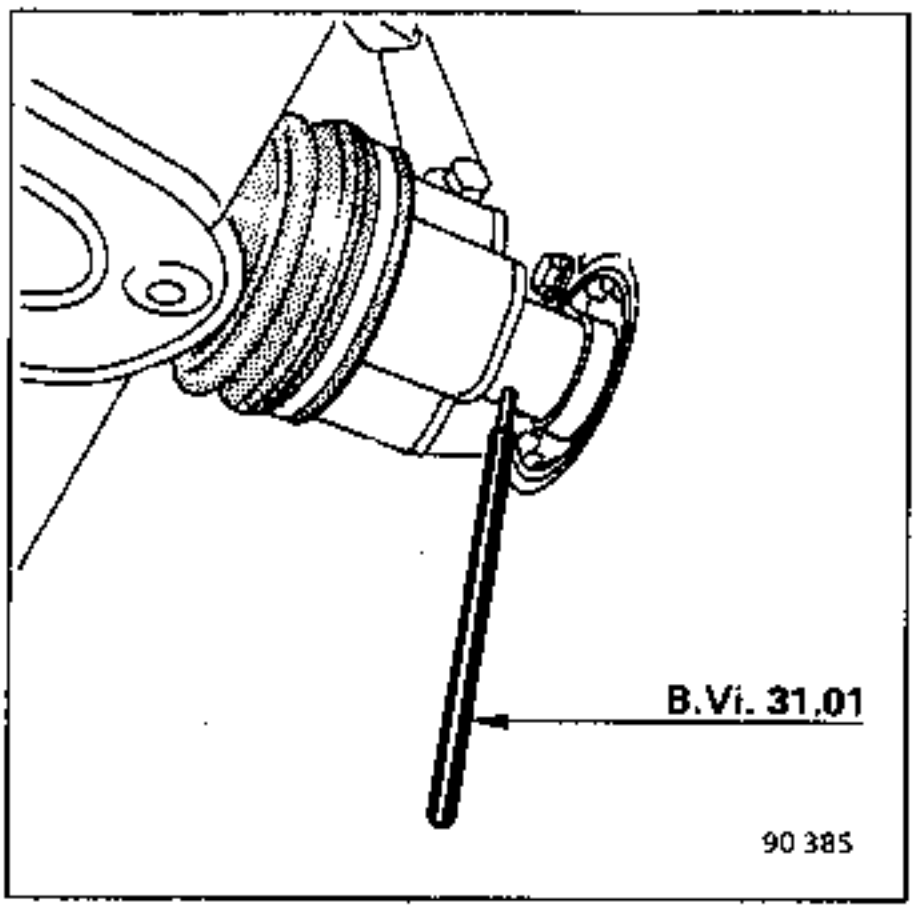


- the bolts from the lower ends of the shock absorbers,
- the stub axle carrier - drive shaft assembly, protecting the spider joint.



On the right hand side

- the pin from the drive shaft using punches **B.Vi 31-01.**

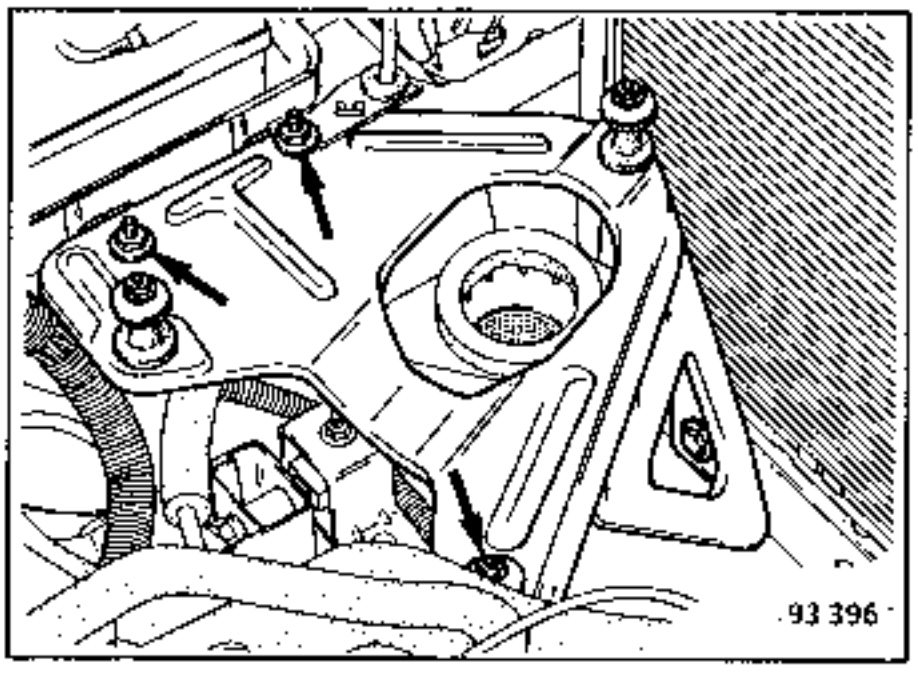


- the shock absorber upper securing bolt.

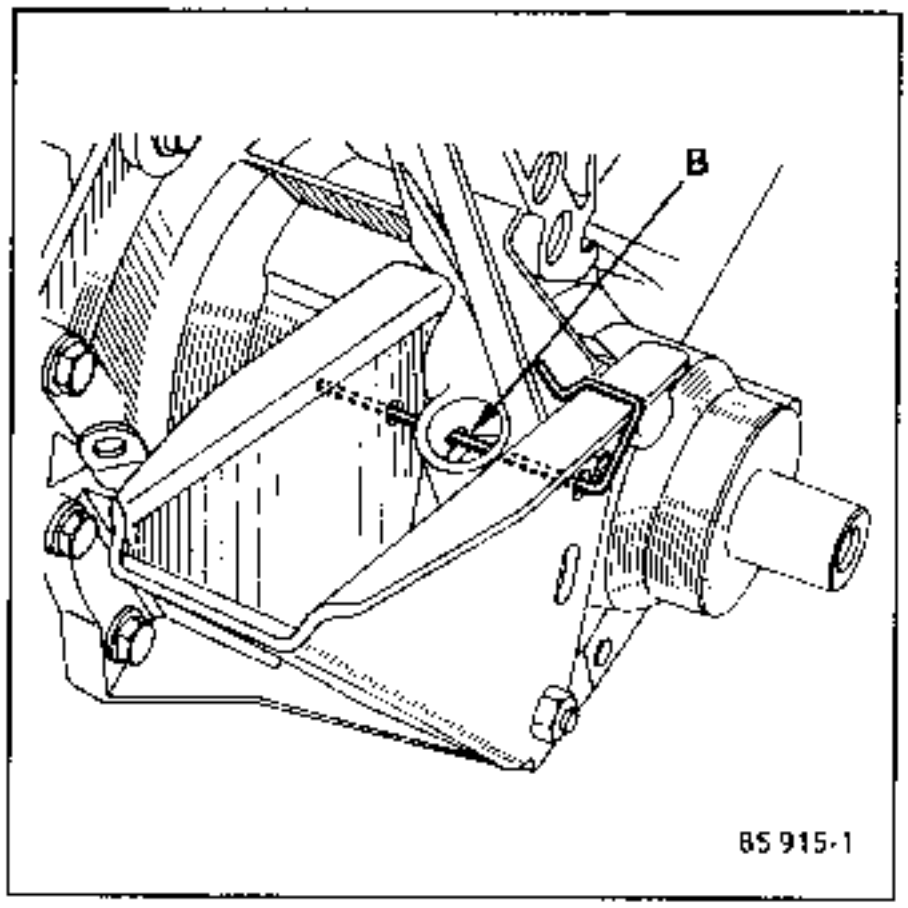
Free the drive shaft.

Remove :

- the bonnet,
- the air filter and its support,



- the clutch, accelerator and speedometer drive cables, removing clip B,



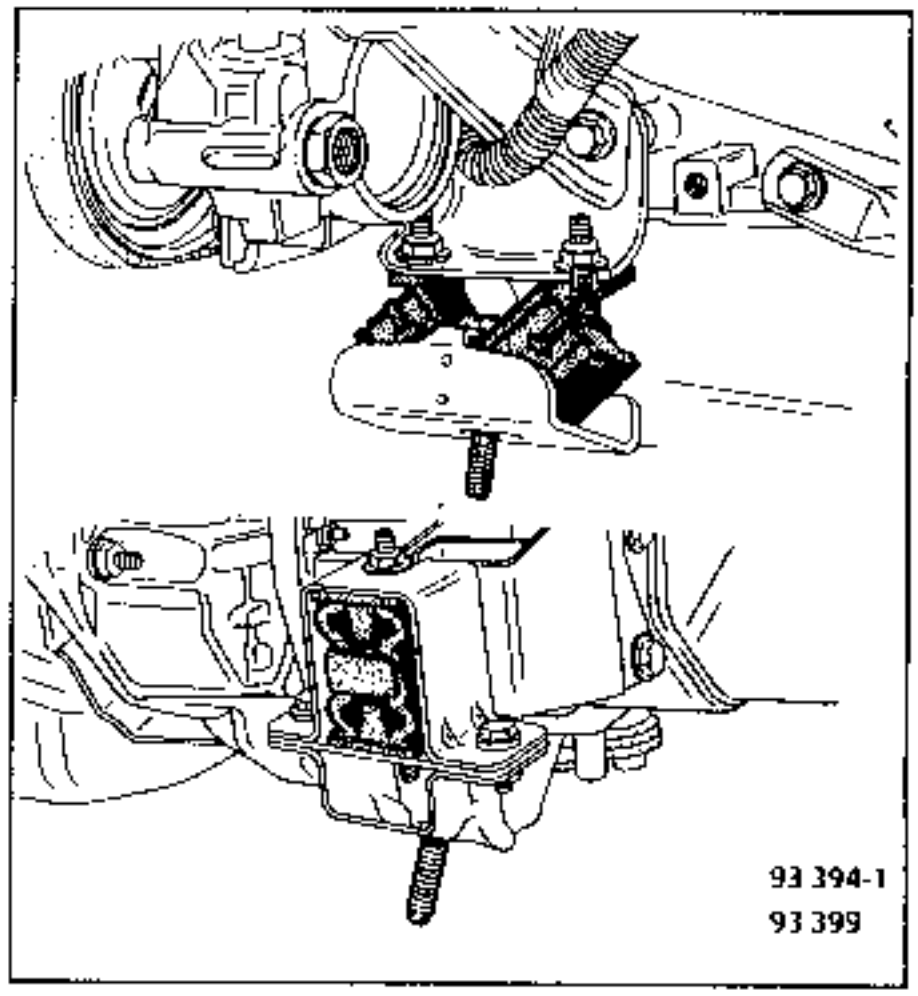
- the exhaust manifold output clamp,
- the power steering pipe supports,
- the expansion chamber and secure it to the engine,
- the nuts from the engine and gearbox earthing braids.

Disconnect

- the electrical wiring harness from the preheater unit, from the electric fan and the engine harness pin, securing them to the engine,
- the following pipes :
  - . heating system, at the engine,
  - . fuel filter heater,
  - . the fuel input and return pipes at the injection pump.

Remove :

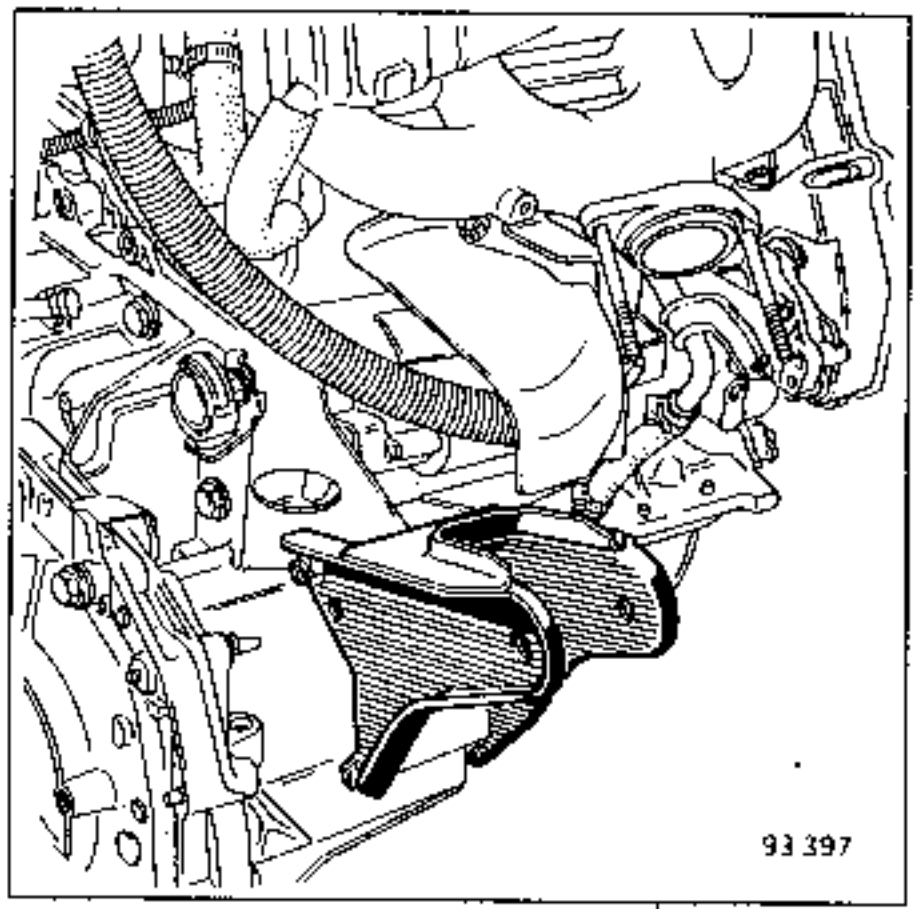
- the expansion chamber support,
- the two nuts from the engine and gearbox front mounting pad.



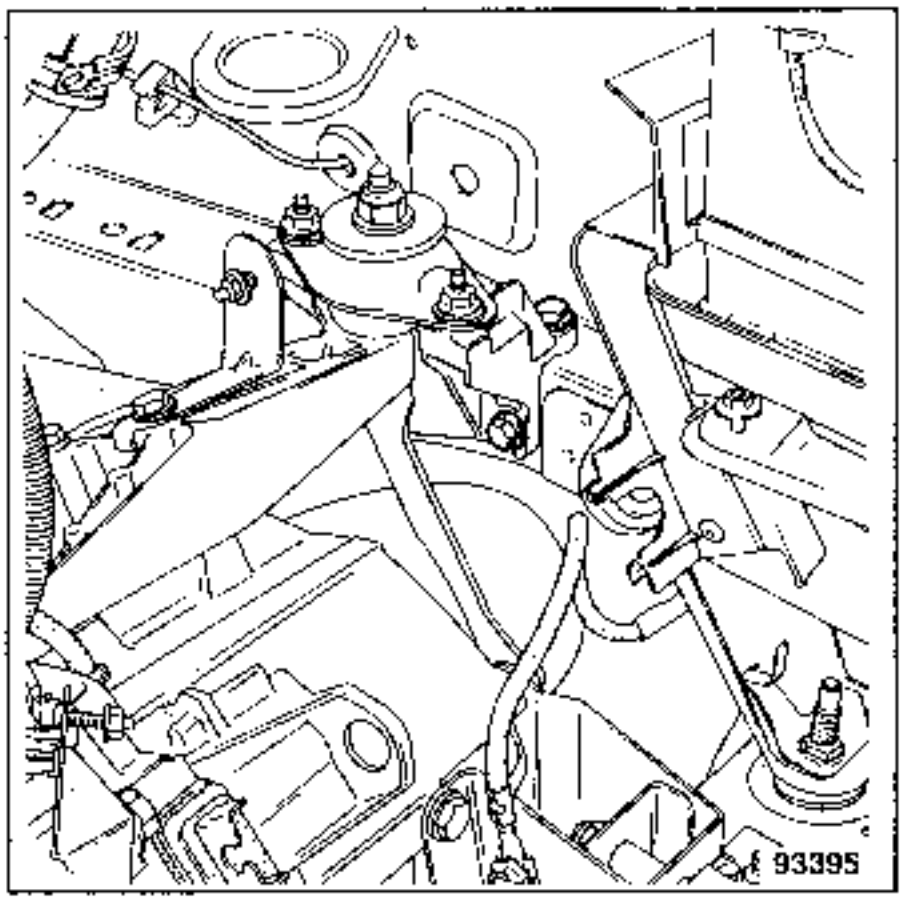
Fit the lifting chain and rings **Mot.878**

Remove :

- the bolt from the gearbox mounting,



- the bolts that secure the suspended flexible mounting.



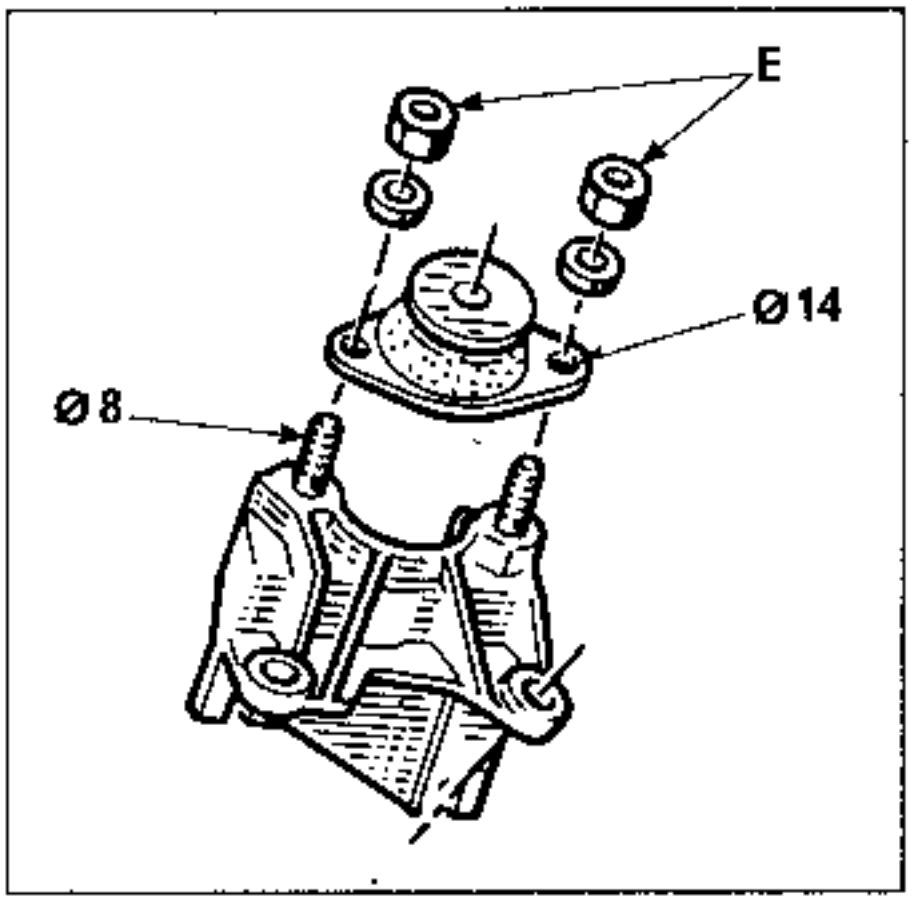
Remove the engine-gearbox assembly.

REFITTING (special points)

When refitting the engine, loosen the 2 nuts (E) that secure the suspended mounting.

Refit the suspended flexible mounting.

Retighten the flexible mounting placing the screwed rods that secure it in the centre of the suspended flexible mounting holes (8 mm Ø rod, 14 mm Ø holes).



Tighten the nuts and bolts to the specified torque.

Fit the caliper securing bolts, coating them with Loctite Frenbloc.

Press the brake pedal a number of times to reposition the pads.

- Fill the gearbox and engine (when applicable) with oil,
- fill and bleed the cooling system and the power steering system (when applicable),
- retighten the exhaust pipe clamp until the springs are coil bound and then loosen the nuts by one and a half turns,
- apply **CAF 4/60 THIXO** to the spring pin holes,
- adjust the accelerator cable,
- bleed the fuel system.

REMOVING-REFITTING

ESSENTIAL SPECIAL TOOLS	
B.Vi. 31-01	Spring pin punches
Mot. 878	Lifting chain and rings
T.Av. 476	Ball joint extractor

TIGHTENING TORQUES (in daN.m)	
Shock absorber lower securing bolts	20
Steering ball joint	4
Engine mounting securing bolts	4
Wheel bolts	9

REMOVING

Disconnect the battery.

Remove :

- the bonnet,
- the front cross member,
- the radiator grille,
- the air filter,
- the bumper shield.

On vehicles with power steering, remove the power steering pump and place it on the vehicle side.

Disconnect :

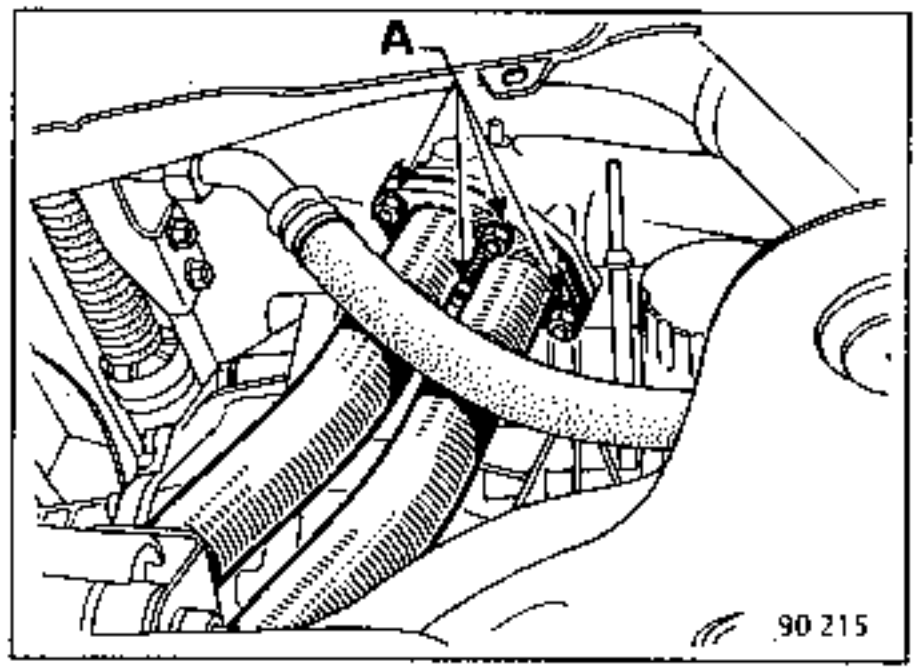
- the electrical connections,
- the accelerator cable,
- the clutch cable,
- the ignition sensor.

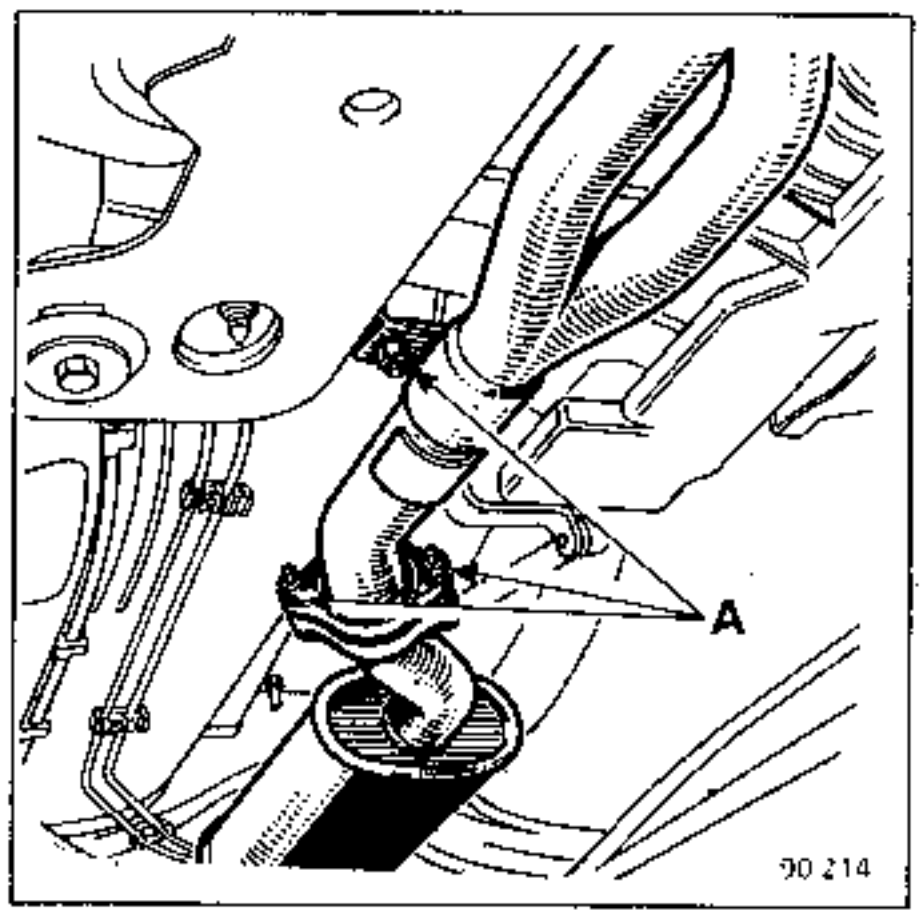
Drain :

- the gearbox,
- the engine, if necessary.

Remove :

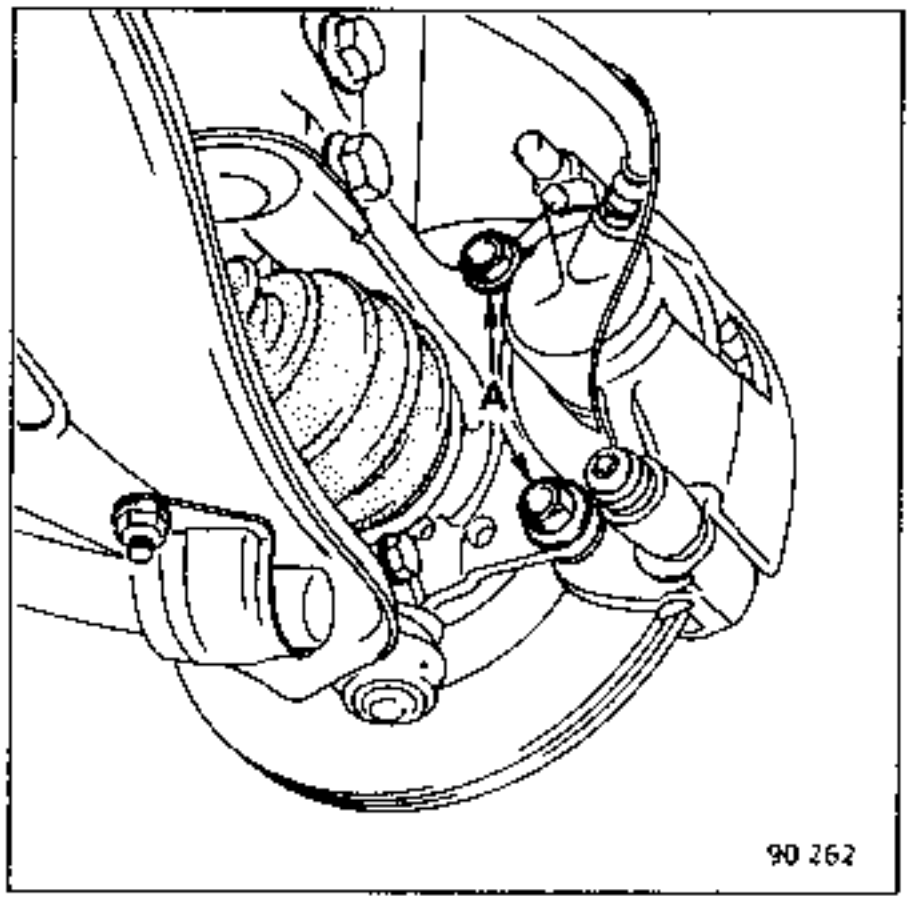
- the exhaust down pipe at (A).



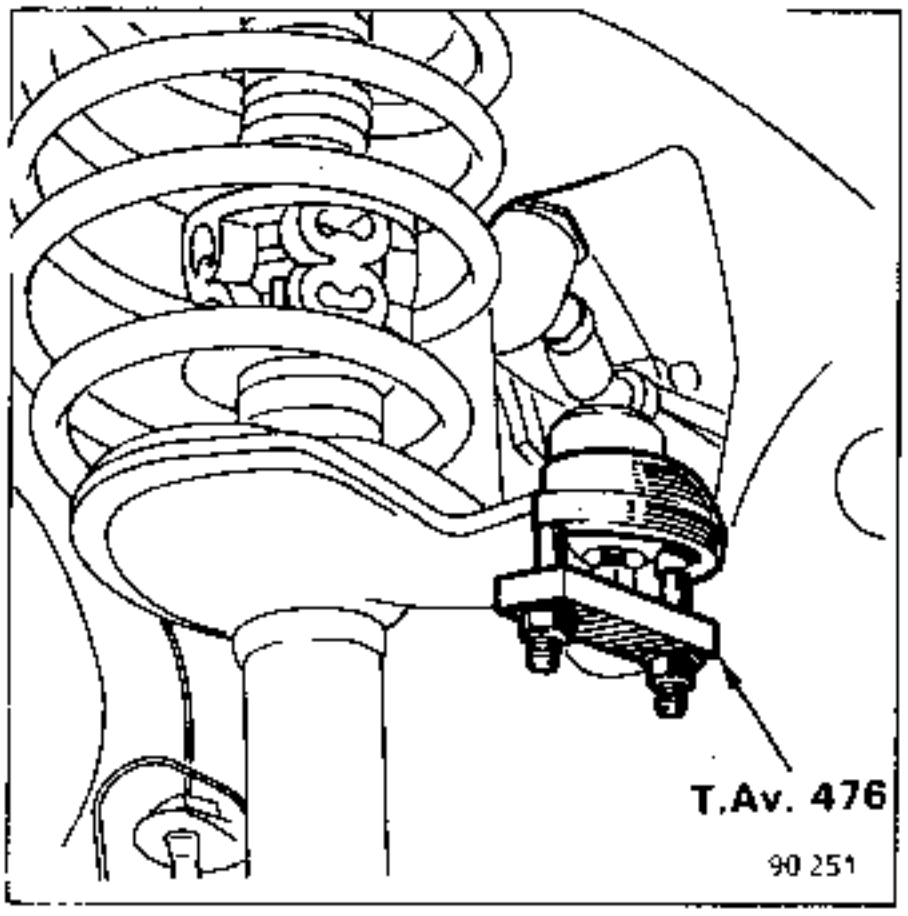


Remove :

- the BENDIX series IV.M calipers (bolts A),



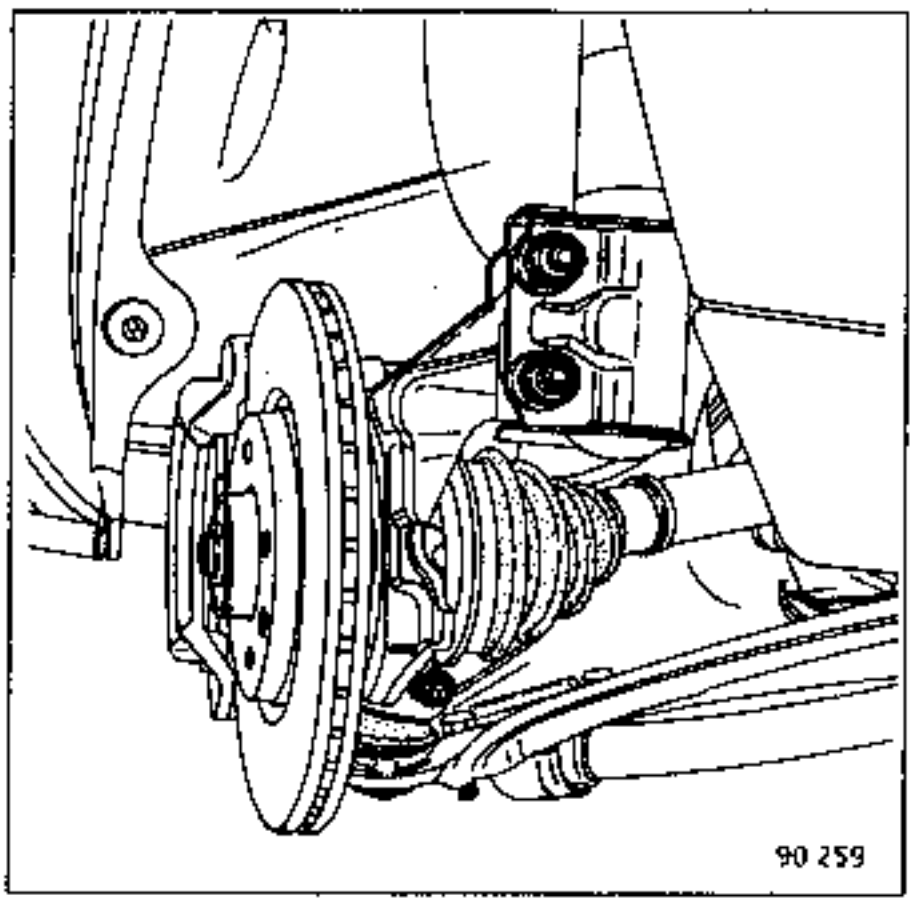
- the pins from the drive shafts using punches **B.Vi.31-01**,



- the nuts from the steering ball joints and extract the ball joints using tool **T.Av.476.**

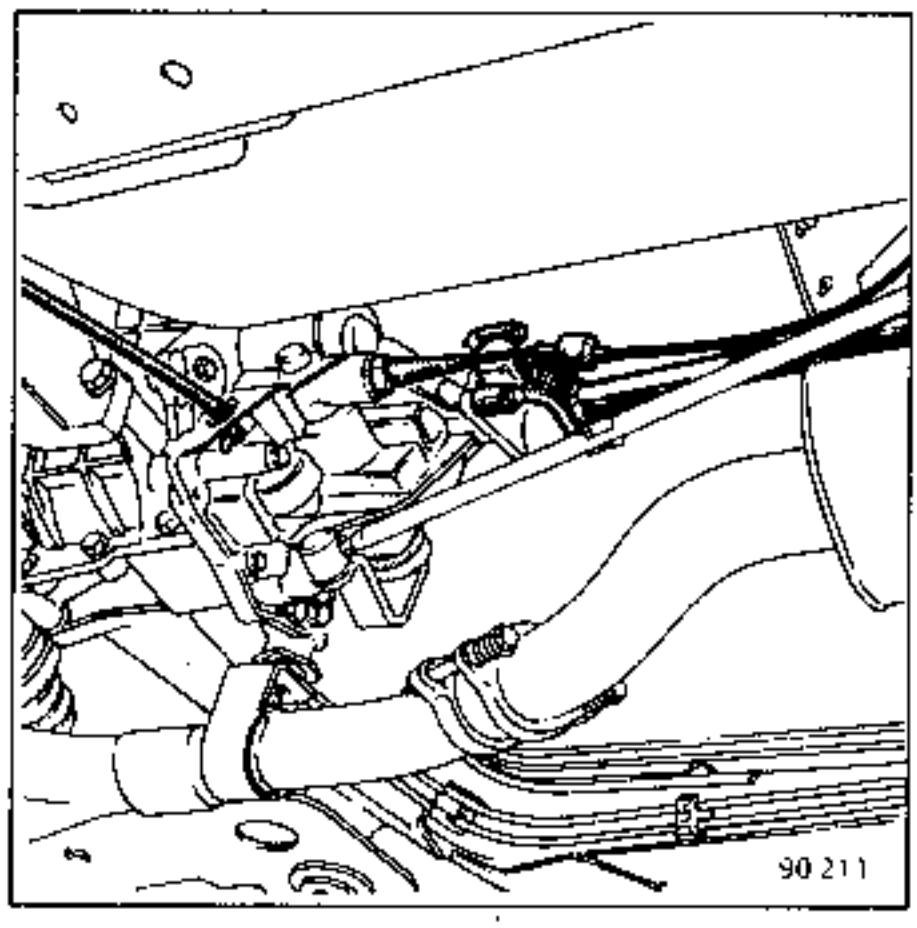
Remove :

- the upper bolts from the lower end of the shock absorbers. Loosen the lower bolts without removing them.



Disconnect :

- the speedometer drive cable,
- the gear shift control.



Remove :

- the securing bolts from the gearbox mounting pads.

Lift out the complete engine-gearbox assembly using tool **Mot.878.**

REFITTING

Carry out the removing operations in reverse.

Tighten the bolts and nuts to the specified torque. ▽

- Fill the gearbox with oil,
- fill the engine with oil, if necessary,
- fill and bleed the cooling system.

Adjust the accelerator cable.

. REFITTING THE EXHAUST SPHERICAL JOINT

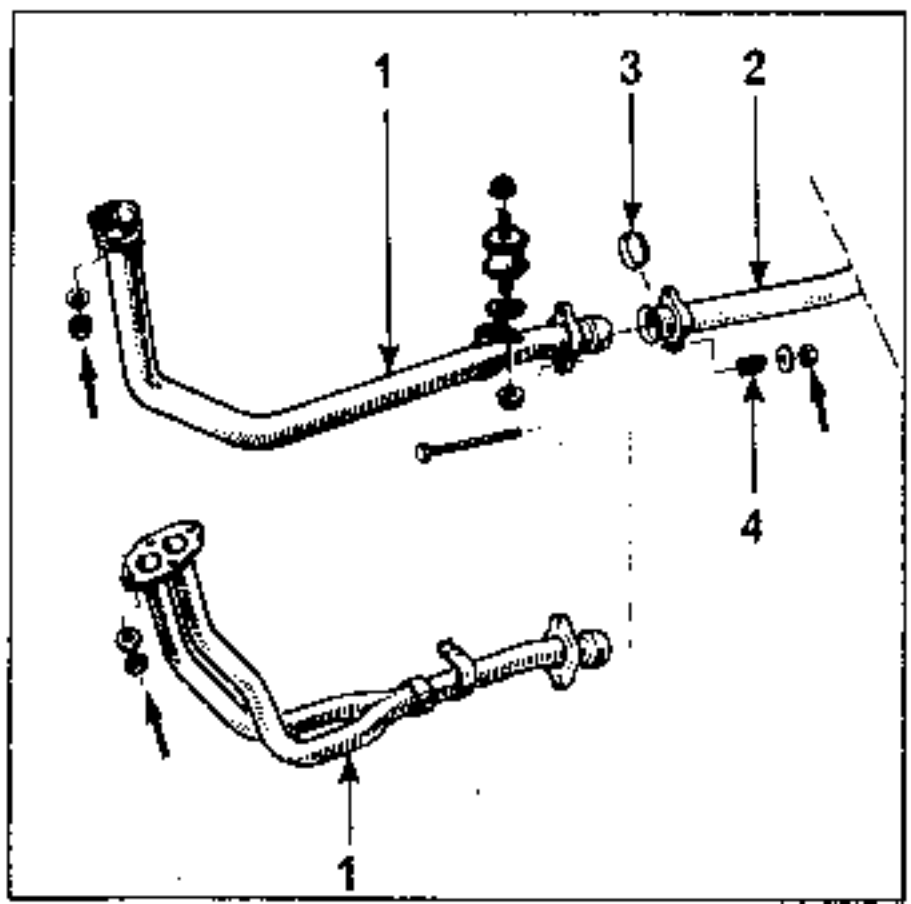
Place the anti-rattle ring (3) part no. **60 25 071 196** between the down pipe (1) and the flared part of the next pipe (2).

. TIGHTENING THE SPHERICAL JOINT

The spherical joint is sufficiently tight as soon as the joint between the 2 pipes is fully sealed.

Carry out a leak test with the engine in its various positions.

For example : Test the system during starting, with the vehicle moving forward, moving backwards, on a slope or with the hand brake applied.



REMOVING-REFITTING

ESSENTIAL SPECIAL TOOLS	
B.Vi.606	Spring pin punches
Mot.878	Lifting chain and rings
T.Av.476	Ball joint extractor
Mot.453-01	Set of 2 hose clamps
SEF.689	Load positioner

The engine or engine-gearbox assembly can be removed from above the vehicle after the front end panel has been removed.

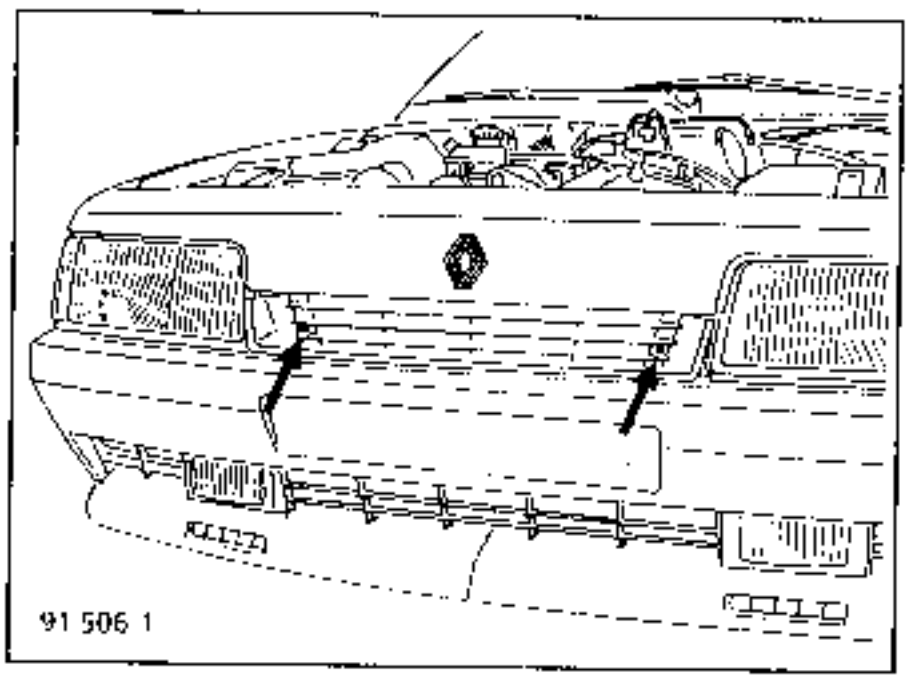
TIGHTENING TORQUES (in daN.m)	
Shock absorber lower securing bolts	20
Steering ball joints	3,5
Engine and gearbox mounting securing bolts	4
Wheel bolts	10
Bolts round the gearbox	5

REMOVING the front end panel

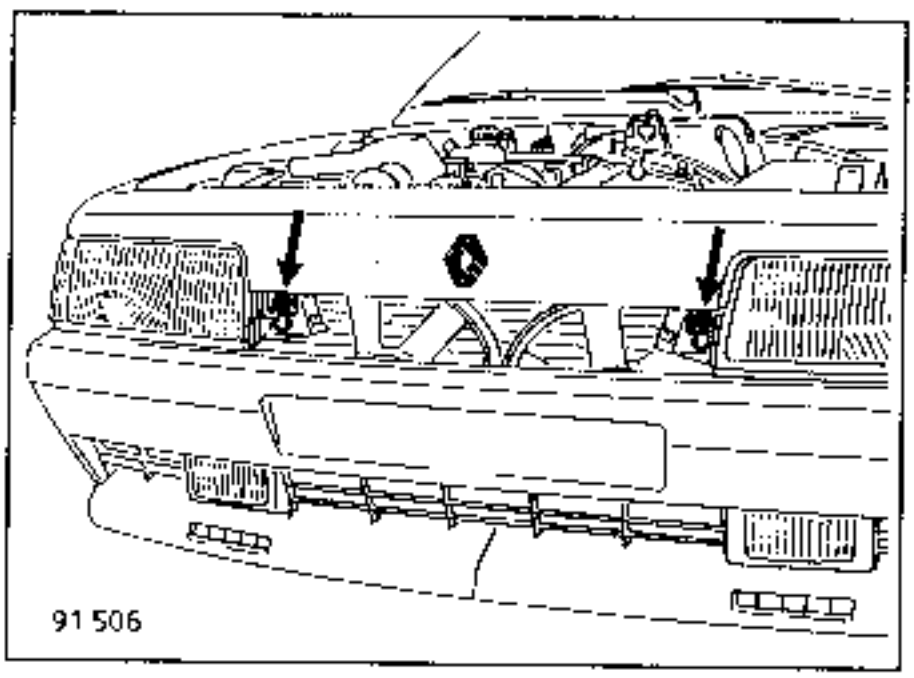
Disconnect the battery

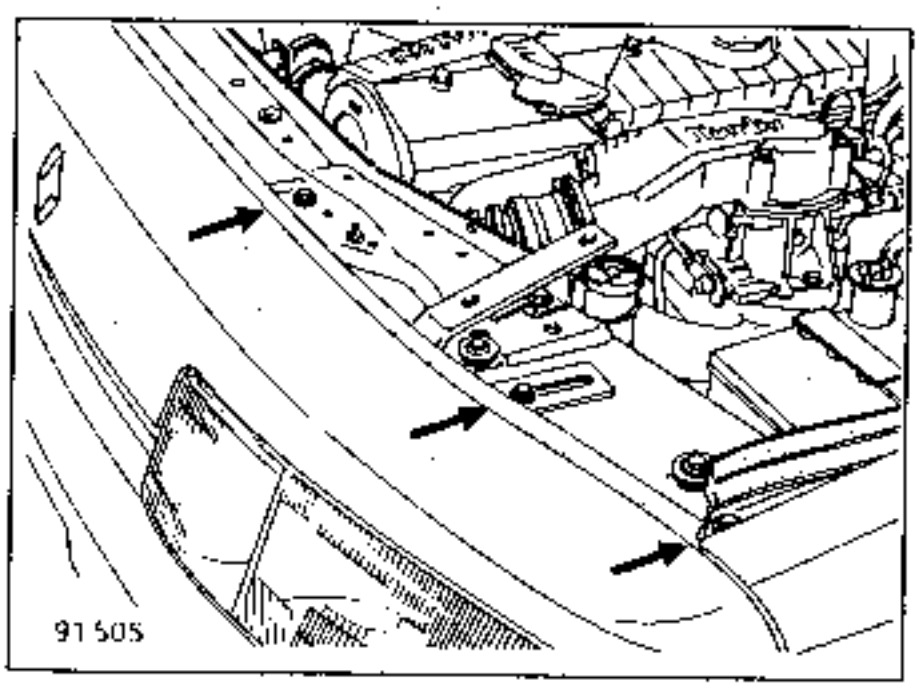
Remove :

- the bonnet,
- the radiator grille,

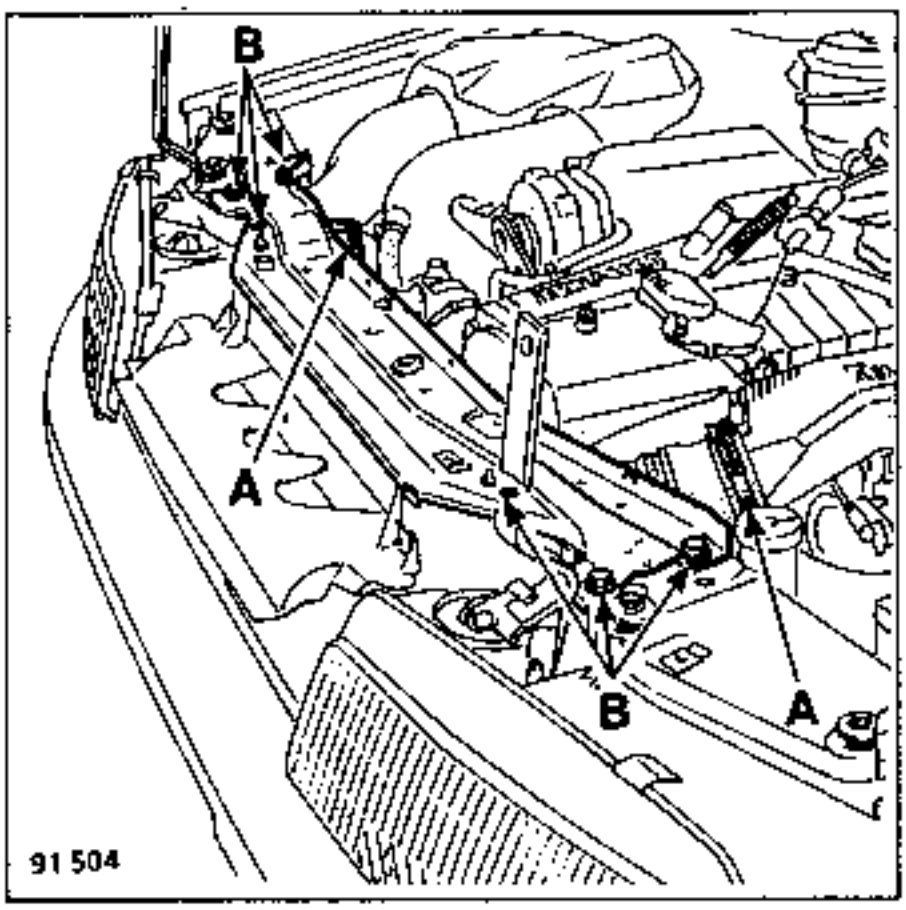


- the radiator grille upper panel,

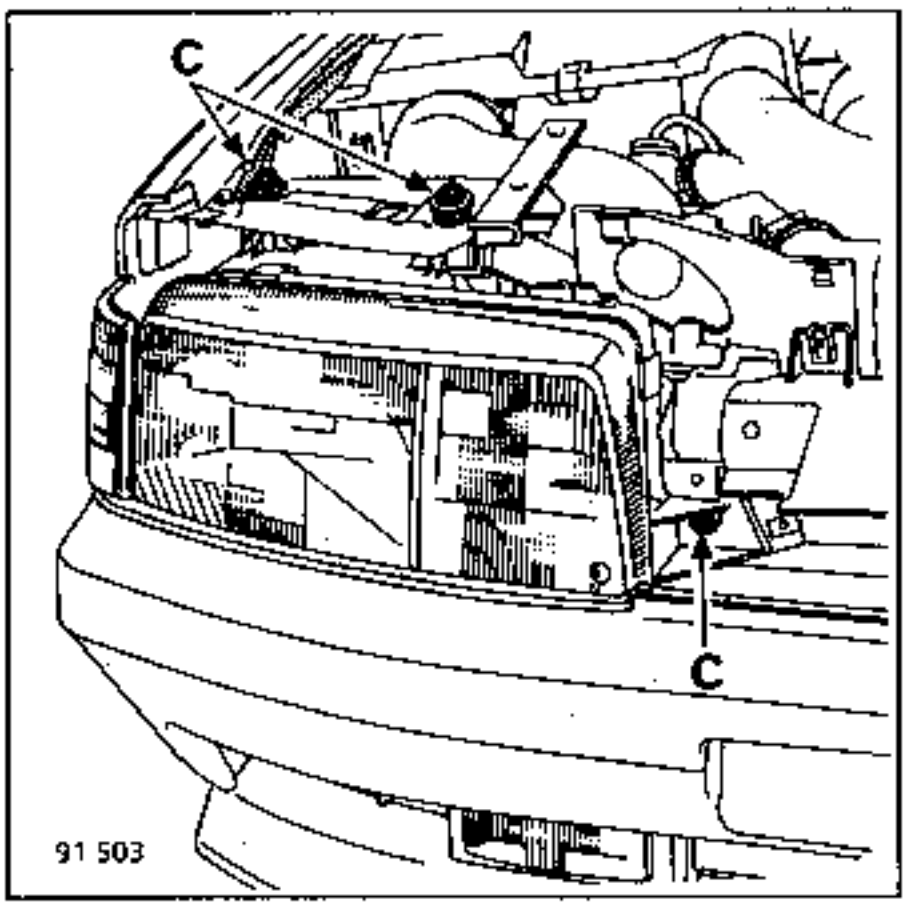


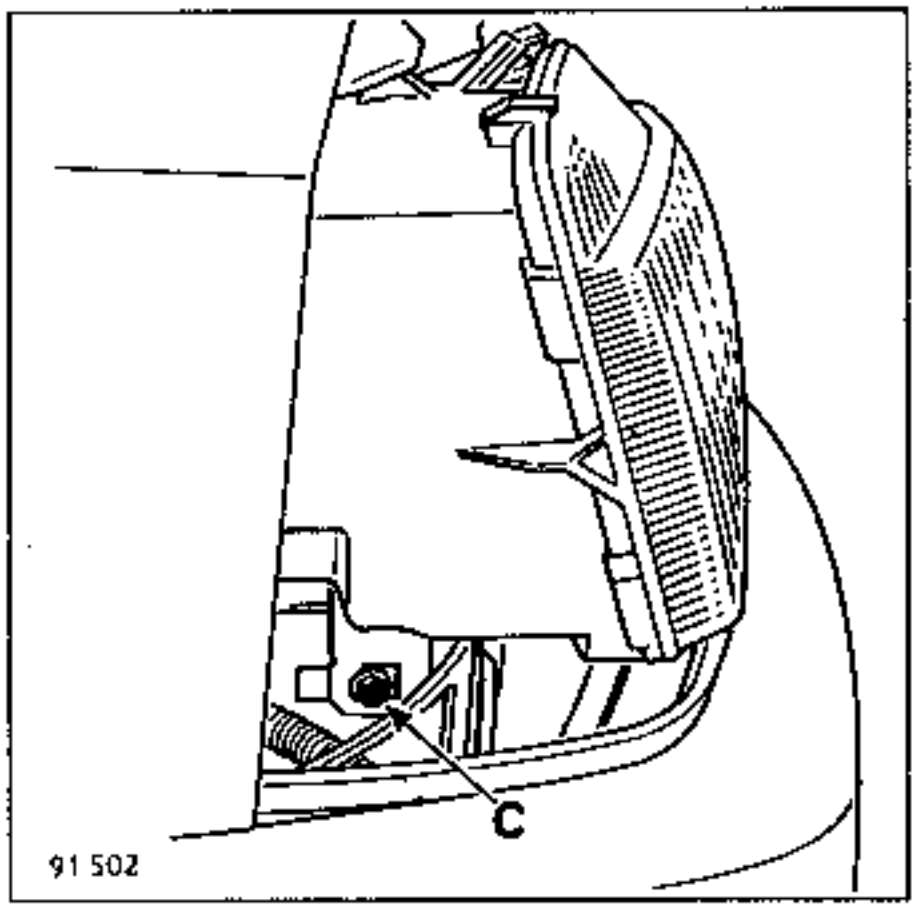


- the upper cross member together with the intercooler, clips (A) and bolt (B),

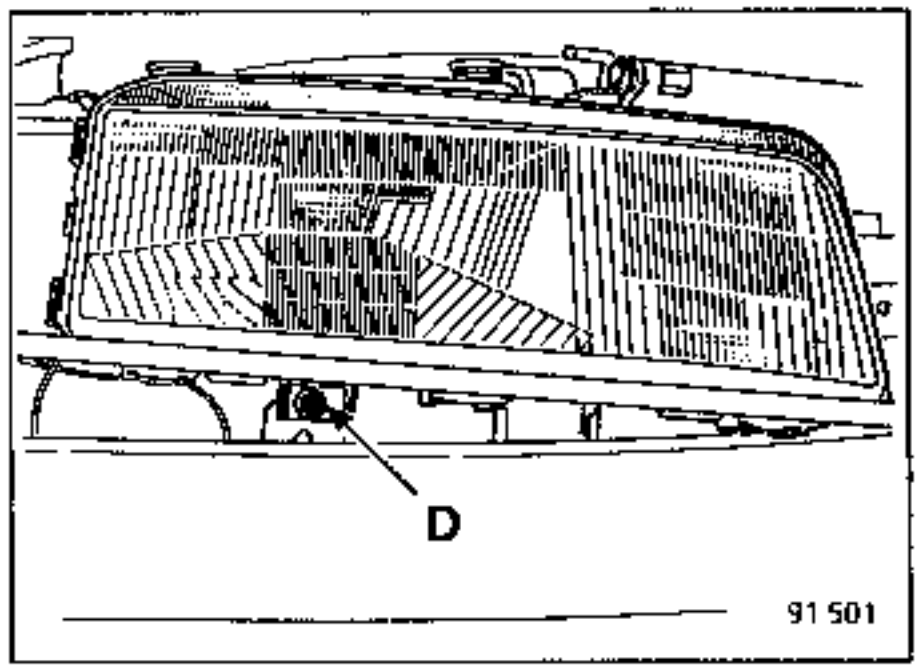


- the direction indicators,
- the beam units, bolts (C).

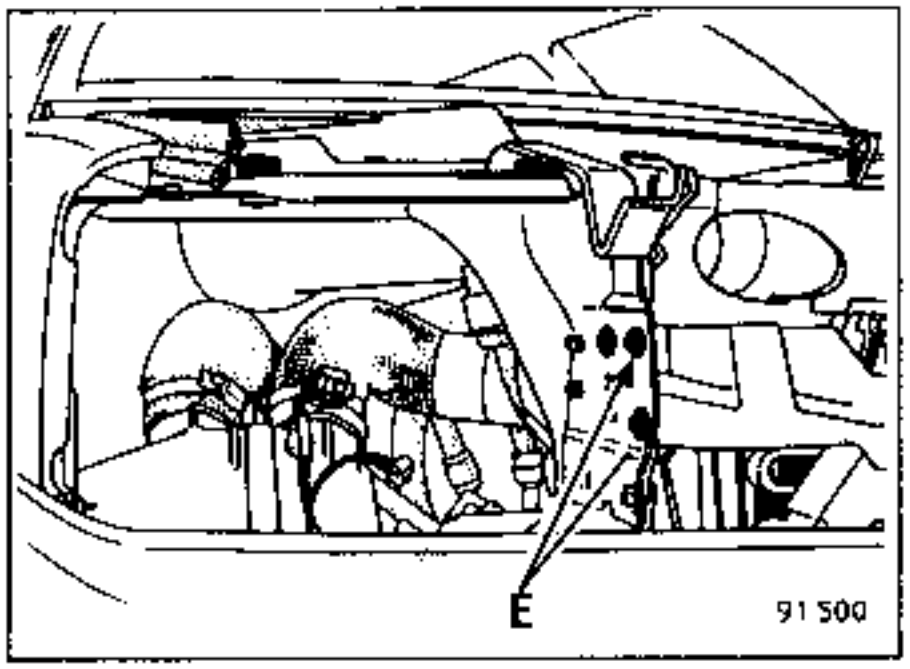




Lift the headlight and remove bolt (D).



Remove the radiator grille support lugs, screws (E).



REMOVING the adjacent components

Remove :

- the air filter and its hoses,
- the air filter support casing.

Bleed the air conditioning refrigeration system at one of the unions on the radiator.

Drain the cooling system at the lower radiator hose.

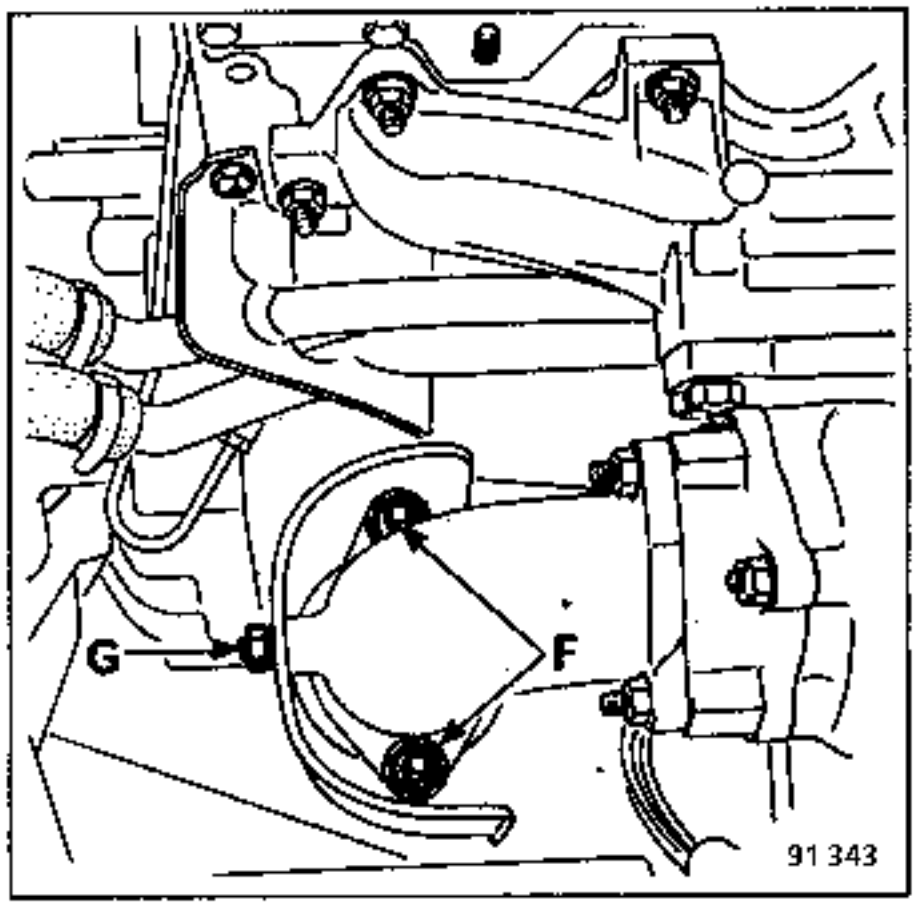
Disconnect :

- the electric fan supply wires (at the connection plate before the ignition switch),
- the air conditioning pipes at the radiator,
- the connectors,
- the upper radiator hose,
- the radiator mounting lugs.

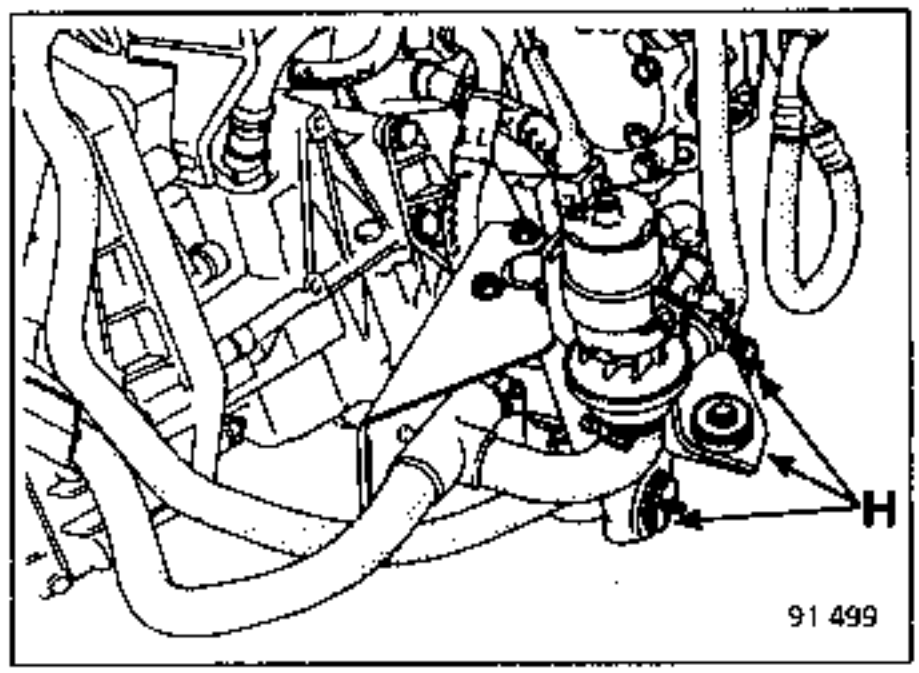
Remove the assembly formed by the radiator, the condenser and the electric fan.

Remove :

- the ignition unit,
- the turbocharger heat shield,
- the exhaust down pipe. To do this, one must unscrew nut (F) and (G) and then remove the stud at (G).

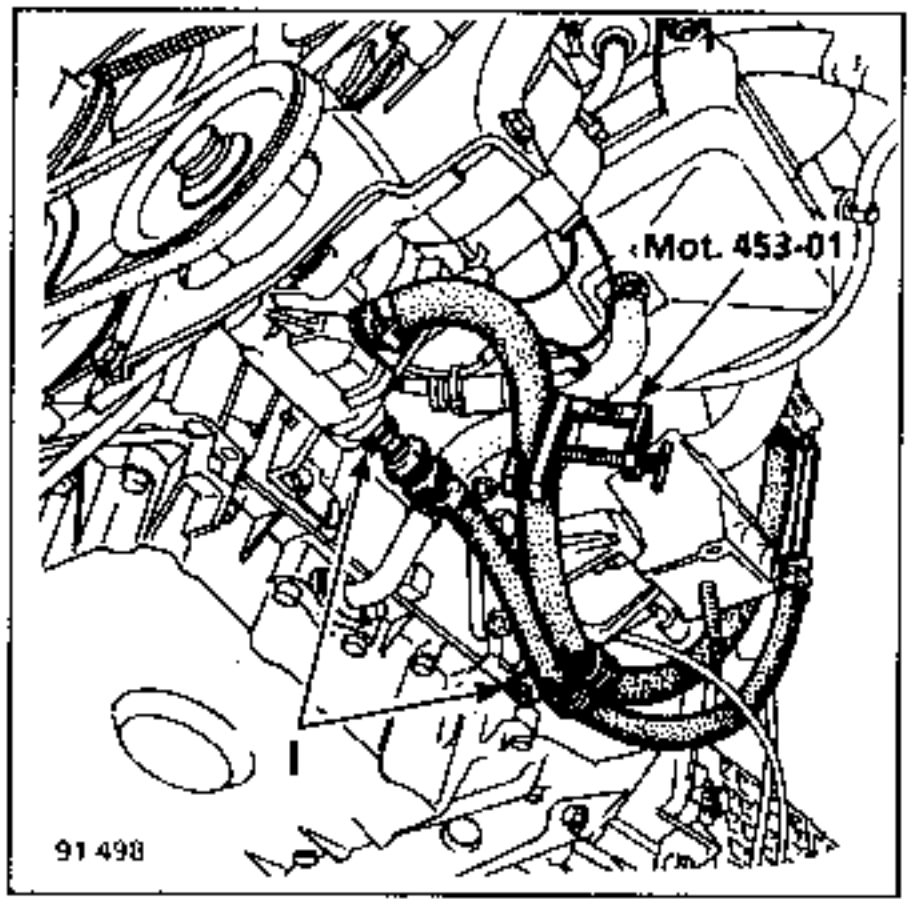


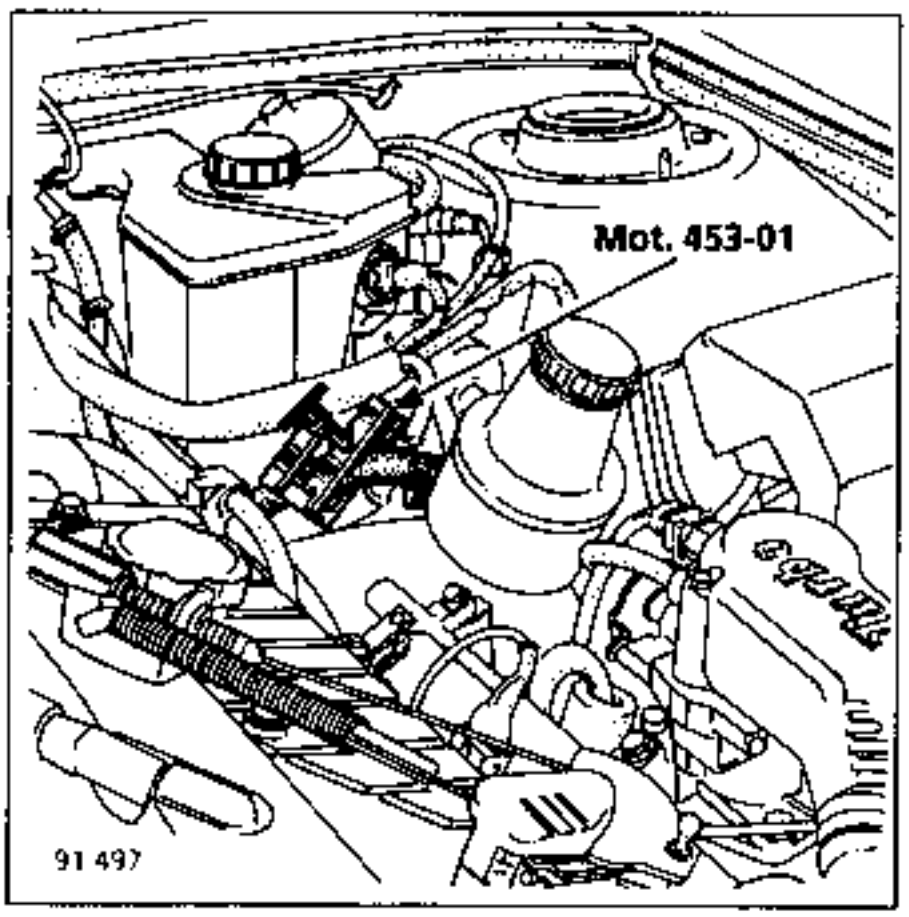
- the bolts from the lower clamp. The is removed from under the vehicle,
- the air conditioning pipe at the compressor,
- the oil cooler (modine) bolt (H).



Fit the 2 clamps **Mot.453-01** to the power steering reservoir output hoses.

Disconnect one hose at the pump (T) and the other at the steering box, then secure the reservoir to the engine.





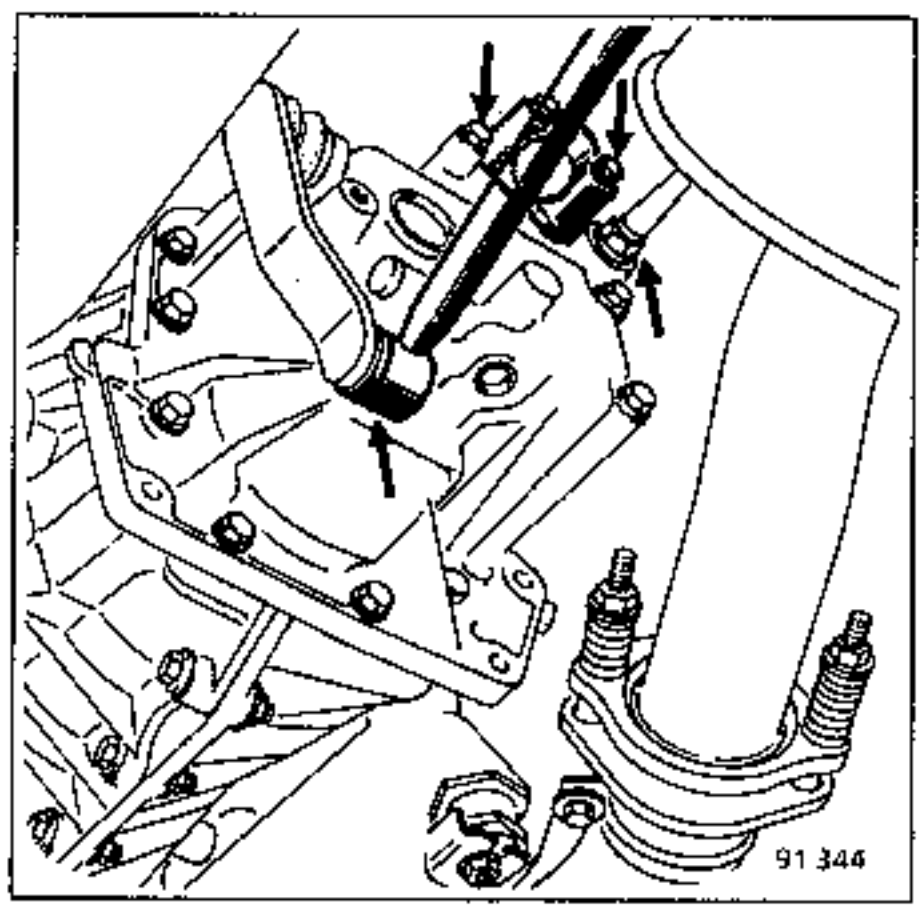
Disconnect :

- the accelerator cable,
- the engine earthing braid,
- the fuel pipes,
- the electrical wiring harnesses, then secure the computer to the engine.

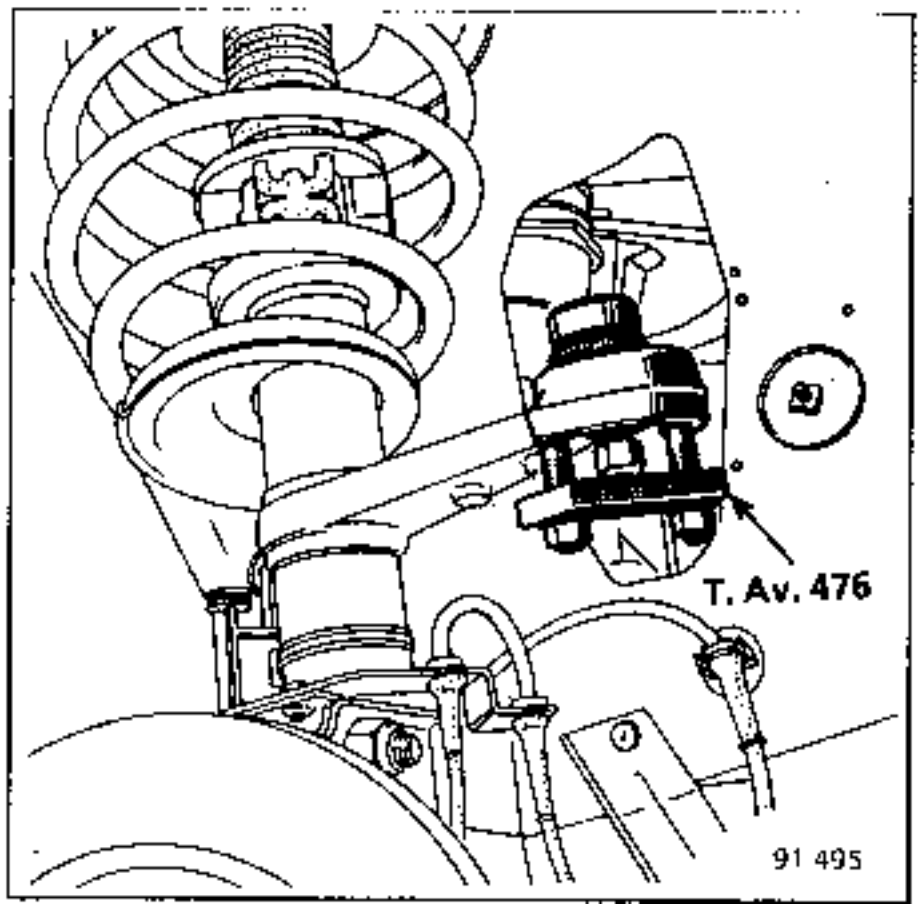
Drain the gearbox.

Remove :

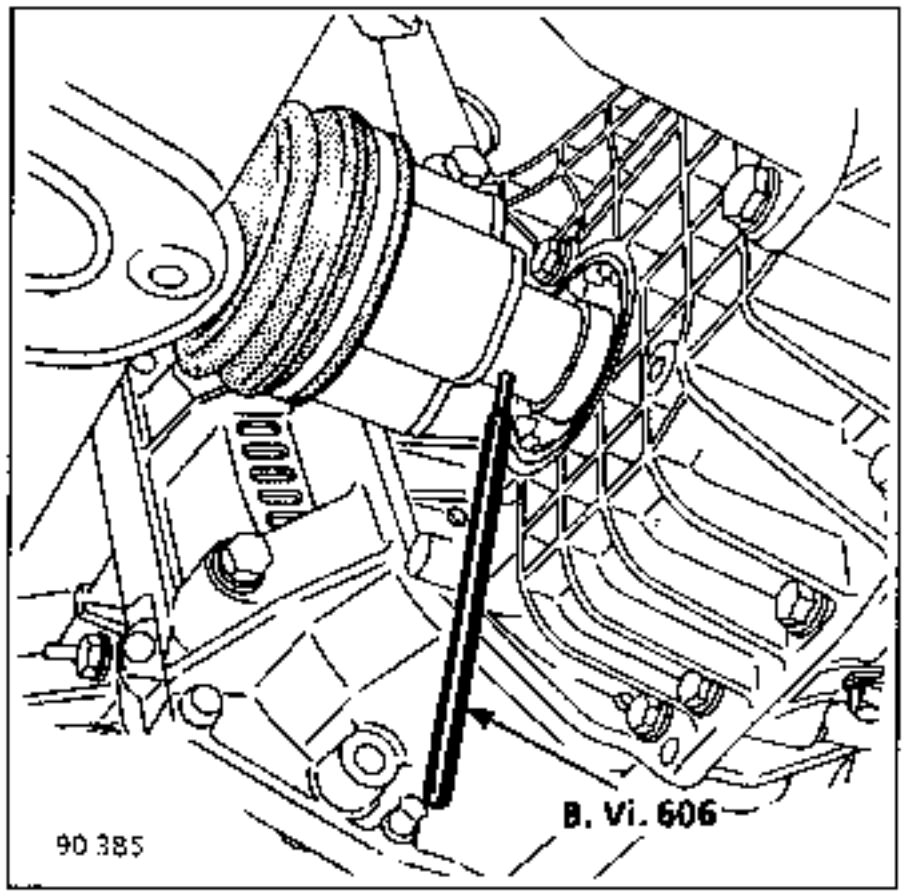
- the gear shift control,



- the speedometer drive cable,
- the gearbox earthing braid,
- the tie rod under the gearbox,
- the wheels,
- one of the steering ball joints.

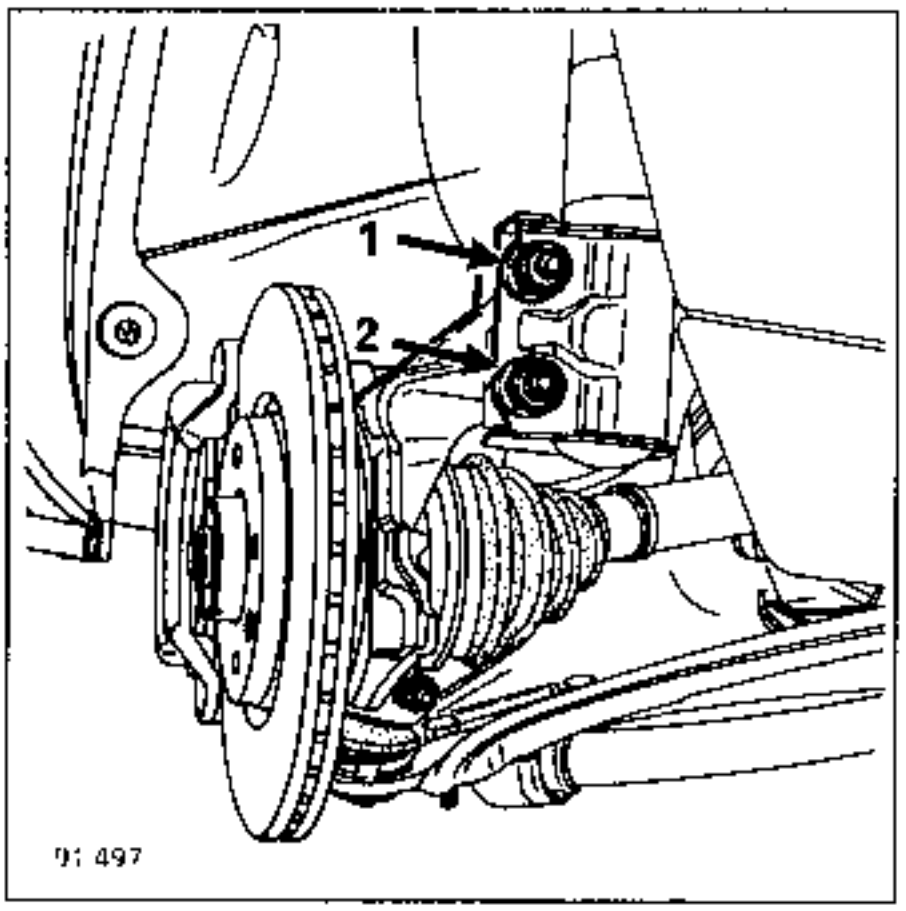


Knock out the spring pins from the drive shafts.

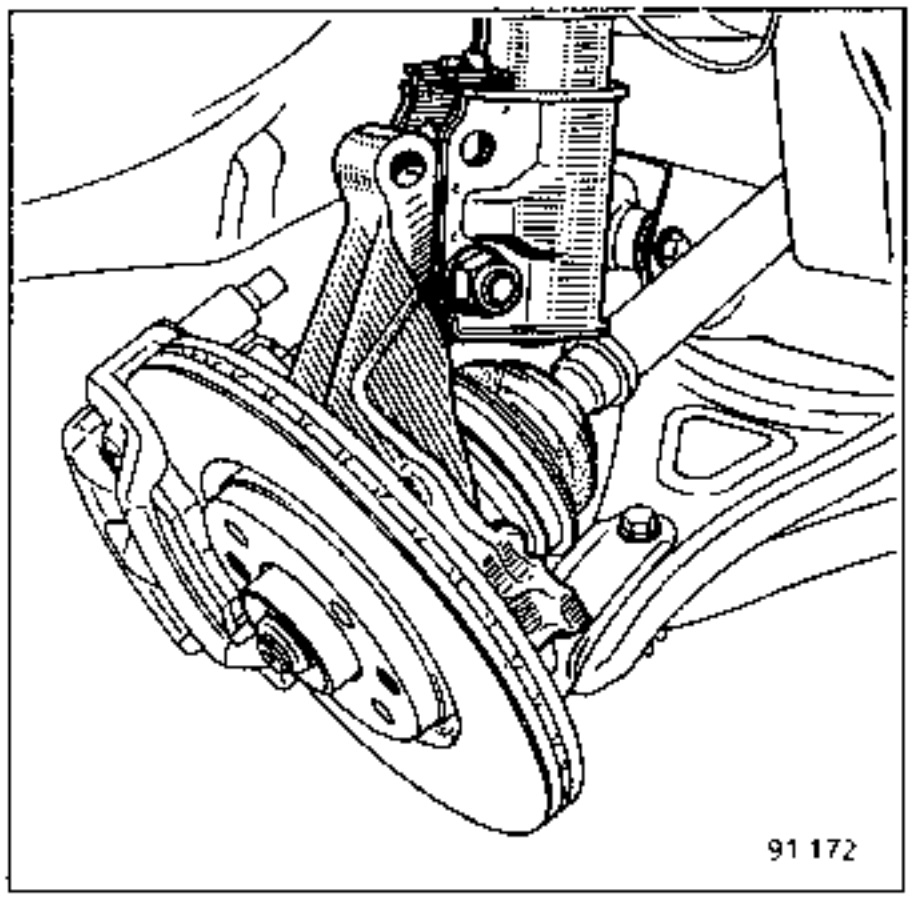


Loosen the lower bolts (2) at the bottom of the shock absorbers and remove the upper bolts (1).

NOTE : these bolts have a spline on them and therefore have to be knocked out with a mallet.

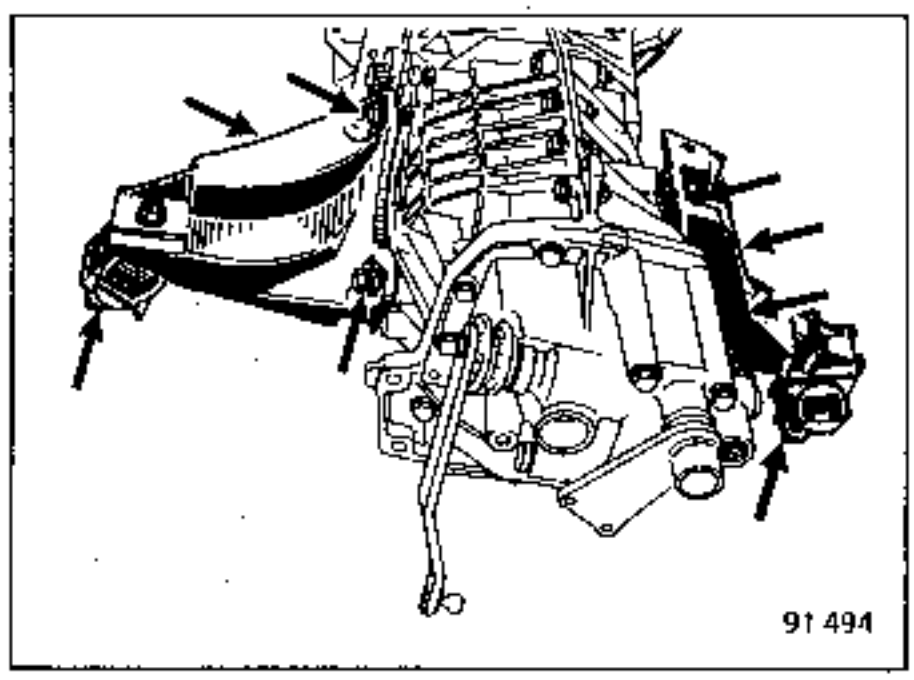


Tilt the stub axle carriers and disconnect the drive shafts.



Pull the rigid coolant pipes to one side and remove the clutch slave cylinder (secure it to the steering box).

Support the weight of the gearbox and remove the gearbox mounting pad assemblies.



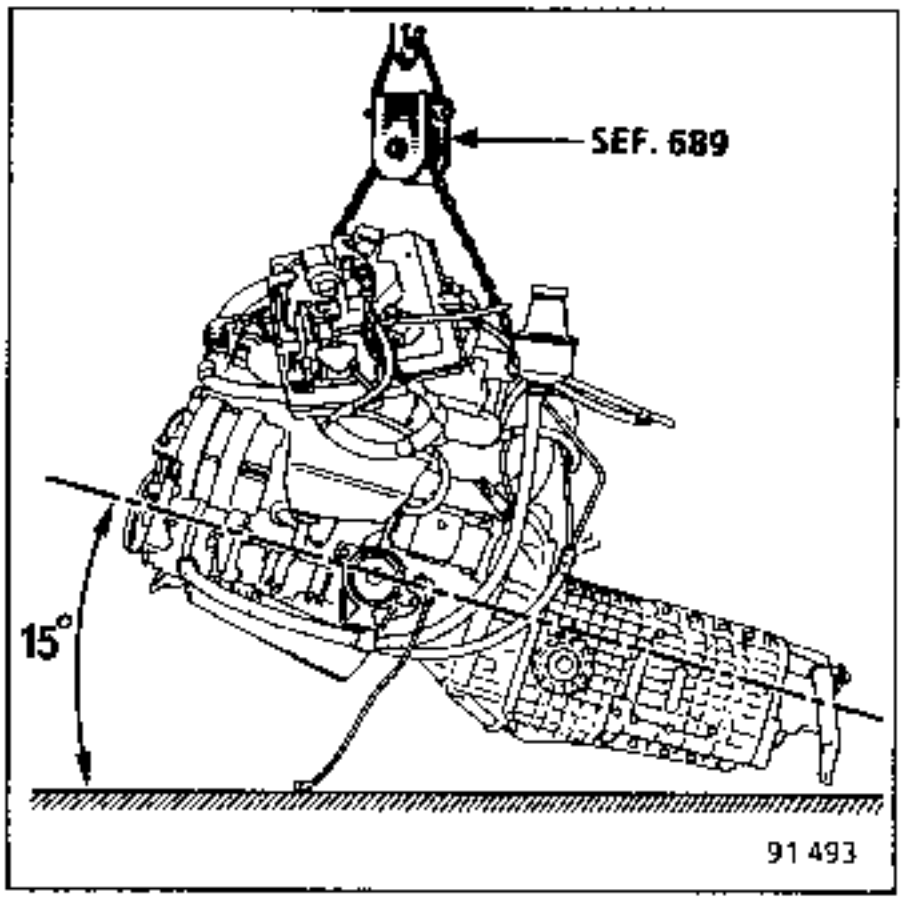
Secure the computer unit and the power steering reservoir to the engine.

Fit the load positioner SEF.689 (SEFAC unit) and remove the Engine-Gearbox assembly.

NOTE : it is essential to attach tool SEF.689 by the hole in the engine front lifting ring that is nearest to the engine (see removing the engine only).

REFITTING the engine-gearbox assembly - Special points

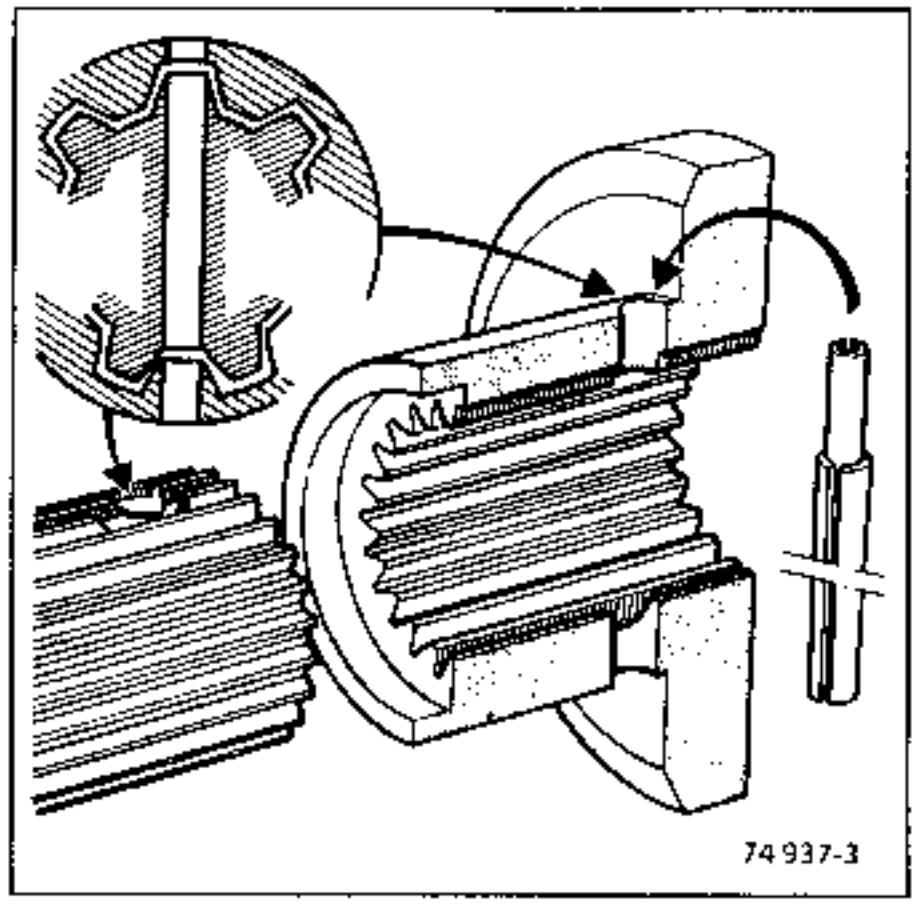
To refit the engine, tilt it at an angle of approximately 15°.



Refit the gearbox side mountings.

Fit the drive shafts :

- coat the splines with grease no. 20,
- ensure that the rubber washer is in place. It should be between the end of the sun wheel shaft and the bottom of the drive shaft yoke,
- correctly position the drive shafts with reference to the sun wheels and then swing up the stub axle carriers whilst pushing the drive shafts on to the sun wheels. Use cranked pin punch **B.Vi.606** to align the holes.



Fit new spring pins and seal their ends (CAF 4/60 THIXO).

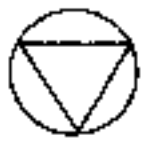
Reconnect :

- the gear shift controls,
- the reverse lock (coating their threads with CAF 4/60 THIXO) compound.

Fill the gearbox.

Fill and bleed the cooling, air conditioning refrigeration and power steering systems (see the section concerned).

Adjust the accelerator cable.



Tighten the nuts and bolts to the specified torques.

ESSENTIAL SPECIAL TOOLS	
B.Vi. 31-01	Spring pin punches
Mot. 878	Lifting chain and rings
T.Av. 476	Ball joint extractor

TIGHTENING TORQUES (in daN.m) ▽	
Shock absorber lower securing bolts	20
Steering ball joints	4
Mounting securing bolts	4
Wheel bolts	9

The engine or engine-gearbox assembly is removed from above the vehicle after taking off the front end panel.

REMOVING

Place the vehicle on a lift.

Disconnect the battery.

Remove :

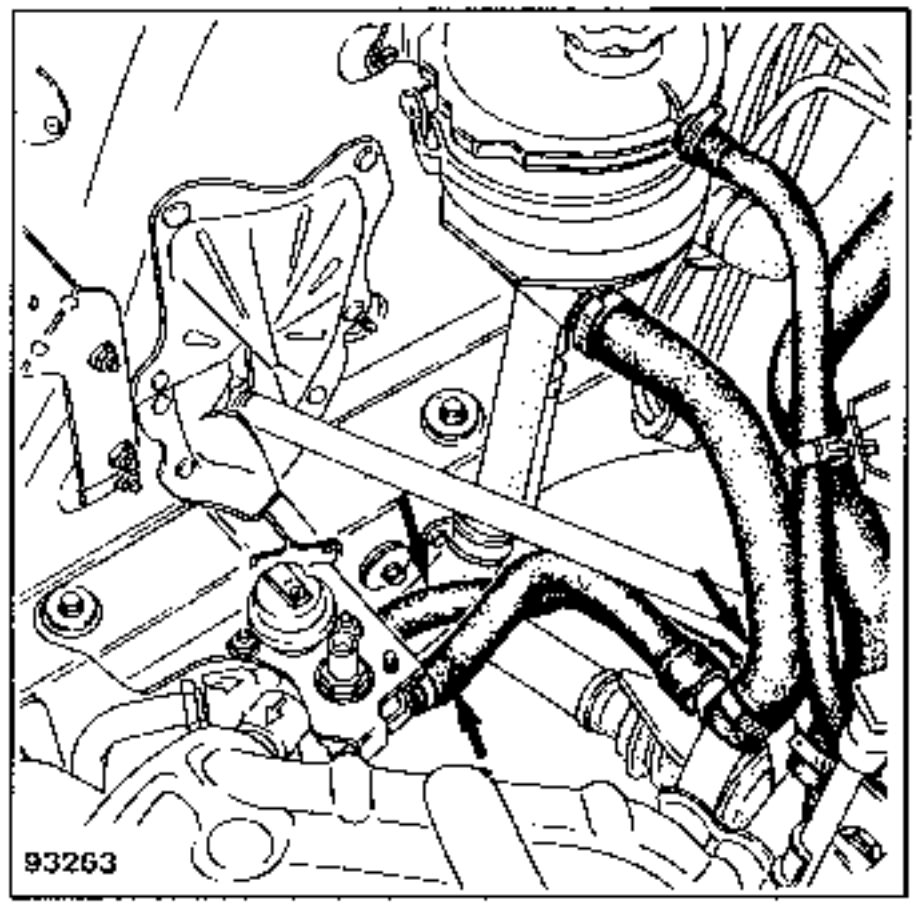
- the bonnet,
- the radiator grille and its upper panel,
- the air filter and its support,
- the protection under the engine.

Drain :

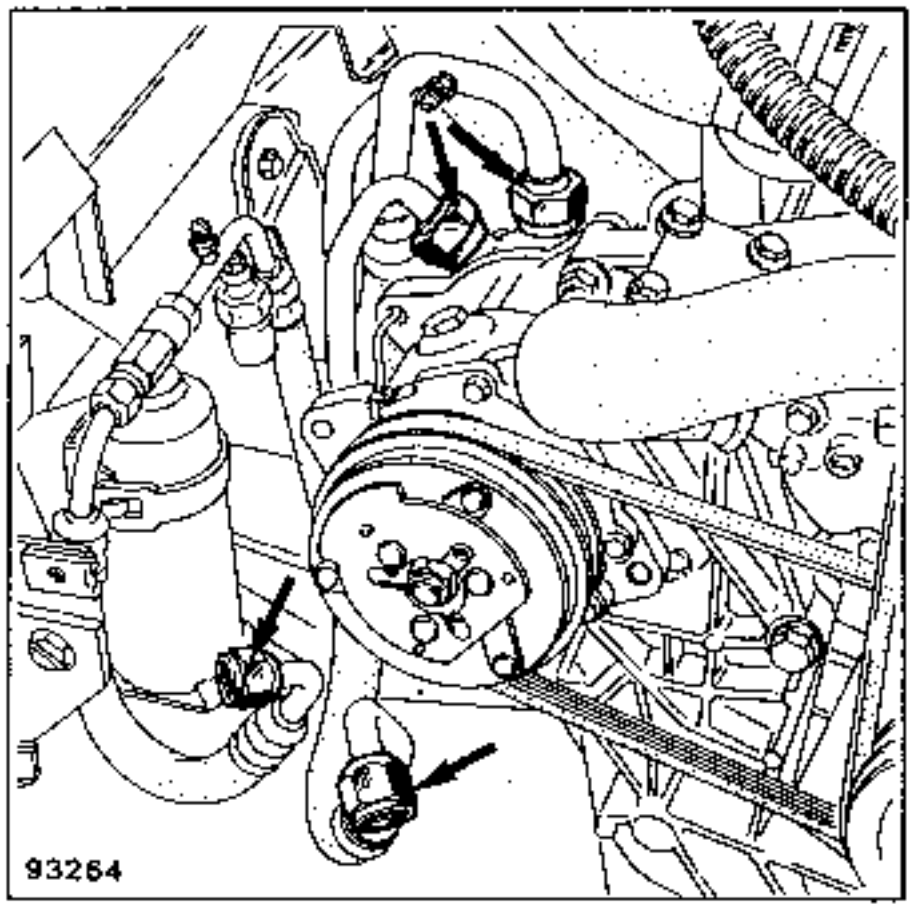
- the engine, if necessary,
- the gearbox, if necessary,
- the cooling system,
- the air conditioning refrigeration system.

Disconnect :

- the electrical connectors (engine, radiator, gearbox),
- the accelerator cable,
- the clutch cable,
- the engine earthing braid,
- the following pipes and hoses :
  - . heater, at the engine outlet,
  - . oil filter cooling at the heater assembly,

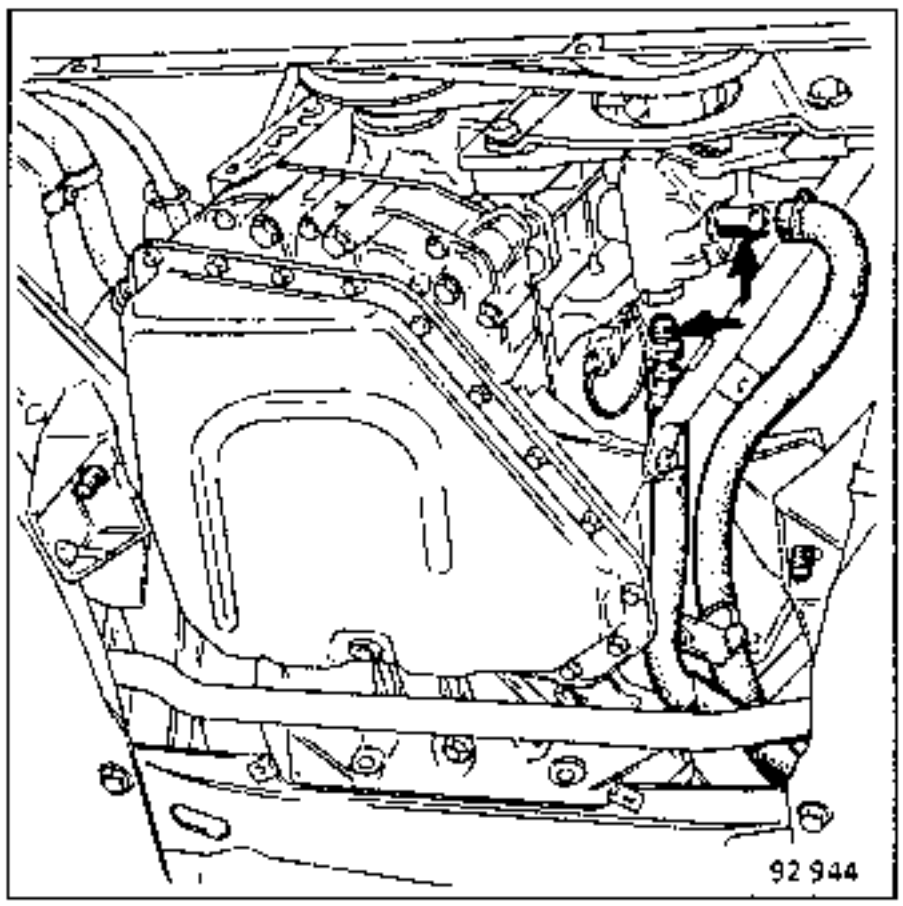


- . fuel,
- . vacuum,
- . HP and LP at the air conditioning compressor and on the radiator,
- . radiator upper and lower hoses.



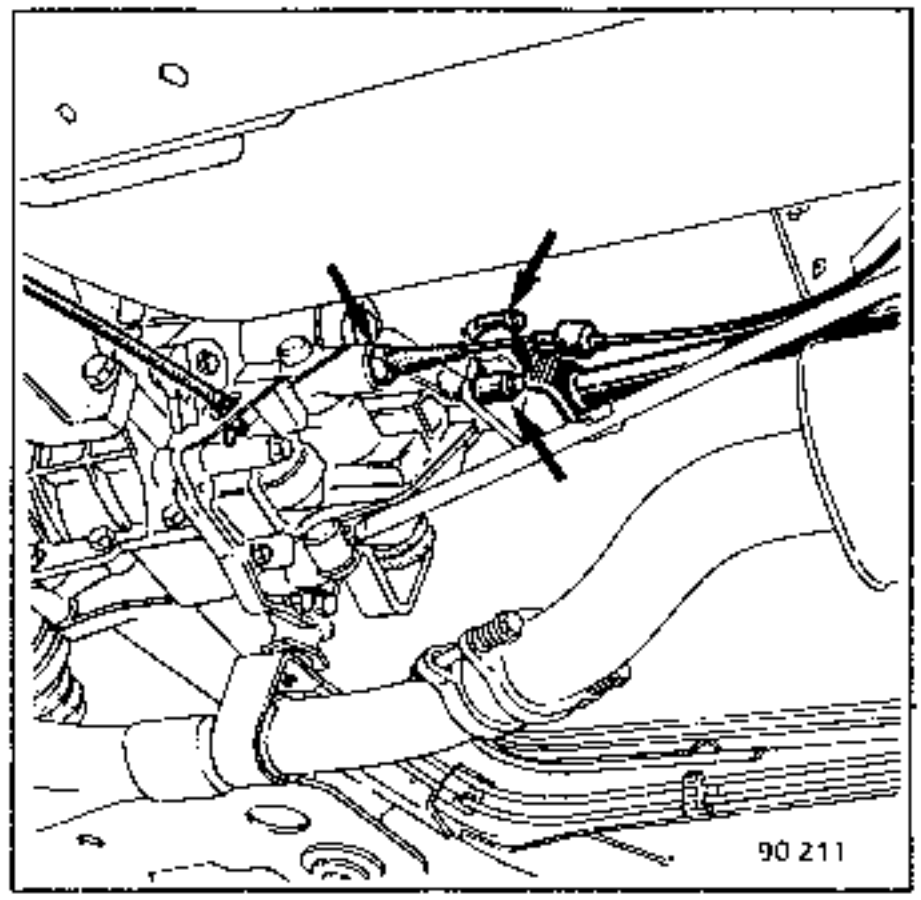
Remove :

- the engine mounting cross member,
- the radiator, condenser and electric fan assembly,
- the exhaust manifold clamp,
- the oil filter heater and its support,
- the computer which is to be secured, together with the oil filter heater, to the engine,
- the power steering pipe supports,
- the power steering pipes.

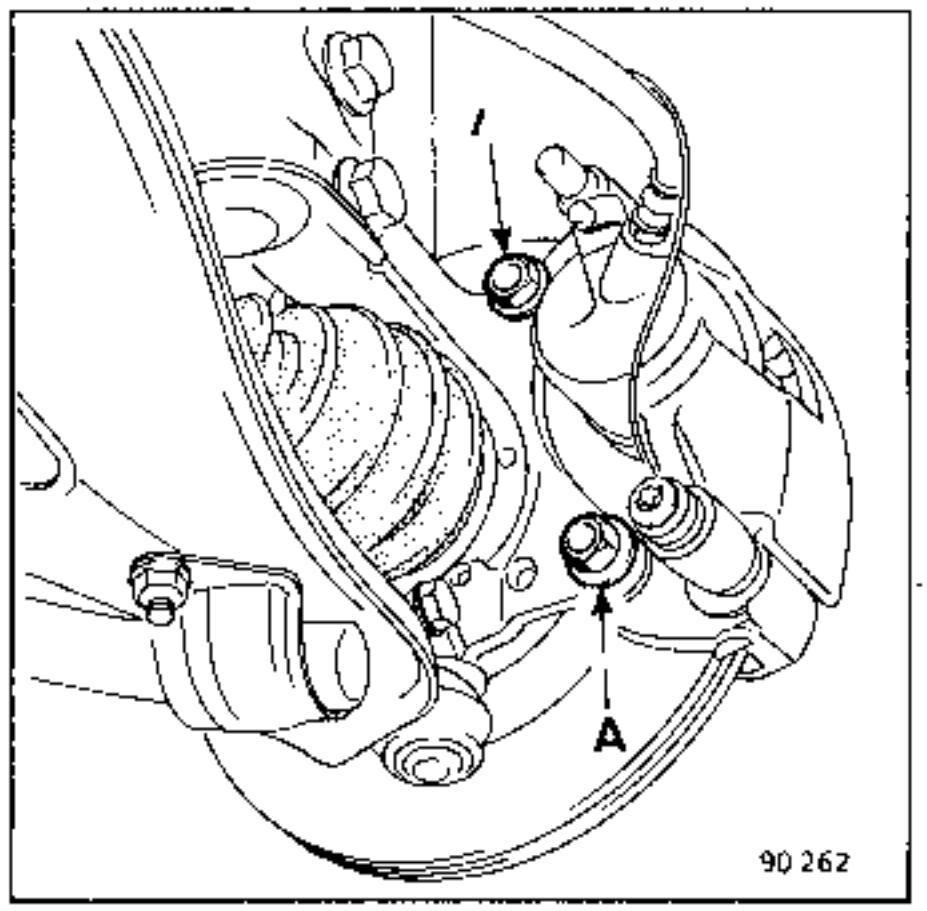


Remove :

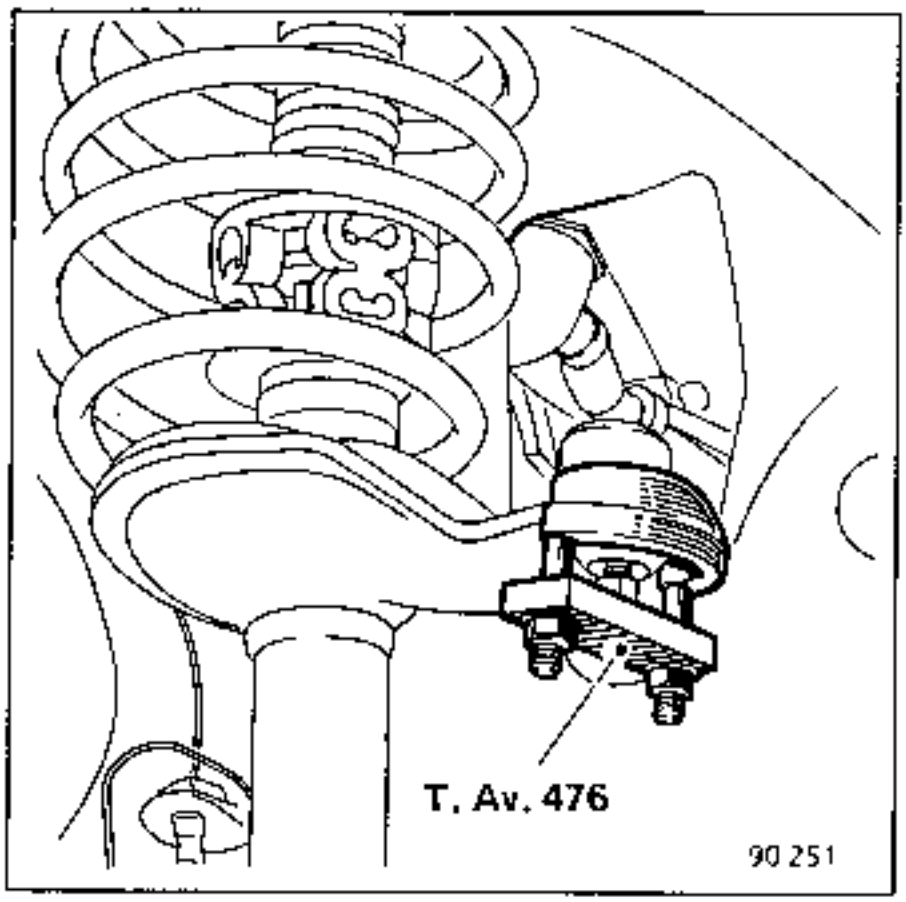
- the exhaust down pipe,
- the speedometer drive cable,
- the gear shift control,



- the calipers (bolts A),



- the pins from the drive shafts using punches **B.Vi.31-01**,

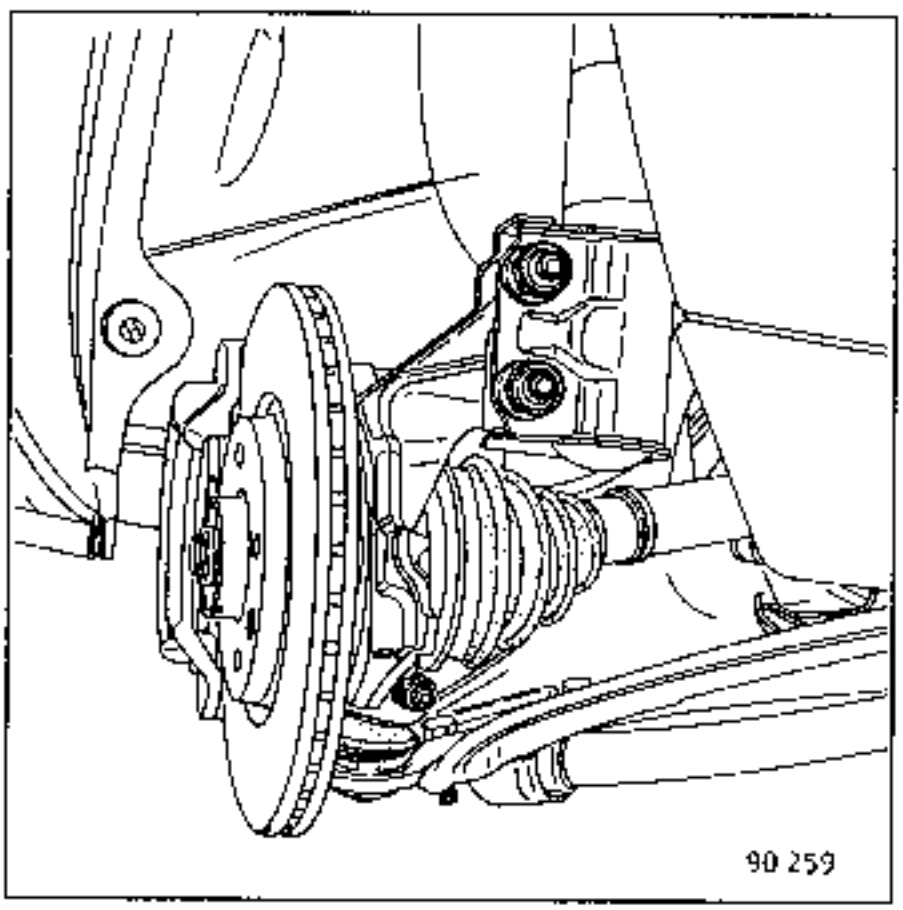


- the steering ball joint nuts.

Extract the ball joints using tool **T.Av. 476.**

Remove the upper bolts from the lower ends of the shock absorbers.

Loosen the lower bolts without removing them.



- Tilt the stub axle carriers and free the drive shafts.

Remove the bolts from the gearbox mounting pads.

Remove the engine-gearbox assembly using tool **Mot.878.**

REFITTING

Carry out the removing operations in reverse, tightening the nuts and bolts to the specified torque. ▽

- Fill the engine and gearbox with oil if necessary,
- Fill and bleed the cooling, air conditioning refrigeration and power steering systems.

Adjust the accelerator cable.

REMOVING-REFITTING

ESSENTIAL SPECIAL TOOLS	
B.Vi. 31-01	Spring pin punches
Mot. 878	Lifting chain and rings
T.Av. 476	Ball joint extractor
Elé. 346-04	Belt tension tester

TIGHTENING TORQUES (in daN.m)	
Shock absorber lower securing bolts	20
Steering ball joints	4
Engine and gearbox mounting pad securing bolts	4
Wheel bolts	9

REMOVING

Disconnect :

- the battery,
- the electrical connectors,
- the accelerator, clutch and speedometer drive cables,
- the earthing braids (engine and gearbox),
- the fuel pipes.

Remove :

- the bonnet,
- the front cross member,
- the radiator grille,

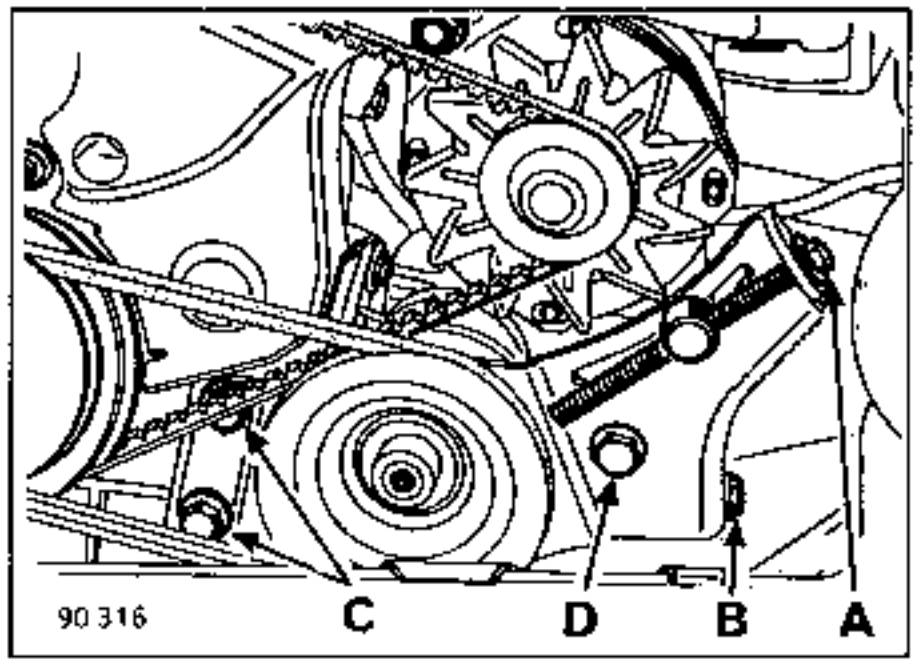
. for turbocharged engines :

- the air filter and the intercooler (protect the compressor and air intake apertures),
- the oil cooler bolts, securing the cooler to the side member.

. on vehicles equipped with power steering :

Loosen :

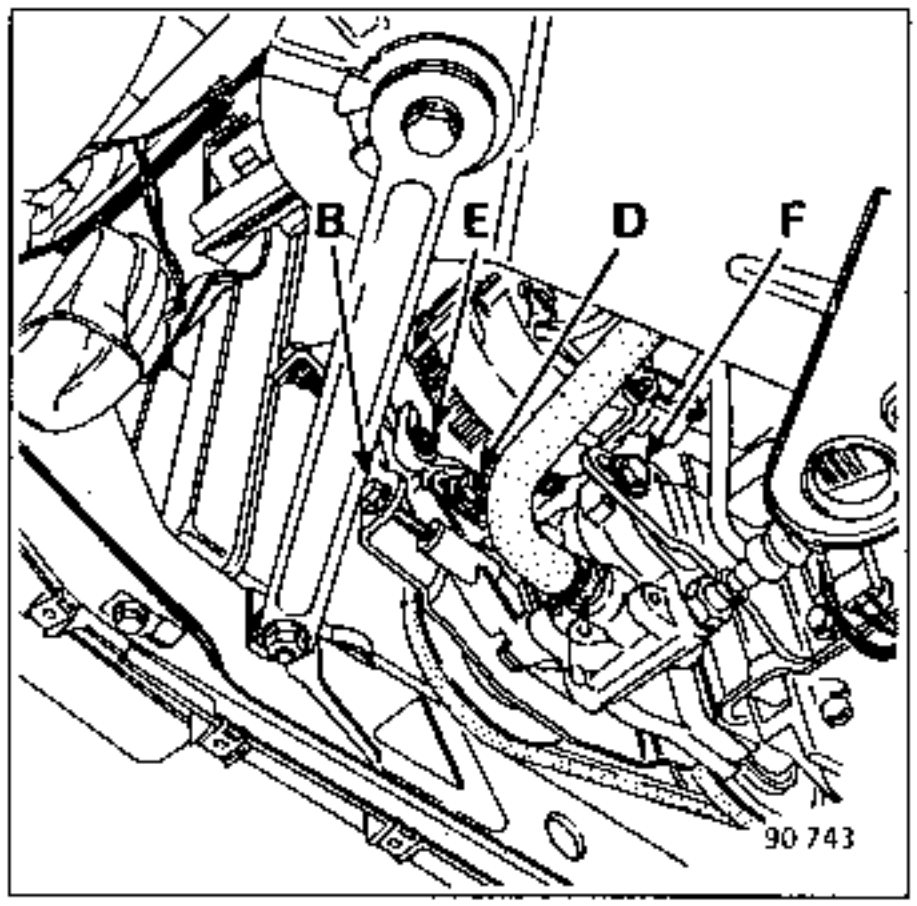
- the alternator tensioner (A) and remove the alternator lower securing nut (E),
- the power steering pump tensioner (B),
- the two screws (C), bolt (D) and the screw from the pump rear support (F).



Take off the drive belt.

Remove :

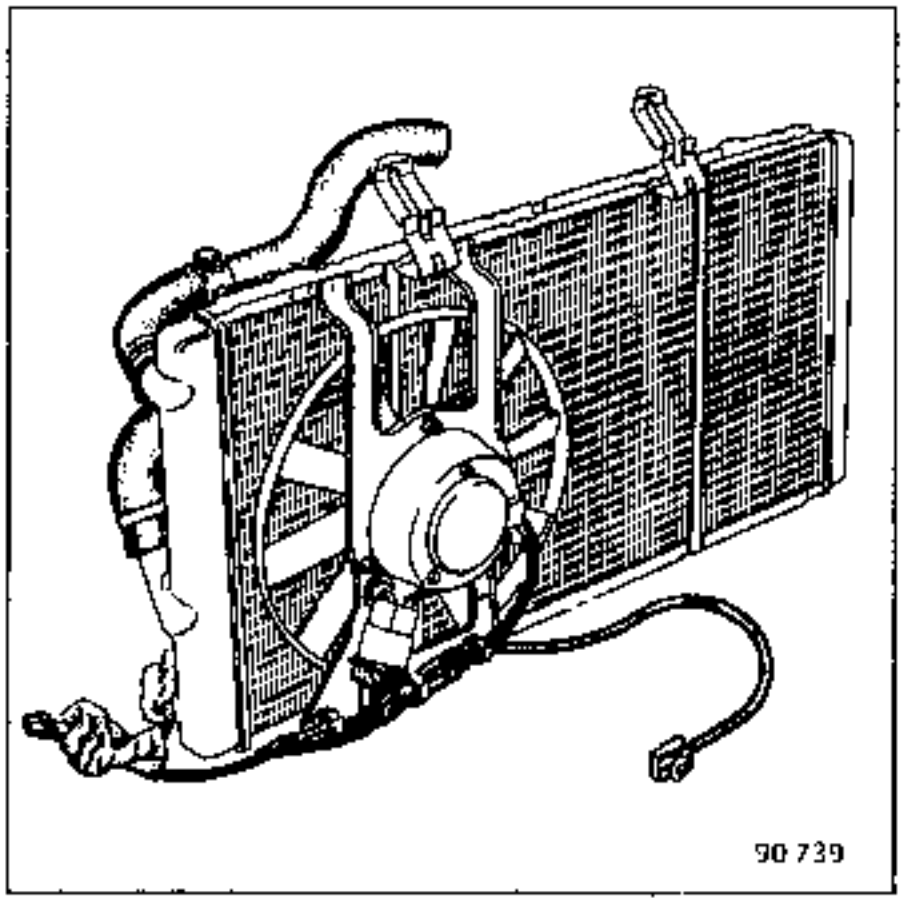
- the screw on the pump rear support (F),
- the two screws (C).



Pull the pump-support assembly to one side and secure it to the body.

Drain the cooling system.

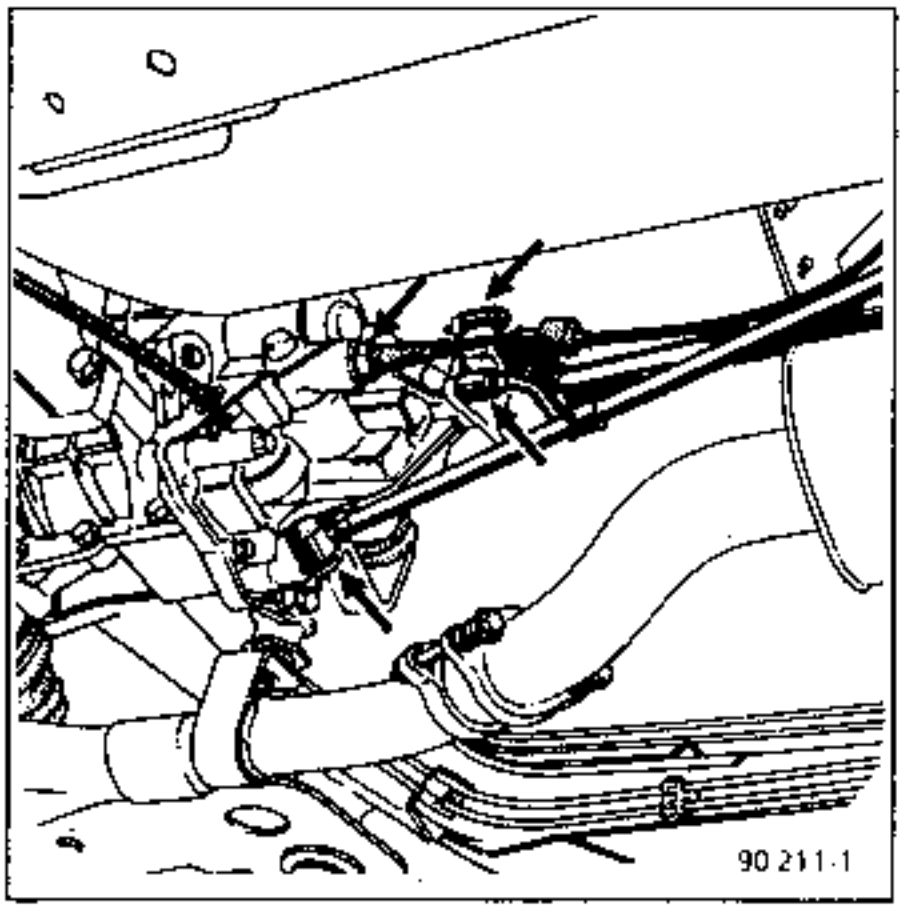
Remove the radiator and its wiring.



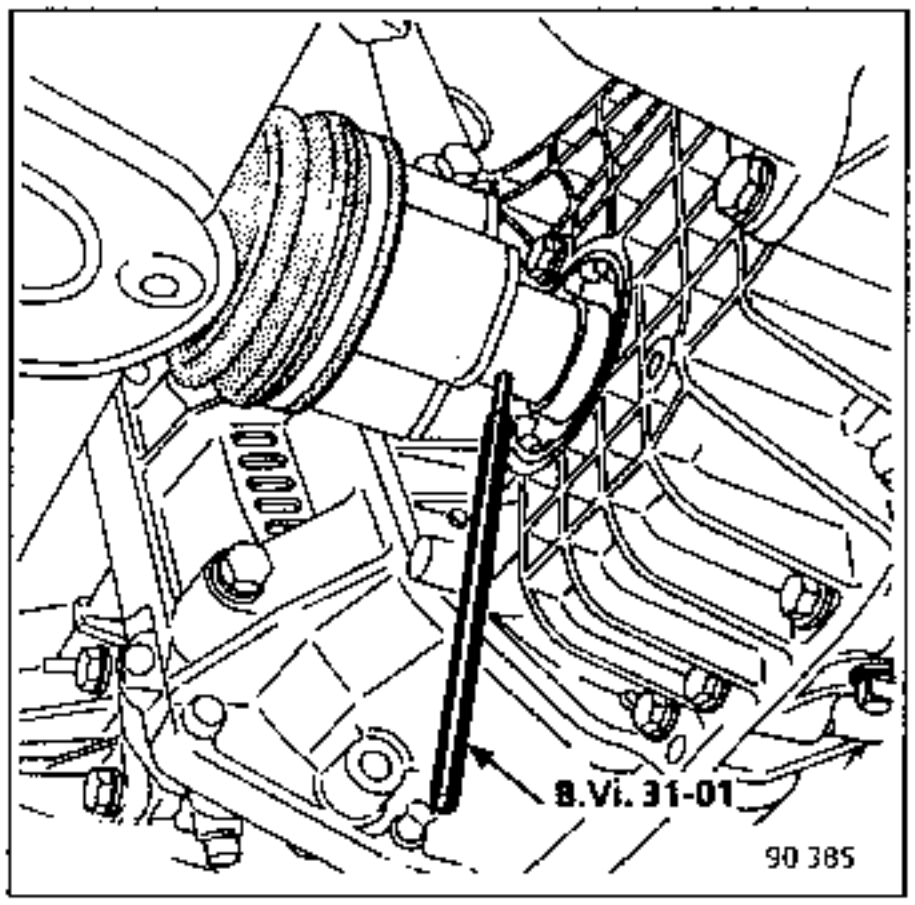
- Disconnect the heater hoses.

Remove :

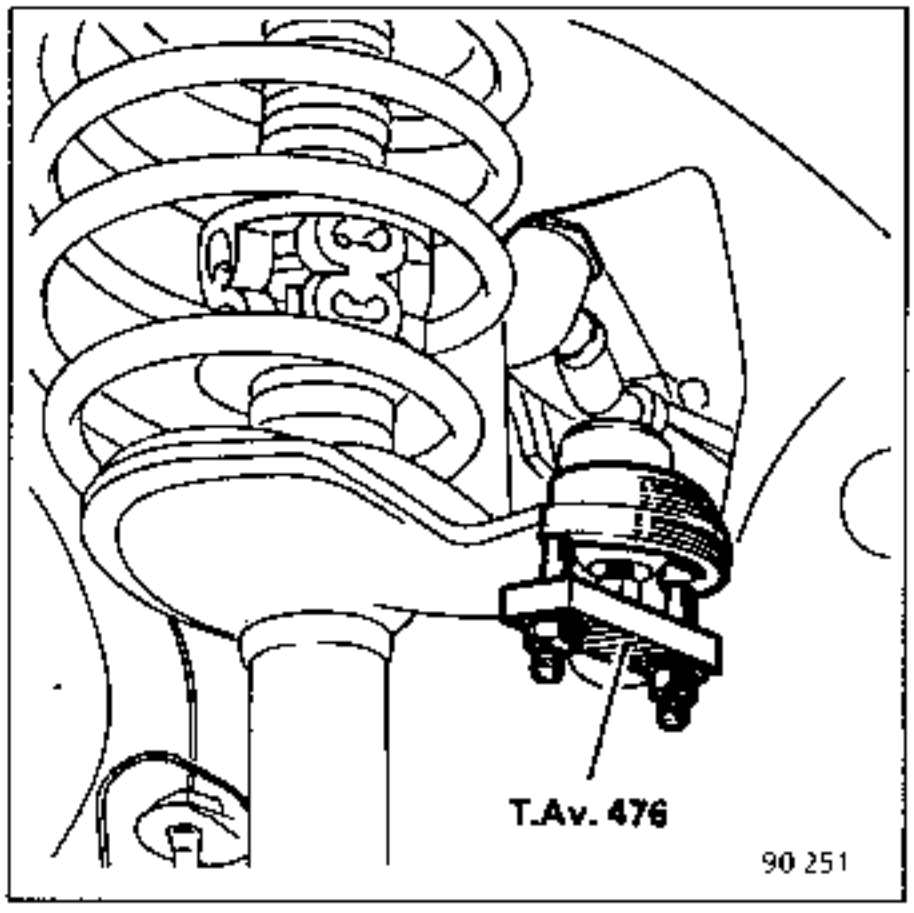
- the lower bolt from the engine damper,
- the gear shift control,



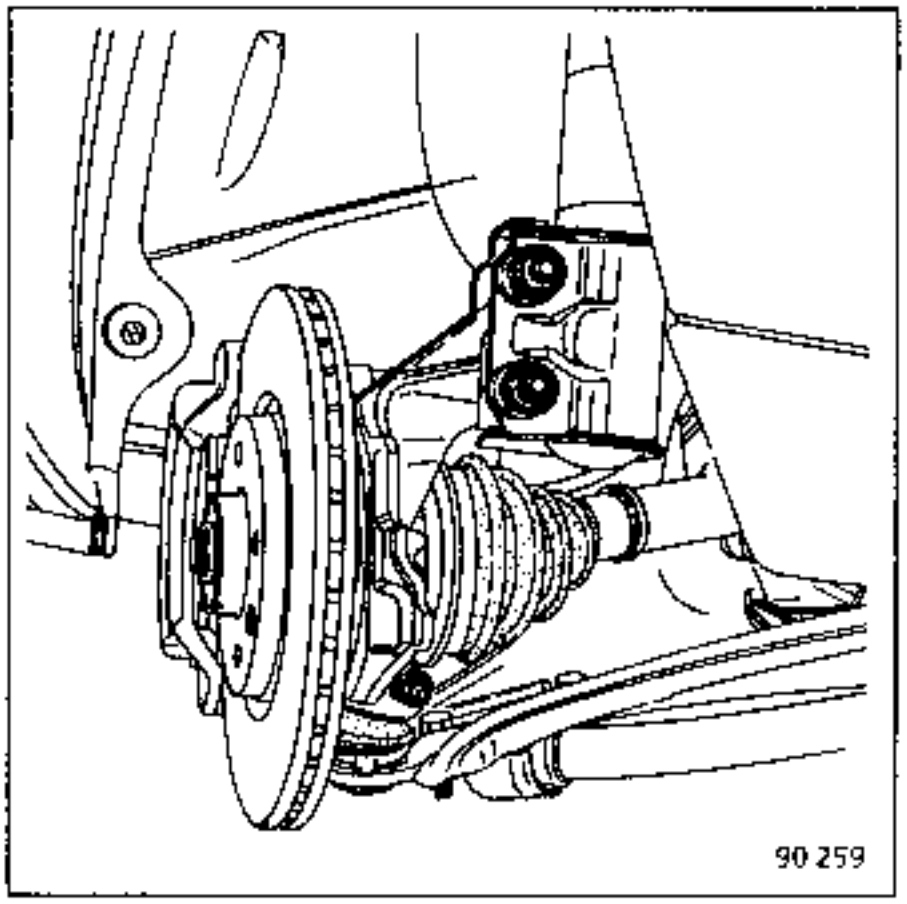
- the wheels,
- the pins, at the gearbox ends, using tool **B.Vi.31-01**,



- the steering ball joints using tool **T.Av.476.**



Remove the upper bolts securing the lower ends of the shock absorbers and loosen the lower bolts without removing them.



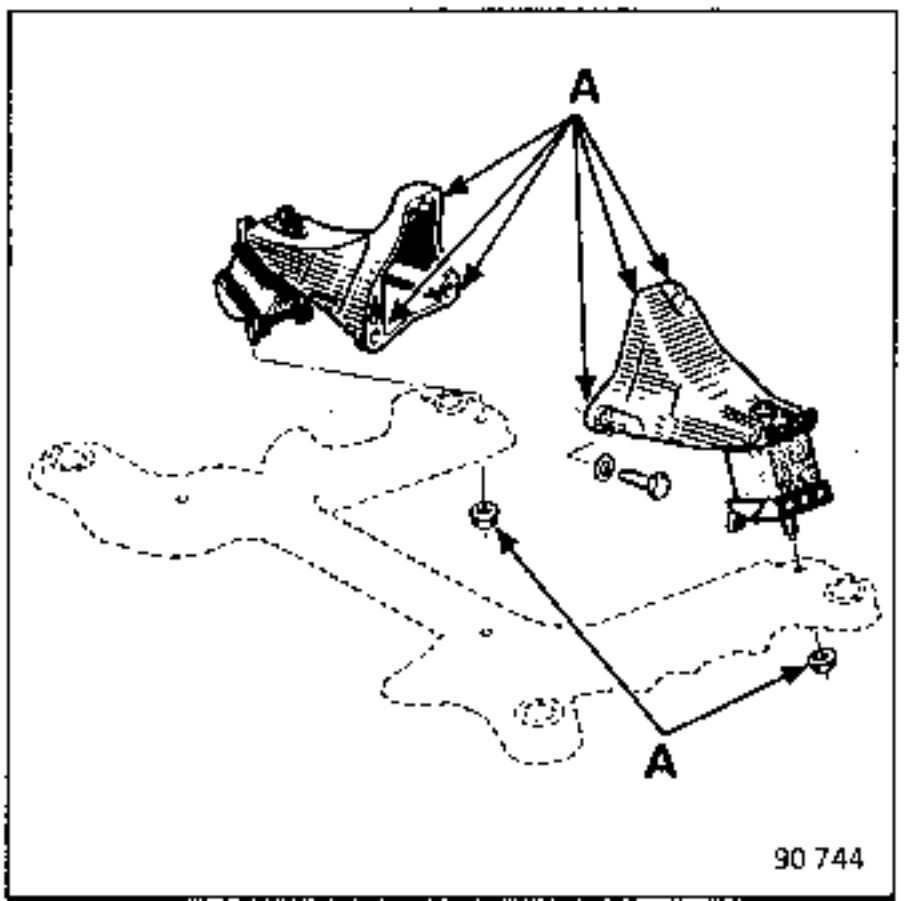
Tilt the stub axle carriers and extract the drive shafts from the sun wheels.

Remove :

- the exhaust pipe clamp from the manifold or turbocharger outlet,
- the tie rod under the gearbox.

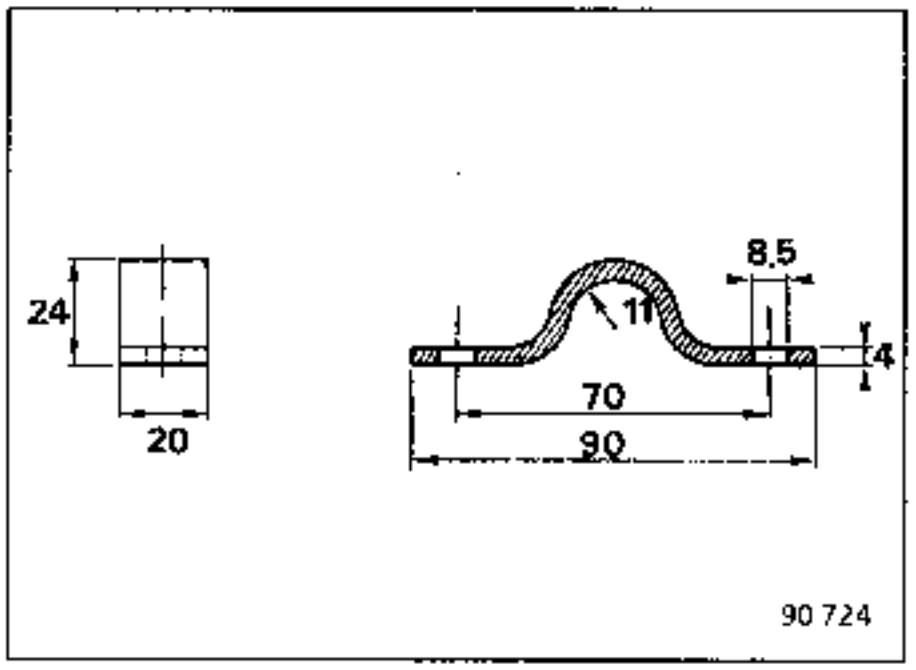
Place jack **DESVIL V 710** or **SEF 6 050** in position.

Remove the gearbox side mounting pad assemblies (bolts A).



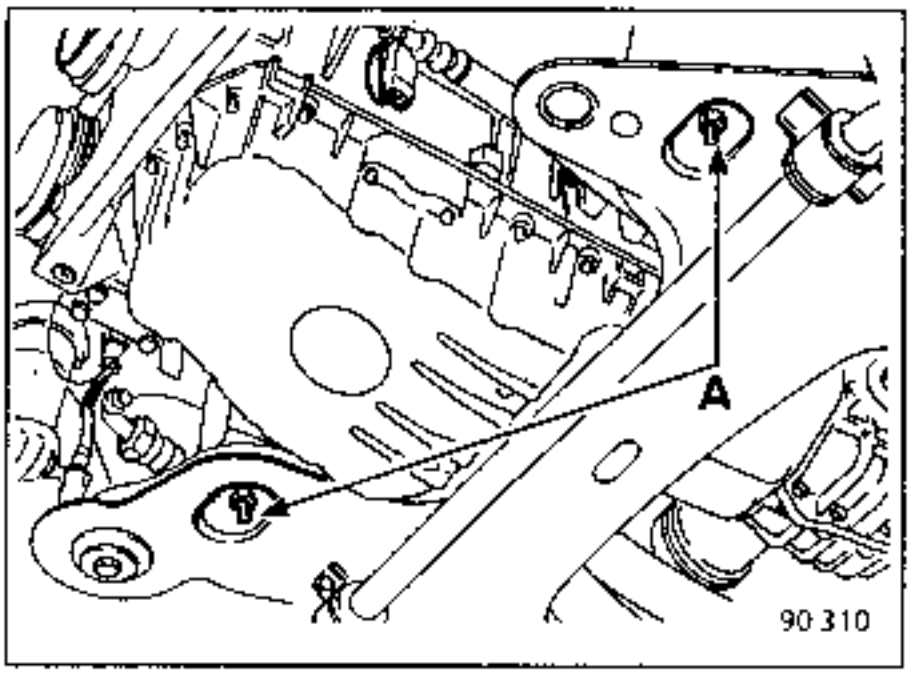
Fit a second lifting lug to the rocker arm cover.

Drawing of lifting lug to be manufactured locally : (dimensions in mm).



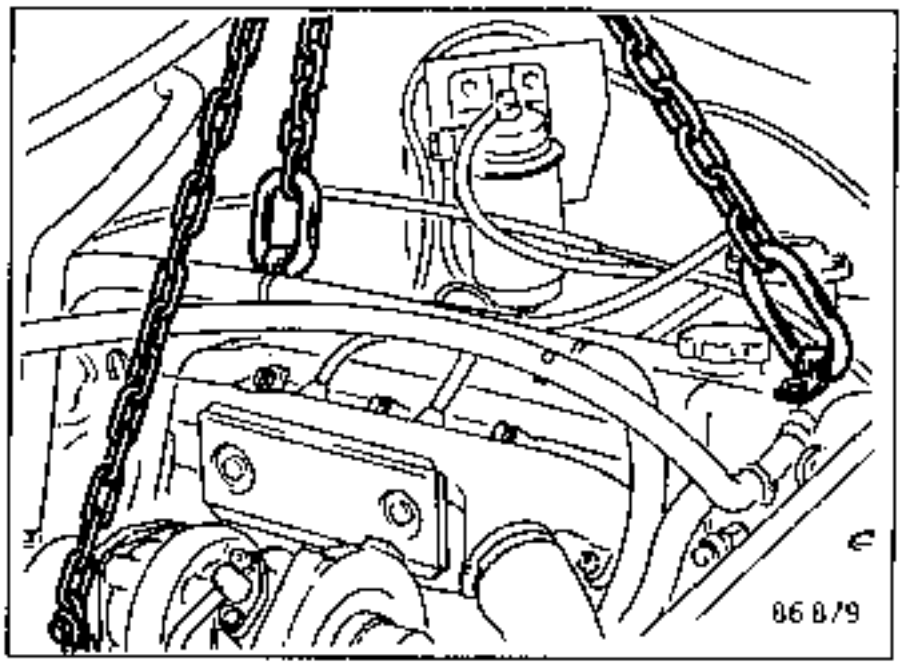
Use tool **Mot.878** securing the engine-gearbox assembly at the lifting lugs.

Remove the two nuts (A).



Special features of the J8S Turbo engine

To prevent the assembly turning, fit an additional chain, securing it to the exhaust manifold.

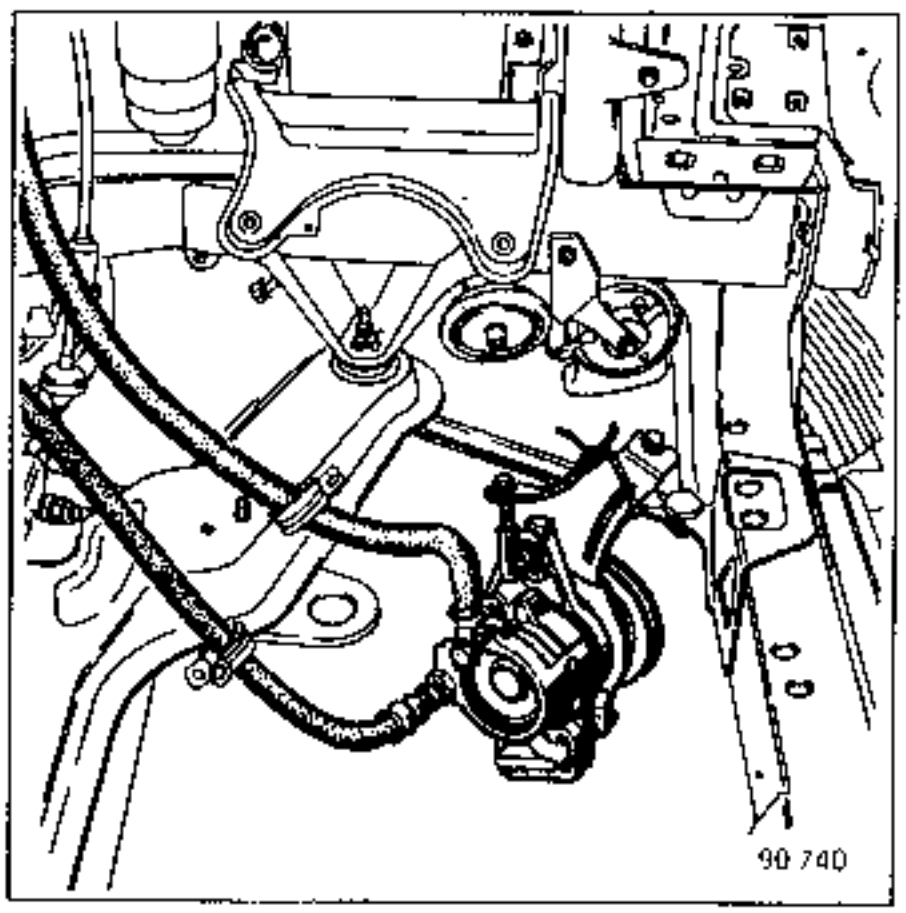


Lift out the engine-gearbox assembly

REFITTING (special points)

. Vehicles equipped with power steering

Before refitting the engine-gearbox assembly, ensure that the power steering pipes pass on either side of the front LH engine mounting pad.



After fitting the power steering pump, check the drive belt tensions using tool **Ele.346-04.**

Fit the drive shafts :
Coat the splines with grease no. 20 **Mobil X57 030.**

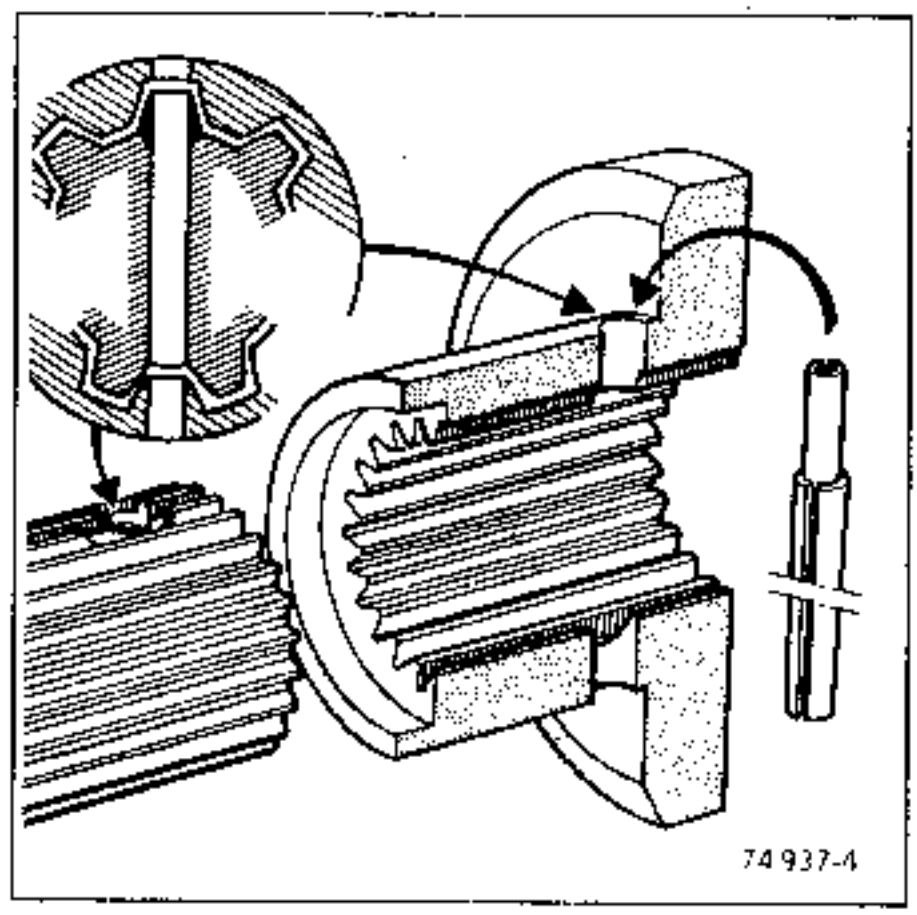
Ensure that the rubber washer that should be between the end of the sun wheel and the bottom of the drive shaft yoke is in position.

Position the drive shaft with reference to the sun wheel and insert it..

Check that it is correctly positioned using the crankpin from set **B.Vi.31-01.**

Lead chamfers on the sun wheel shafts make it easier to enter the new spring pins using tool **B.Vi.31-01.**

Seal the pin holes with **CAF 4/60 THIXO** compound.



Remove the locally manufactured lifting lug.

Tighten the nuts and bolts to the specified torques.

Fill and bleed the cooling system.

REMOVING-REFITTING

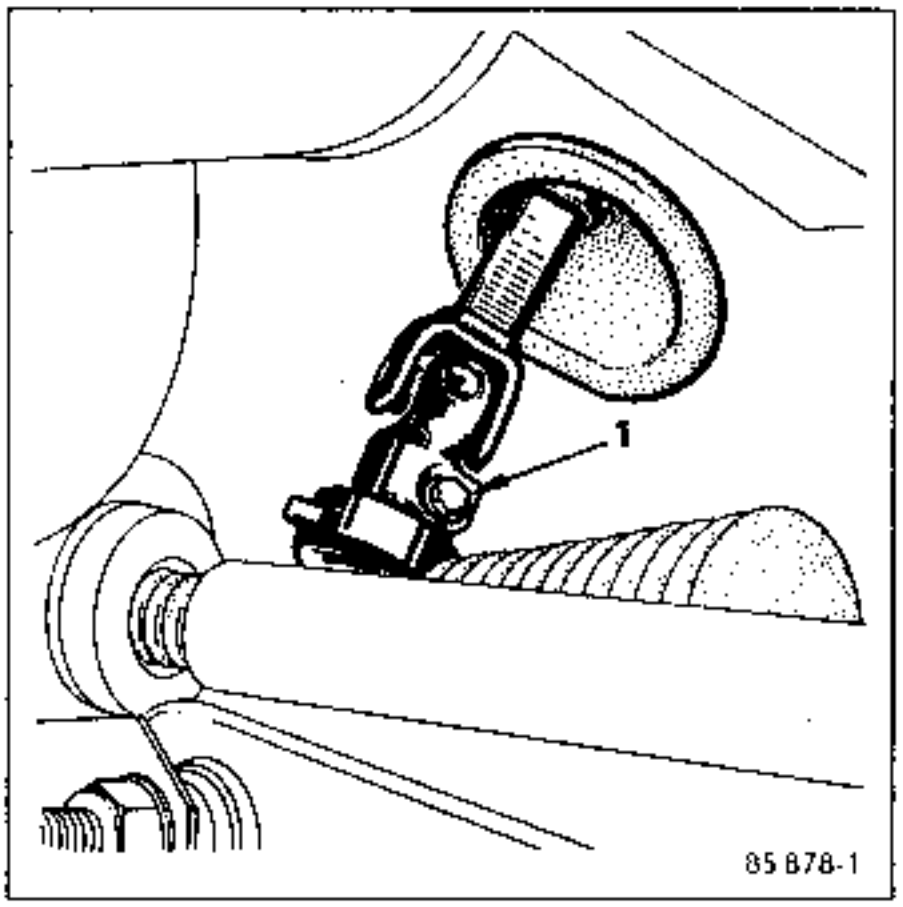
ESSENTIAL SPECIAL TOOLS	
Mot 1040-01	Dummy sub frame for removing and refitting the power unit assembly

TIGHTENING TORQUES (in daN.m)	▽
Sub frame securing bolts	8,5
Shock absorber upper cup securing bolts	2,5
Brake caliper securing bolts	10
Steering column universal joint securing bolt	2,5
Wheel bolts	9

REMOVING

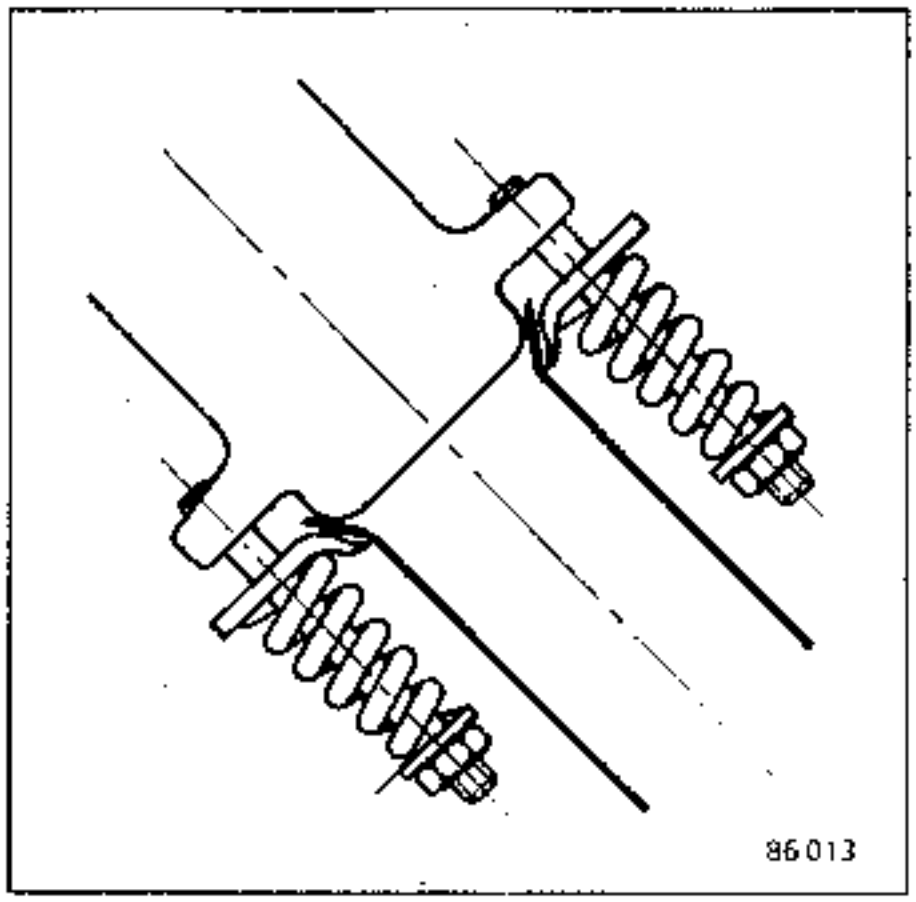
Disconnect:

- the battery,
- the choke cable,
- the accelerator cable,
- the speedometer drive cable,
- the pipes and hoses,
- the electrical wiring,
- the gear shift control,
- the steering column universal joint, bolt (1), after having marked its position on the steering box.



Remove:

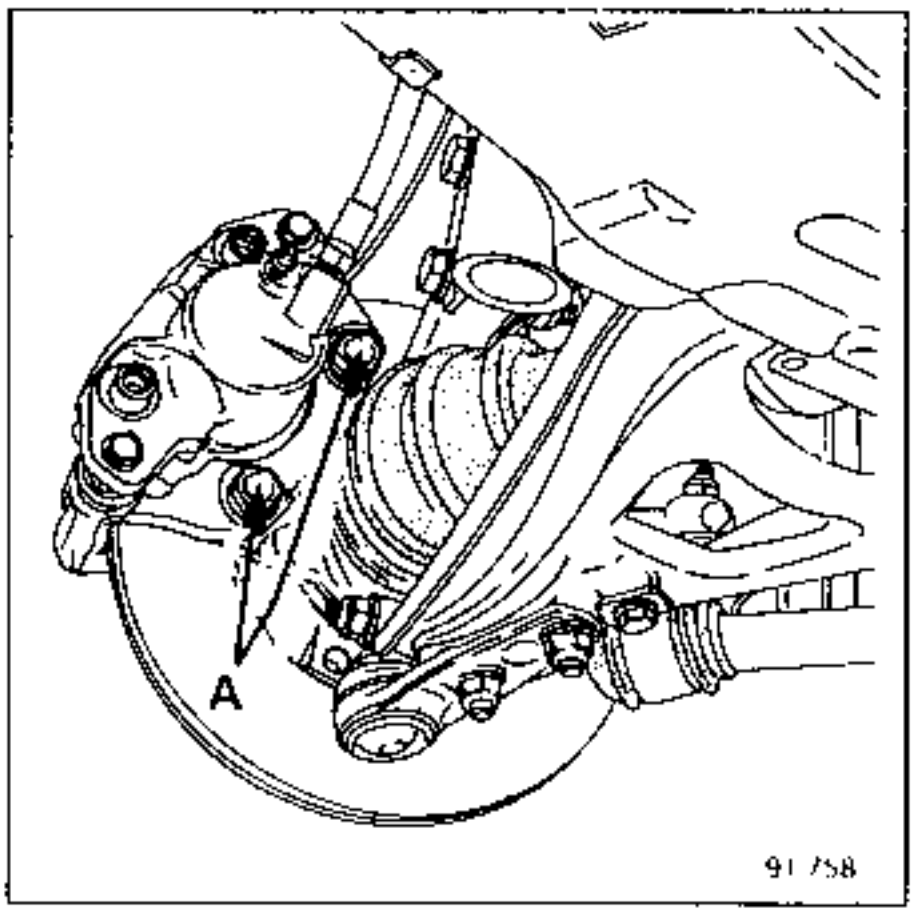
- the clamp on the exhaust manifold and remove the down pipe.



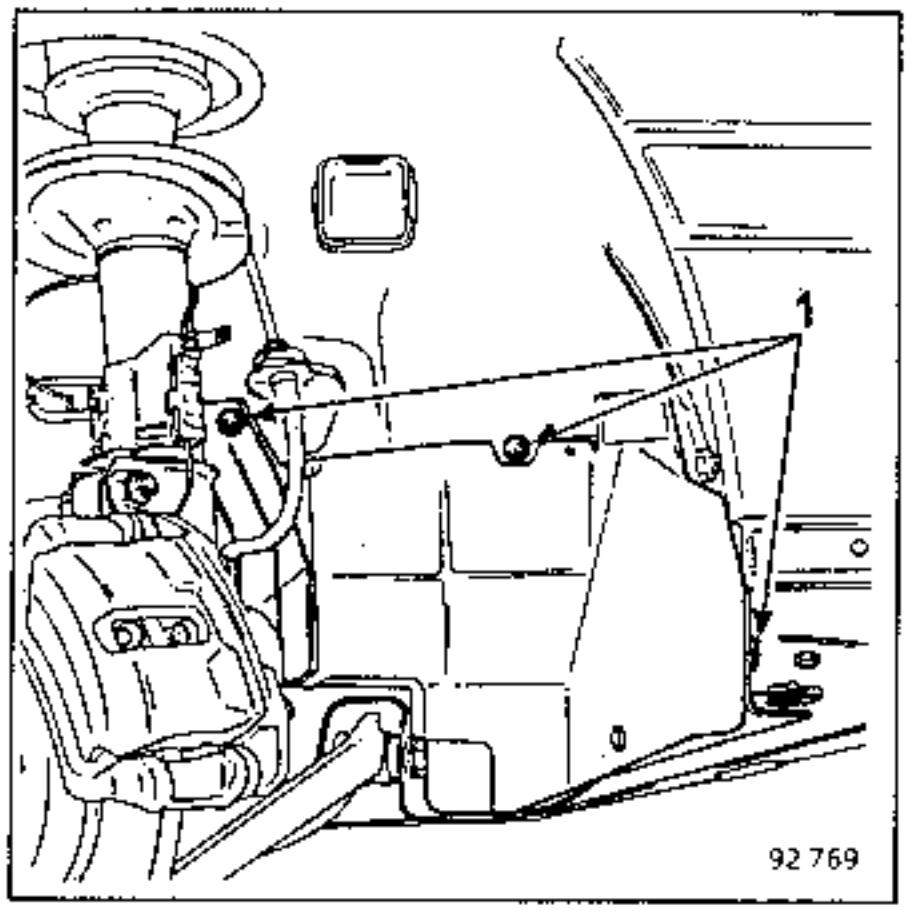
Fit clamps Mot.453-01 to the heating system hoses, then disconnect the hoses from the coolant pump.

Remove:

- the brake calipers and secure them to the body.

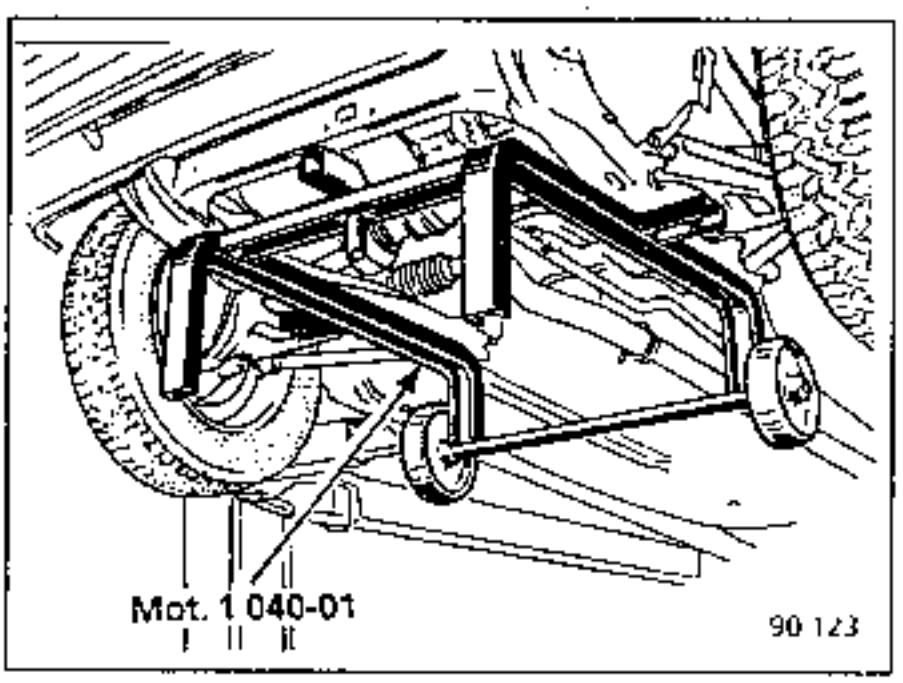


Drill out the rivets (1) on the protective panel.



The tie bars securing the sub-frame to the body.

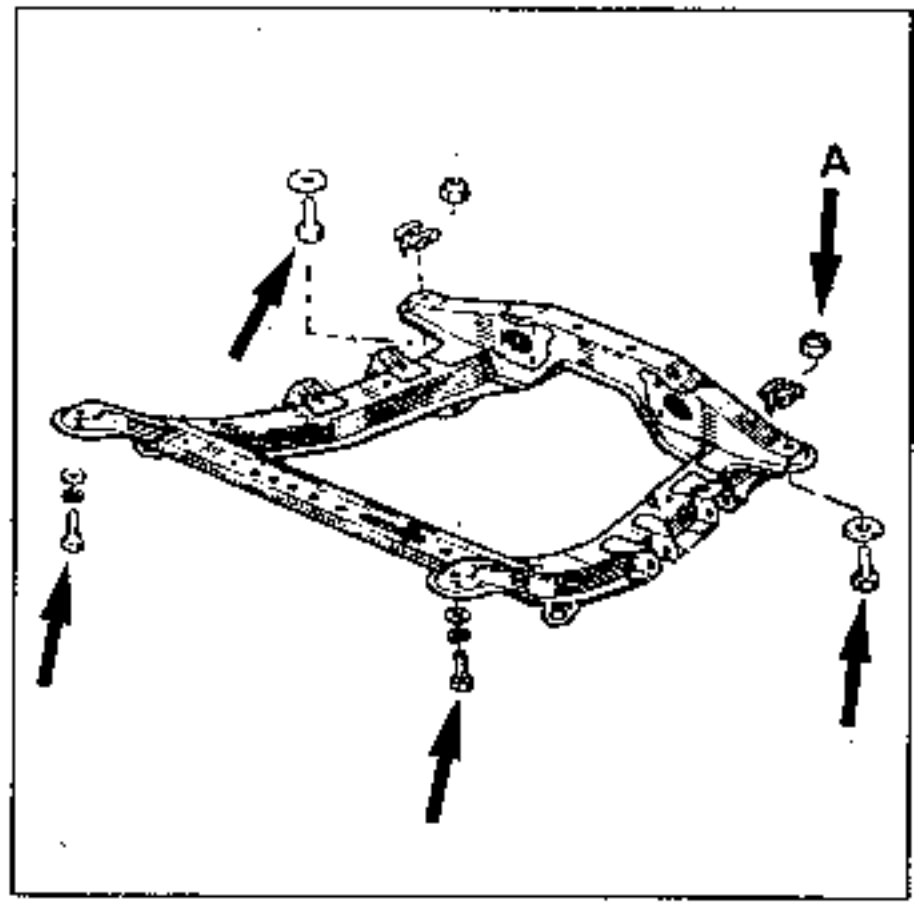
Fit tool Mot.1 040-01.



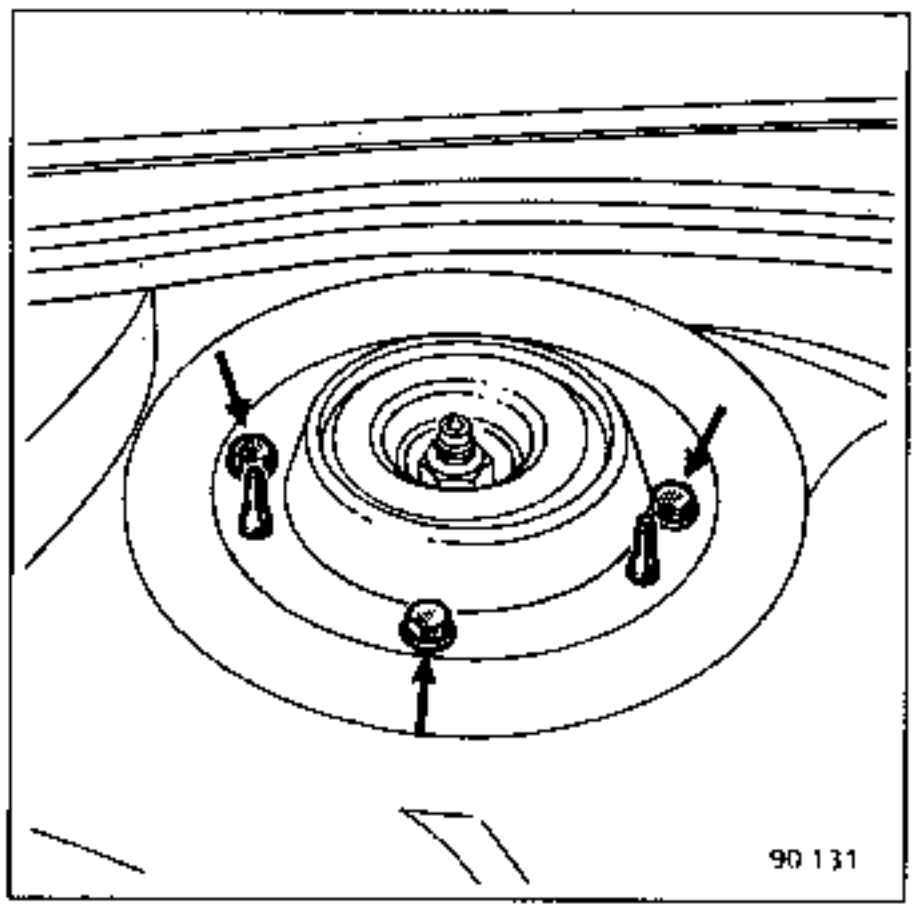
Lower the vehicle to the ground.

Remove:

- the four sub-frame securing bolts.

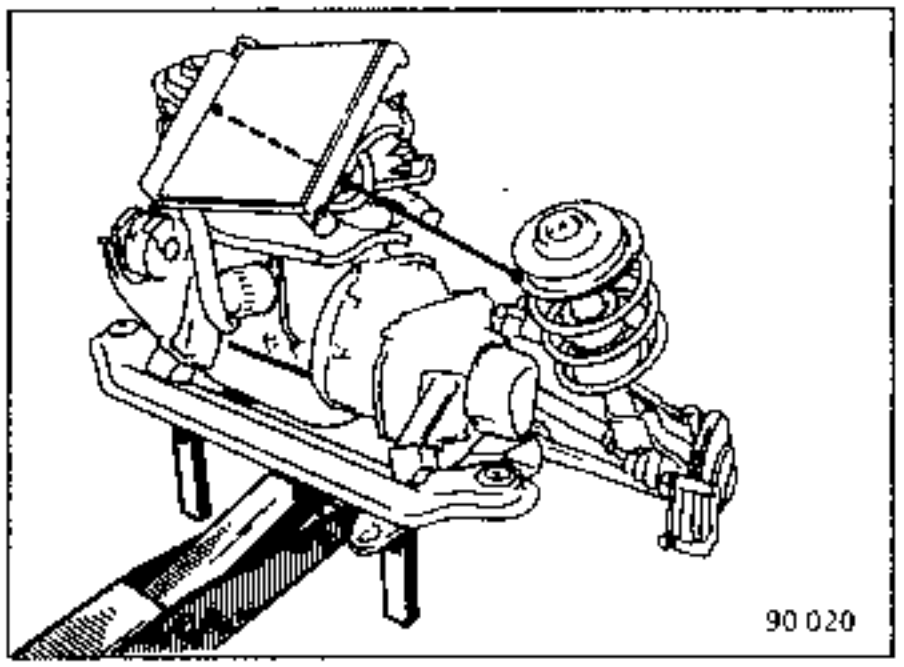


- the bolts from the shock absorber upper cups.



Lift the body and take out the power unit assembly.

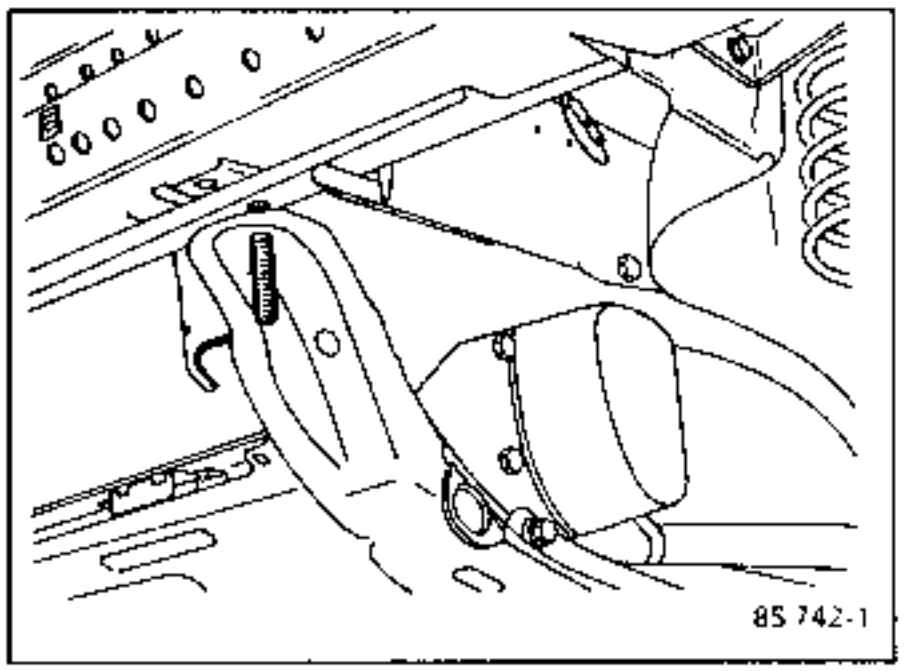
After Removing the Power Unit Assembly



Secure the spring-shock absorber assemblies with string.

REFITTING (special points)

It will be found easier to align the body with the engine sub-frame if screwed rods approximately 100mm long are fitted.



To obtain the correct clutch free travel, see M.R.291.

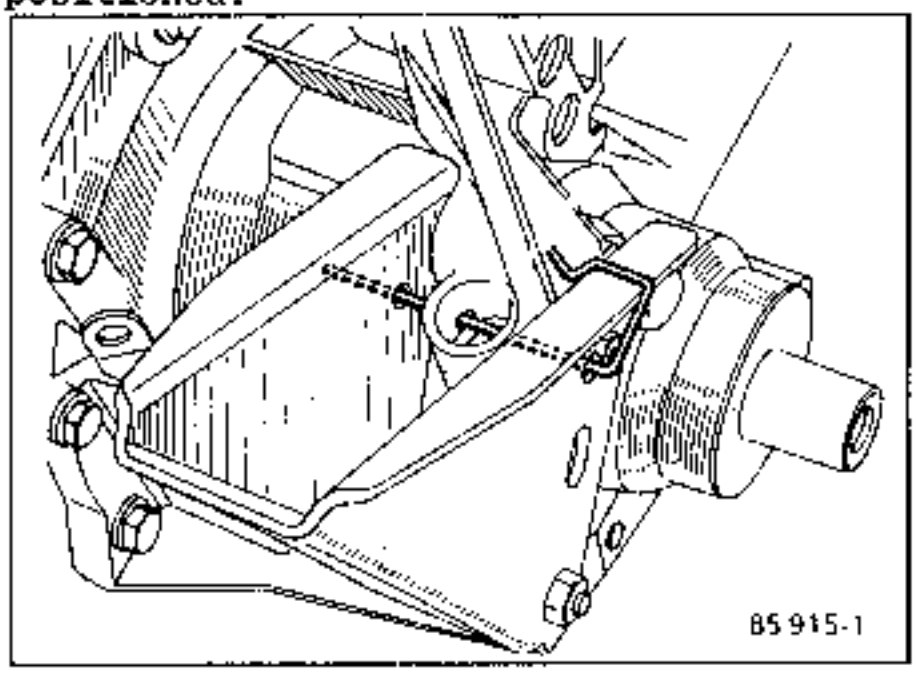
Tighten the brake caliper securing bolts to a torque of 10 daN.m after first coating them with Loctite FRENBLOC.

Press down the brake pedal a number of times to bring the caliper pistons against the brake pads.

Fill and bleed the cooling system.

Ensure that the steering column universal joint is tightened in the correct position (see M.R.291).

Reconnect the speedometer drive cable, ensuring that the clip is correctly positioned.



Adjust the accelerator and choke cables.

Retighten the exhaust pipe clamp until the springs are coil bound then loosen the nuts by one and a half turns.

REMOVING - REFITTING

ESSENTIAL SPECIAL TOOLS	
Mot 1040-01	Dummy sub-frame for removing and refitting the power unit assembly

TIGHTENING TORQUES (in daN.m) ▽	
Sub-frame securing bolts	8,5
Shock absorber upper cup securing bolts	2,5
Brake caliper securing bolts	10
Steering column universal joint securing bolt	2,5
Wheel bolts	9

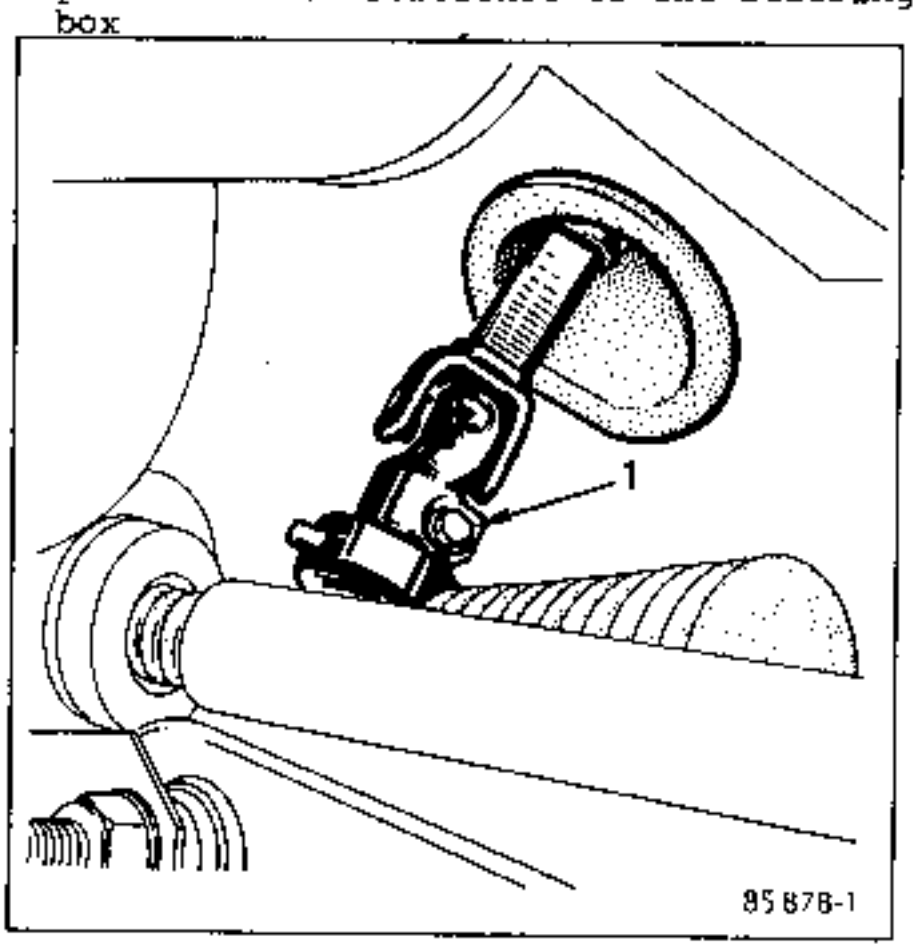
REMOVING

Disconnect the battery.

Remove the air filter.

Disconnect:

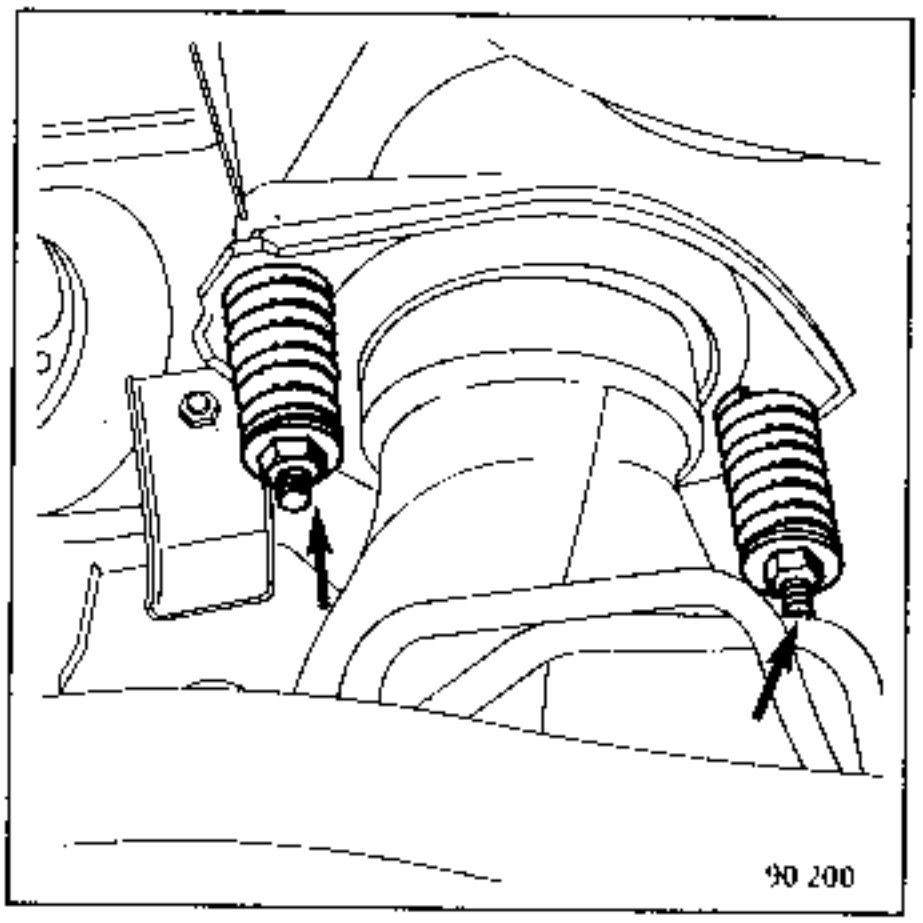
- the choke cable,
- the accelerator cable,
- the speedometer drive cable,
- the pipes and hoses,
- the electrical wiring,
- the gear shift control,
- the steering column universal joint, bolt (1) after having marked its position with reference to the steering box



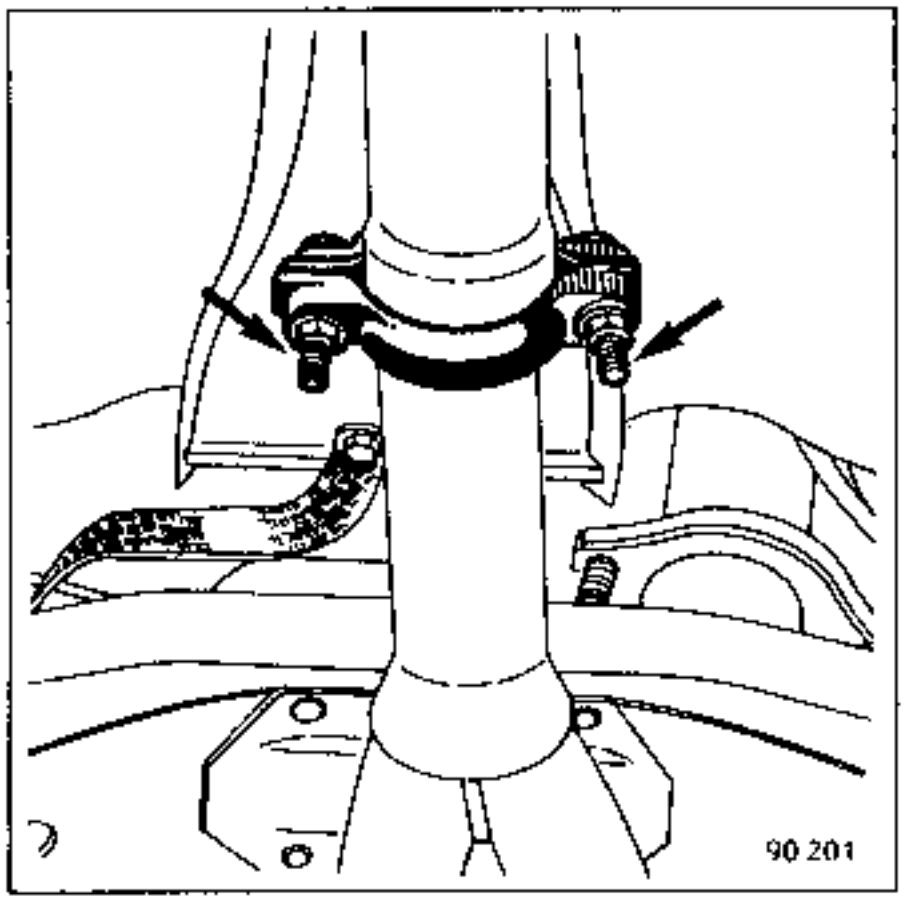
Remove:

The three bolts which secure the power steering pump support (on vehicles fitted with power steering)

The clamp securing the exhaust down pipe to the manifold.

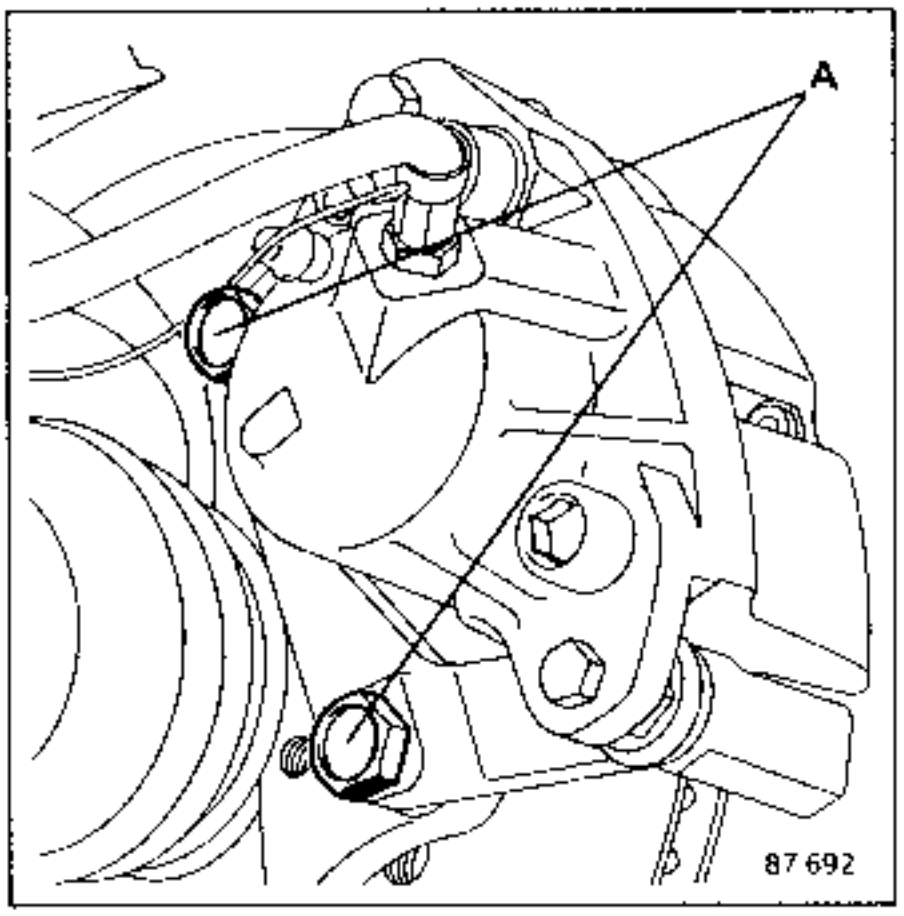


The exhaust downpipe from under the vehicle.

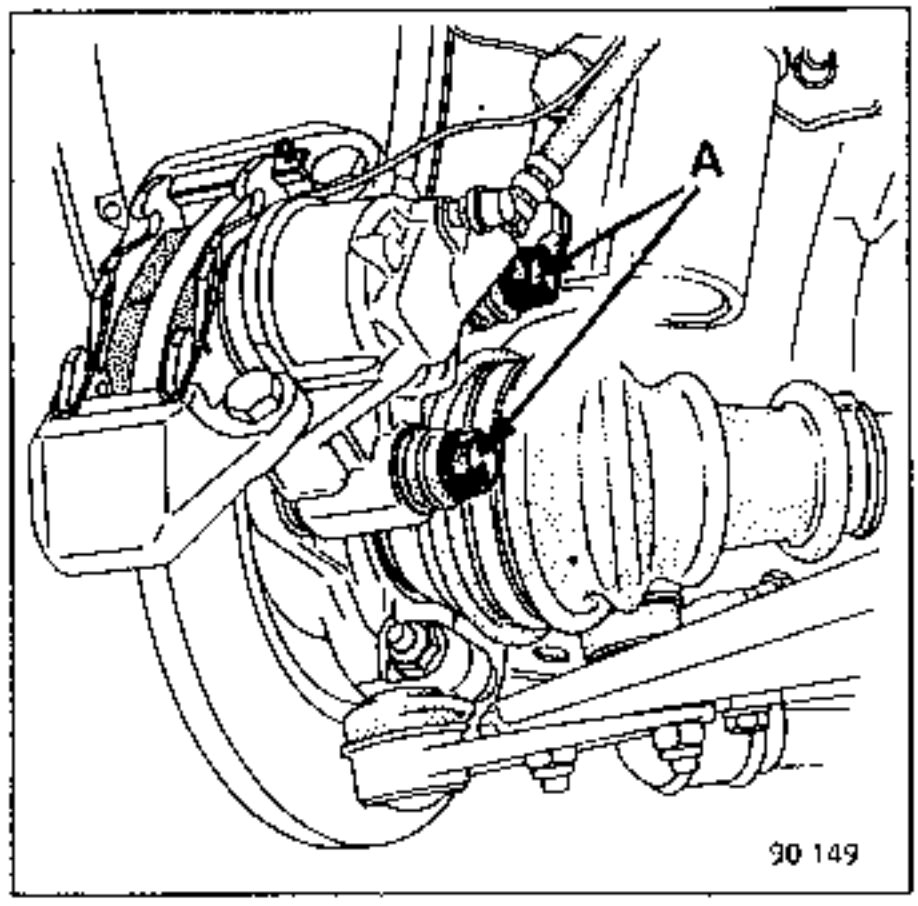


The brake calipers (bolt A) securing them to the vehicle body.

GIRLING



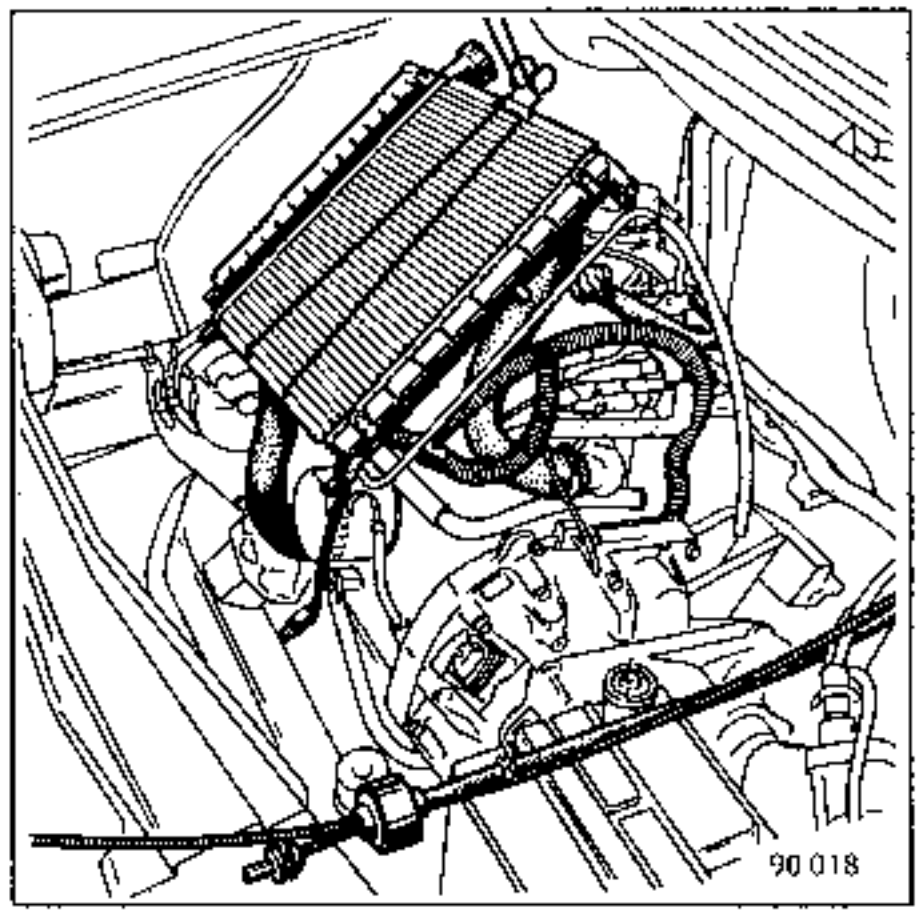
BENDIX Series IV.



Disconnect:

- the radiator temperature sensor,
- the electric fan unit.

Unclip the radiator and secure it to the engine.



Fit the 2 clamps Mot. 453-01 to the heater hoses, then disconnect them from its inlet and outlet sides.

If a "dummy engine sub-frame" Mot. 1040-01 is available, it will not be necessary to carry out the following modification to convert the Mot. 1040.

To use Mot. 1040 for this operation, it will have to be modified as follows:

Drill 2 holes 11mm in diameter at a between centres dimension of 670mm and make up 2 securing lugs (see the illustrations below).

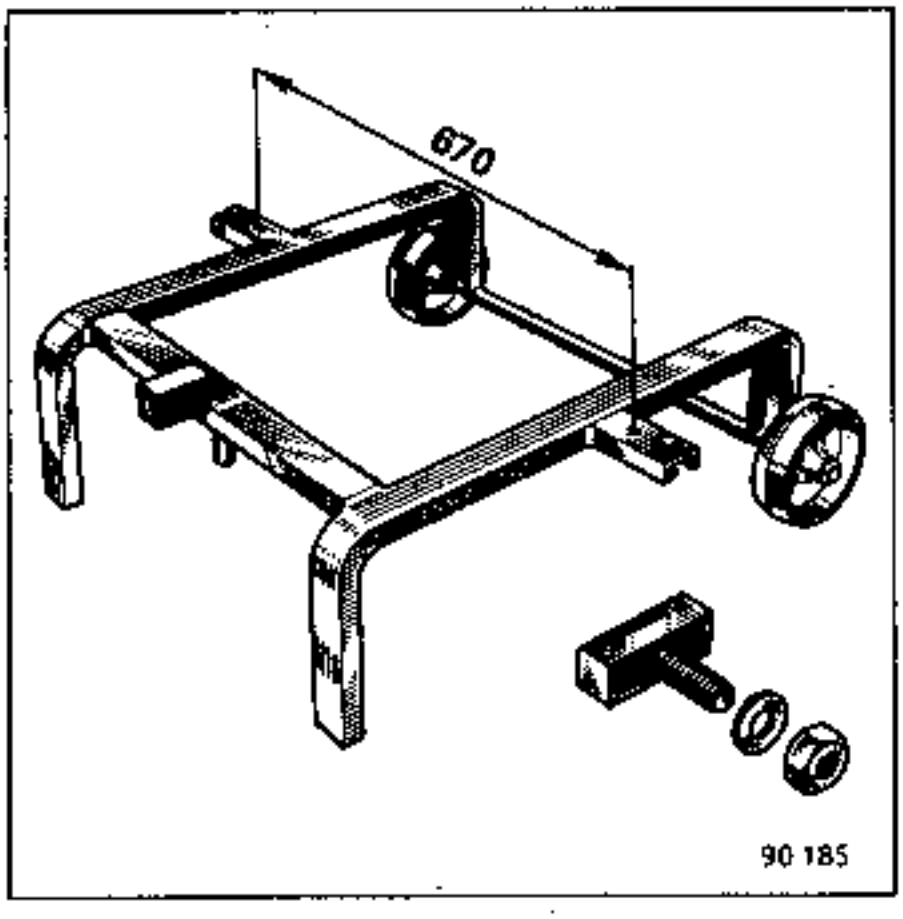
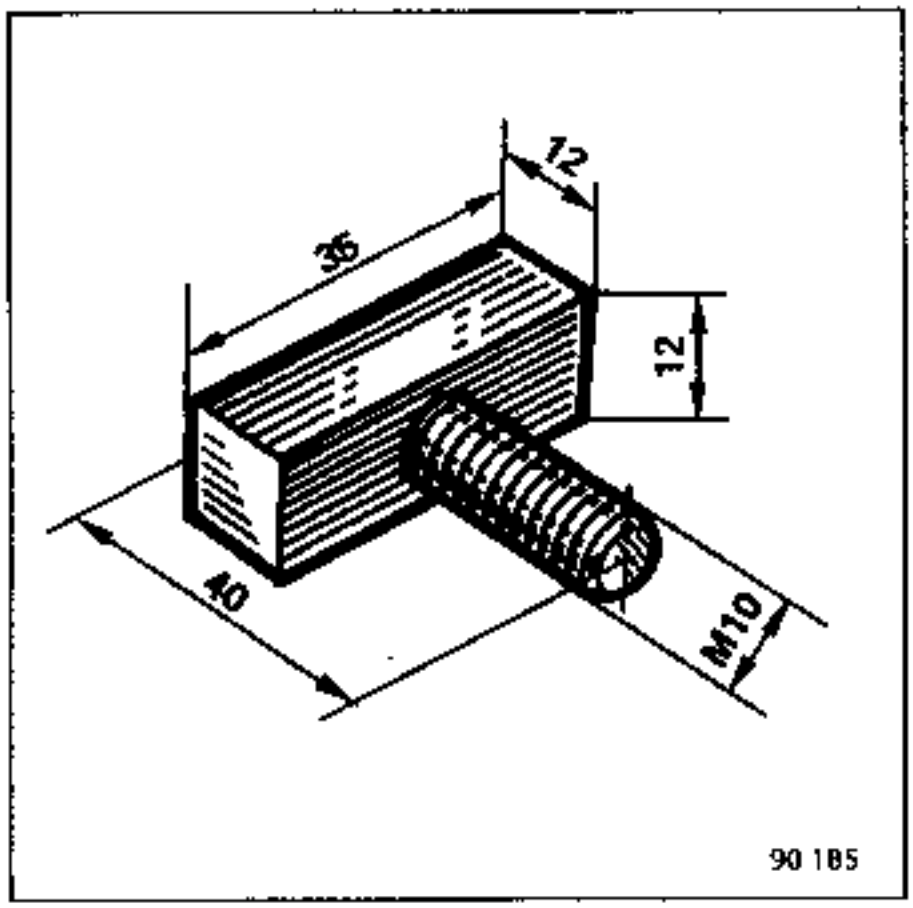
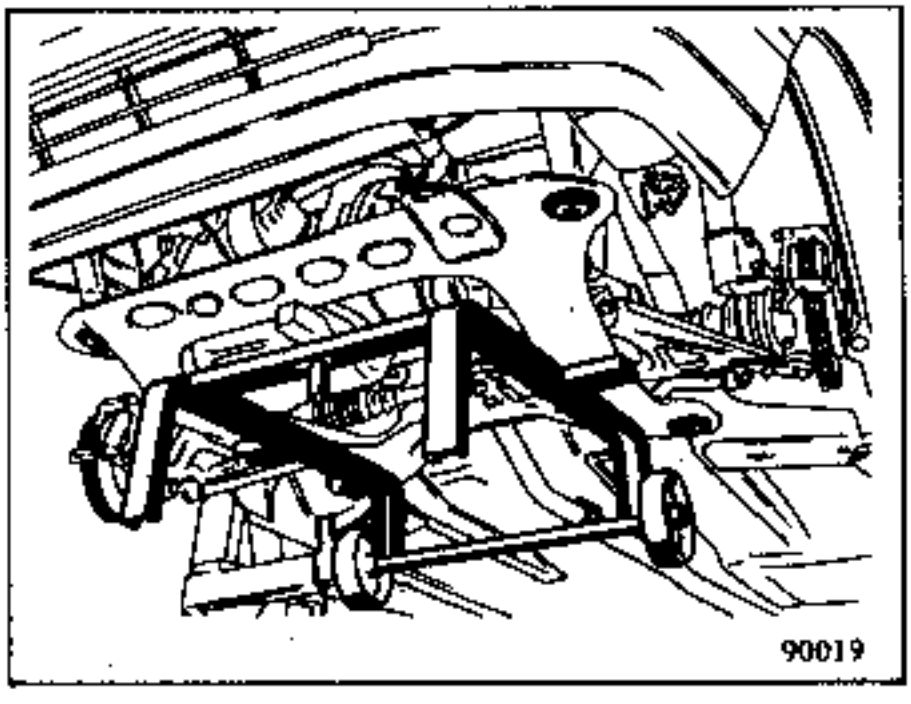


DIAGRAM OF TOOLS TO BE MADE LOCALLY
(Dimensions in mm)



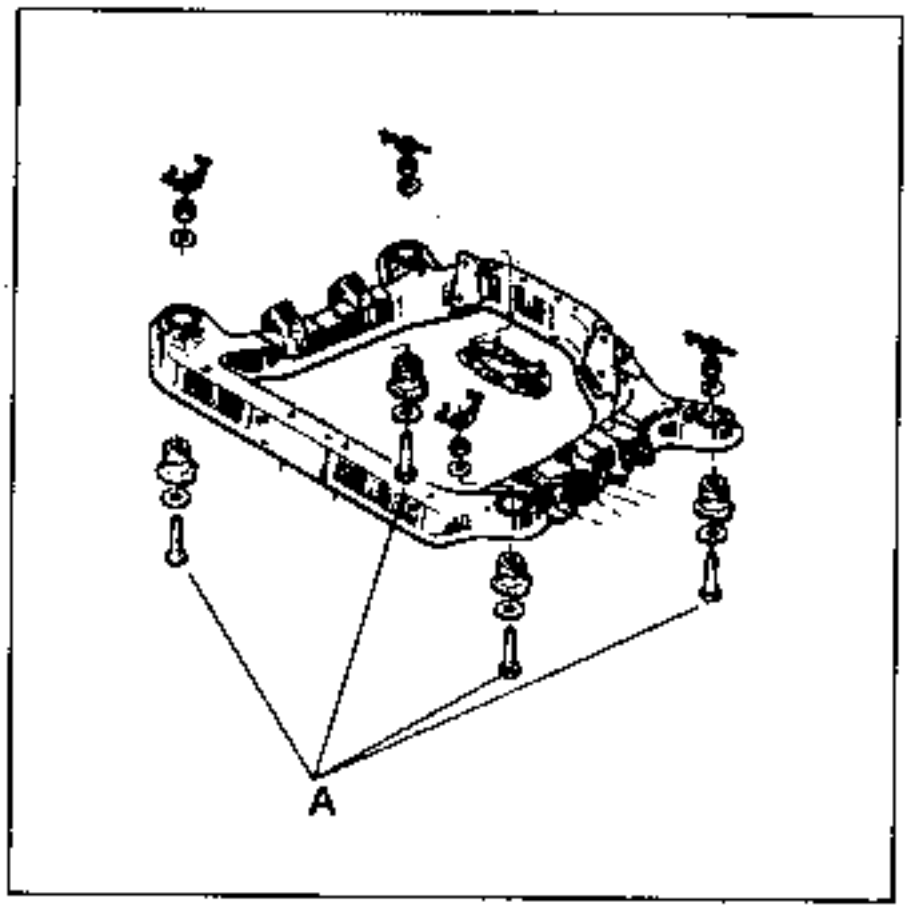
Then fit them to the dummy sub-frame.



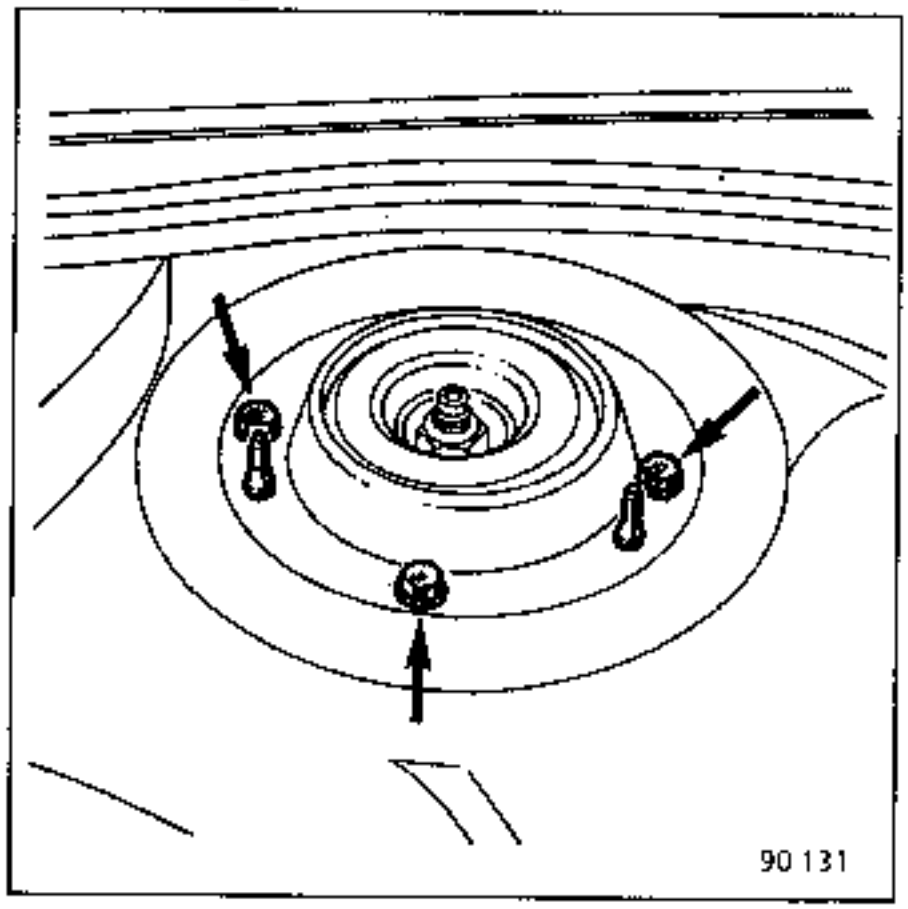
Lower the lift until the dummy frame makes contact with the floor.

Remove:

- the four sub-frame securing bolts (A),

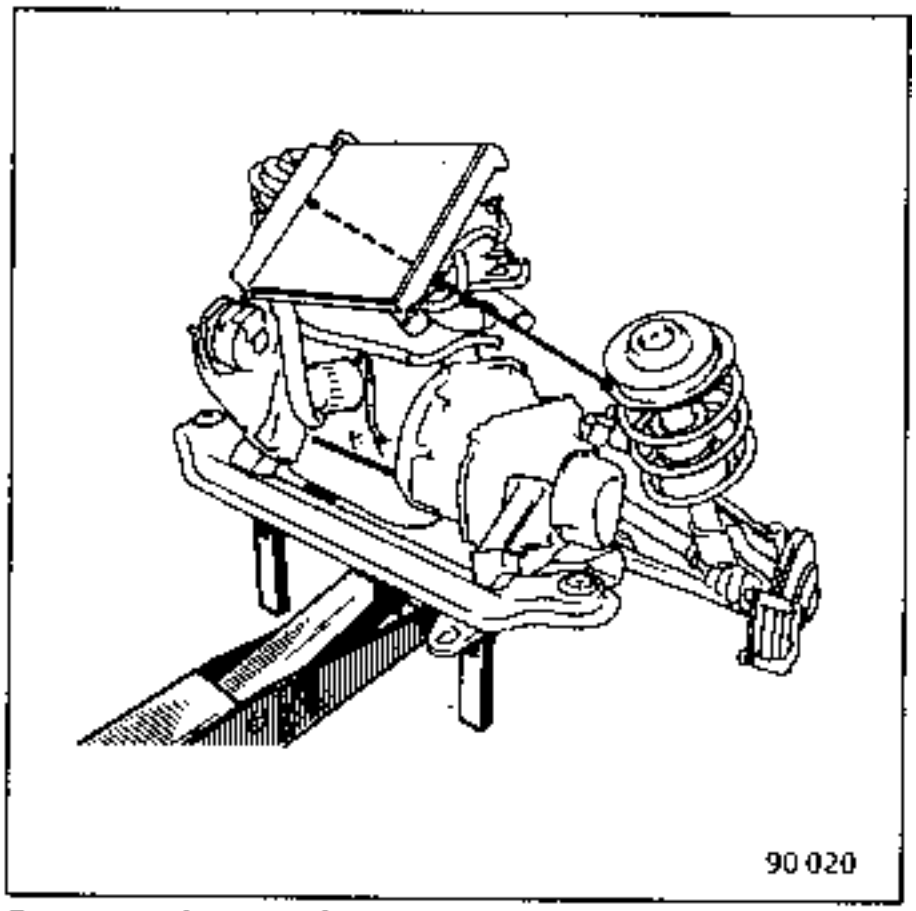


- the bolts from the shock absorber upper cups,



Lift the body and take out the power unit assembly.

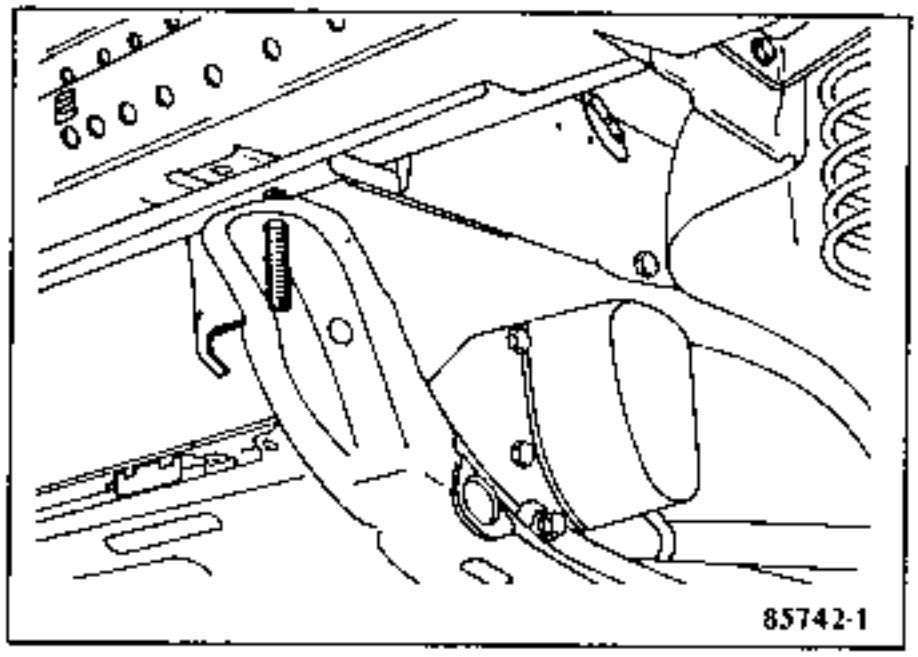
After removal of the power unit assembly



Secure the spring-shock absorbers in place with the string.

REFITTING (special points)

It will be found easier to align the engine sub-frame with the body if two screwed rods approximately 100mm are fitted.



To obtain the correct clutch free travel, see the section entitled CLUTCH.

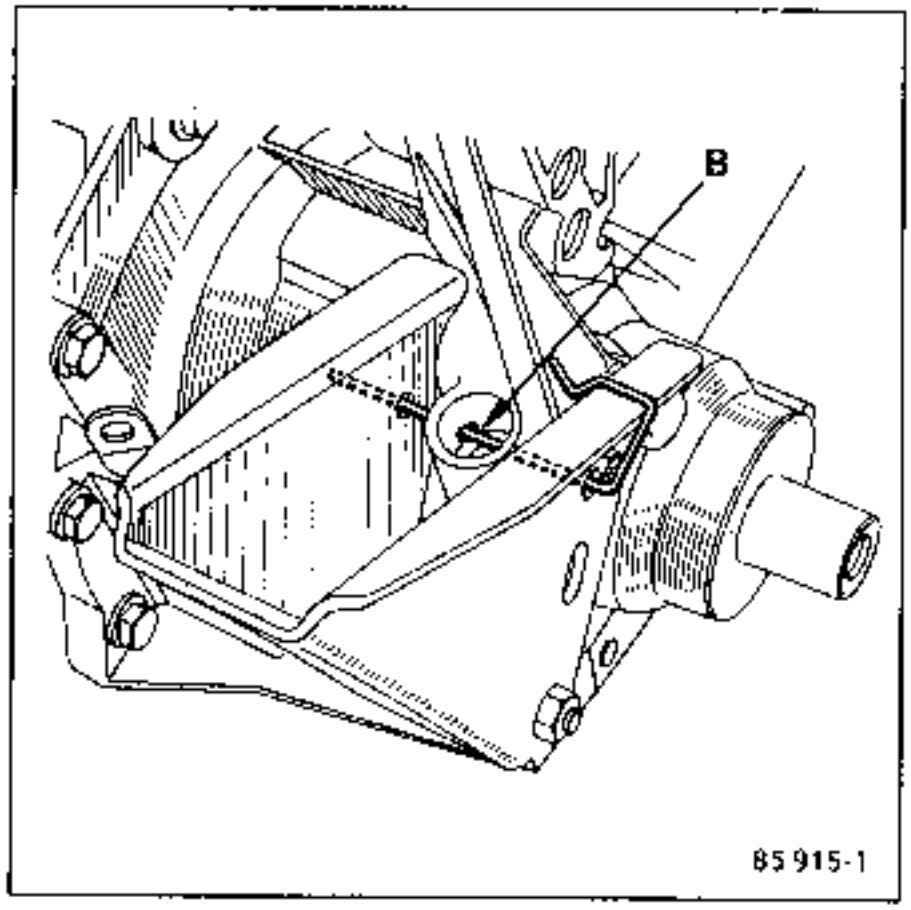
Tighten the brake caliper securing bolts to a torque of 10 daN.m after first coating them with Loctite Frenbloc.

Press down the brake pedal a number of times to bring the caliper pistons into contact with the brake pads.

Fill and bleed the cooling system.

Ensure that the steering column universal joint is tightened in the correct position.

Reconnect the speedometer drive cable, ensuring that the clip is in the correct position.



Adjust the accelerator and choke cables.

Retighten the exhaust pipe clamp.

REMOVING - REFITTING

ESSENTIAL SPECIAL TOOLS	
Mot 1040	Dummy sub-frame for removing and refitting the power unit assembly.

TIGHTENING TORQUES (in daN.m) ▽	
Sub-frame securing bolts	8,5
Shock absorber upper cup securing bolts	2,5
Brake caliper securing bolts	10
Steering column universal joint securing bolt	2,5
Wheel bolts	9

Place the vehicle on a lift and disconnect the battery.

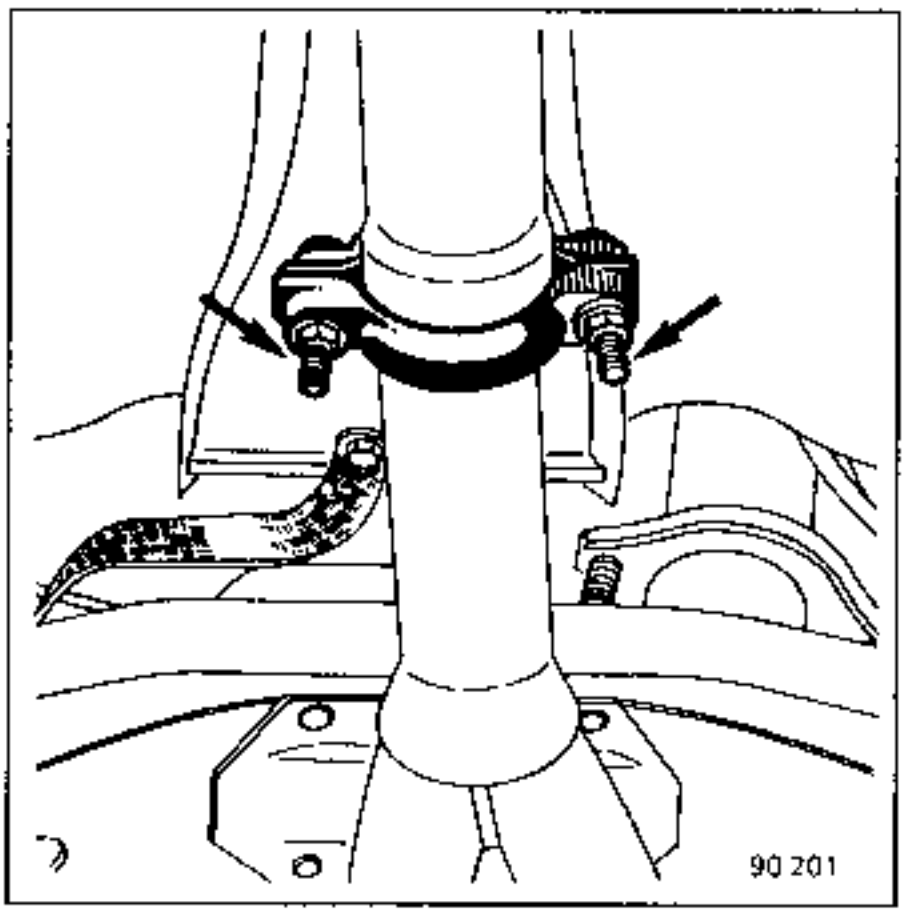
Remove:

- the wheels,

- the protective panels from under the engine and gearbox,

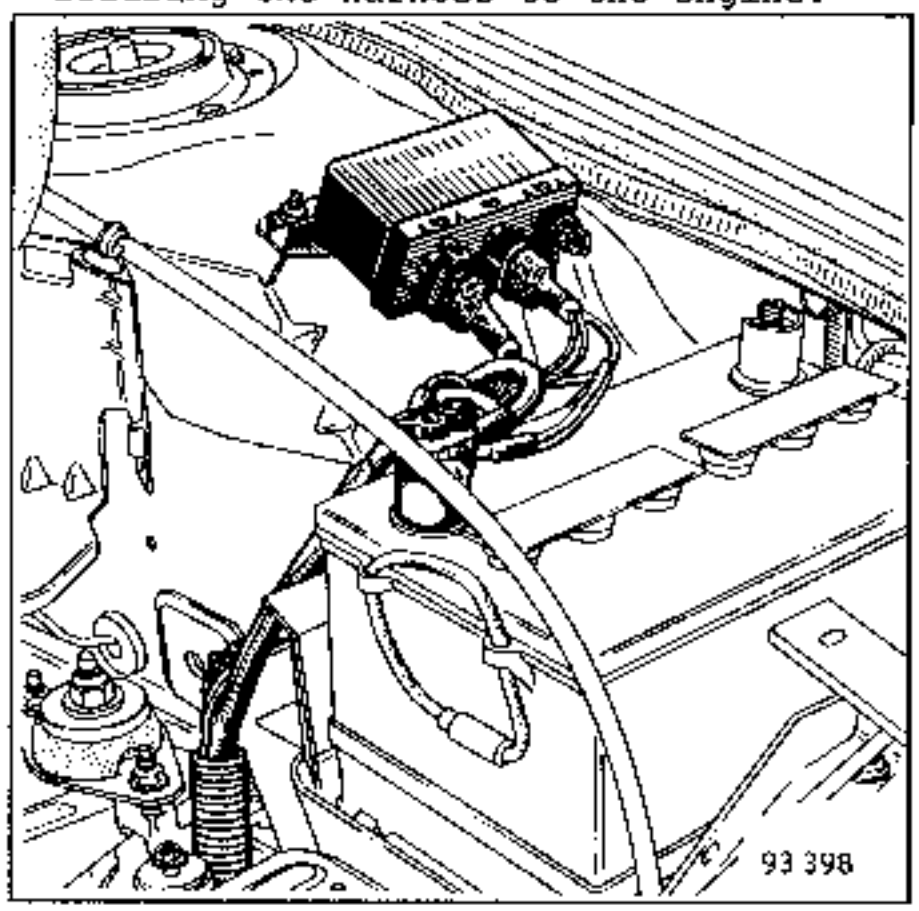
- the gear shift lever,

- the exhaust pipe clamp at the exhaust downpipe.



Disconnect:

- the electrical wiring from the pre-heater unit and the electric fan, together with the engine harness pin, securing the harness to the engine.



- the following pipes and hoses:

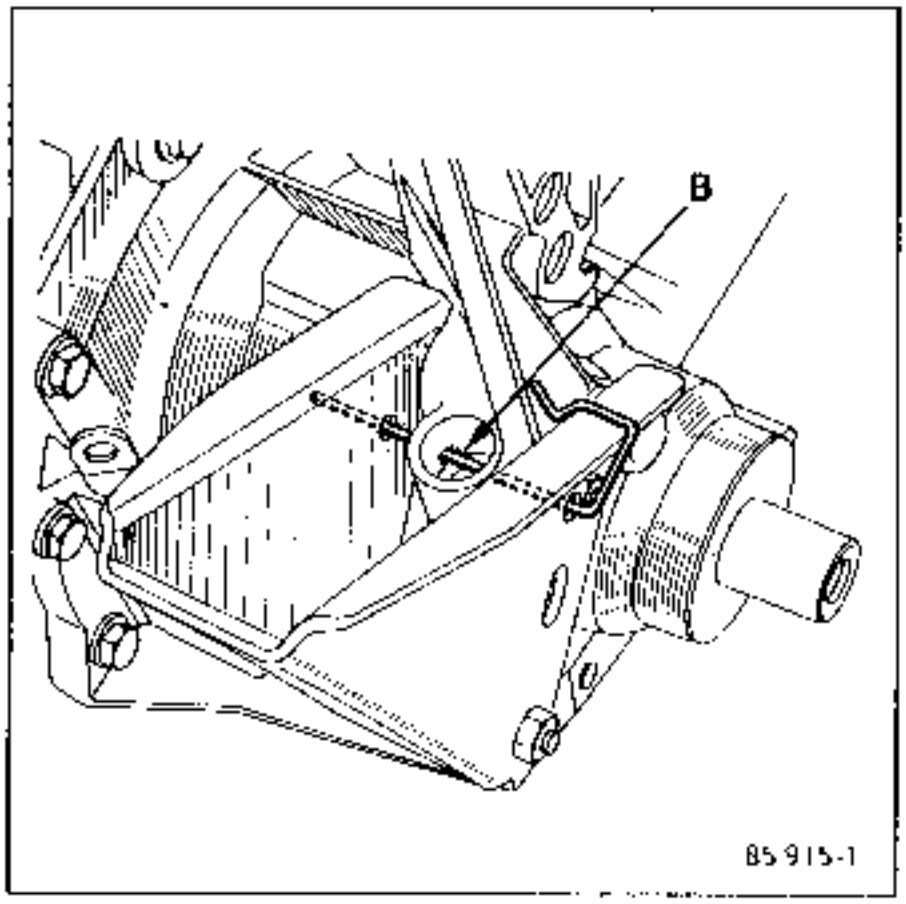
  . heater hoses at the engine,
  . fuel filter heater,
  . injection pump fuel supply and return pipes.

Remove:

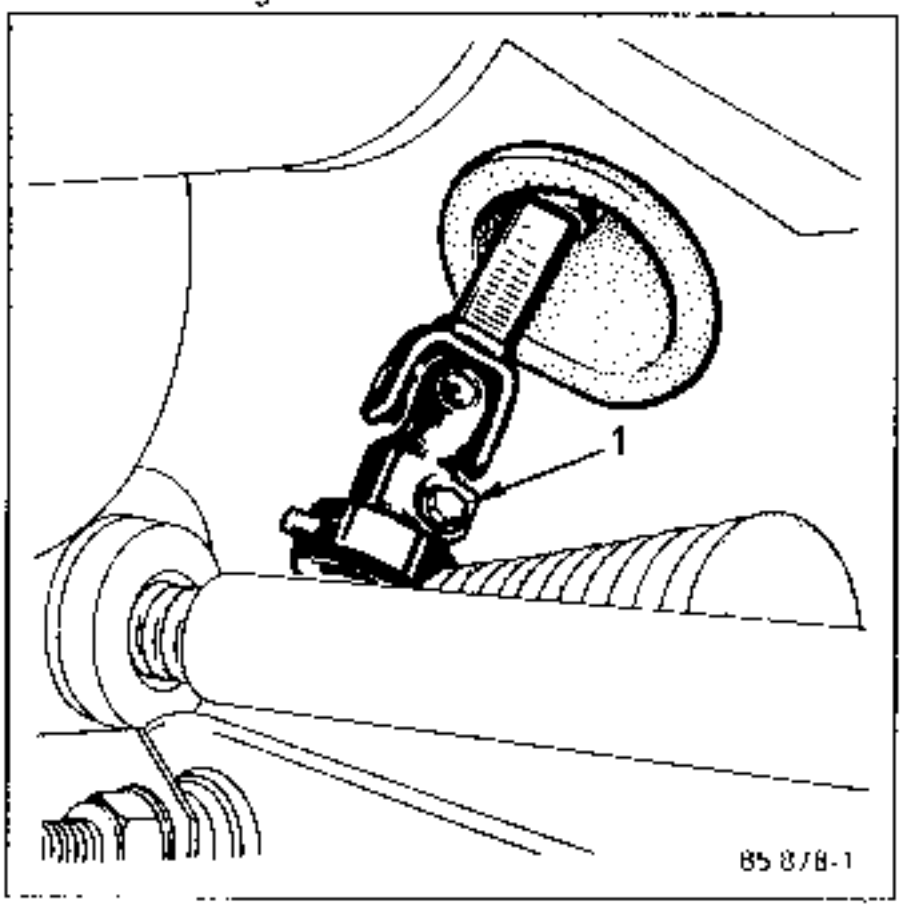
- the air filter,
- the expansion bottle and the power steering reservoir (when applicable), securing them to the engine,

- the following cables:

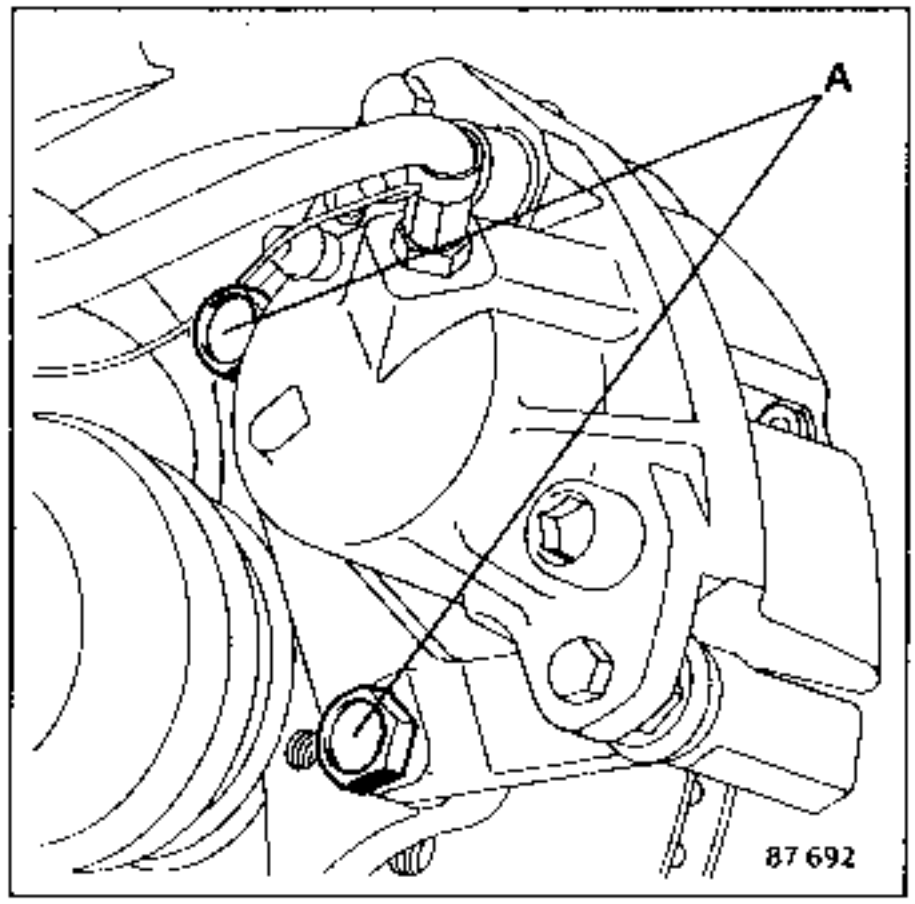
  . clutch,
  . accelerator,
  . speedometer drive, removing clip B.



The steering column universal joint, bolt (1) after marking its position on the steering box.



The brake calipers (bolts A) securing them to the vehicle body.



Loosen the sub-frame securing bolts.

Fit the dummy sub-frame Mot. 1040.

Sub-frame Mot. 1040 will have to be modified, as follows, to carry out this operation:

Drill 2 holes 11mm in diameter at a between centres dimension of 670mm and make up 2 securing lugs (see below).

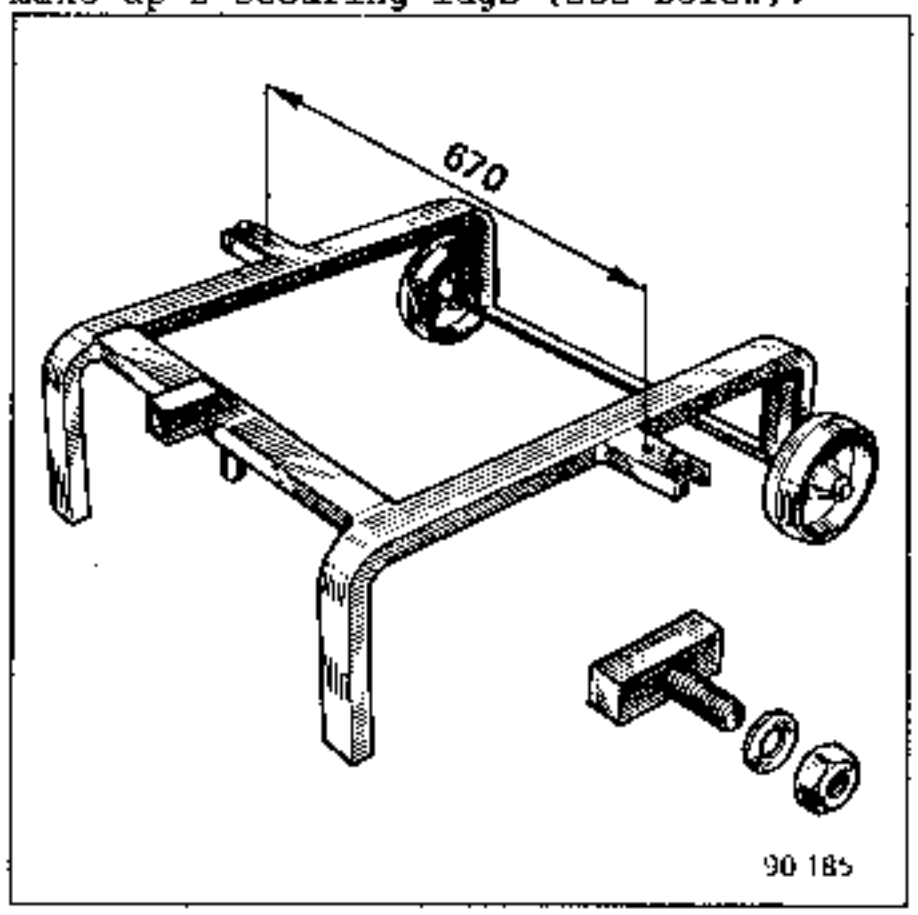
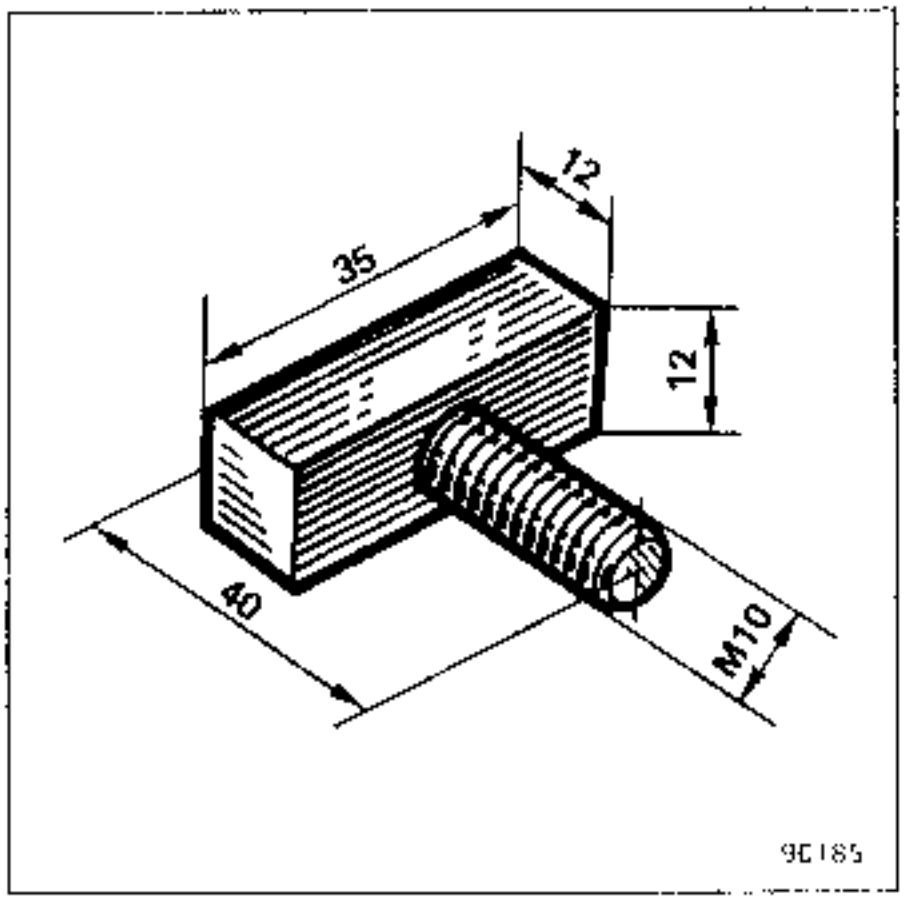
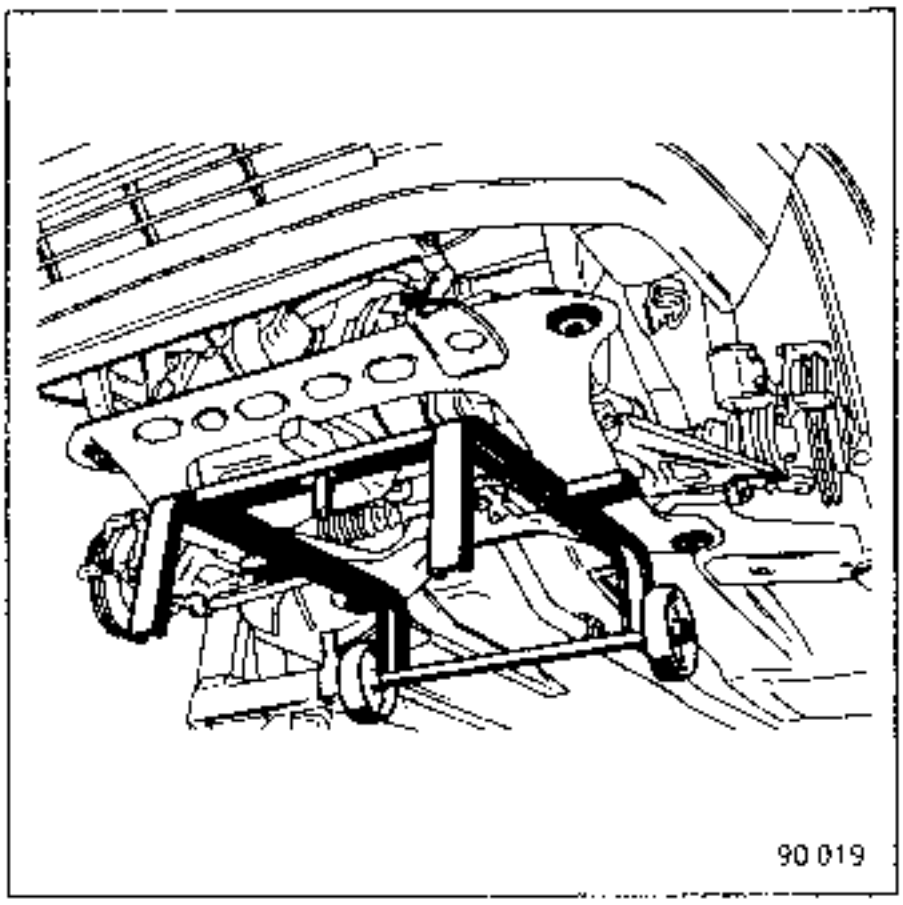


DIAGRAM OF TOOLS TO BE MADE LOCALLY
(Dimensions in mm)



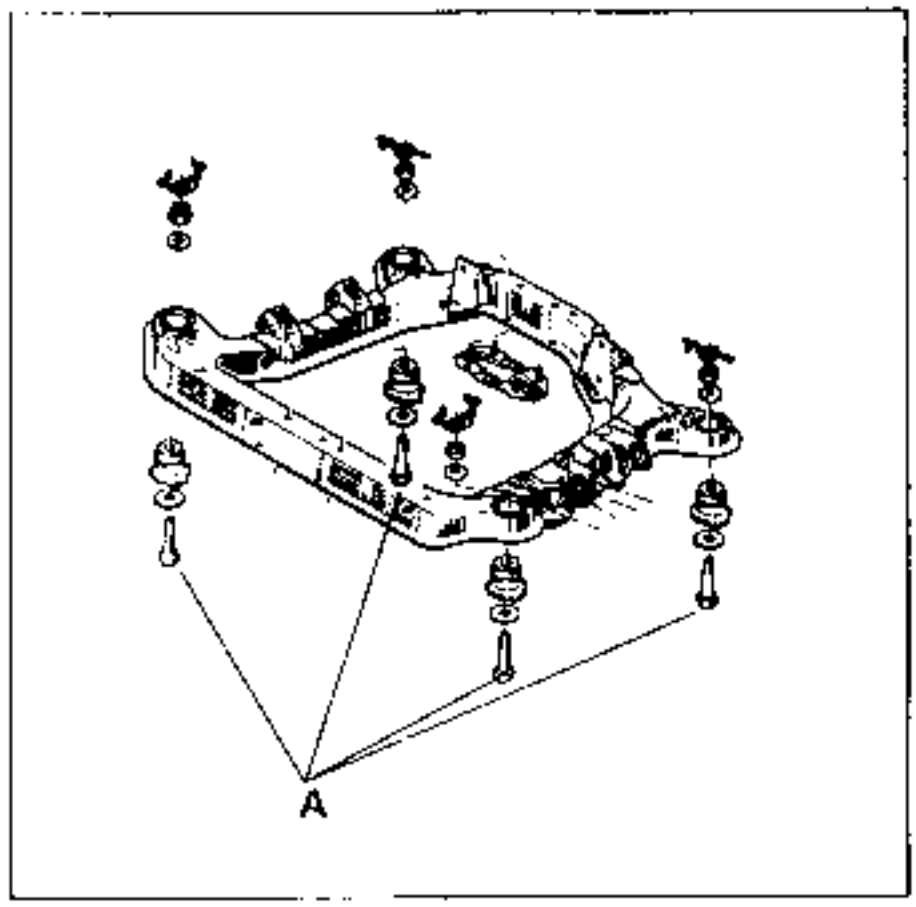
Then fit these to the dummy sub-frame.



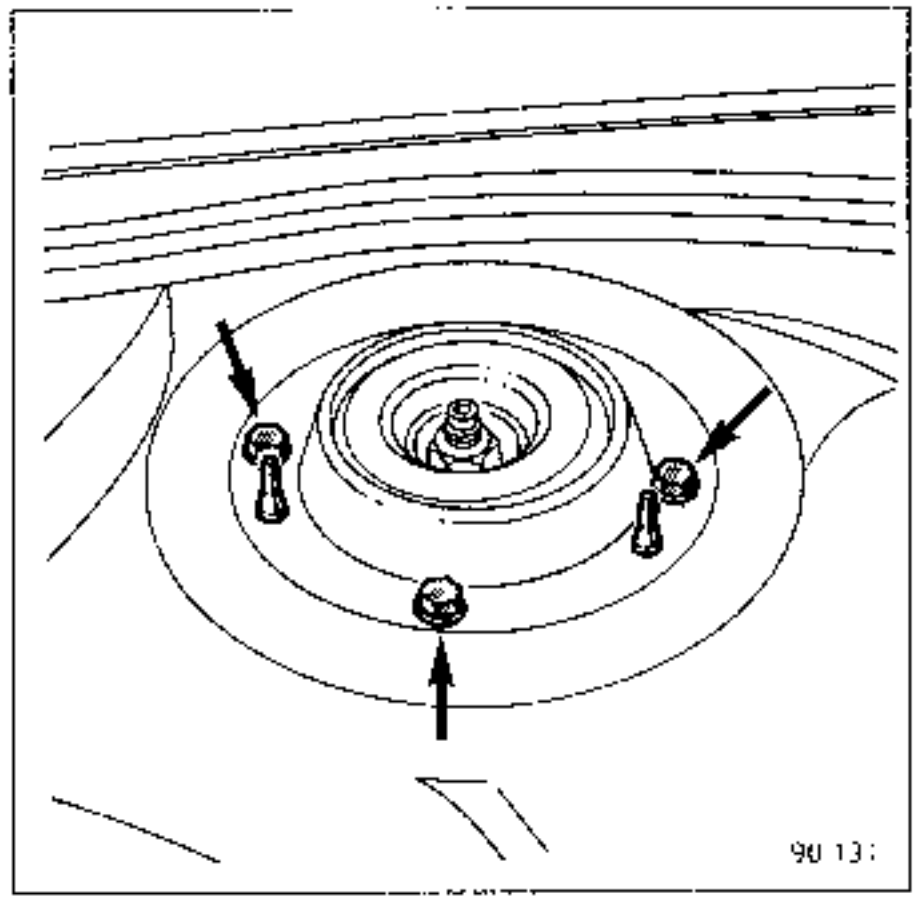
Lower the lift until the dummy sub-frame makes contact with the floor.

Remove:-

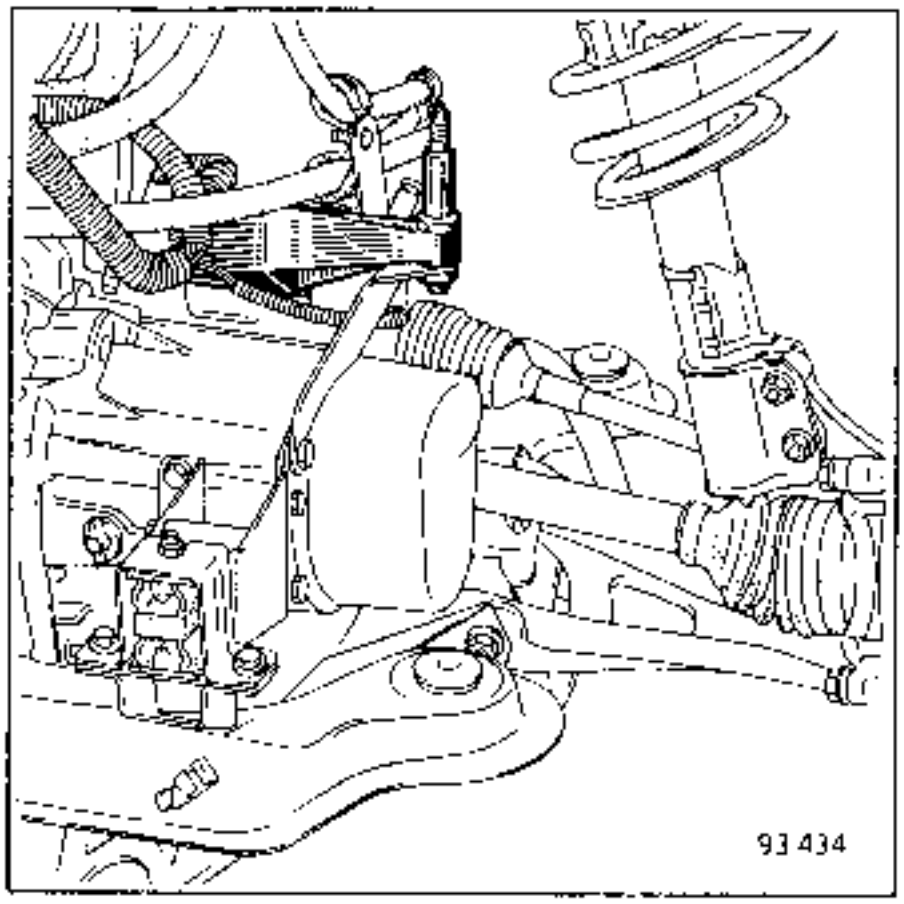
- the four sub-frame securing bolts (A).



- the shock absorber upper cup securing bolts.



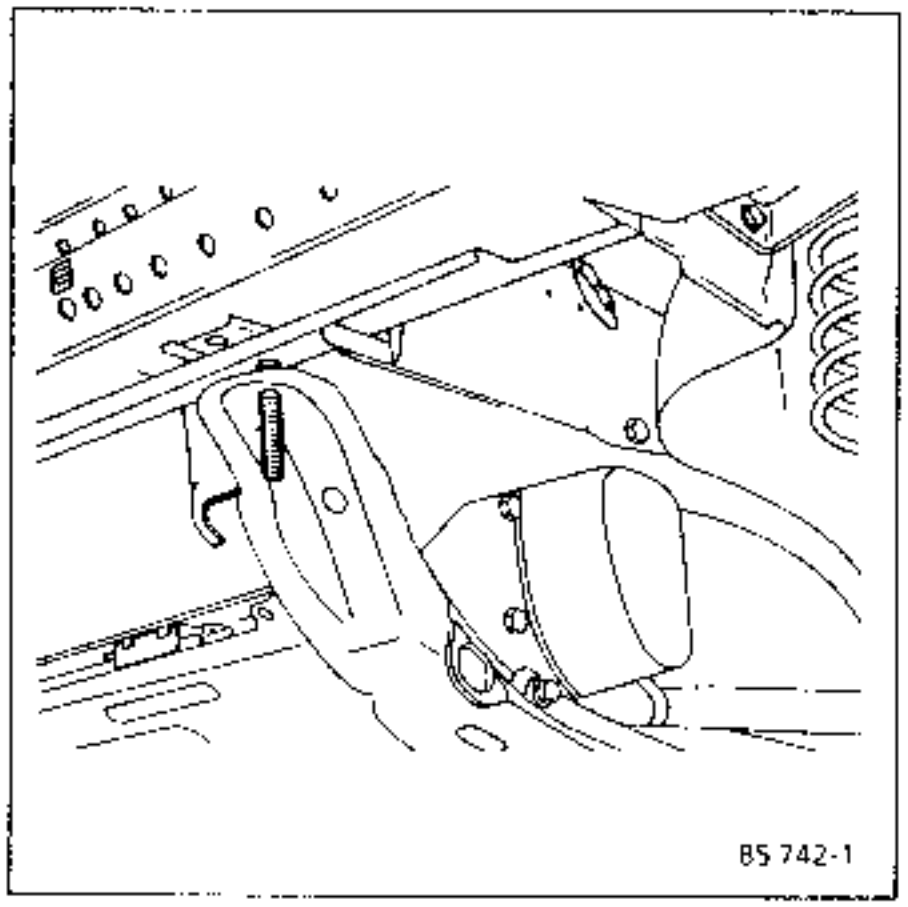
Remove the nut from the suspended flexible mounting and free the screwed rod from the flexible bush by knocking it with a bronze drift.



Lift the vehicle body and take out the power unit assembly.
Secure the spring-shock absorber assemblies with string.

REFITTING (special points)

It will be found easier to align the engine sub-frame with the body if two screwed rods approximately 100mm long are fitted.



Tighten the nuts and bolts to the specified torques.
Coat the brake caliper securing bolts with Loctite Frenbloc before fitting them.

Press down the brake pedal a number of times to reposition the brake pads.

Fill the engine with oil (if necessary).

- Fill and bleed the cooling system.

- Adjust the accelerator cable.

- Bleed the fuel system.

- Ensure that the steering column universal joint is tightened in the correct position.

REMOVING - REFITTING

ESSENTIAL SPECIAL TOOLS	
Mot 1040-01	Dummy sub-frame for removing and refitting the power unit assembly
T.Av 476	Ball joint extractor

TIGHTENING TORQUES (in daN.m) ▽	
Brake caliper securing bolts	10
Shock absorber cup securing bolts	2,5
Wheel bolts	9
Sub-frame securing bolts	8,5

REMOVING

Disconnect:

- the battery,

- the electrical connectors,

- the accelerator cable,

- the clutch cable,

- the speedometer drive cable.

Drain:

- the cooling system,

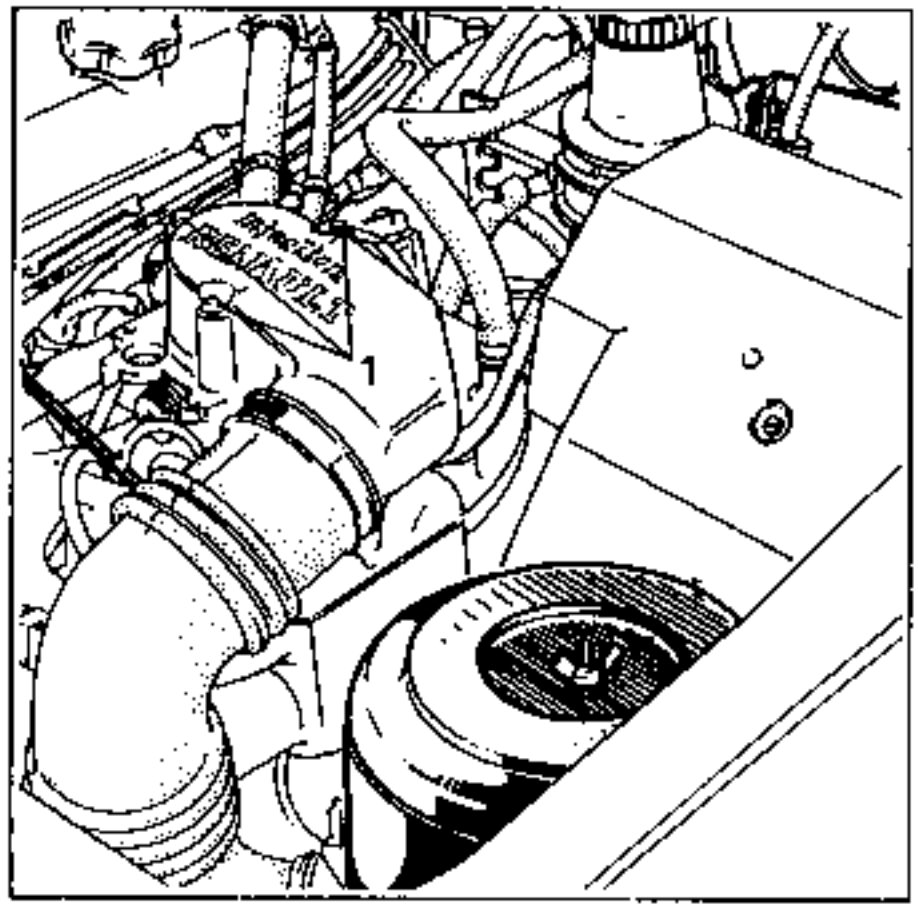
- the engine,)
) if necessary
- the gearbox.)

Disconnect:

- the heater hoses,

- the radiator hoses, leaving the hoses on the vehicle,

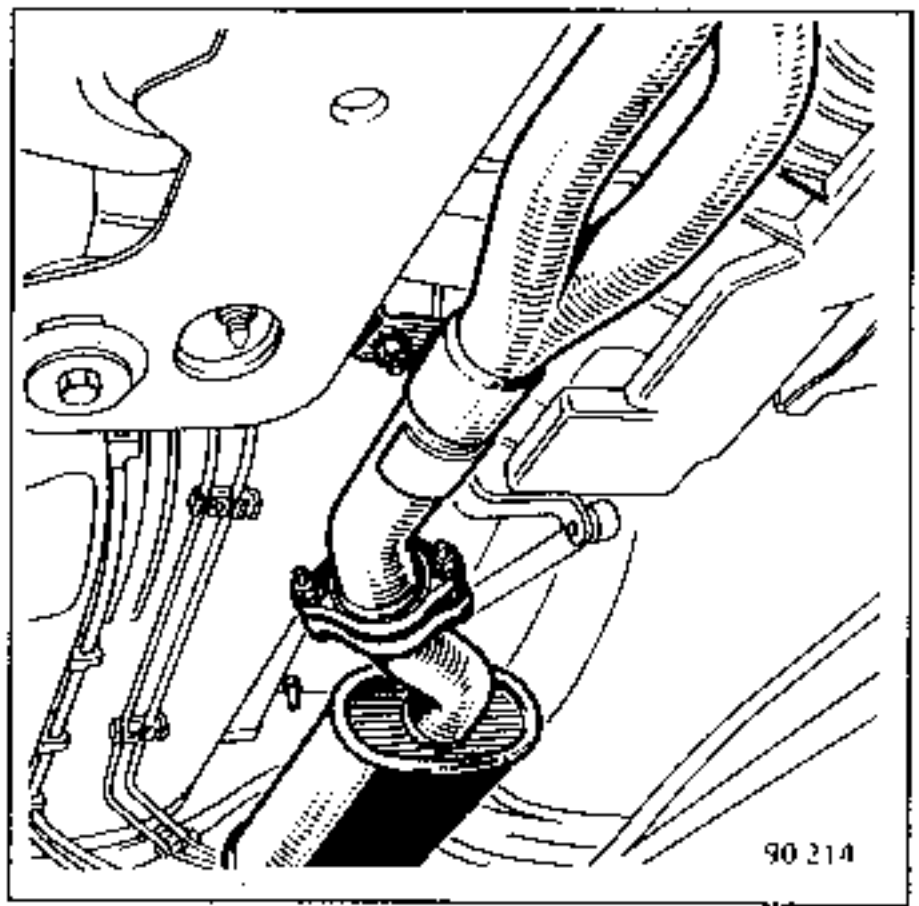
- the earthing braids (Engine and Gearbox).



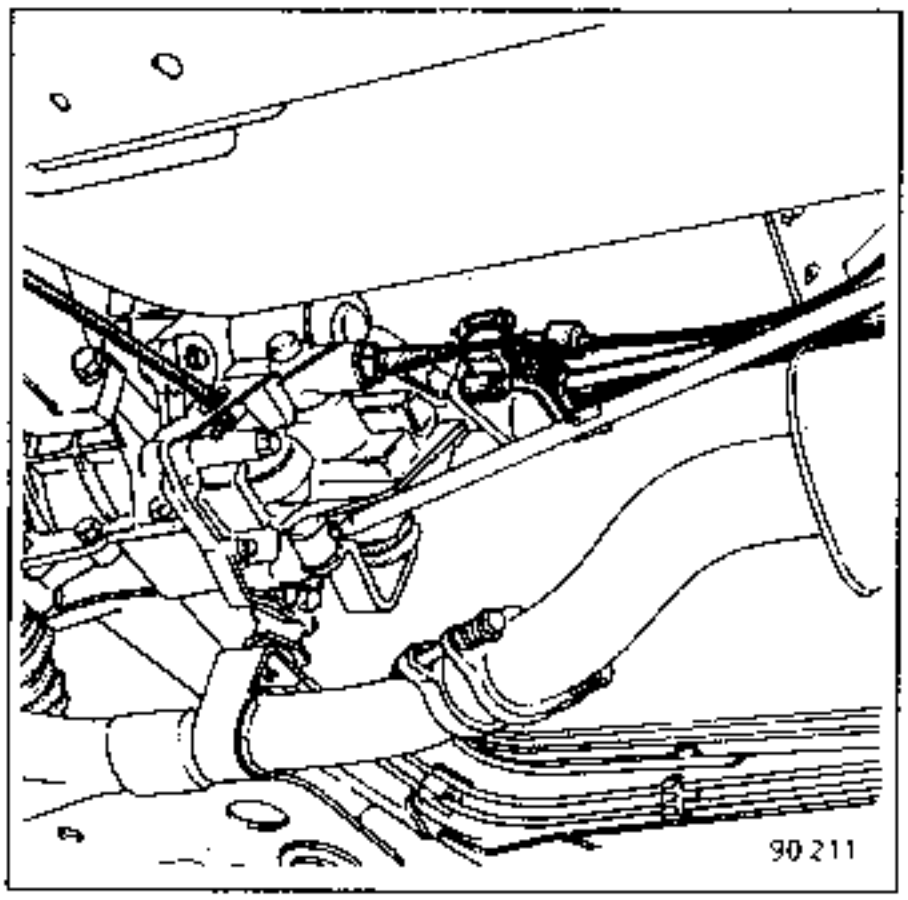
Remove:

- the screws which secure the throttle casing cover (1),

- the exhaust pipe spherical joint,

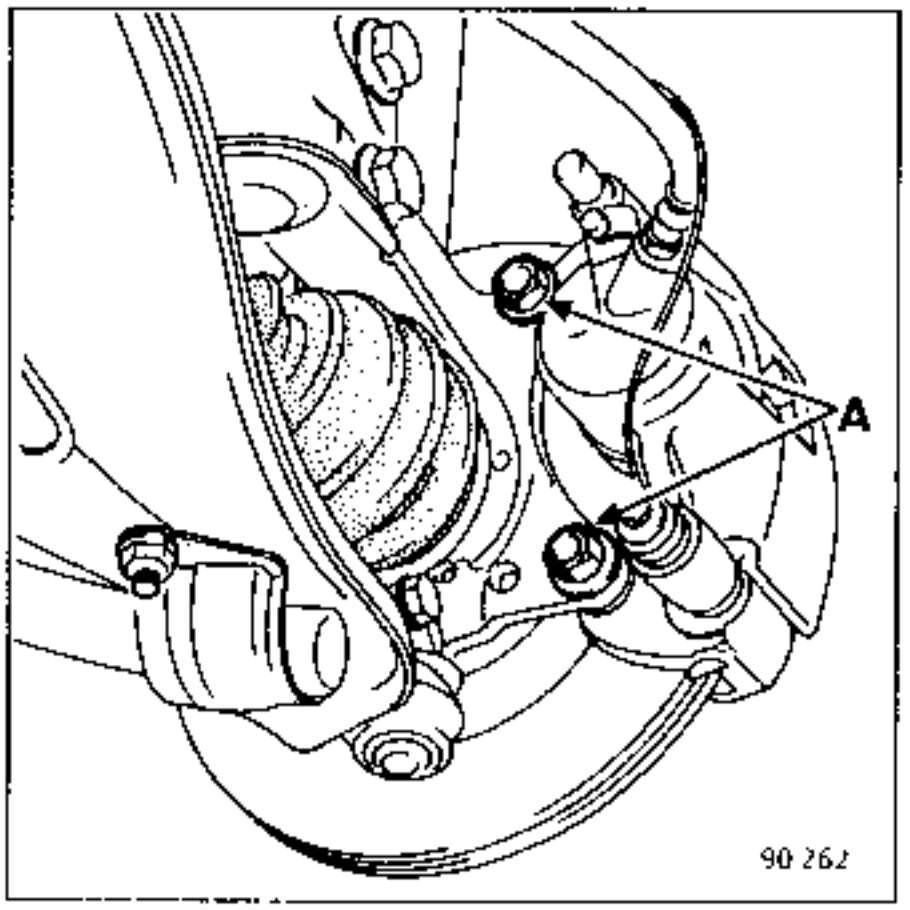


- the gear shift controls,

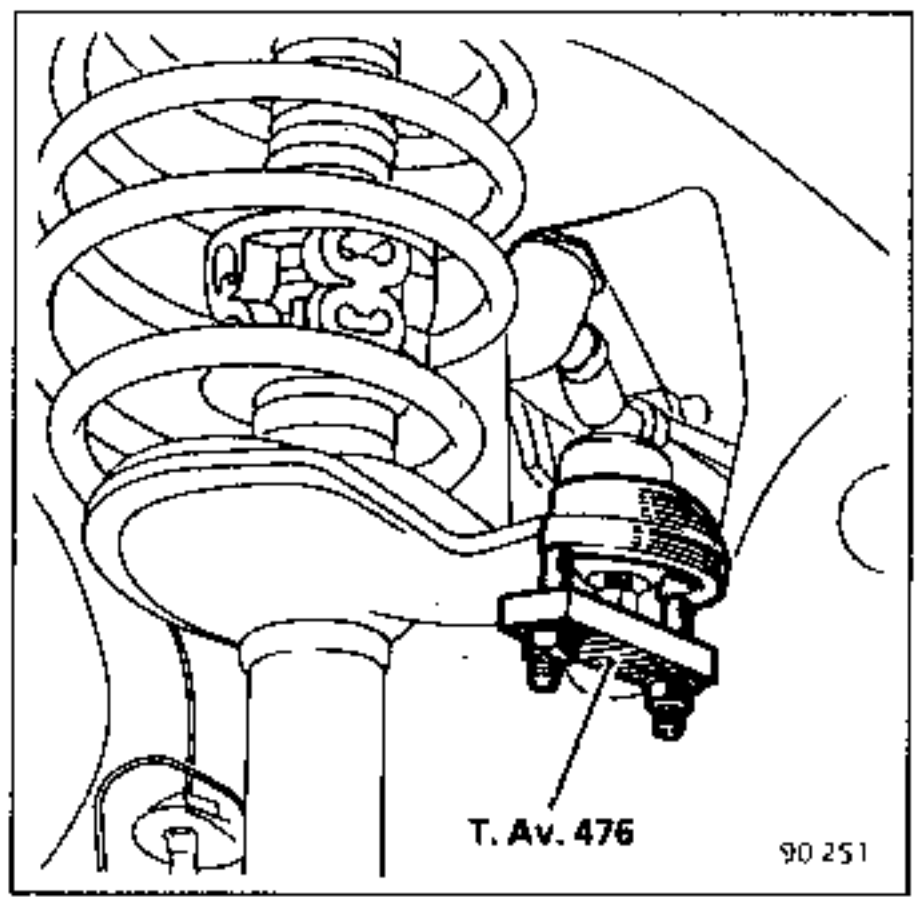


- the wheels,

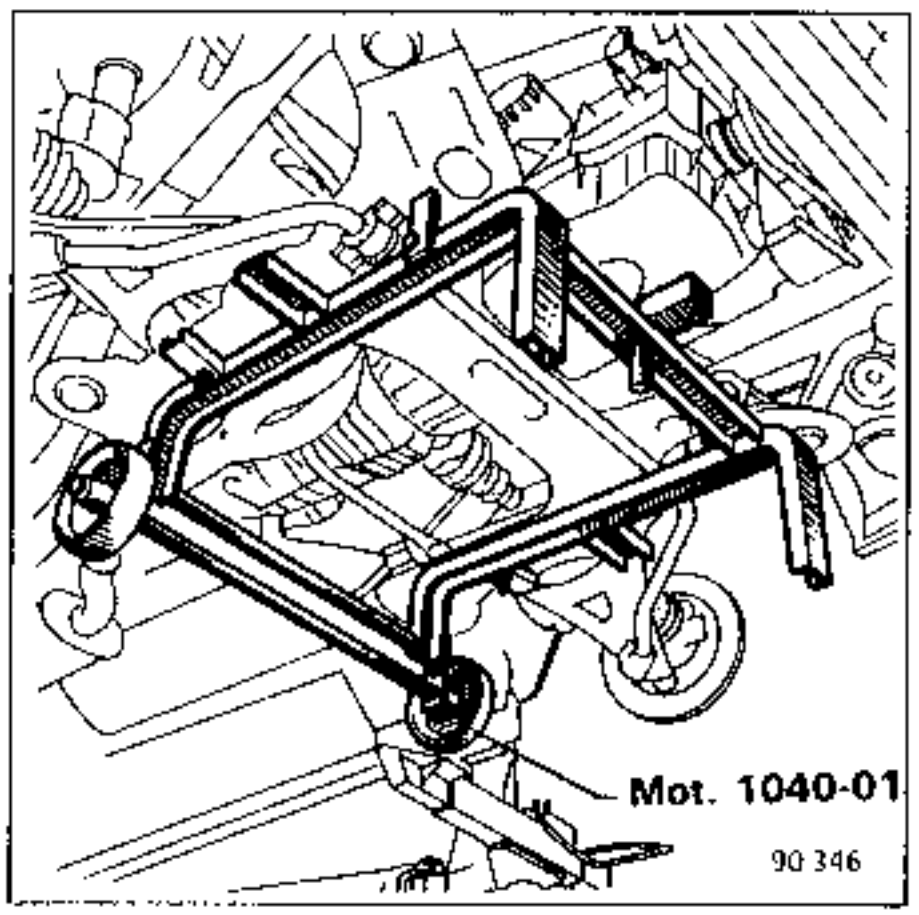
- the brake calipers (bolts A) and secure the calipers to the body.



- the steering ball joints, using tool T.Av.476.



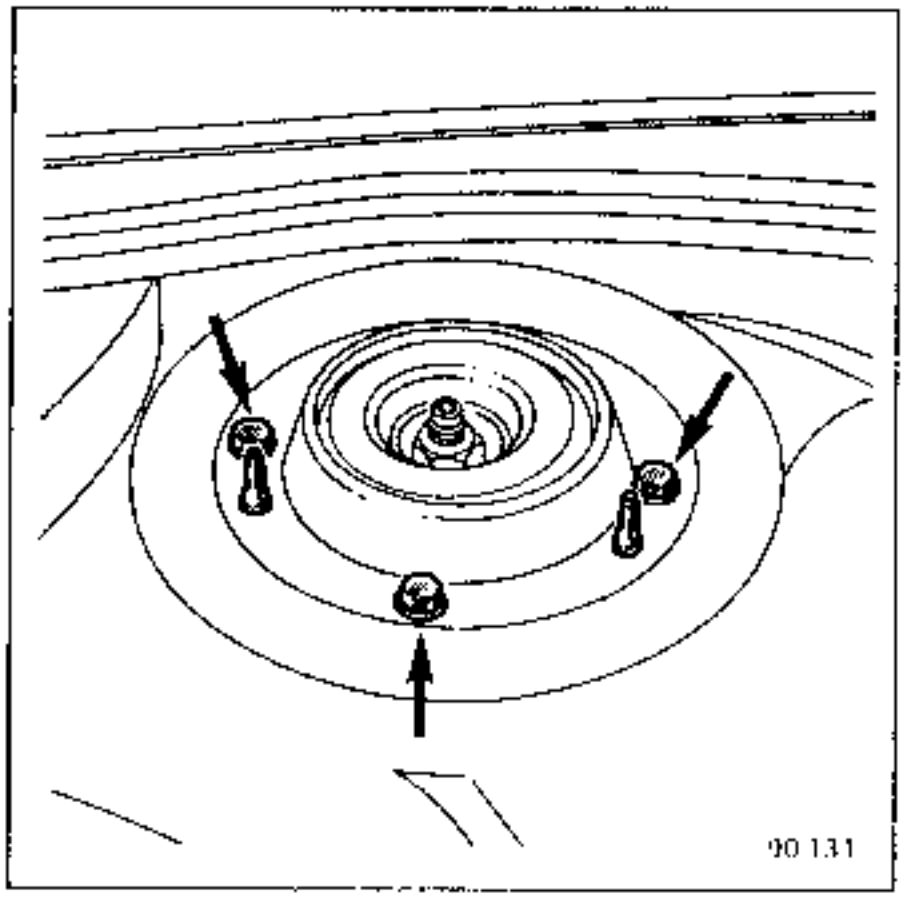
Fit dummy sub-frame 1040-01 to the engine sub-frame.



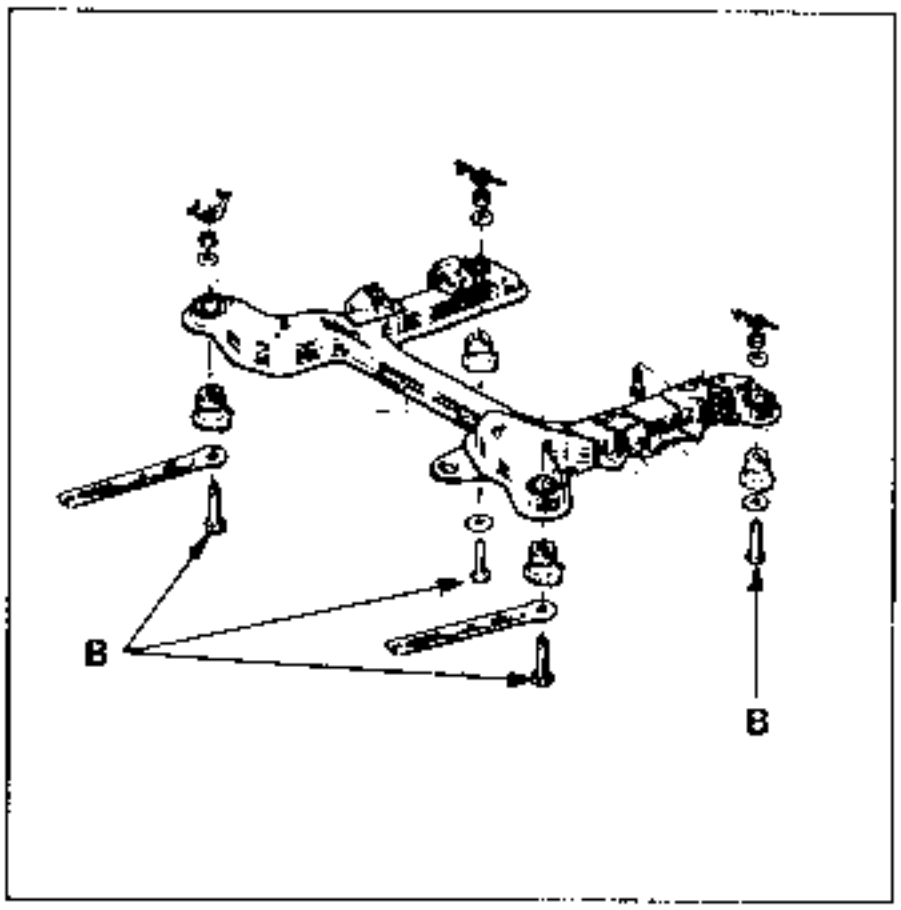
Lower the vehicle, fitted with sub-frame Mot. 1040-01 to the ground.

Remove:

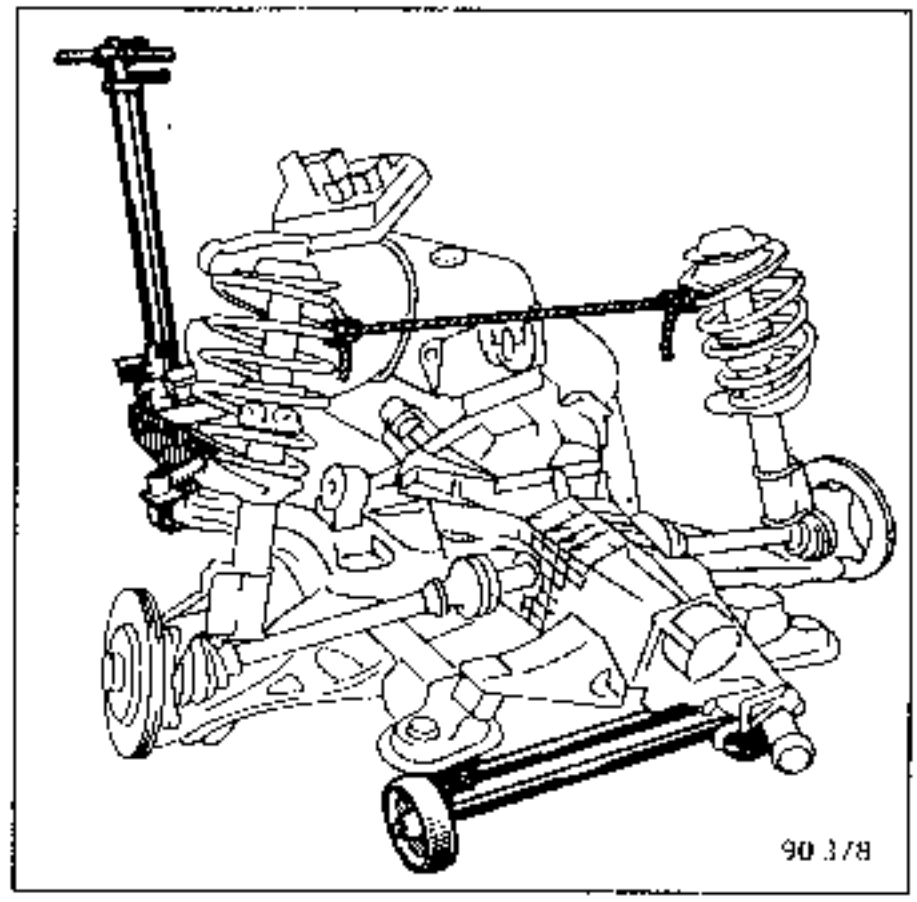
- the shock absorber upper cup securing bolts,



- the sub-frame securing bolts (B).



Take out the power unit assembly by lifting the body.



Secure the spring-shock absorber assemblies with string.

REFITTING (special points)

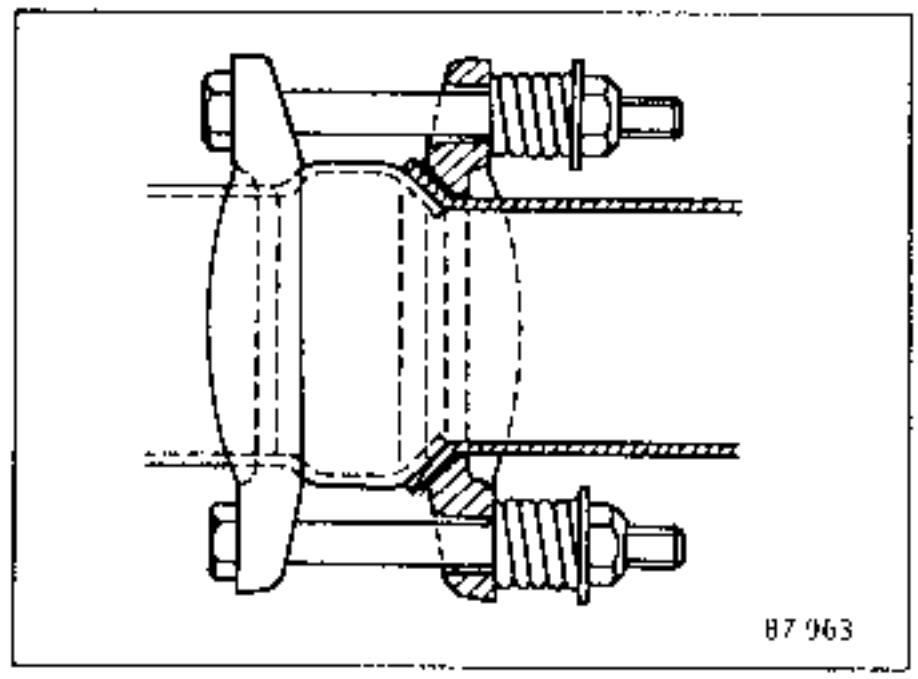
Aligning the body with the engine sub-frame can be made easier by using screwed rods approximately 100mm long.

Tighten the nuts and bolts to the specified torques.

Fill the engine and gearbox with oil (if necessary).

Fill and bleed the cooling system.
Adjust the accelerator cable.

Tighten the exhaust clamp, fitting the springs and the anti-rattle bush.



The spherical joint is sufficiently tight as soon as an effective seal between the 2 pipes is obtained.

REMOVING - REFITTING

ESSENTIAL SPECIAL TOOLS	
T.Av. 476	Ball joint extractor
Mot. 1040-01	Dummy sub-frame for removing and refitting the power unit assembly

TIGHTENING TORQUES (in daN.m)	
Brake caliper securing bolts	10
Shock absorber cup securing bolts	2.5
Steering column ball joint	3.5
Wheel bolts	10
Sub-frame securing bolts	8.5

REMOVING

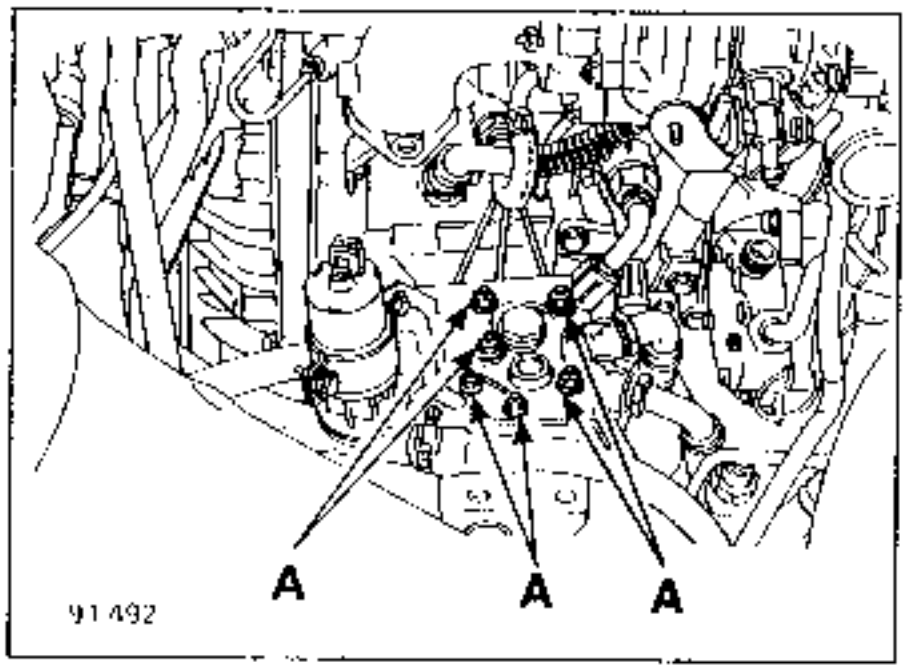
Remove the bonnet.

Disconnect:

- the battery,
- the electrical connectors,
- the accelerator and speedometer drive cables,
- the earthing braids (engine and gearbox),
- the fuel pipes.

Remove:

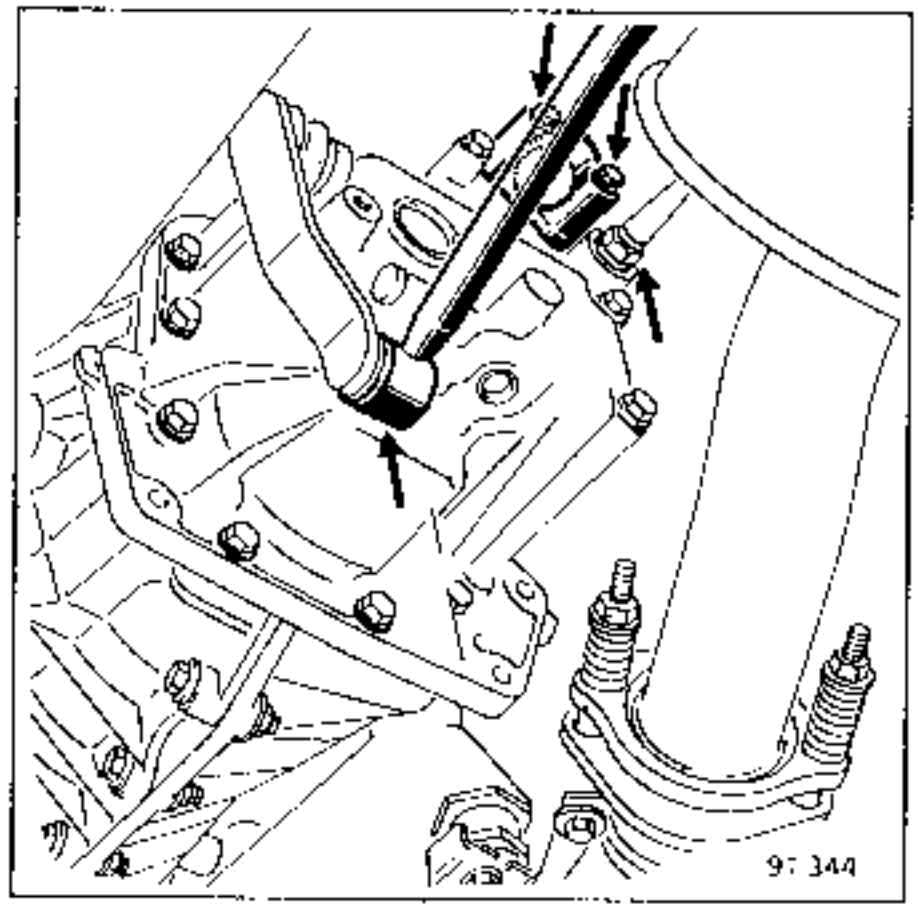
- the air filter together with its ducting. Protect the compressor and intercooler apertures,
- the oil cooler, bolts (A),
- the oil cooler (modine) support.



Drain the cooling, power steering and air conditioning systems.

Disconnect:

- the refrigeration system pipes,
- the cooling system pipes at the radiator and the heater,
- the diagnostic plug and the ignition unit connectors,
- the gear shift control,
- the exhaust pipe clamp.



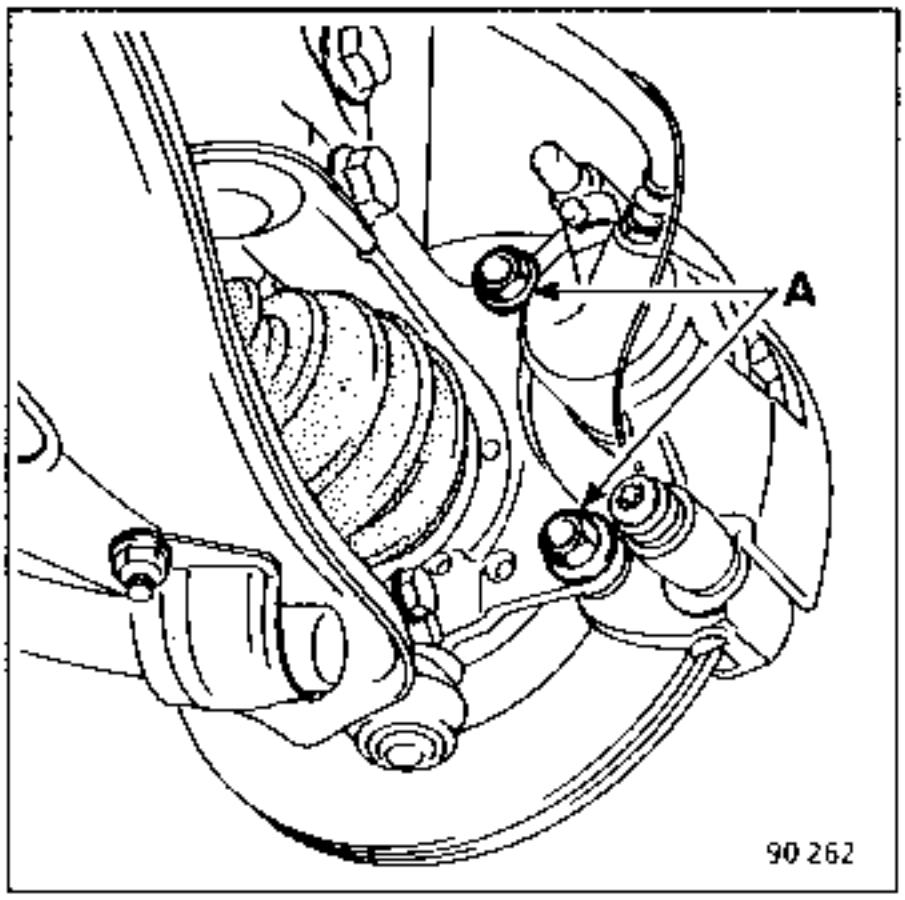
Remove:

- the wheels,

- the brake cooling ducts,

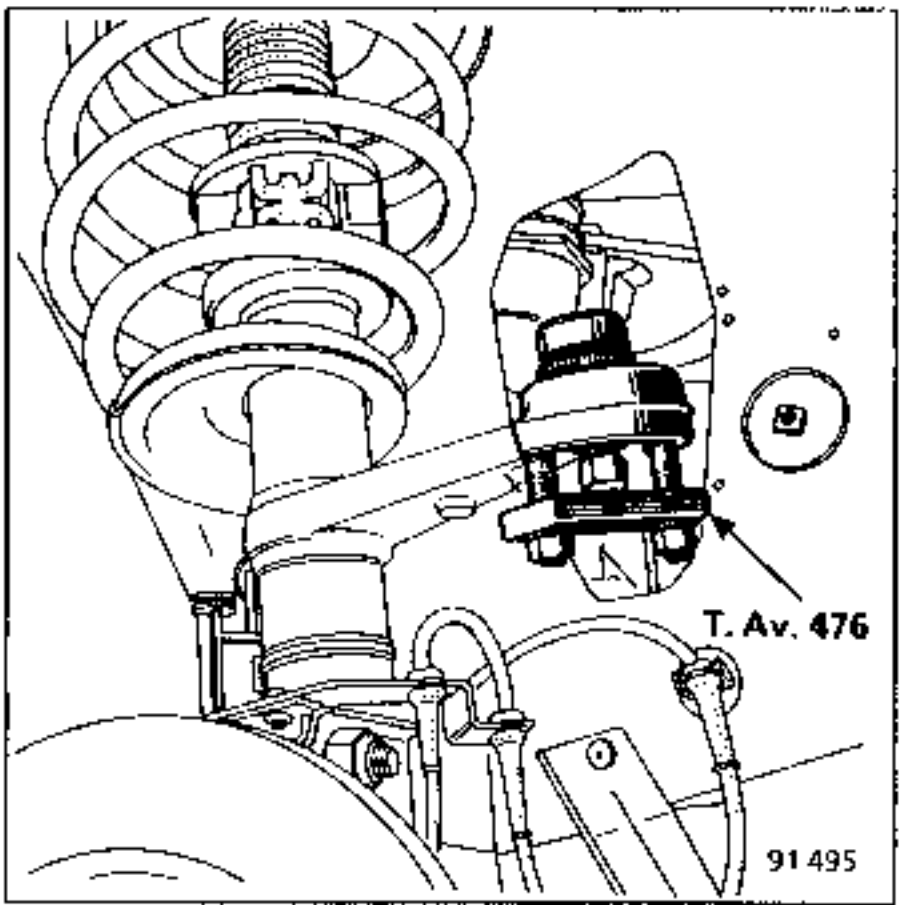
- the wheel sensors (A.B.S),

- the caliper securing bolts (A), securing the calipers to the body.



Disconnect:

- the steering ball joints using tool T.Av.476.



- the 2 pipes from the power steering pump,

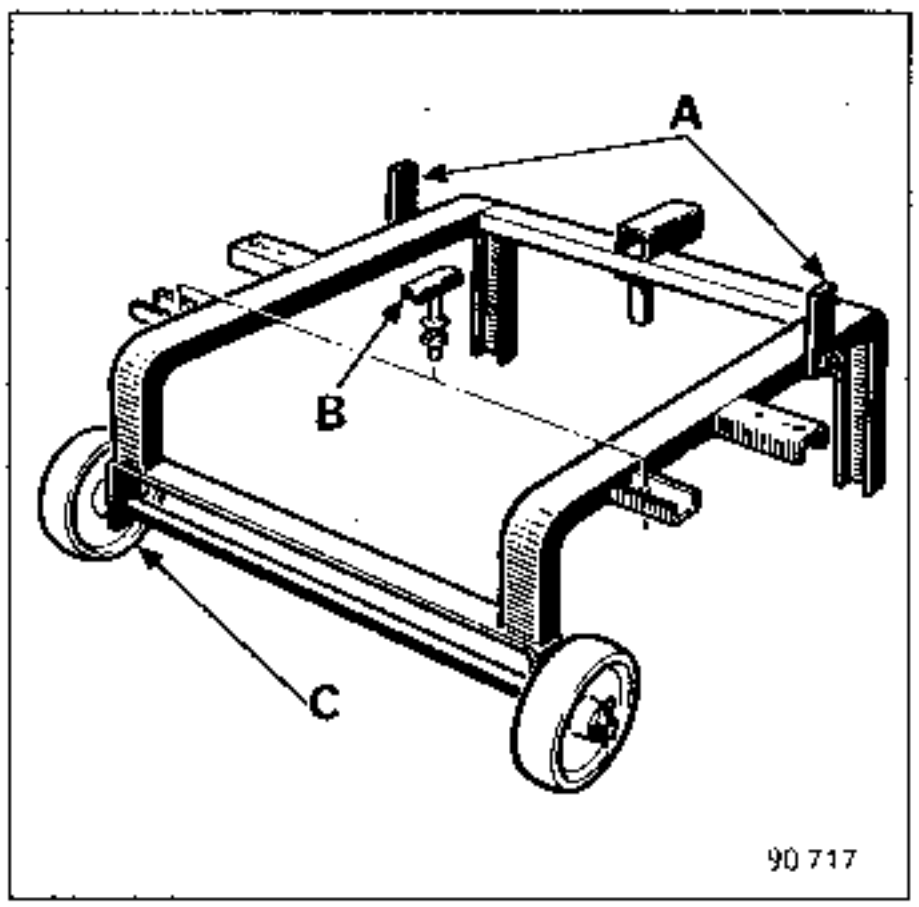
- the clutch slave cylinder pipe, at the union.

Preparing dummy sub-frame Mot.1040-01:

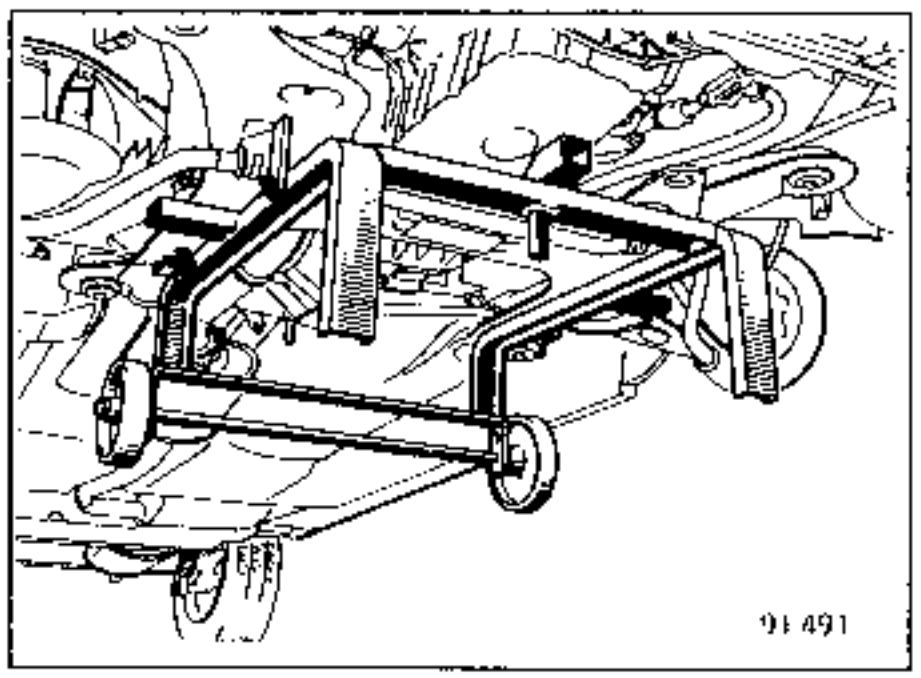
Fit the wheel axle in the lower holes (C).

Lift the retaining lugs (A).

The fastenings, under the sub-frame, consist of hooks, (B).

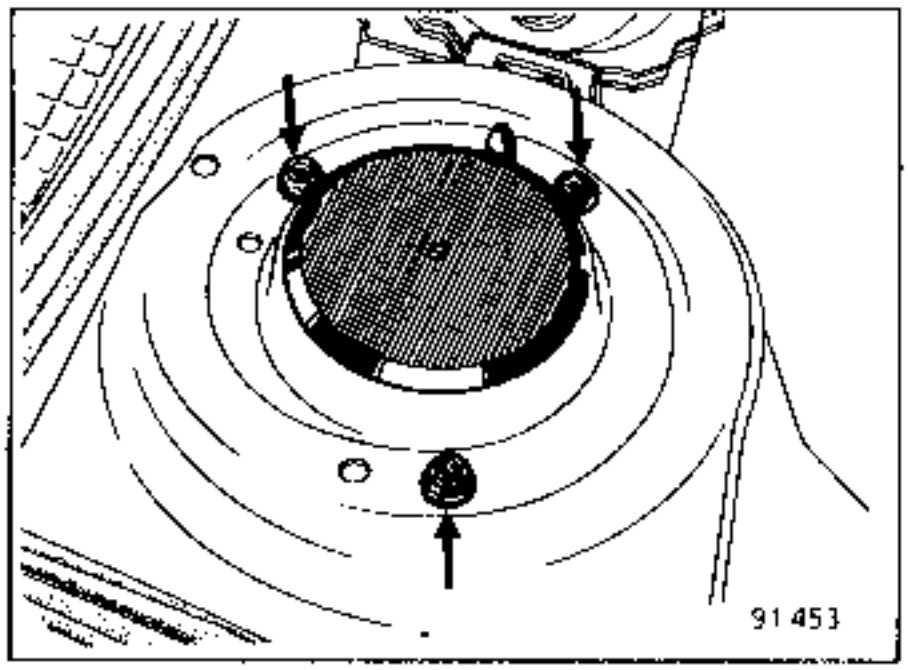


Secure the dummy sub-frame 1040-01 under the engine sub-frame.



Lower the lift until the dummy sub-frame makes contact with the floor.

Remove the shock absorber upper cup securing bolts.

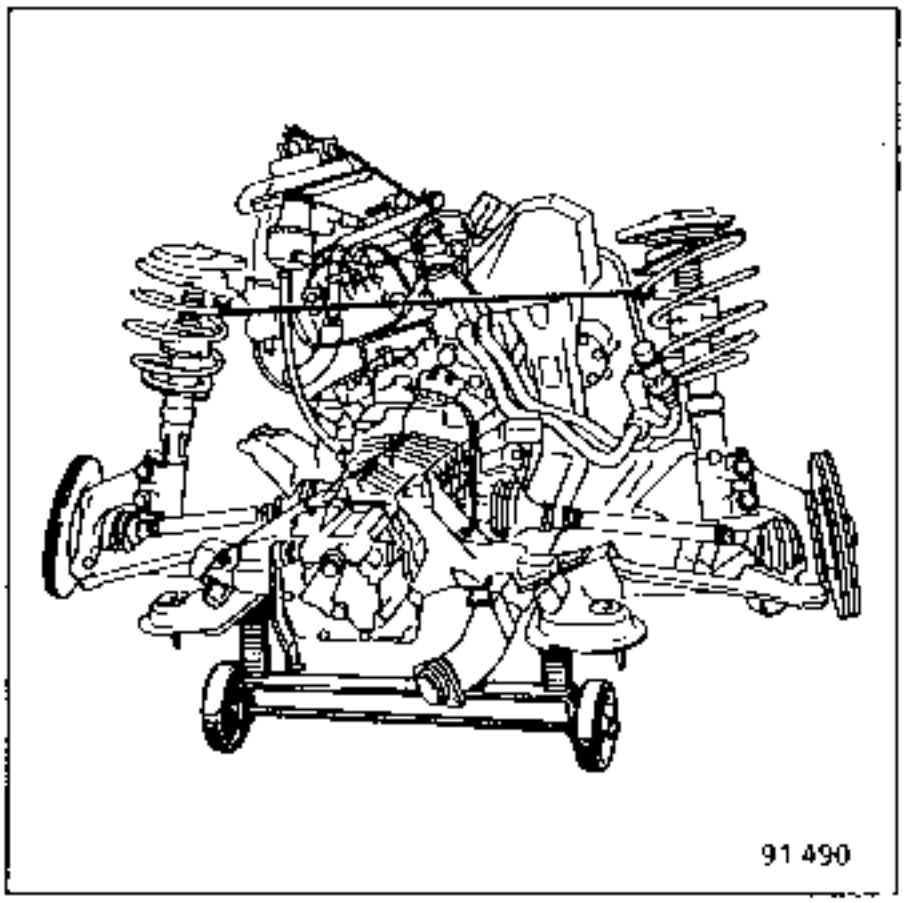


Remove the sub-frame securing bolts.

Place the injection unit on the engine or disconnect it, at its connector, and remove it.

Take out the power unit assembly by lifting the body.

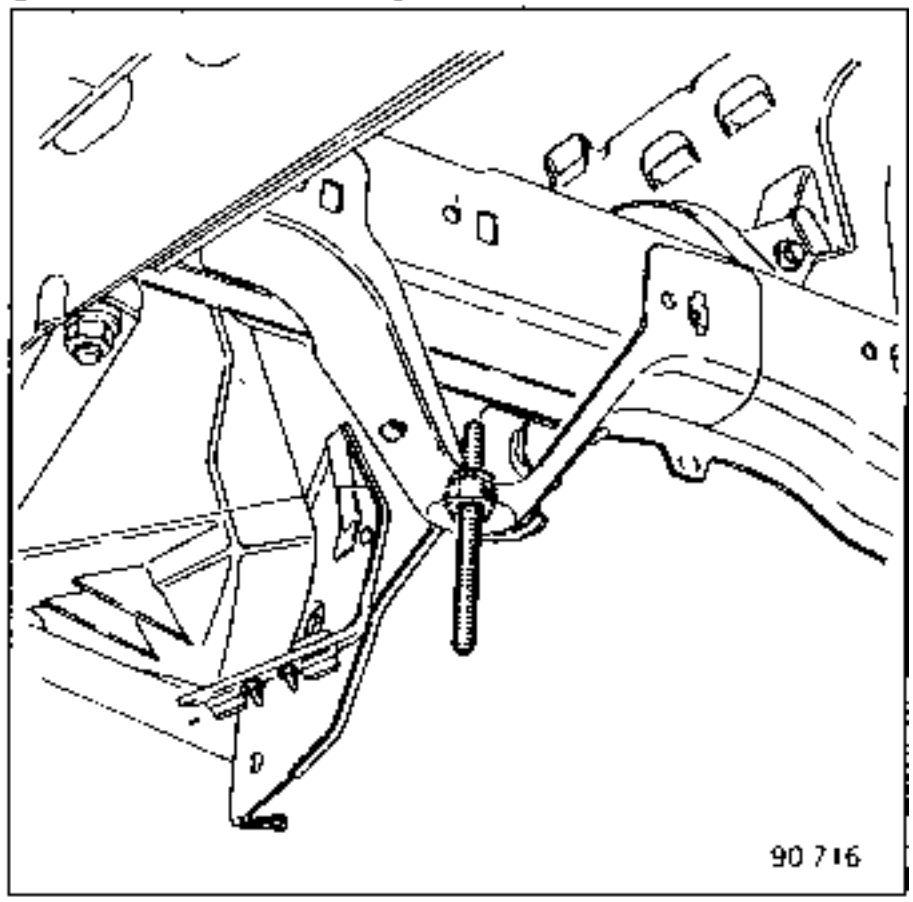
After removal of the power unit assembly:

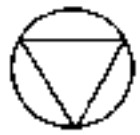


Secure the spring-shock absorber assemblies with string, and also the injection unit.

REFITTING (special points)

Aligning the body with the engine sub-frame can be made easier by fitting two screwed rods approximately 100mm long into the front two sub-frame securing points on the body.





Tighten the nuts and bolts to the specified torques.

Tighten the brake caliper securing bolts to a torque of 10 daN.m after coating the bolts with Loctite FRENBLOC.

Press down the brake pedal a number of times to bring the caliper pistons into contact with the pads.

Adjust the accelerator cable.

Fill and bleed the cooling, power steering, clutch control and air conditioning systems (see the section concerned).

REMOVING - REFITTING

ESSENTIAL SPECIAL TOOLS	
Mot.1040-01	Dummy sub-frame for removing and refitting the power unit assembly.
T.Av.476	Ball joint extractor

TIGHTENING TORQUES (in daN.m) ▽	
Brake caliper securing bolts	10
Shock absorber upper cup securing bolts	2.5
Wheel bolts	9
Sub-frame securing bolts	8.5

Place the vehicle on a 2 column lift and remove the protection from under the engine.

REMOVING

Disconnect:

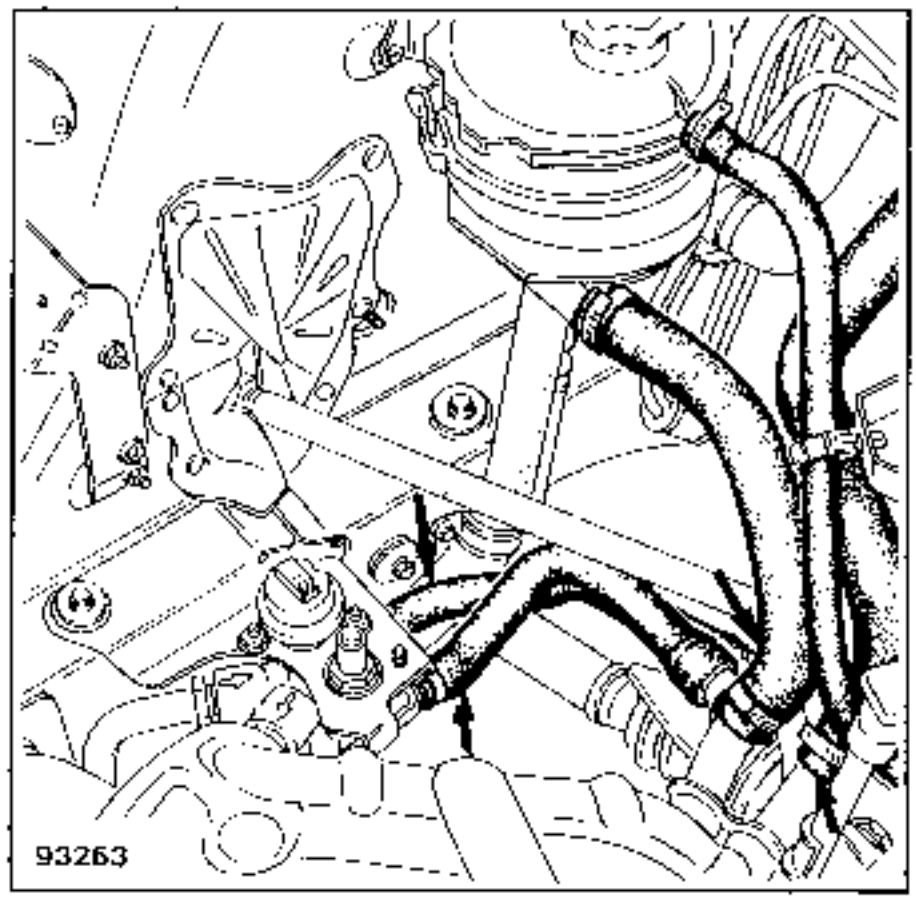
- the battery,
- the electrical connectors,
- the accelerator cable,
- the clutch cable,
- the speedometer drive cable.

Drain:

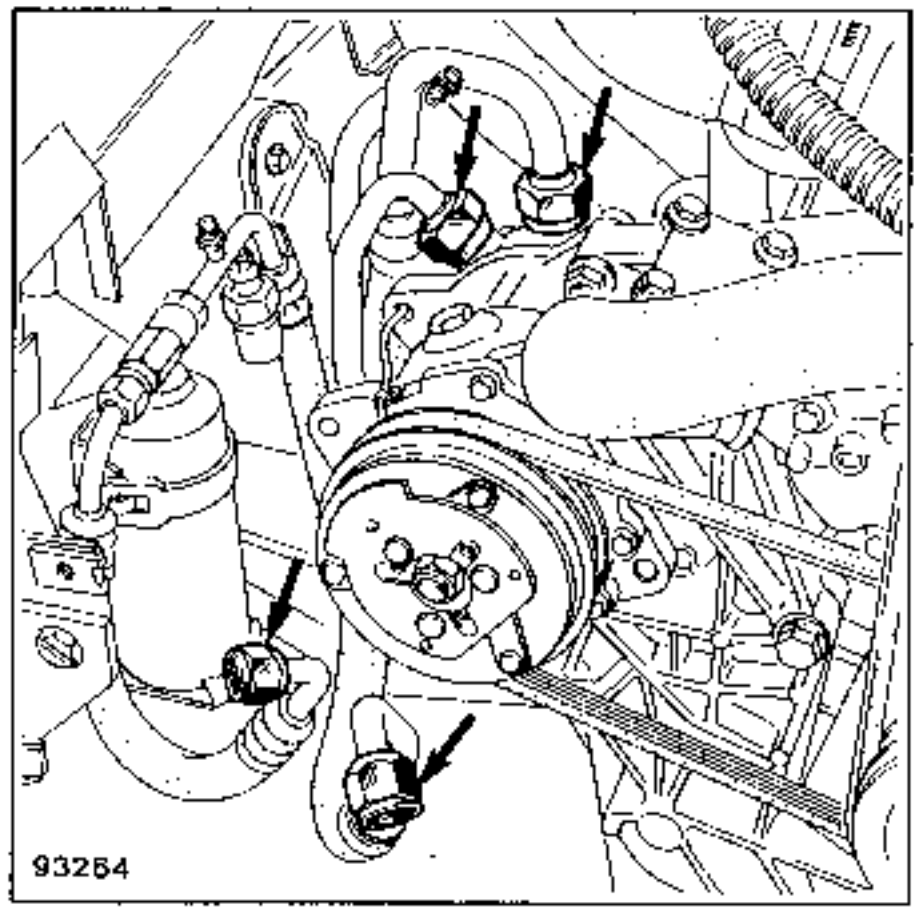
- the cooling system,
- the engine, if necessary,
- the gearbox, if necessary,
- the air conditioning refrigeration circuit.

Disconnect the following pipes and hoses:

- heater hoses at the engine outlets,
- oil filter cooling pipes on the oil cooler,
- fuel pipes,
- vacuum pipes,
- expansion bottle degassing pipes,



- the HP and LP connections on the air conditioning compressor,
- the radiator (this will be left on the vehicle).



Remove:

- the oil filter heater and its support,
- the exhaust manifold clamp,

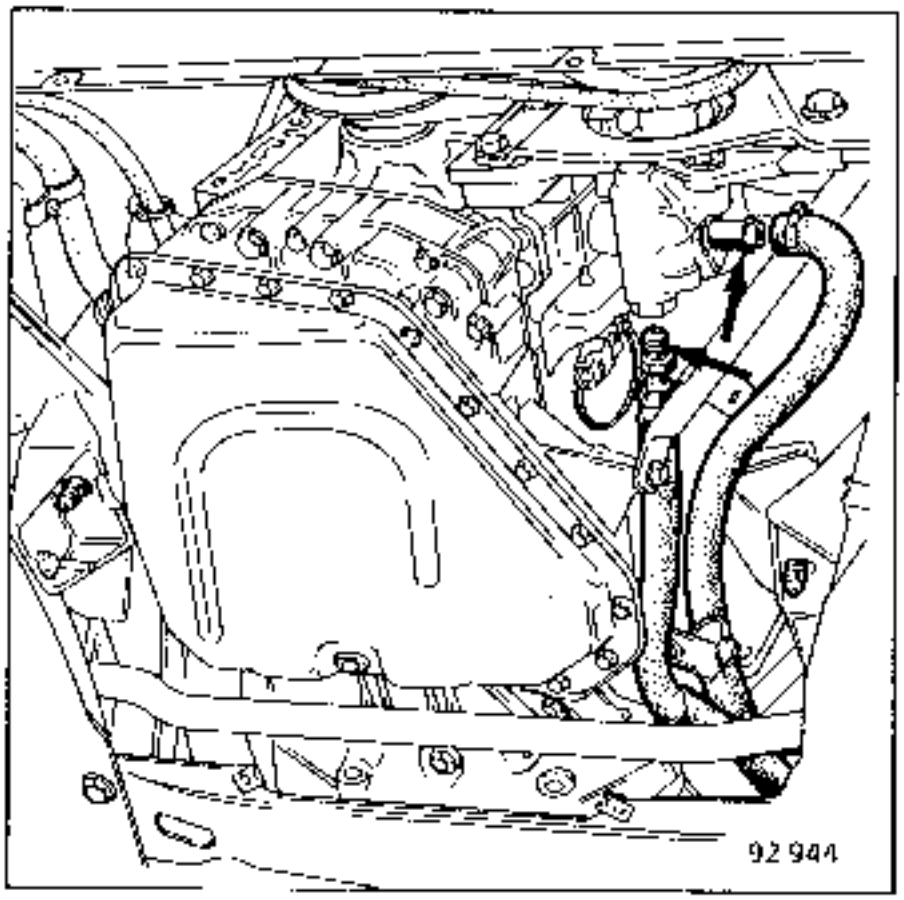
- the air filter and its support,

- the computer, which is to be secured, together with the oil filter heater, to the engine,

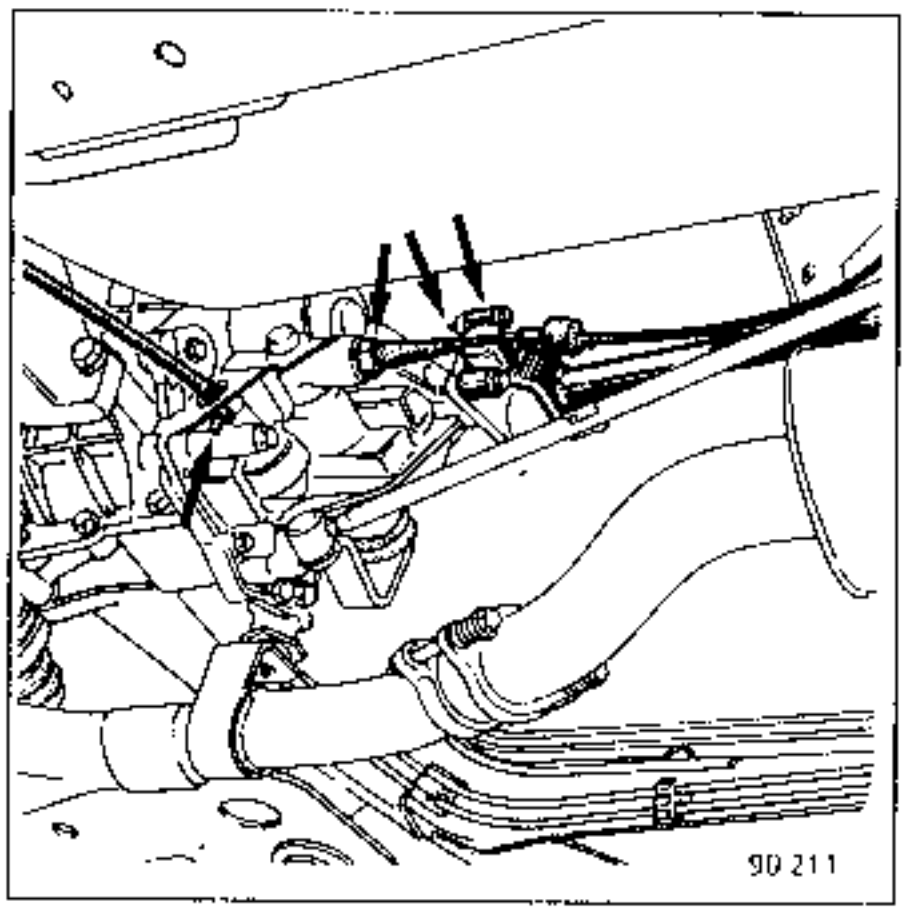
- the exhaust pipe spherical joint,

- the power steering pipe supports,

- the power steering pipes,

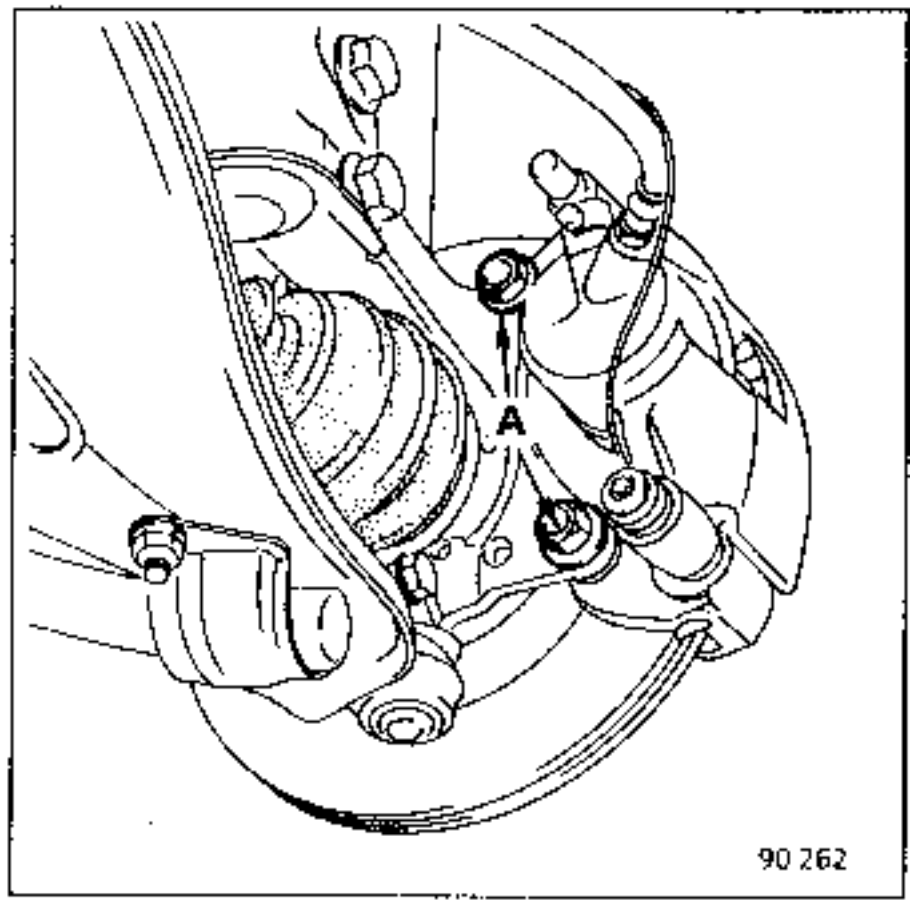


- the gear shift controls,

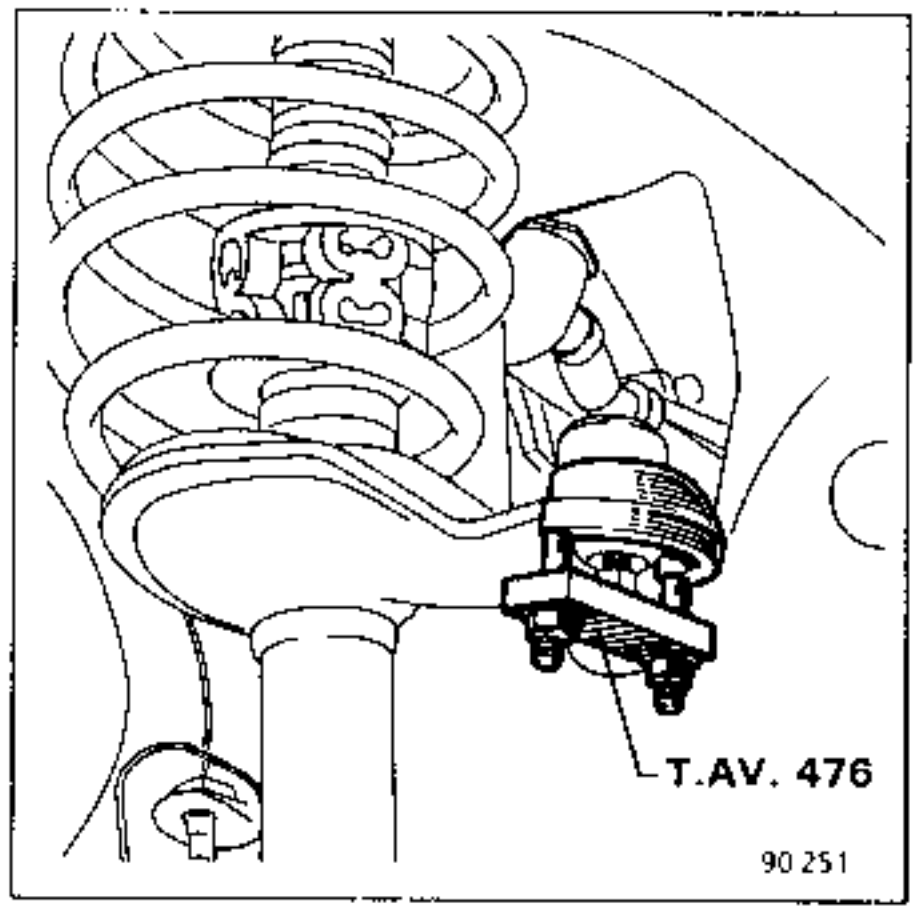


- the wheels,

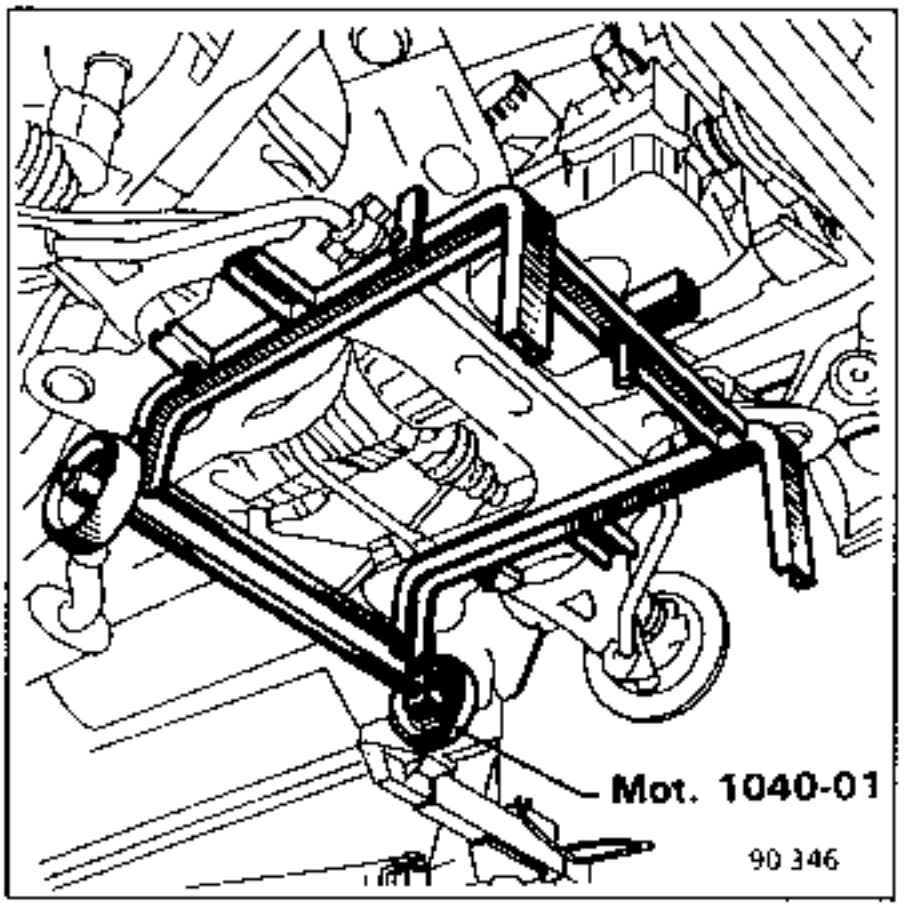
- the brake calipers (bolt A) and secure the calipers to the body.



- the steering ball joints using tool T.Av.476.



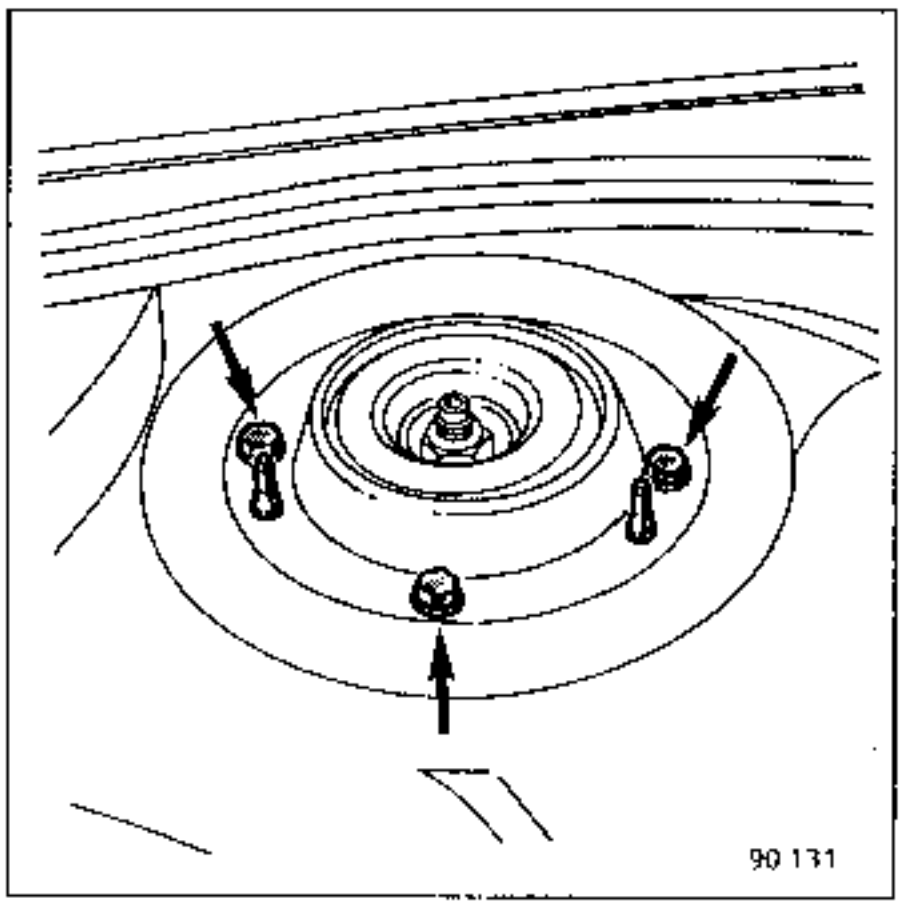
Place dummy sub-frame Mot. 1 040-01 on the engine sub-frame.



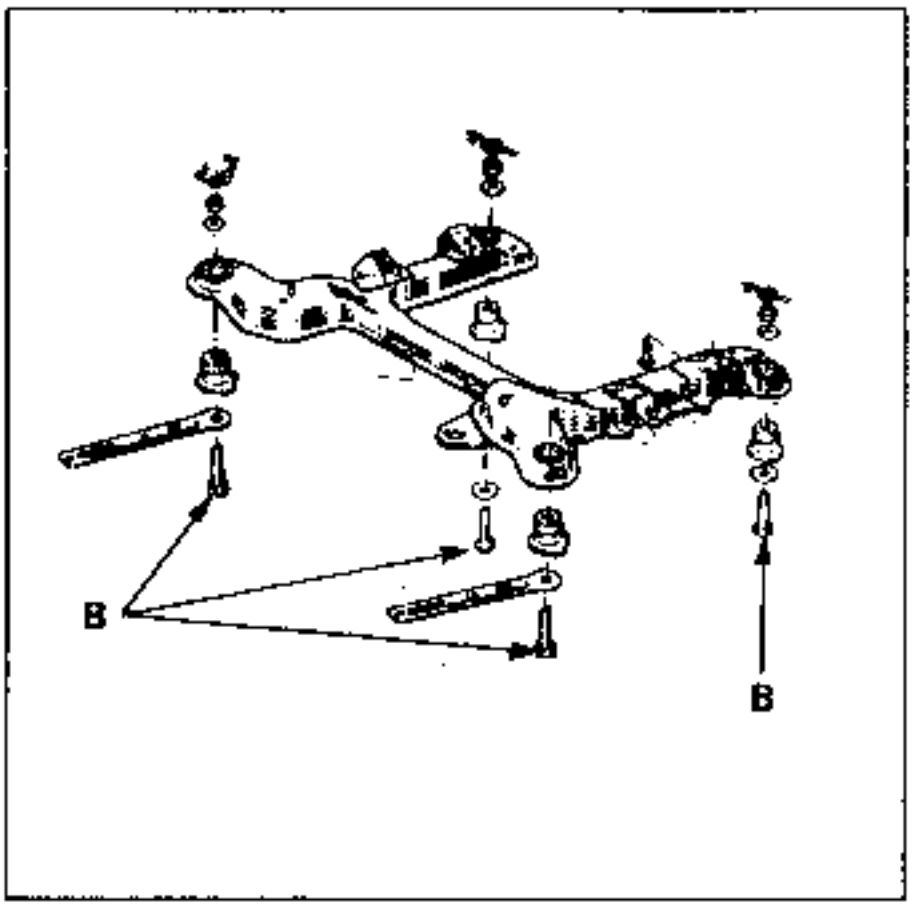
Lower the vehicle, fitted with sub-frame Mot. 1040-01, until it makes contact with the ground.

Remove:

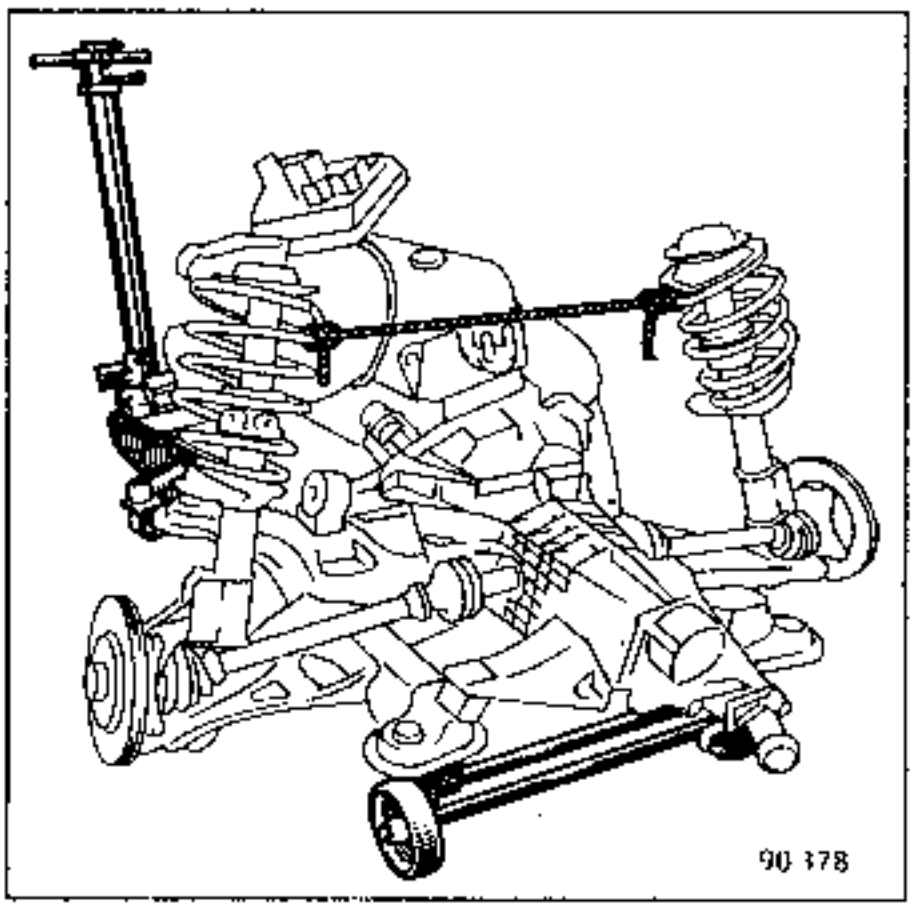
- the shock absorber upper cup securing bolts,



- the engine sub-frame securing bolts (B).



Lift the body and take out the power unit assembly.



Secure the spring-shock absorber assemblies with string.

REFITTING (special points)

Aligning the body with the engine sub-frame can be made easier by fitting screwed rods approximately 100mm long.

Tighten the nuts and bolts to the specified torques.

Fill the engine and gearbox with oil, if necessary.

Fill and bleed the cooling system.

Fill the air conditioning and power steering systems.

Adjust the accelerator cable.

REMOVING - REFITTING

ESSENTIAL SPECIAL TOOLS	
Mot. 1040-01	Dummy sub-frame for removing and refitting the power unit assembly
Mot. 453-01	Hose clamps.

TIGHTENING TORQUES (in daN.m)	
Brake caliper securing bolts	10
Shock absorber upper cup securing bolts	2.5
Wheel bolts	9
Sub-frame securing bolts	8.5
Steering ball joint nuts	4

REMOVING

Remove the bonnet.

Disconnect:

- the battery,

- the electrical connectors,

- the accelerator, clutch and speedometer drive cables,

- the earthing braids (engine and gearbox),

- the fuel pipes.

Remove:

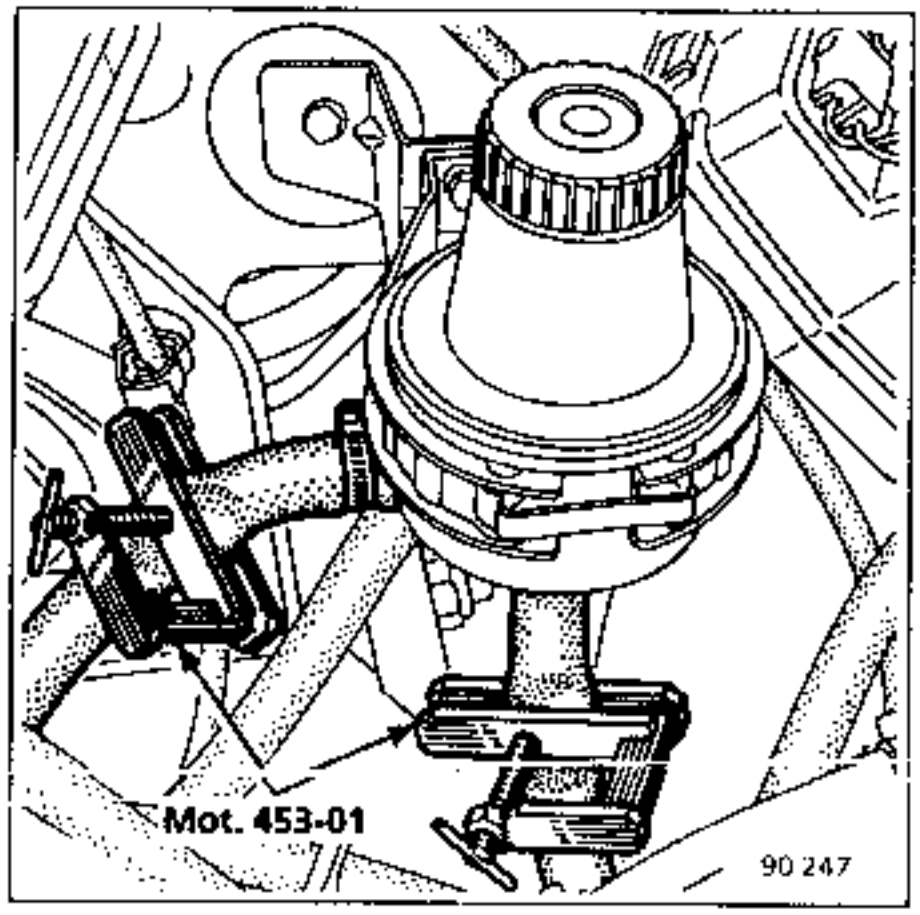
. in the case of turbo charged engines:

  - the air filter and the inter-cooler (protect the compressor apertures),

  - the bolts securing the oil cooler to the side member.

. in the case of vehicles fitted with power steering:

  - place one clamp Mot. 453-01 on each of the pipes leaving the oil reservoir and free the reservoir.

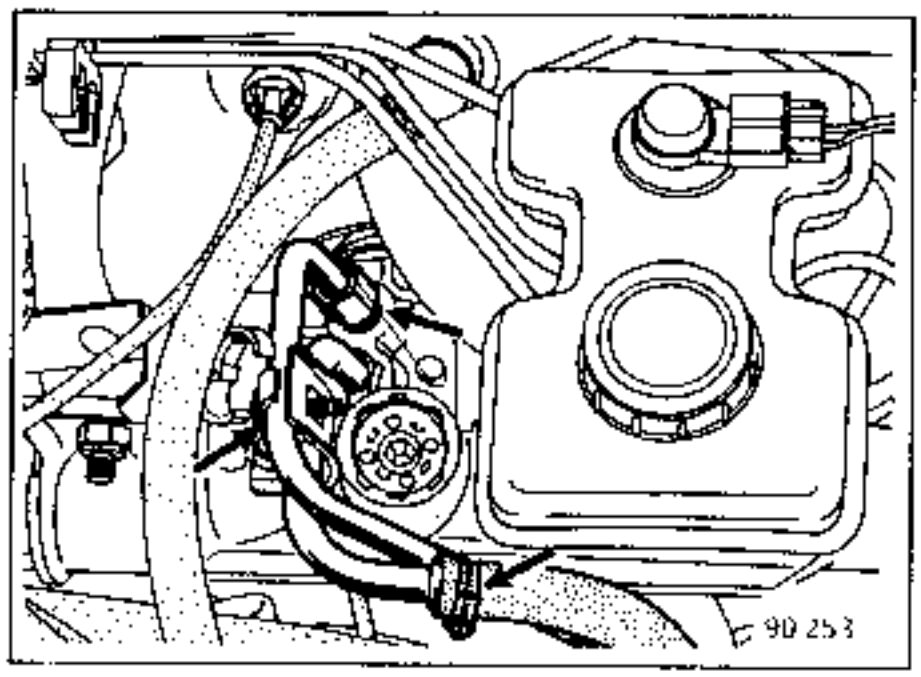


Remove:

- the pipe retaining clamp,

- the high pressure pipe at the union on the valve,

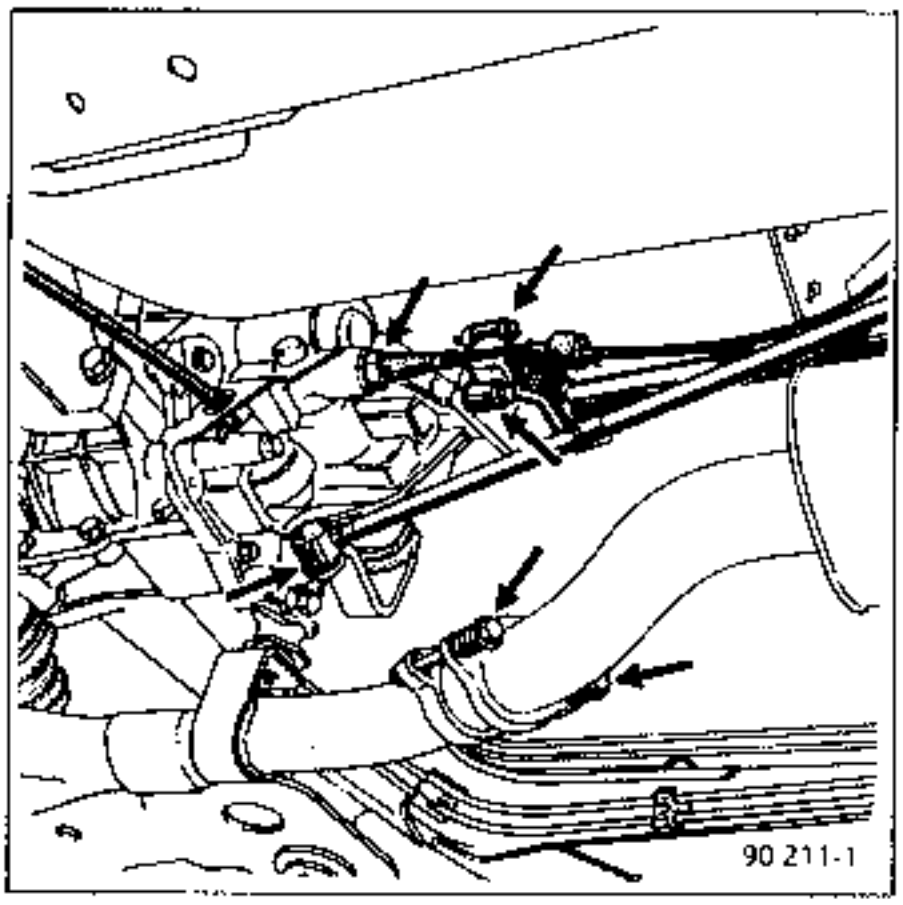
- the low pressure pipe at the union on the pipe.



Drain the cooling system.

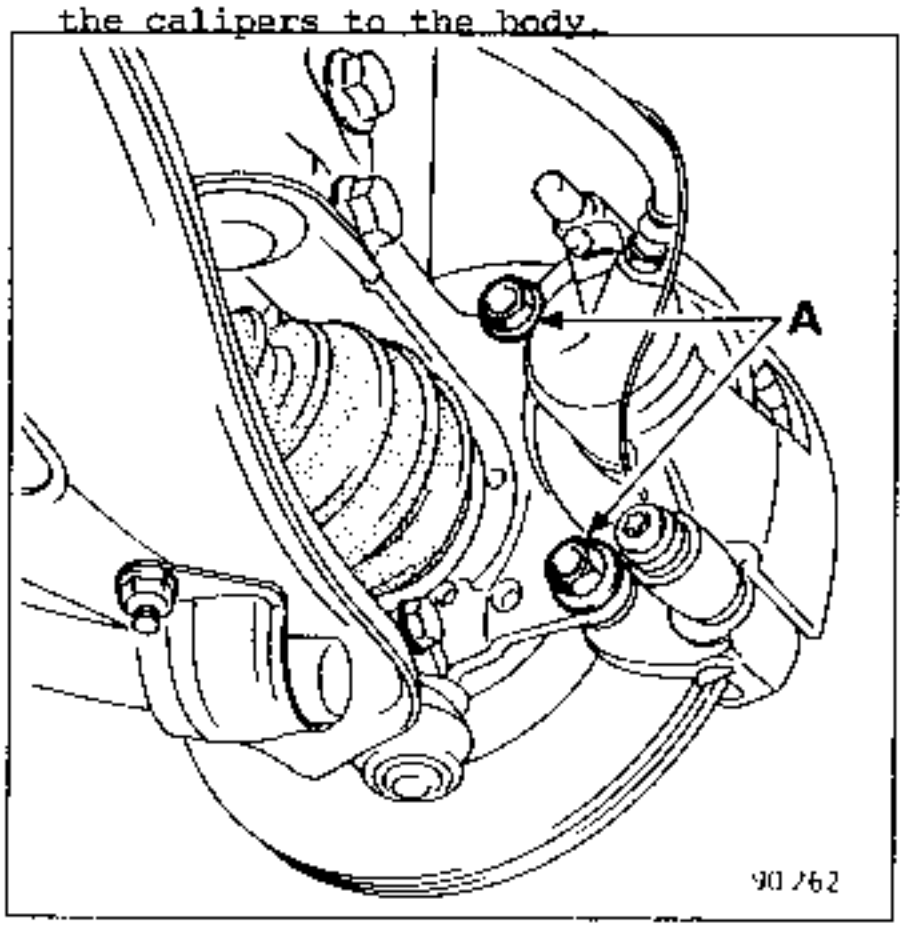
Disconnect:

- the heater hoses,
- the radiator hoses, followed by the radiator after removing the front cross member,
- the engine damper upper securing point,
- the gear shift controls,
- the exhaust pipe clamp.

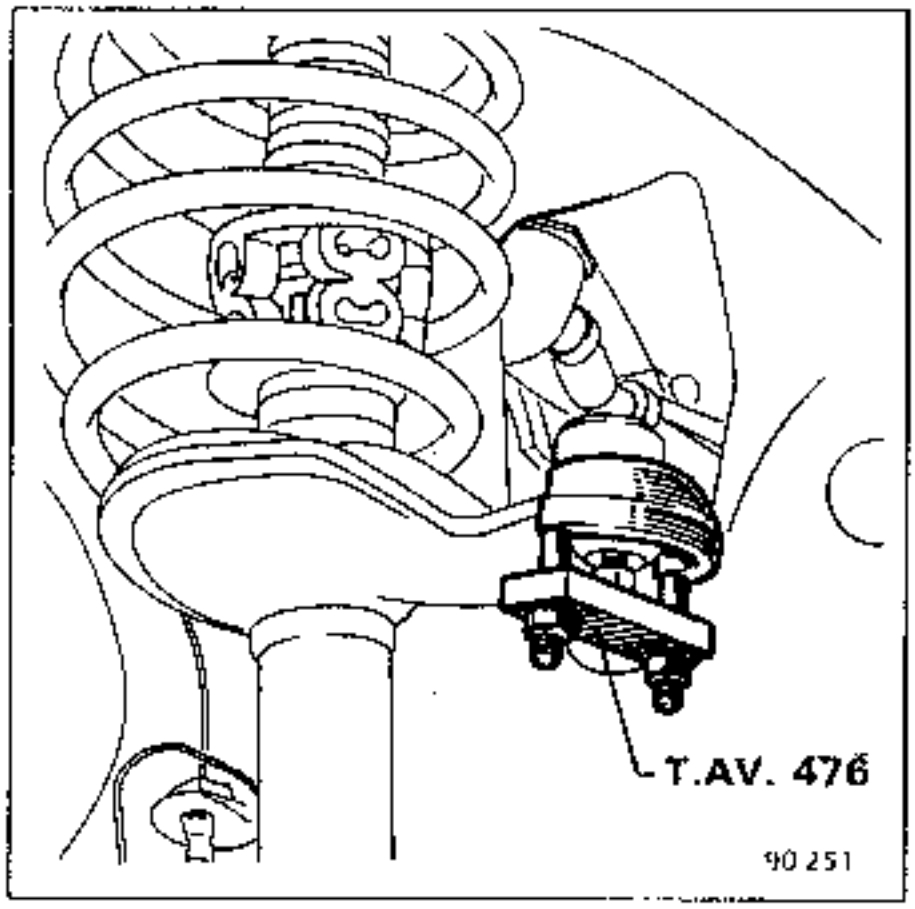


Remove:

- the wheels,
- the brake calipers (bolts A), securing the calipers to the body.



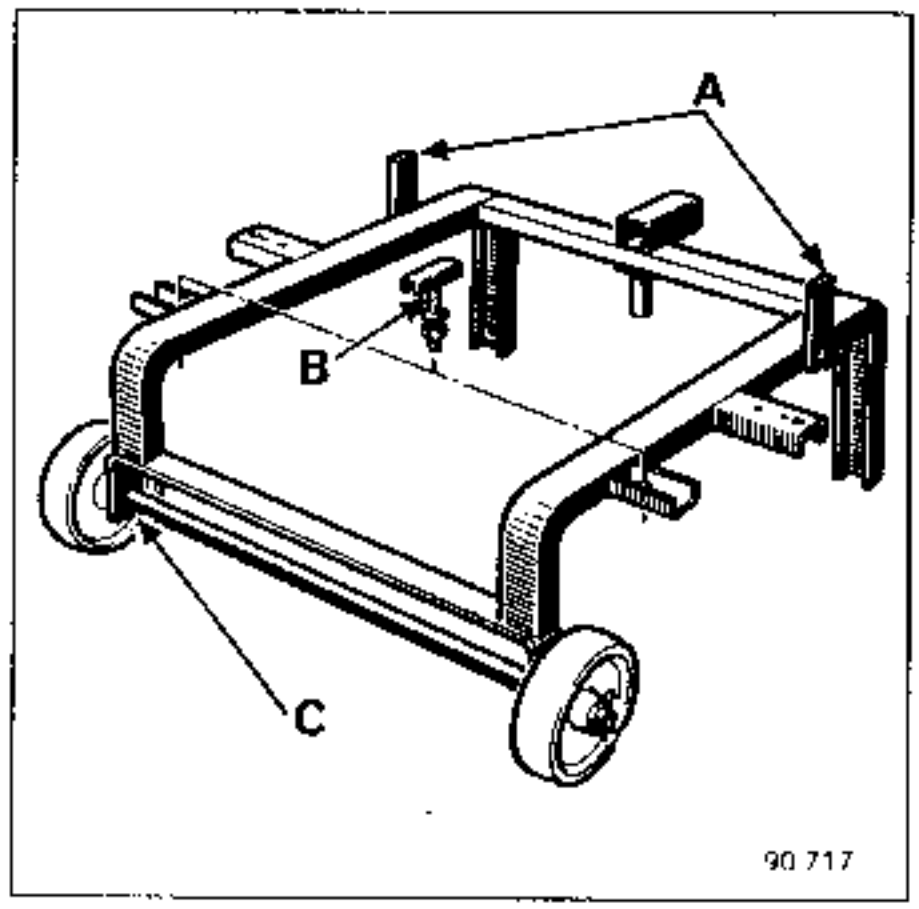
Disconnect the steering ball joints using tool T.Av.476.



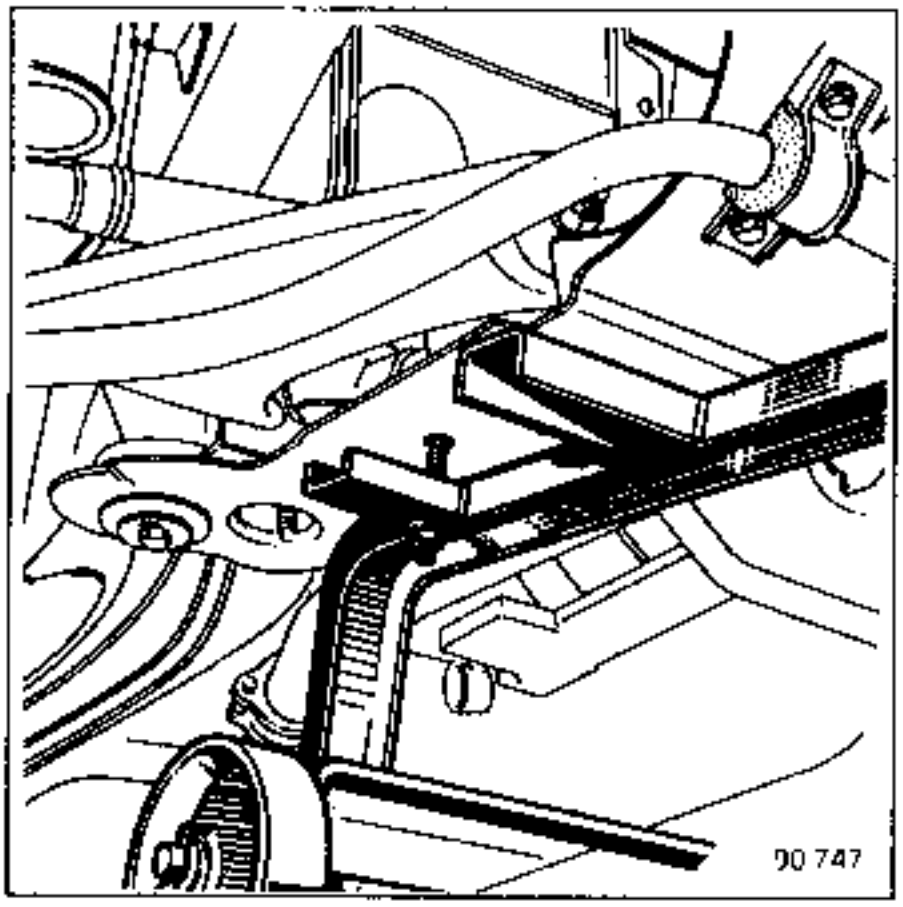
Preparing dummy cradle Mot. 1 040-01:
Place the wheel shaft in the lower holes (C).

Lift up the retaining lugs (A).

The fastenings under the sub-frame consist of hooks (B).

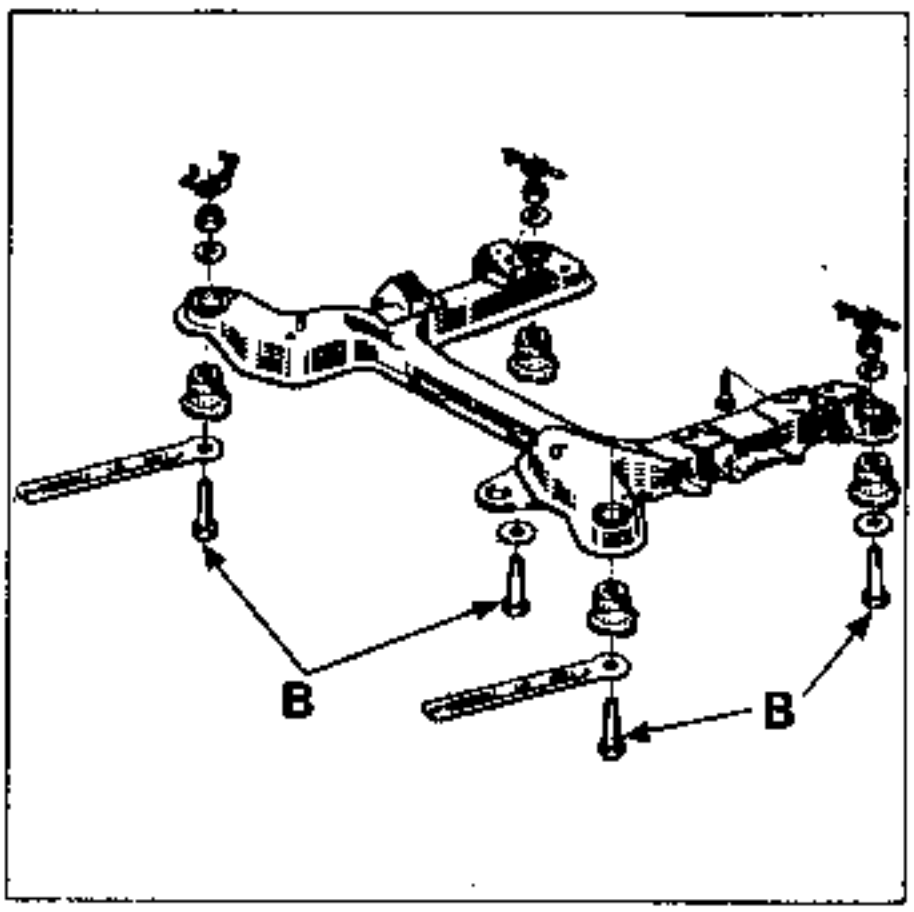


Secure frame Mot. 1 040-01 under the sub-frame.



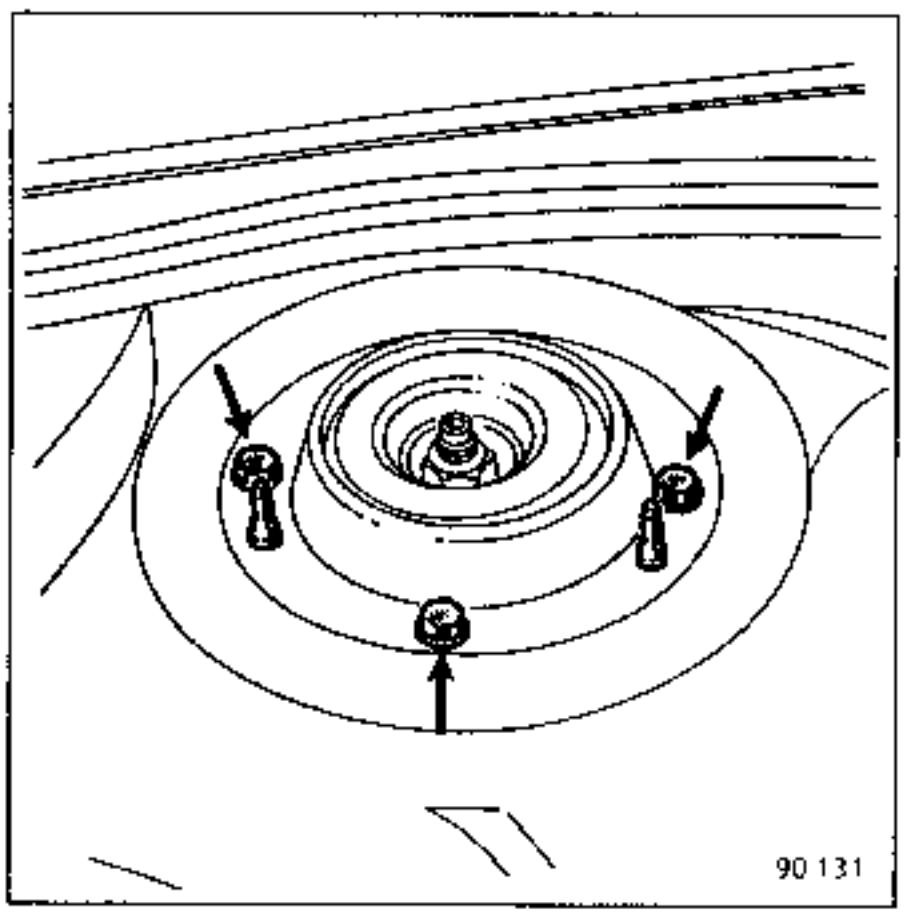
Remove the securing bolts from the shock absorber upper cups,

Remove the engine sub-frame securing bolts (B).

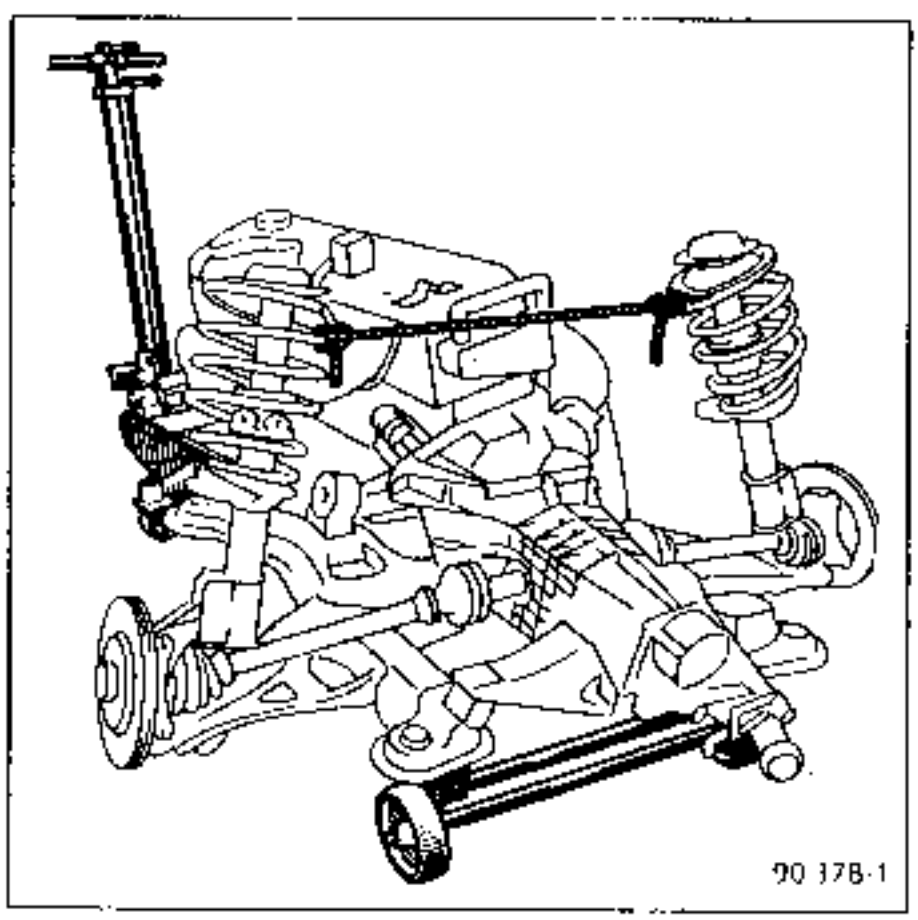


Take out the power unit assembly by lifting the body.

After removing the power unit assembly:



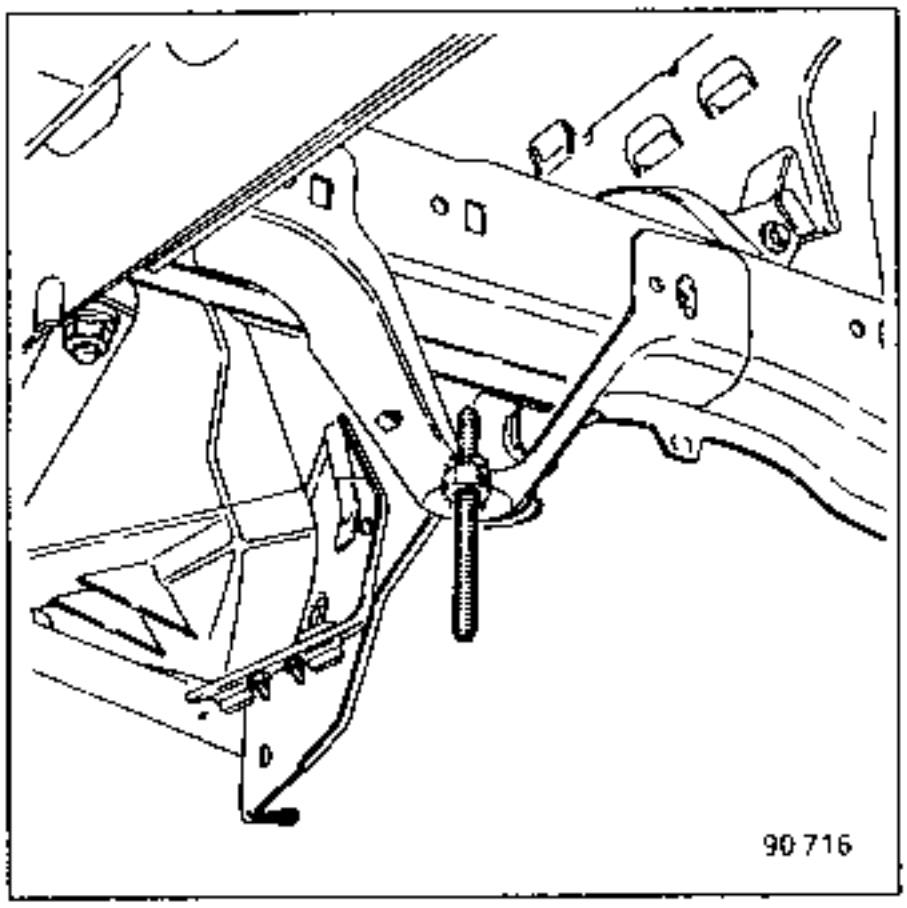
Lower the lift until the dummy sub-frame makes contact with the floor.



Retain the spring-shock absorber assemblies with string.

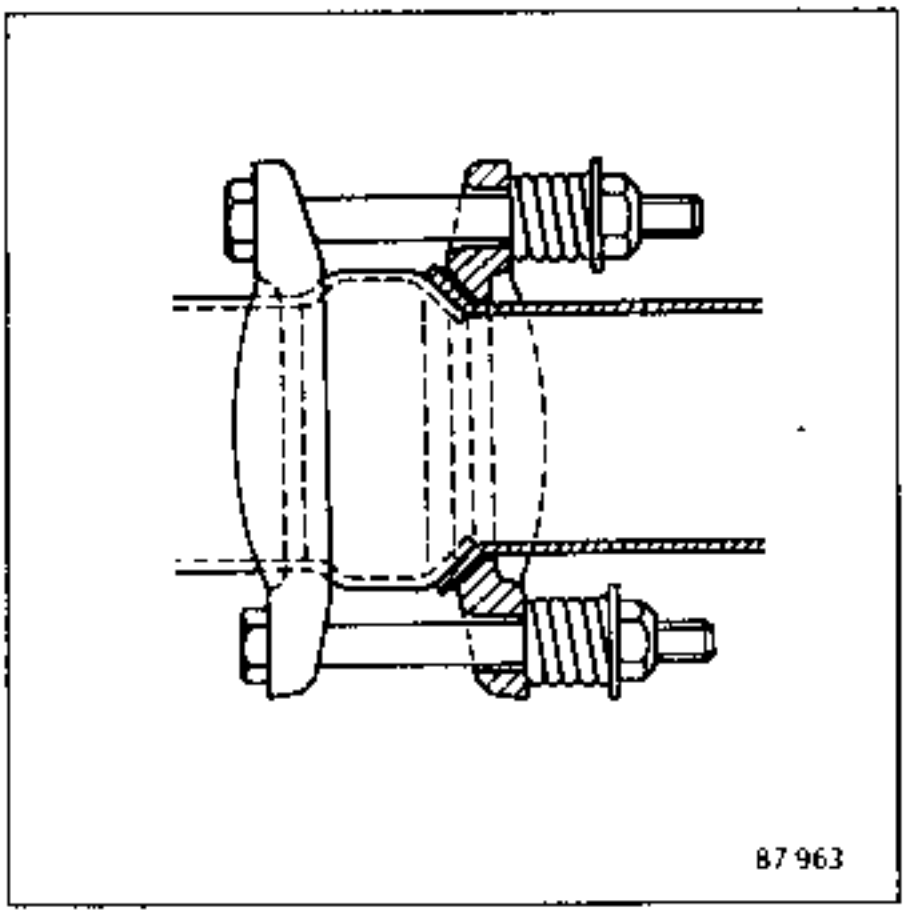
REFITTING (special points)

Aligning the engine sub-frame with the body can be made easier by fitting two screwed rods approximately 100mm long into the two front sub-frame to body securing points.



Tighten the nuts and bolts to the specified torques.

Tighten the exhaust pipe clamp, fitting the springs and the anti-rattle bush.



The joint is sufficiently tight as soon as an effective seal is obtained between the two pipes.

Fill and bleed the cooling system and the power steering system (on vehicles fitted with power steering).

Press down the brake pedal several times to bring the caliper pistons into contact with the pads.

REMOVING - REFITTING

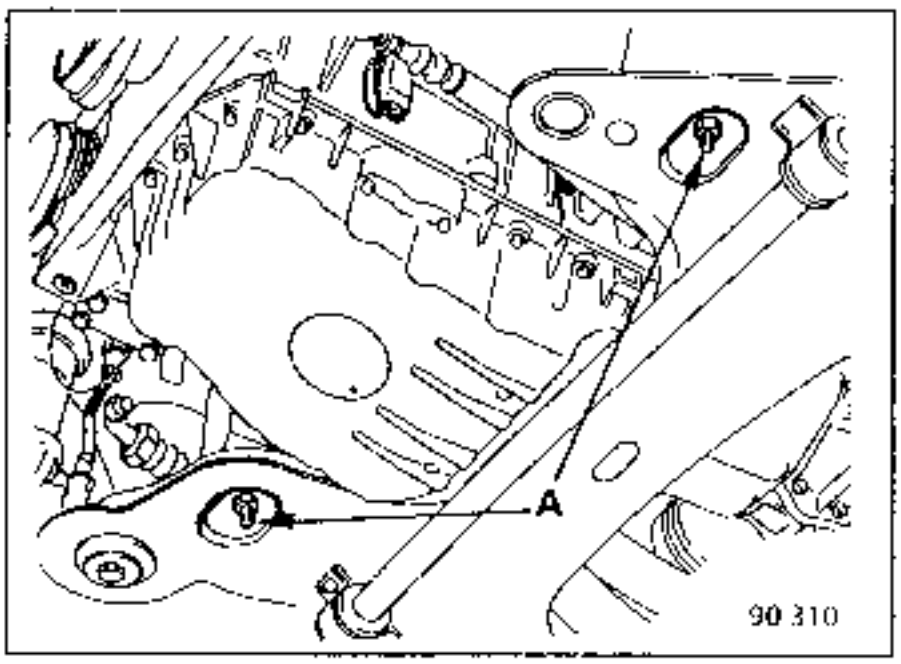
ESSENTIAL SPECIAL TOOLS
Mot. 1063 Hinged key for sump screws

TIGHTENING TORQUES (in daN.m)	
Sump securing screws	1.4 to 1.7

REMOVING

Disconnect the battery.
Drain the engine.

Remove the two nuts (A).



Lift the engine, either by means of an engine lifting cross piece FACOM WM103, or with a workshop crane secured to the front lifting lug.

Remove the screws from the sump. They are of the Torx type, and special tool Mot. 1063 is necessary to remove them.

Special features of diesel engines.

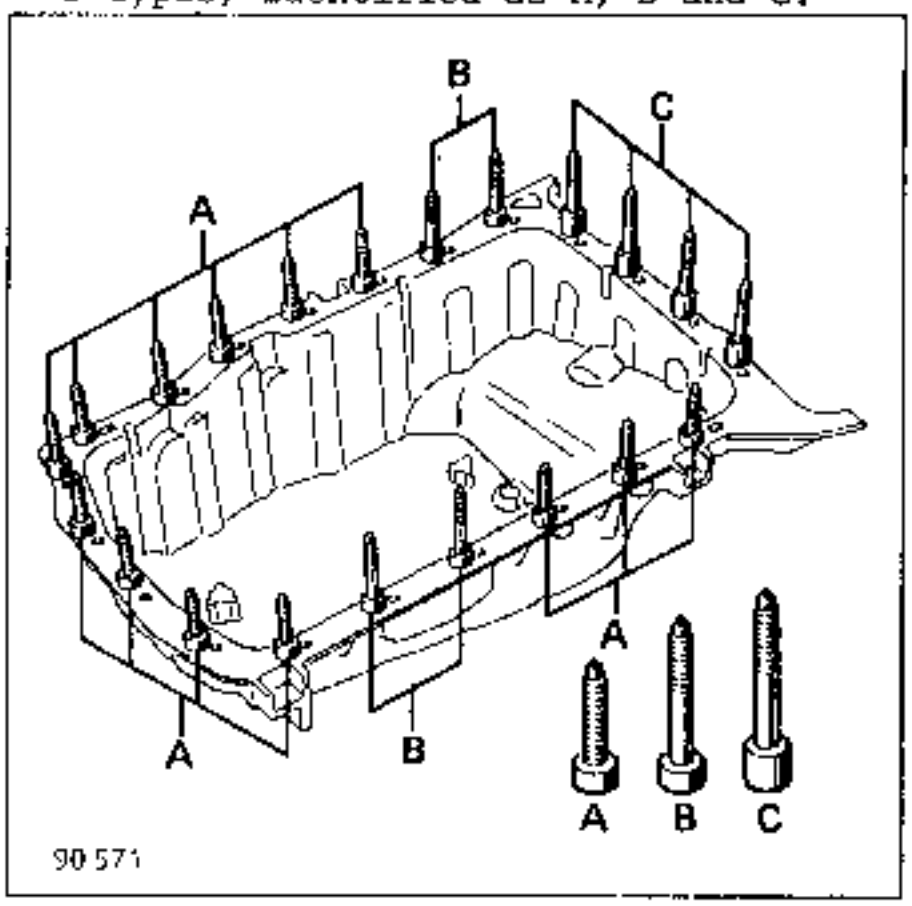
Move the engine lifting ring to the front of the engine. Do not forget to return the lifting ring to its original position after the operation has been carried out.

REFITTING

Replace the gasket, which is to be fitted dry.

Sump screw identification:

- 3 types, identified as A, B and C.



Do not refit the engine to the vehicle before tightening the sump screws.

Tighten the three bolts between the clutch housing and the sump before tightening the sump screws.

Fill the engine with oil.

REMOVING - REFITTING

ESSENTIAL SPECIAL TOOLS	
Mot. 1063	Hinged key for sump screws

TIGHTENING TORQUES (in daN.m)	
Sump securing screws	1.4 to 1.7

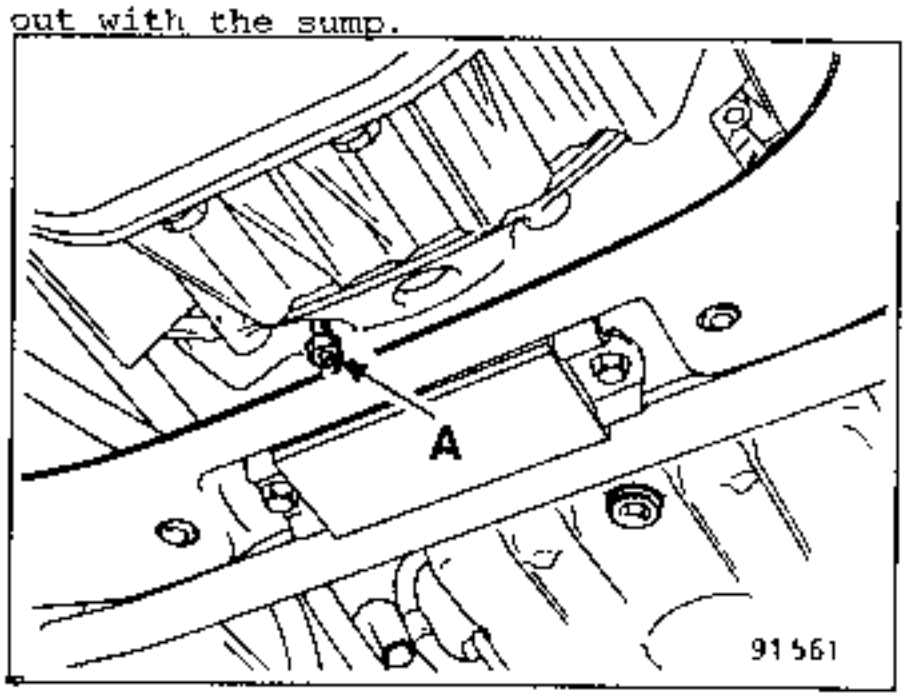
REMOVING

Disconnect the battery.

Drain the engine.

Remove the dipstick and position the crankshaft so that the pistons are half way up the bores.

Remove the sump securing screws; only screw (A) is left in place. It comes out with the sump.

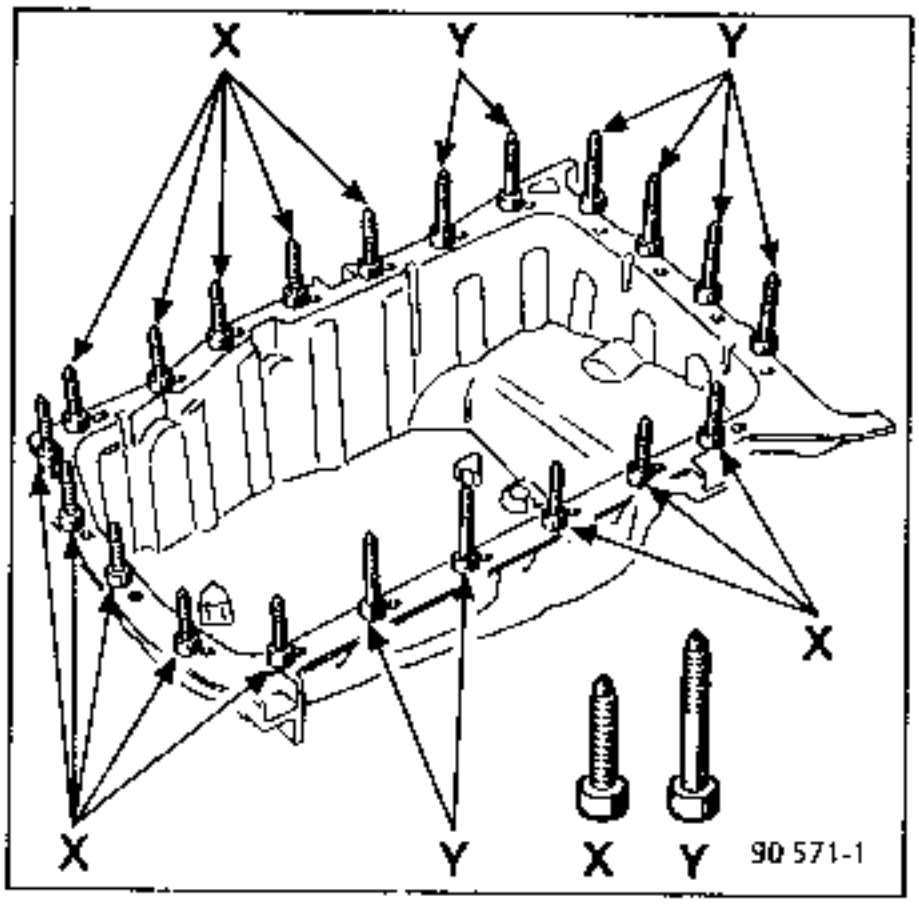


REFITTING

Replace the gasket, which is to be fitted dry.

When fitting the sump, do not forget to refit the screw (A).

Sump securing screw identification: there are 2 sorts of screw, identified as X and Y.



The screws are of the Torx type and tool Mot. 1 063 must be used.

Tighten the three bolts between the clutch housing and the sump first, and then tighten the sump screws.

Fill the engine with oil.

J7R Turbo, J7R 125
engines: J7T
This operation can be carried out with the engine still on the vehicle.

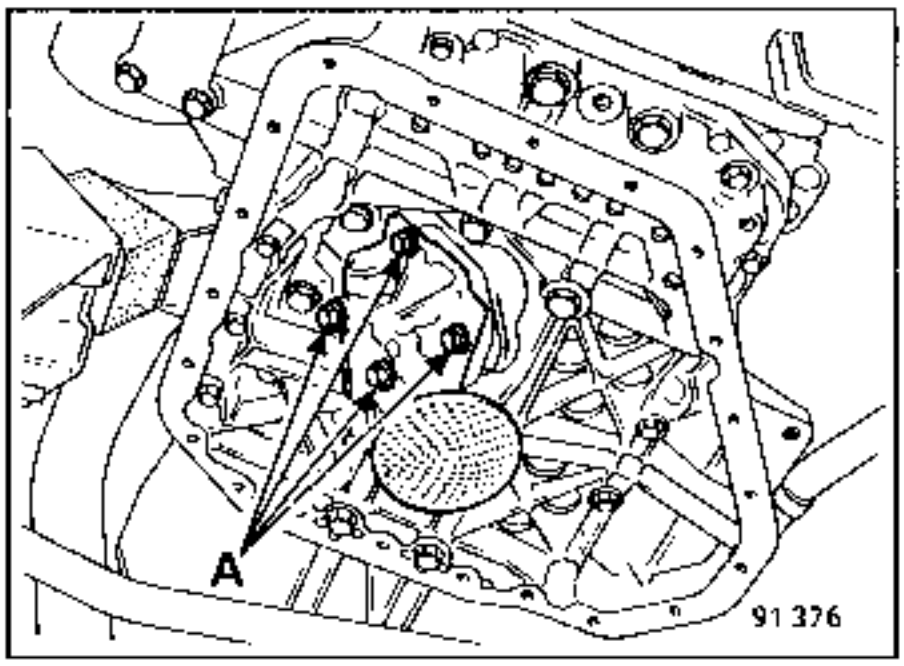
REMOVING

- Drain the engine.

Remove:

- the pressed steel sump,

- the oil pump strainer, screws A, and take out the pump gears,



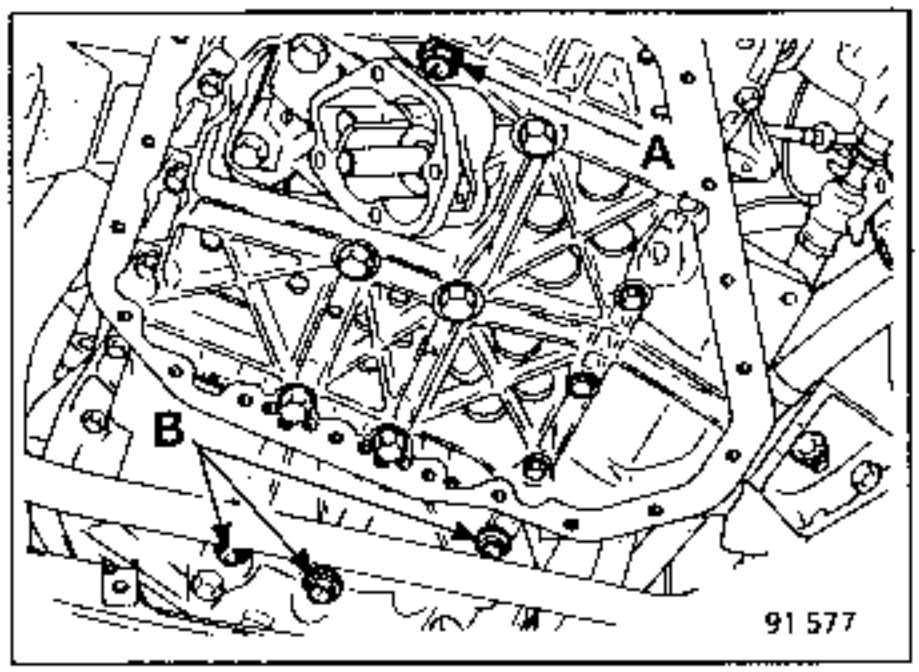
- the 2 bolts from the oil pump body,

- the oil pump body,

- the oil level sensor (if necessary),

- the base securing screws (see screw identification marks and tightening torques),

- the 3 bolts B are removed at the same time as the base.



REFITTING

Thoroughly clean the housing and base:

- stick the gasket to the base with a few dabs of CAF 4/60 THIXO,

- place the oil pump drive shaft in position with the circlip towards the pump,

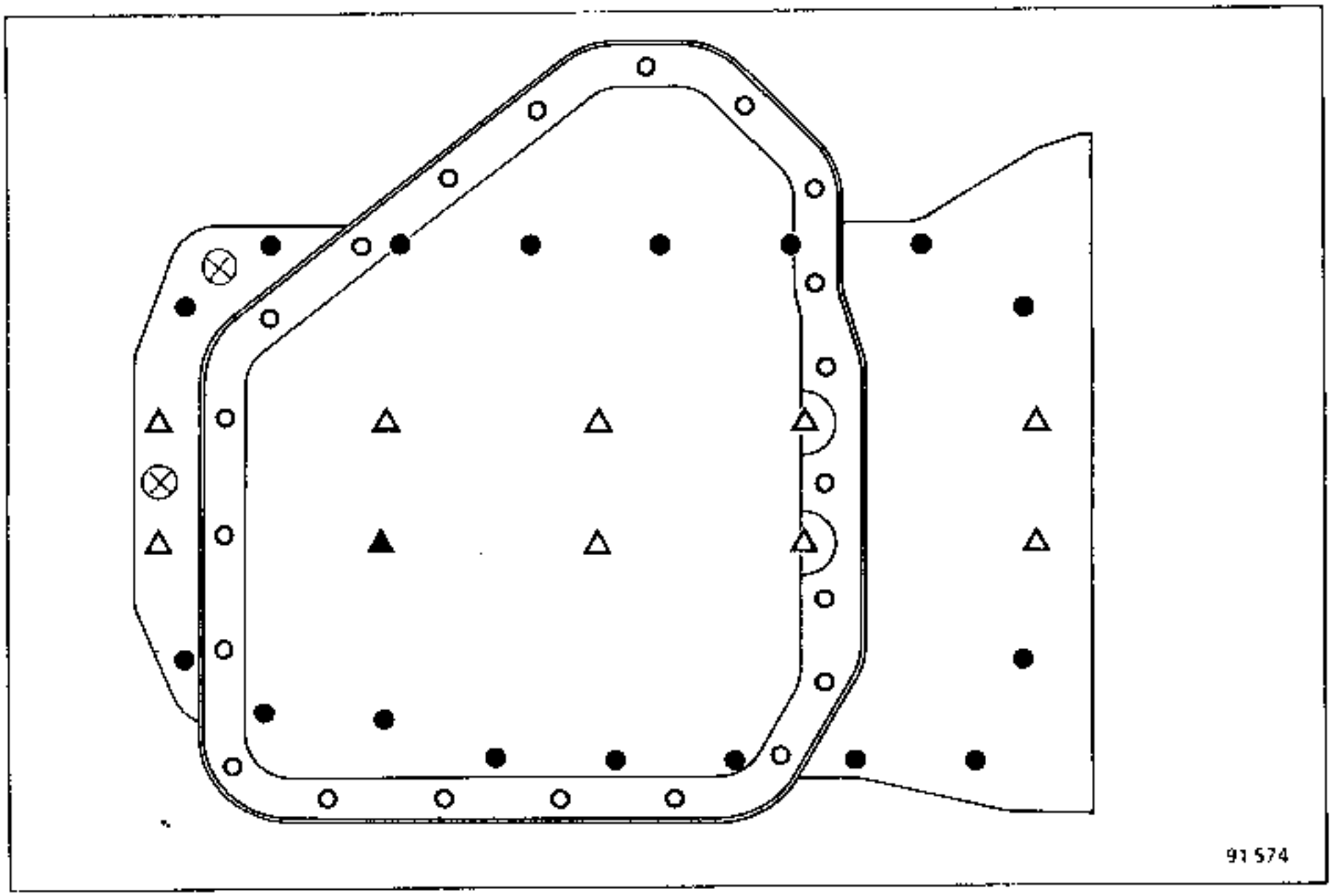
- tighten the base securing screws (see the chart showing the identification marks and torques on the following page),

- fit and tighten the oil pump body in place (4 to 4.5 daN.m) (ensure that the drive shaft is correctly positioned),

- fit the gears and the pump body cover and tighten it to torque,

- fit the pressed steel sump and tighten the screws to the specified torque.

Identification of the screws securing the base to the cylinder and the sump to the base.



There are 4 types of screw, identified as follows:

● : 17 screws (M7 x 100-50), tightening torque: 1.2 to 1.8 daN.m.

o : 21 screws (M6 x 100-16), tightening torque: 0.7 to 1.1 daN.m.

▲: 1 screw (M10 x 150-40), tightening torque: 3.2 to 4.8 daN.m.

△: 9 screws (M10 x 150-75), tightening torque: 3.2 to 4.8 daN.m.

⊗: screws not used

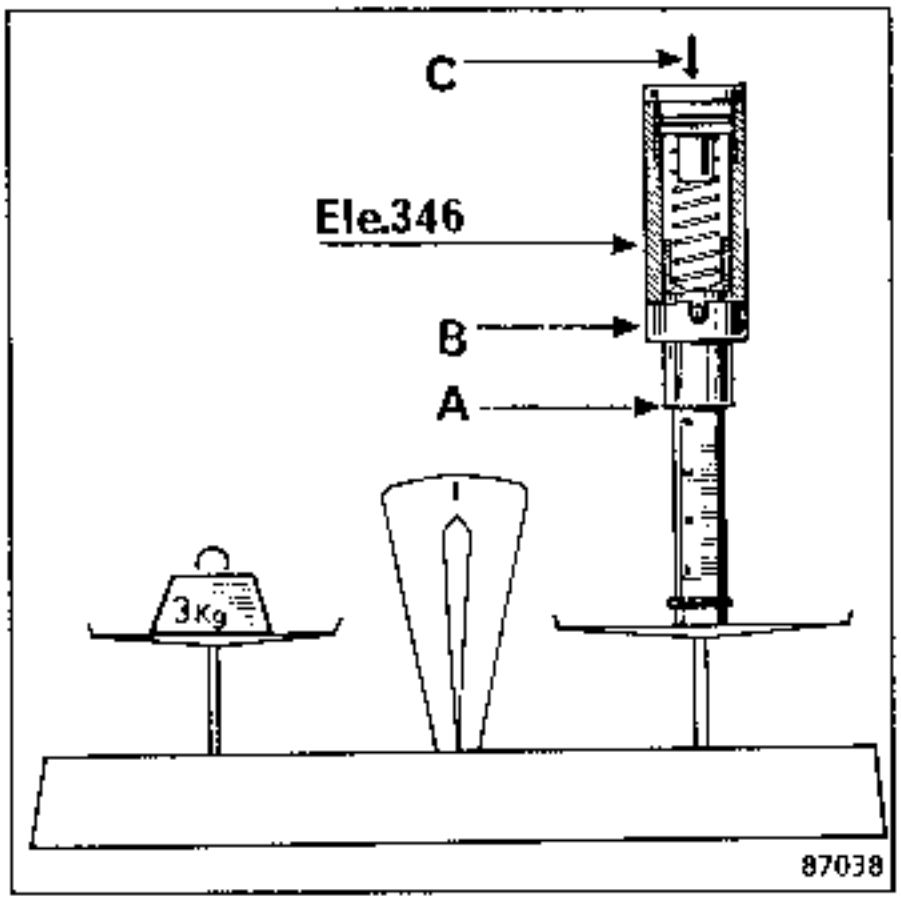
ESSENTIAL SPECIAL TOOLS	
Ele. 346	Belt tension tester
B.Vi. 906	Force measurer

ZEROING TOOL Ele. 346.

There are two methods

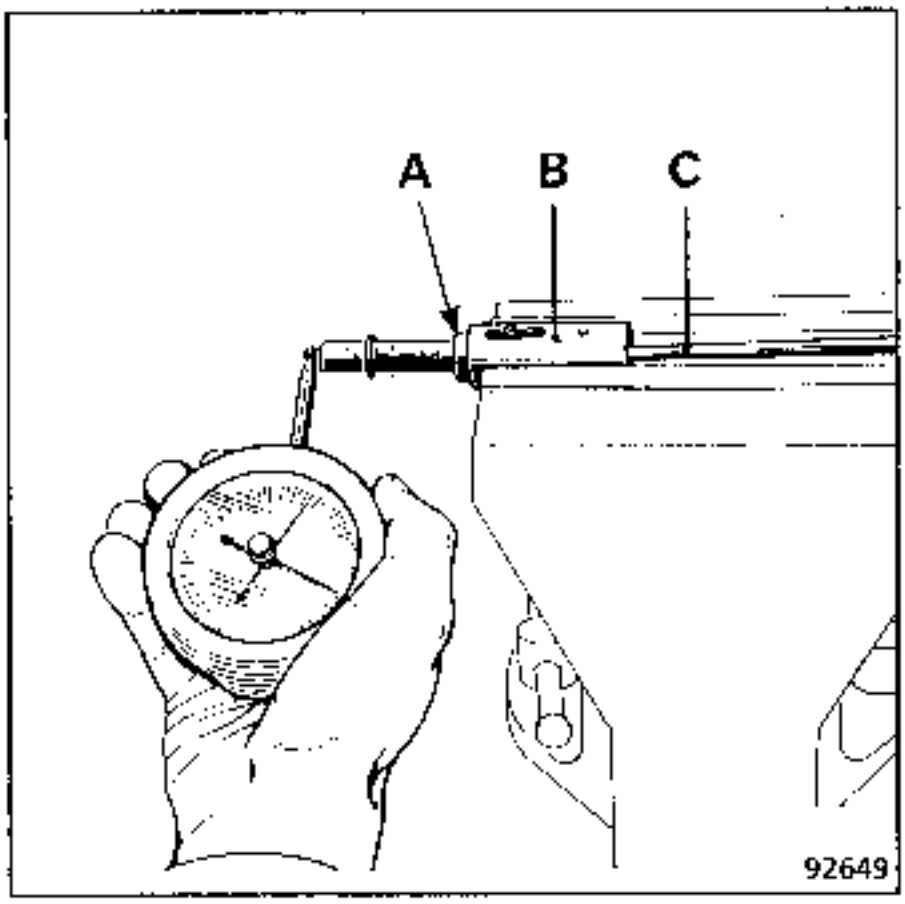
It is essential to check that tool Ele. 346 is correctly zeroed before the first time it is used (new tool) and periodically after this.

1st Method:



Apply a force of 3 daN (weight of 3 kg) to the tool. The shoulder (A) should be flush with the plunger body (B). If it is not, turn the screw (C) to increase or reduce the spring pressure.

2nd Method:

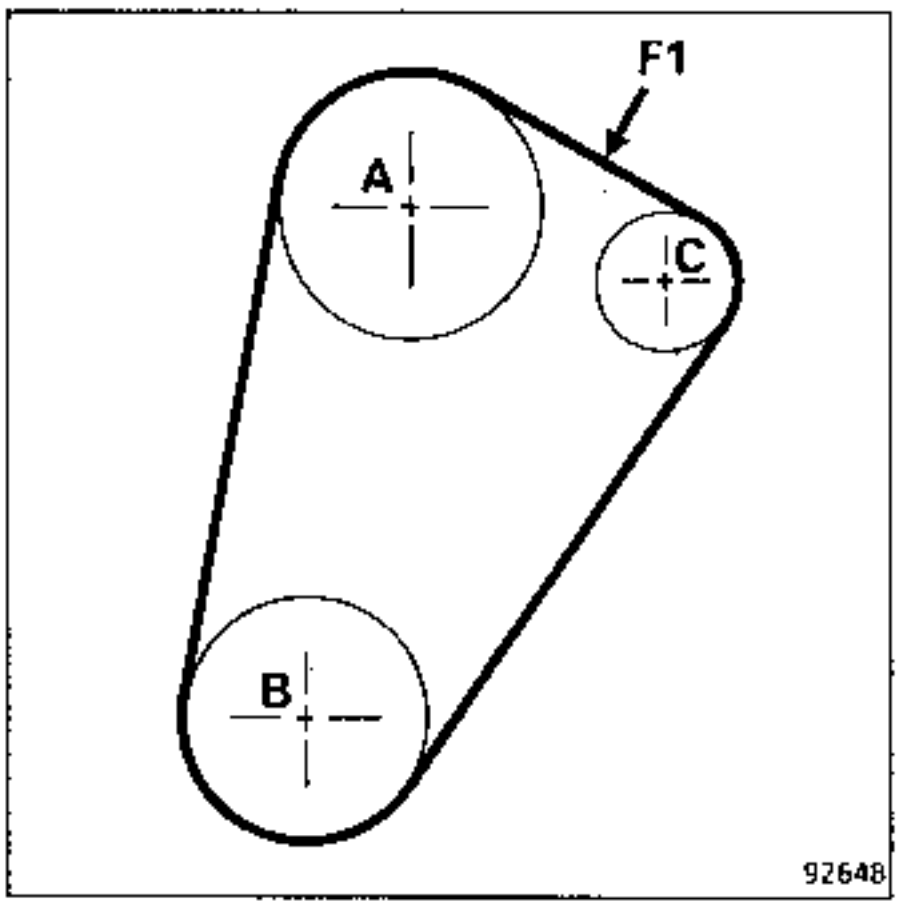


Grip tool Ele. 346 in a vice after first removing its plug. Apply the cylindrical part of tool B.Vi.906 to the end of the sliding part. The shoulder (A) should be flush with the plunger body (B) when the pointer shows 3 daN. If it is not, adjust screw (C) to increase or reduce the spring pressure.

Checking the Belt Tension

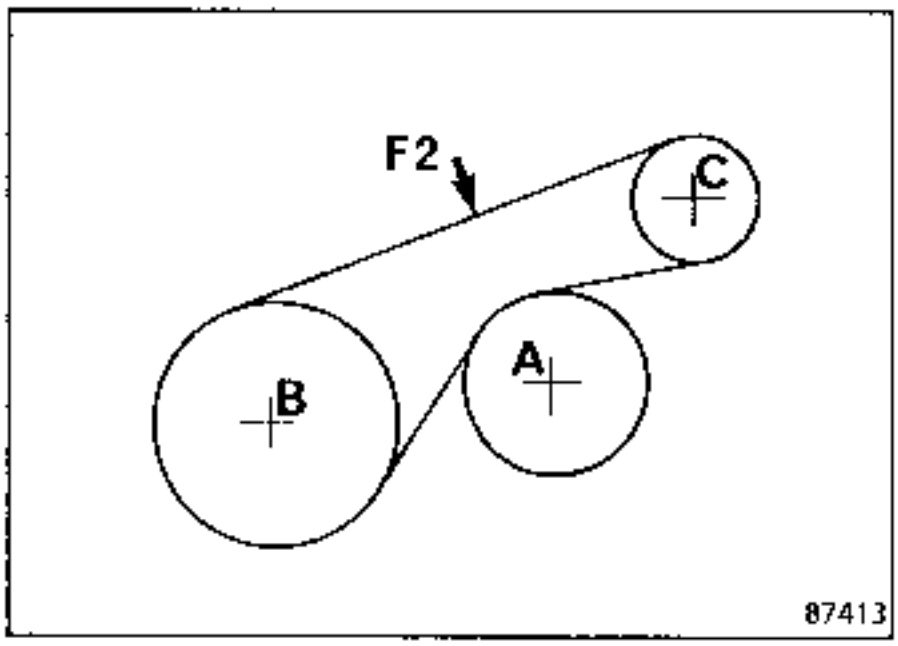
Fit the belt and apply the "cold" tension. Run the engine until the electric fan cuts in and readjust the tension if it is less than that specified for a "warm" belt.

ENGINE TYPE C



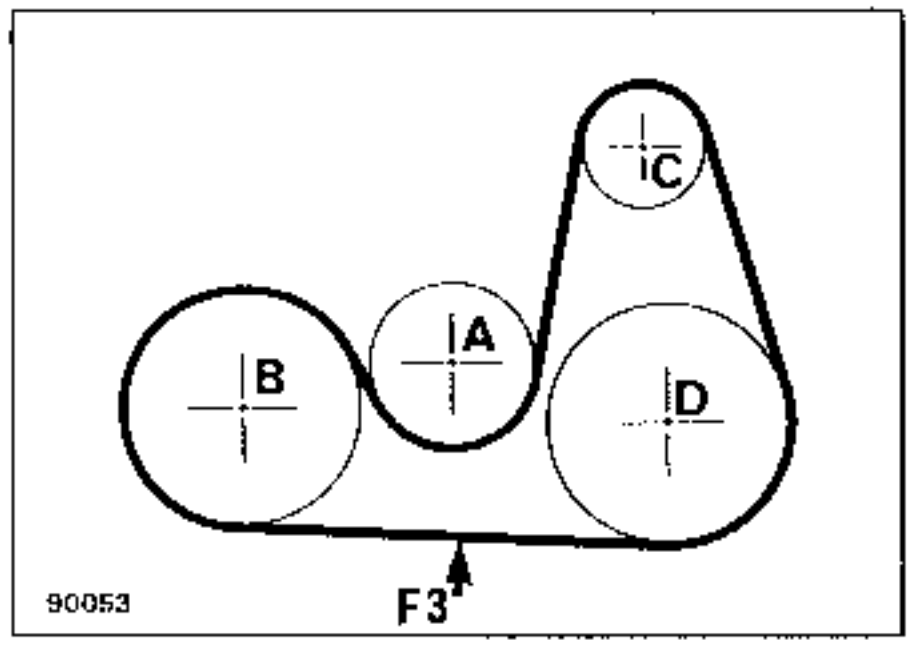
Alternator drive belt: F1 = 4mm.

ENGINE TYPE F



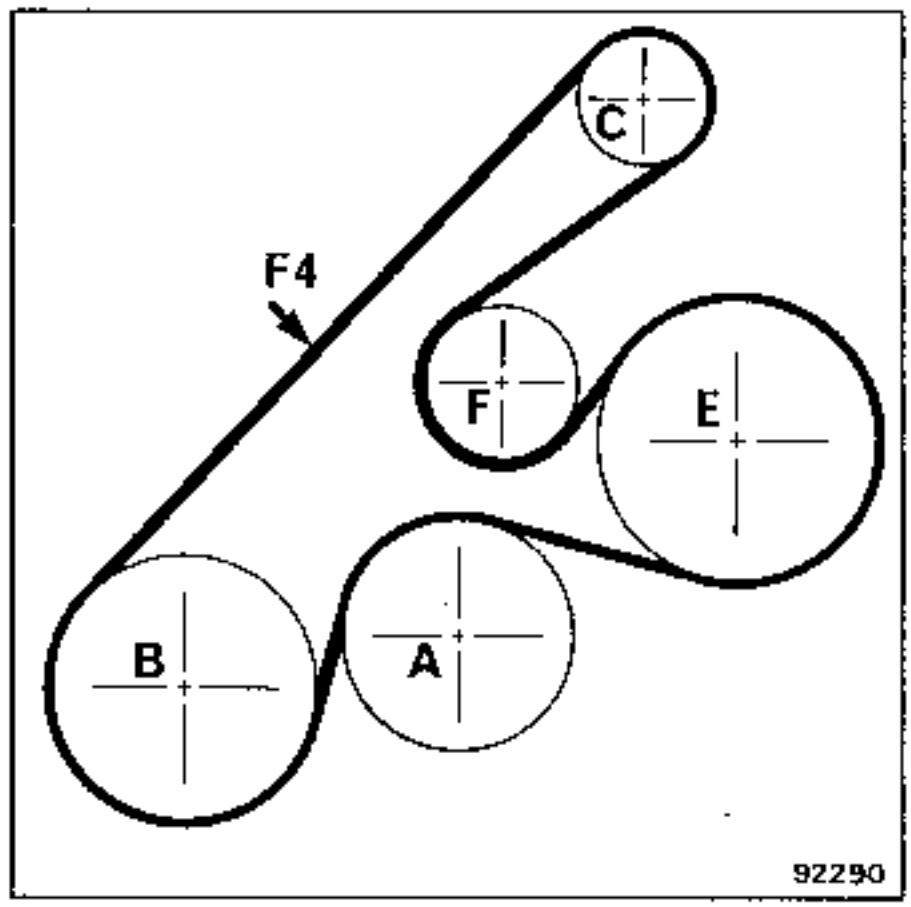
Coolant pump-alternator belt

Deflection "cold" (F2) = 3mm
Deflection "warm" (F2) = 4mm



Coolant pump-Power steering- alternator belt

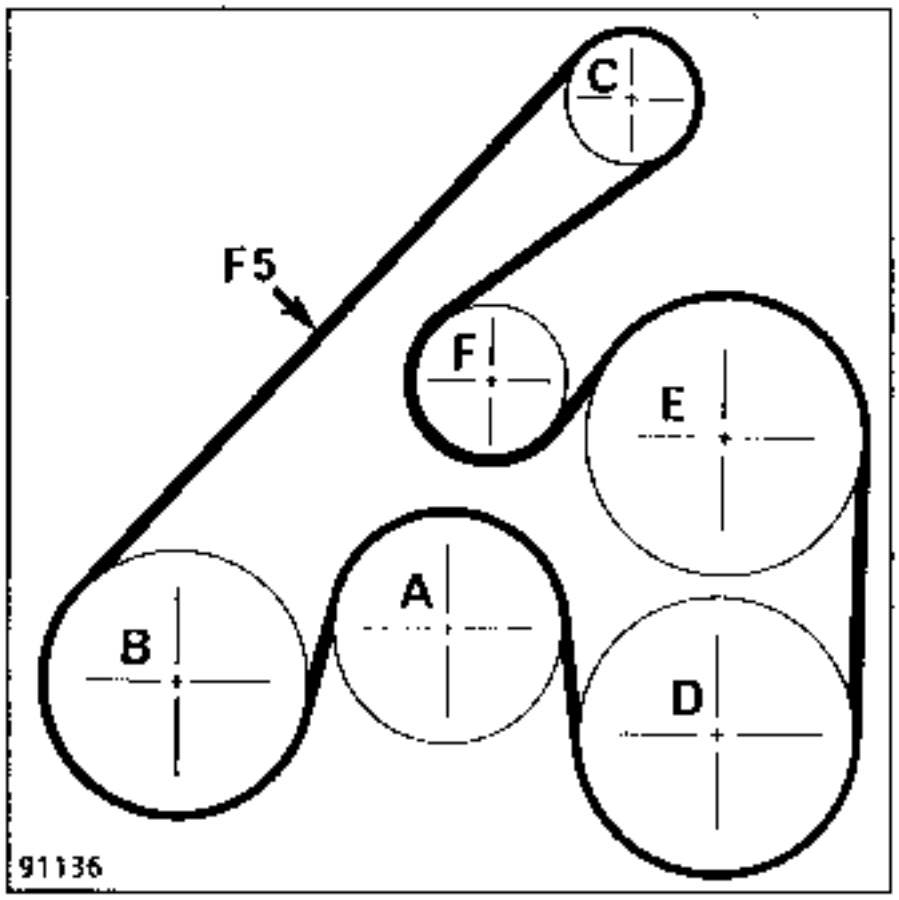
Deflection "cold" (F3) = 2.5 to 3mm
Deflection "warm" (F3) = 3 to 3.5 mm



Coolant pump-compressor-alternator belt

Deflection "cold" (F4) = 4 to 5mm

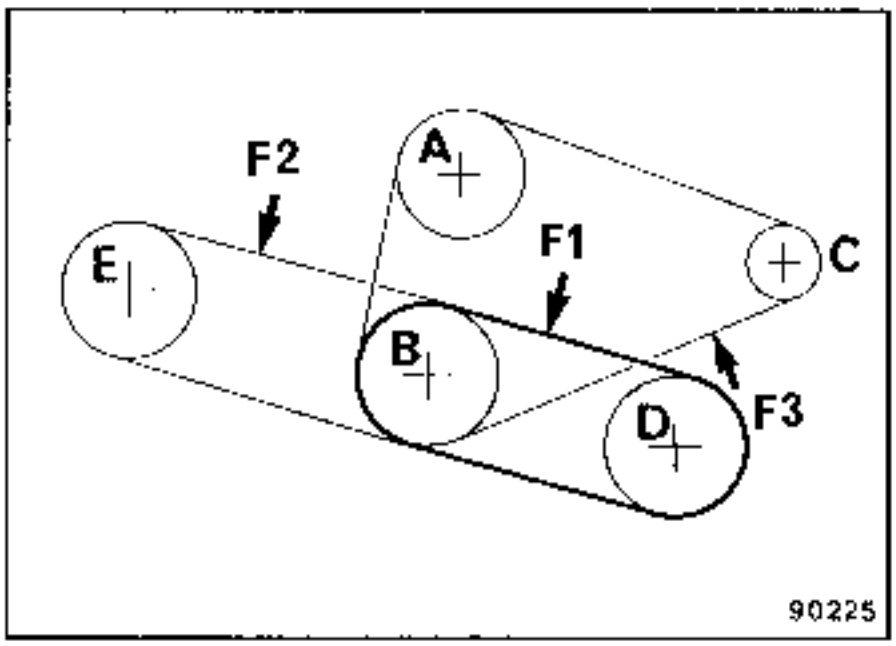
ENGINE TYPE F



Coolant pump-power steering
Compressor-alternator belt

Deflection "cold" (F5) = 4 to 5mm
Deflection "warm" (F5) = 6 to 6.5mm

ENGINE TYPE J



Deflection "cold":
F1 = 3 to 3.5mm
F2 = 4mm
F3 = 4.5 to 5mm

Deflection "warm":
F1 = 4 to 5mm
F2 = 4.5 to 5.5mm
F3 = 6 to 6.5mm

Pulley identification:
A Coolant pump pulley
B Crankshaft pulley
C Alternator pulley
D Power steering pump pulley
E Compressor pulley
F Tensioner roller

IDLING SPEEDS

Vehicle	Engine	Capacity (cm³)	Fuel	Fuel System	Idling (rpm.)	C.O. (%)
X 481	F2N 712 F2N 716	1721 C Ratio 9,2/1	Regular I.O. 92	SOLEX 28-34 Z10 Rep. 867 Rep. 867 (D) Rep. 970 (D)	700 ± 25	1 ± 0,5
	F2N 716	1721 C Ratio 9,2/1	Super I.O. 98	SOLEX 28-34 Z10 Rep. 913	700 ± 25	1 ± 0,5
X 482	F2N 710	1721 C Ratio 10/1	Super I.O. 98	SOLEX 28-34 Z10 Rep. 889 (D)	700 ± 50	1,5 ± 0,5
	F2N 754	1721 C Ratio 9,5/1	Super I.O. 95 (1)	SOLEX 28-34 Z13 Rep. 967 (C) (D)	800 ± 50	1,5 ± 0,5
X 483	J7R 750 (BM) J7R 751 (TA)	1995 C Ratio 10/1	Super I.O. 95 (1)	Bendix Multipoint Injection	775 ± 50 775 ± 50 (N)	1,5 ± 0,5
X 485	J7R 752 (Turbo)	1995 C Ratio 8/1	Super I.O. 95 (1)	Multipoint Injection	800 ± 25	1,5 ± 0,5
X 486	J8S 704	2068 C Ratio 21,5/1	Diesel	BOSCH or CAV Roto Diesel Injection	825 ± 25	-
X 488 Turbo	J8S 714 J8S 742	2068 C Ratio 21,5/1	Diesel	BOSCH Injection	825 ± 25	- -
X 489	J6R 758 (BM) J6R 759 (TA)	1995 C Ratio 8,6/1	Ordinary I.O. 89	WEBER 32 DARA 59 WEBER 32 DARA 60	800 ± 50 900 ± 50 (N)	1,5 ± 0,5 1 ± 0,5
X 48 D	C2J 770	1397 C Ratio 9,25/1	Super I.O. 98	WEBER 32 DRT 21	800 ± 50	1,5 ± 0,5
X 48 E	F3N 722	1721 C Ratio 9,5/1	Regular (2) I.O. 91 min.	Bendix Multipoint Injection	800 ± 50 (3)	-
X 48 F	F3N 726	1721 C Ratio 9,5/1	Regular (2) I.O. 91	Bendix Monopoint Injection	750 ± 50 (3)	-
X 48 H	F8Q 710	1870 C Ratio 21,5/1	Diesel	BOSCH or CAV Roto Diesel Injection	850 ± 50 825 ± 25	-
X 48 J	F2R 702	1965 C Ratio 8,4/1	Regular I.O. 91 min.	SOLEX 28-34 Z9 Rep. 915 (C)	700 ± 25	1,5 ± 0,5
X 48 K	J7T 754 (BM) J7T 755 (TA)	2165 C Ratio 9,2/1	Regular (2) I.O. 91 min.	Bendix Multipoint Injection	800 ± 25 (3) 800 ± 25 (3)	- -
X 48 M	F2N 750	1721 C Ratio 9,2/1	Regular (2) I.O. 91 min.	SOLEX 28-34 Z10 Rep. 926	725 ± 25	1 ± 0,5 w/out pulsair
X 48 N	F2N 752	1721 C Ratio 9,5/1	Euro Super I.O. 95 (4)	SOLEX 28-34 Z10 Rep. 927 (D)	850 ± 50	1,25 ± 0,25 w/out pulsair
X48 Q X 48 Y	J7R 754	1995 C Ratio 9,3/1	Super I.O. 95 (1)	Bendix Multipoint Injection	850 ± 75	1,8 ± 0,2
X 48 V	J8S 740	2068 C Ratio 21,5/1	Diesel	BOSCH or CAV Roto Diesel Injection	850 ± 50 825 ± 25	-

(1) Compatible with Eurosuper I.O.95
(2) Operates on unloaded fuel I.O. 91.
(I.O. = octane rating)
(3) These figures are non adjustable.
(4) Operates on unleaded Eurosuper I.O.95

For those items not dealt with in this workshop manual, see manuals M.R. Carb. S and W, INJ R(E), M.R. INJ(D) latest edition.

Vehicle	Engine						Gearbox	Injection type	Ignition Type
	Type	Index	Bore (mm)	Stroke (mm)	Capacity (cm^3)	Comp Ratio			
X 48 F	F3N	726	81	88,5	1 721	9,5	Manual	Monopoint + Mixture Regulation	I.P.M. with pinking detector

Engine	Idling		Fuel	
	Speed (rpm)	Mixture (CO)	Special features	Octane Rating
F3N 726	700 to 800* (non adjustable)	0.5% max (non adjustable)	Unleaded	I.O. 92

* At a coolant temperature of between 80 and 100°C.

Fuel System Type	Monopoint Renix Regulated Injection System
Fuel pump (on the front of the rear cross member, right hand side)	Voltage: 12 volts Pressure: 3 bars Delivery: 130 l/h
Fuel filter (beside fuel pump)	Replacement: 50 000 km
Paper cartridge air filter	Replacement: 20 000 km
Pressure regulator (integral part of throttle unit)	Pressure 1,2 ± 0,05 bar
Electromagnetic injector	Voltage: : 12 volts Resistance: 1,4 Ω must be less than 10 Ω
Catalyzer (under the floor)	◇ C02 N° 8934202175
Oxygen sensor or Lambda sensor	Make: Autolite n° 8933002455 A 800 °C : - Rich mixture : 625- 1 100 mV - Lean mixture : 0 to 150 mV
E.G.R.	WITH Valve No. 8933003184
Anti-evaporation system	With or without depending on the country

Computer mounted in the engine compartment				REMARKS
Renix No.	Approval No.	RNUR No.	Diagnostic Code	- mixture adjusted by oxygen sensor - speed adjusted by electro-actuator - pinking detector - transitory defects not placed on memory - inj. warning light non operational
S 100 811 101	77 00 731 802	77 00 738 169	202.3	
S 100 811 102	77 00 731 802	77 00 744 410	204.3	

Specifications and Adjustments

Vehicle	Engine						Gearbox	Injection Type	Ignition Type
	Type	Index	Bore (mm)	Stroke (mm)	Capacity (cm^3)	Comp. Ratio			
X48E	F3N	722	81	83,5	1721	9,5	Manual	Renix Multipoint + Mixture Regulation	I.P.M. with pinking detector

Engine	Idling		Fuel	
	Speed (rpm)	Mixture (CO)	Special Features	Octane Rating
F3N 722	750 to 850* (non adjustable)	0,5 % max (non adjustable)	Unleaded	I.O. 91 min.

* At a coolant temperature of between 80 and 100°C.

Fuel System Type	Regulated Multipoint Injection
Fuel pump mounted on the right hand side of the rear cross member	Voltage: 12 volts Pressure: 3 bars Delivery: 130 l/h
Fuel filter mounted above the fuel pump.	Replacement : 50 000 km
Pressure regulator	Pressure: - zero vacuum (A)(B): 2.5 ± 0.2 bars (C) : 3.0 ± 0.2 bars - at a vacuum of 500 mbars (A)(B): 2.0 ± 0.2 bars (C) : 2.5 ± 0.2 bars
Electromagnetic injectors	Will only operate with a computer: Voltage : 12 volts Resistance : $2,5 \pm 0,5\ \Omega$
Throttle unit	WEBER: double-barrelled Ø32 x 36 CFR Ref.: 2
Full throttle/no throttle switch, with three wires	A: idling: throttle open less than 1° B: partial load: throttle open more than 1° C: fully open: throttle open more than 70°
Idling speed regulator valve	Bosch - voltage: 12 volts

For the meanings of the references, see next page.

Specifications and Adjustments

Computer	Rénix No.	Approval No.	R.N.U.R. No.	Diagnostic Code
Renix or Bendix mounted in the engine compartment	S 100 812 101 S 100 812 101 S 100 812 101 S 101 263 101	77 00 735 559 77 00 735 559 77 00 735 559 77 00 746 044	77 00 736 401 77 00 740 149 77 00 745 344 77 00 744 412	210 - 3 (A) 211 - 3 (B) 213 - 3 or 215 - 3 (B) 216 (C)

(A) Without an anti-fuel evaporation system
(B) With an anti-fuel evaporation system
(C) With a pressure regulator (3 bars)

Air temperature sensor	Bendix: type CTP (A and B) CTN(C)
Coolant temperature sensor	Bendix: type CTP (A and B) CTN(C)

Oxygen Sensor	Make: BOSCH at 800°C: - Rich mixture: 625 to 100 mV - Lean mixture: 0 to 150 mV
Catalyzer (mounted under the floor)	Type : three function Reference: CO 5
Paper cartridge air filter	Replacement: 20,000 km
E.G.R.	
Anti-evaporation system (for certain countries)	Using GM Canister (B)
Ignition system	Curves: programmed into the injection computer M.P.A.: Ignition Power Module with (I.P.M.) pinking detector

Specifications and Adjustments

Vehicle	Engine						Gearbox	Injection Type	Ignition Type
	Type	Index	Bore (mm)	Stroke (mm)	Capacity (mm)	Comp. Ratio			
X 483	J7R J7R	750 751	88	82	1995	10	BM (A) TA (B) (E)	Renix Multipoint	I.P.M. with pinking detector

Engine	Idling		Fuel	
	Speed (rpm)	Mixture (CO)	Special Features	Octane Rating
J7R 750 J7R 751	775 50* (non adjustable)	1,5 ± 0,5	Super (Premium)	I.O. 98

* At a coolant temperature of between 80 and 100°C.

Fuel System Type	Multipoint Injection
Fuel pump, mounted on the rear right hand side member	Voltage : 12 volts Pressure : 3 bars Delivery : 130 l/h
Fuel filter: mounted above the fuel pump	Replacement: 50 000 km
Pressure Regulator	Pressure: - at zero vacuum 2,5 ± 0,2 bars - at a vacuum of 500 mbar 2,0 ± 0,2 bars
Electromagnetic injectors	Will only operate with a computer: Voltage : 12 volts Resistance : 2,5 ± 0,5 Ω
Throttle unit	SOLEX: single barrel Ø 50mm Ref. : 863 BM ; 864 TA
Full throttle/no throttle switch, with three wires	A : idling: throttle open less than 1° B : partial load: throttle open more than 1° C : fully open: throttle open more than 70°
Idling regulator valve	Bosch - voltage: 12 volts

Specifications and Adjustments

Computer	Renix No.	Approval No.	R.N.U.R. No.	Diagnostic Code
Renix or Bendix mounted in the engine compartment	S 100 805 101 S 100 805 101 S 100 805 103 S 100 805 201 S 100 805 204	77 00 731 803 77 00 731 803 77 00 731 803 77 00 731 804 77 00 740 605	77 00 733 848 77 00 740 150 77 00 736 594 77 00 733 984 77 00 740 932	20 - 3 (A) 20 - 3 (A) 20 - 3 (A) 23 - 3 (B) 22 - 3 (E)

(E) BVA AR4 (Automatic transmission)

Air temperature sensor	Bendix: type CTP
Coolant temperature sensor	Bendix: type CTP

Oxygen sensor	
Catalyzer	
Paper cartridge air filter	Replacement : 20 000 km
E.G.R.	
Anti-evaporation system	
Ignition system	Curves: programmed into the injection computer M.P.A. (I.P.M.) : Ignition Power Module with pinking detector

Specifications and Adjustments

Vehicle	Engine						Gearbox	Injection Type	Ignition Type
	Type	Index	Bore (mm)	Stroke (mm)	Capacity (cm^3)	Comp. Ratio			
L 485	J7R	752	88	82	1995	8	Manual	Renix Multipoint	I.P.M. with pinking detector

Engine	Idling		Fuel	
	Speed (rpm)	Mixture (CO)	Special features	Octane Rating
J7R 752	800 ± 25 * (non adjustable)	1,5 ± 0,5 %	Super	I.O. 98

* For a coolant temperature of between 80 and 100°C.

Fuel System Type	Multipoint injection
Fuel pump: mounted on the rear right hand side member	Voltage : 12 volts Pressure : 3 bars Delivery : 130 l/h
Fuel filter: mounted above the fuel pump	Replacement: 50 000 km
Pressure Regulator	Pressure: - at zero vacuum : 2,5 ± 0,2 bars - at a vacuum of 500 mbar : 2,0 ± 0,2 bars
Electromagnetic injectors	Will only operate with a computer: Voltage : 12 volts Resistance : 2,5 ± 0,5 Ω
Throttle unit	SOLEX: single barrel Ø 50mm Ref.: 875
Load potentiometer	A : idling: XR25 reading = 5 to 15 B : partial load: XR25 reading = 20 to 190 C : fully open: XR25 reading = 225 min
Idling regulator valve	Bosch - voltage: 12 volts

Specifications and Adjustments

Computer	Renix No.	Approval No.	R.N.U.R. No.	Diagnostic Code
Renix or Bendix mounted in the engine compartment	S 100 805 102 S 101 100 103 S 101 100 104	77 00 731 805 77 00 731 805 77 00 745 306	77 00 733 985 77 00 733 985 77 00 744 404	25 - 3 83 - 3 27 - 3 (1)

NOTE: The computer controls a turbocharger pressure regulator.

(1) Fitted, after manufacture, with an oxydization catalyzer - Germany.

Air temperature sensor	Bendix : type CTN
Coolant temperature sensor	Bendix : type CTN

Oxygen Sensor	
Catalyzer	
Paper cartridge air filter	Replacement : 20 000 km
E.G.R.	
Anti-evaporation system	
Ignition system	Curves: programmed into the injection computer M.P.A. (I.P.M.) : Ignition Power Module with pinking detector

Specifications and Adjustments

Vehicle	Engine						Gearbox	Injection Type	Ignition Type
	Type	Index	Bore (mm)	Stroke (mm)	Capacity (cm^3)	Comp. Ratio			
X 48 K	J7T J7T	754 755	88	89	2 165	9,2	Manual BM (1) Automatic TA (2)	Renix Multipoint + Mixture Regulator	I.P.M. with Pinking Detector

Engine	Idling		Fuel	
	Speed (rpm)	Mixture (CO)	Special Features	Octane Rating
J7T 754 J7T 755	800 ± 25* (non adjustable)	0,5 % max (non adjustable)	Unleaded	I.O. 91

* For a coolant temperature of between 80 and 100°C with the automatic transmission in (N).

Fuel system type	Regulated multipoint injection
Fuel pump: mounted on the rear right hand side member	Voltage : 12 volts Pressure : 3 bars Delivery : 130 l/h
Fuel filter: mounted above the fuel pump	Replacement : 50,000 km
Pressure regulator	Pressure: - at zero vacuum : 2,5 ± 0,2 bars - at a vacuum of 500 mbar : 2,0 ± 0,2 bars
Electromagnetic injectors	Will only operate with a computer: Voltage : 12 volts Resistance : 2,5 ± 0,5 Ω
Throttle unit	SOLEX : single barrel Ø 50mm Ref. 863 manual; 864 automatic
Full throttle/no throttle switch with three wires	A : idling: throttle open by less than 1° B : partial load: throttle open more than 1° C : fully open: throttle open more than 70°
Idling regulator valve	Bosch - voltage: 12 volts

Specifications and Adjustments

Computer		Renix No.	Approval No.	R.N.U.R. No.	Diagnostic Code
Renix or Bendix mounted in the engine compartment	(1)	S 100 810 101	77 00 735 562	77 00 736 398	32 - 3
	(1)	S 101 108 103	77 00 735 562	77 00 748 183	45 - 3
	(2)	S 100 810 201	77 00 735 563	77 00 736 399	33 - 3
	(2)	S 100 810 204	77 00 742 418	77 00 742 313	41 - 3 (A)
	(2)	S 101 108 203	77 00 742 418	77 00 748 184	47 - 3 (A)

(A) BVA AR4 (Automatic Transmission)

Air temperature sensor	Bendix: type CTP
Coolant temperature sensor	Bendix: type CTP
Oxygen sensor	Make : BOSCH At 800°C: - Rich mixture : 625 to 1,100mV - Lean mixture : 0 to 150mV
Catalyzer (mounted under the floor)	Type : Three function Reference: CO 1
Paper cartridge air filter	Replacement: 20,000 km
E.G.R.	
Anti-evaporation system	In certain countries, by means of GM Canister
Ignition system	Curves : programmed into the injection computer M.P.A. (I.P.M.) : ignition power module without pinking detector

Specifications and Adjustments

Vehicle	Engine						Gearbox	Injection Type	Ignition Type
	Type	Index	Bore (mm)	Stroke (mm)	Capacity (cm^3)	Comp. Ratio			
X 48 Q X 48 Y	J7R	754	88	82	1 995	9,3	Manual	Renix Multipoint	I.P.M. with pinking detector

Engine	Idling		Fuel	
	Speed (rpm)	Mixture (CO)	Special Features	Octane Rating
J7R 754	850 ± 75* (non adjustable)	1,8 ± 0,2 %	Super Eurosuper Unleaded	I.O. 98 I.O. 95

* At a coolant temperature of between 80 and 100°C.

Fuel system type	Multipoint injection
Fuel pump: mounted on the rear right hand side member	Voltage : 12 volts Pressure : 3 bars Delivery : 130 l/h
Fuel filter: mounted above the fuel pump	Replacement: 50 000 km
Pressure regulator	Pressure: - at zero vacuum : 3,0 ± 0,2 bars - at a vacuum of 500 mbars : 2,5 ± 0,2 bars
Electromagnetic injectors	Will only operate with a computer: Voltage : 12 volts Resistance : 2,5 ± 0,5 Ω
Throttle unit	SOLEX: single barrel Ø 55mm Ref. : 937
Load potentiometer	A : idling: XR 25 reading = 4 to 10 B : partial load: XR 25 reading = 20 to 190 C : fully open: XR 25 reading = 225 min
Idling regulator valve	HITACHI: Voltage : 12 volts Coil resistance : 9 - 30 Ω

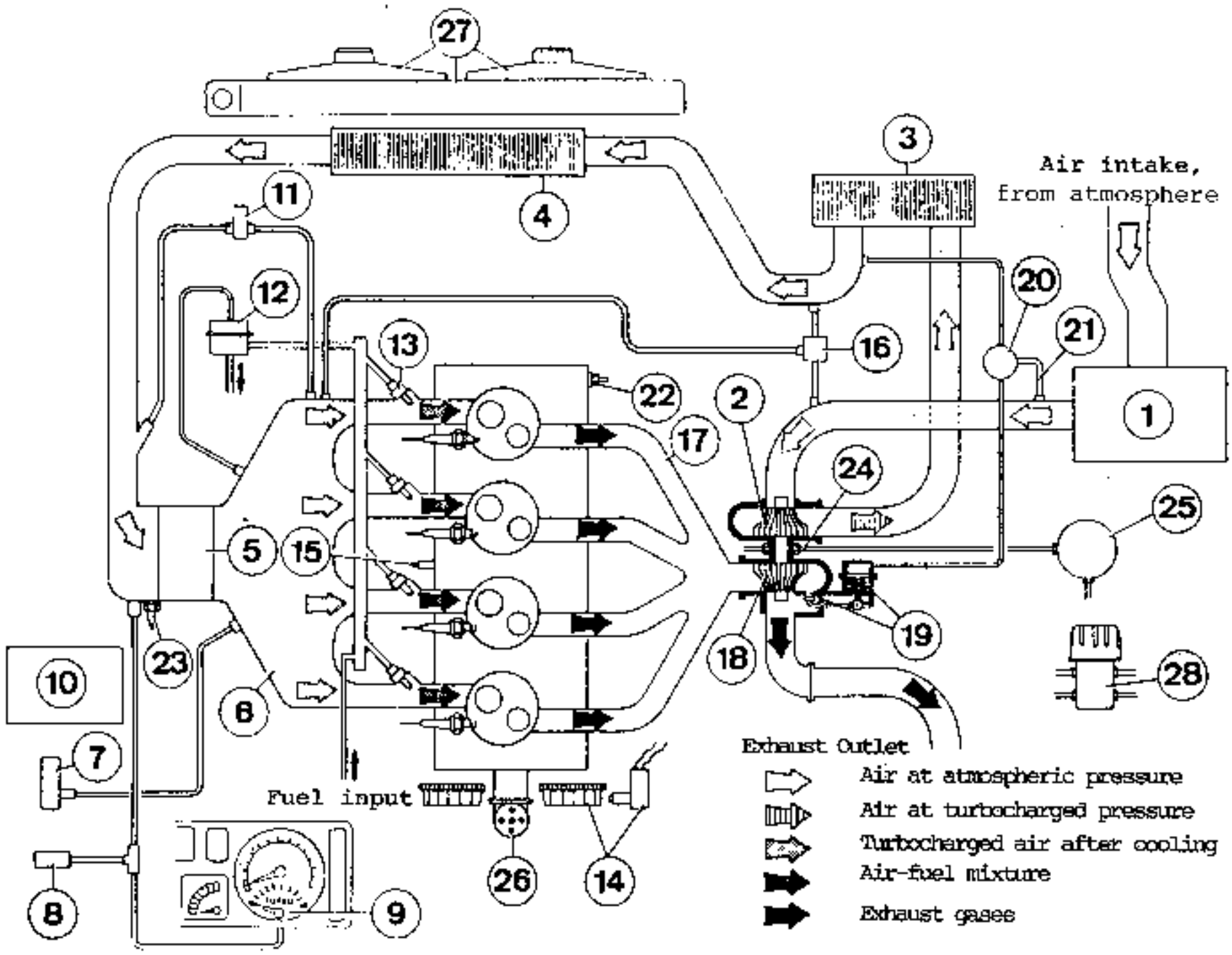
Specifications and Adjustments

Computer	Renix No.	Approval No.	R.N.U.R. No.	Diagnostic Code
Renix or Bendix mounted in the engine compartment	S 101 266 101	77 00 745 990	77 00 744 407	28 - 3

Air temperature sensor	Bendix: type CTN
Coolant temperature sensor	Bendix: type CTN

Oxygen sensor	
Catalyzer	
Paper cartridge air filter	Replacement : 20 000 km
E.G.R.	
Anti-evaporation system	
Ignition system	Curves : programmed into the injection computer M.P.A. (I.P.M.) : Ignition Power Module with pinking detector
Spark plugs: EYQUEM	FC62LS3 spark gap 1.2mm (non adjustable)

FUEL SYSTEM DIAGRAM (X 485)



1 - Air filter
2 - Compressor
3)
4) Intercoolers
5 - Throttle unit and potentiometer
6 - Inlet manifold
7 - Engine air intake pressure sensor
8 - Safety pressure switch
9 - Turbocharged pressure gauge
10 - Engine electronic management computer
11 - Idling speed regulator solenoid valve
12 - Fuel pressure regulator
13 - Injectors
14 - Flywheel position/speed sensor
15 - Pinking detector
16 - Turbo bypass valve
17 - Exhaust manifold
18 - Turbine
19 - Turbo regulator capsule and valve
20 - Solenoid valve which controls the turbocharging pressure regulation
21 - Variable "leak" across solenoid valve 20
22 - Coolant temperature sensor
23 - Air temperature sensor
24 - Turbine bearing water cooling system
25 - Electric coolant pump which operates with the ignition switched off
26 - Ignition distributor
27 - Engine cooling radiator with 2 electric blower fans
28 - Oil cooler

INLET MANIFOLD ELECTRIC HEATER

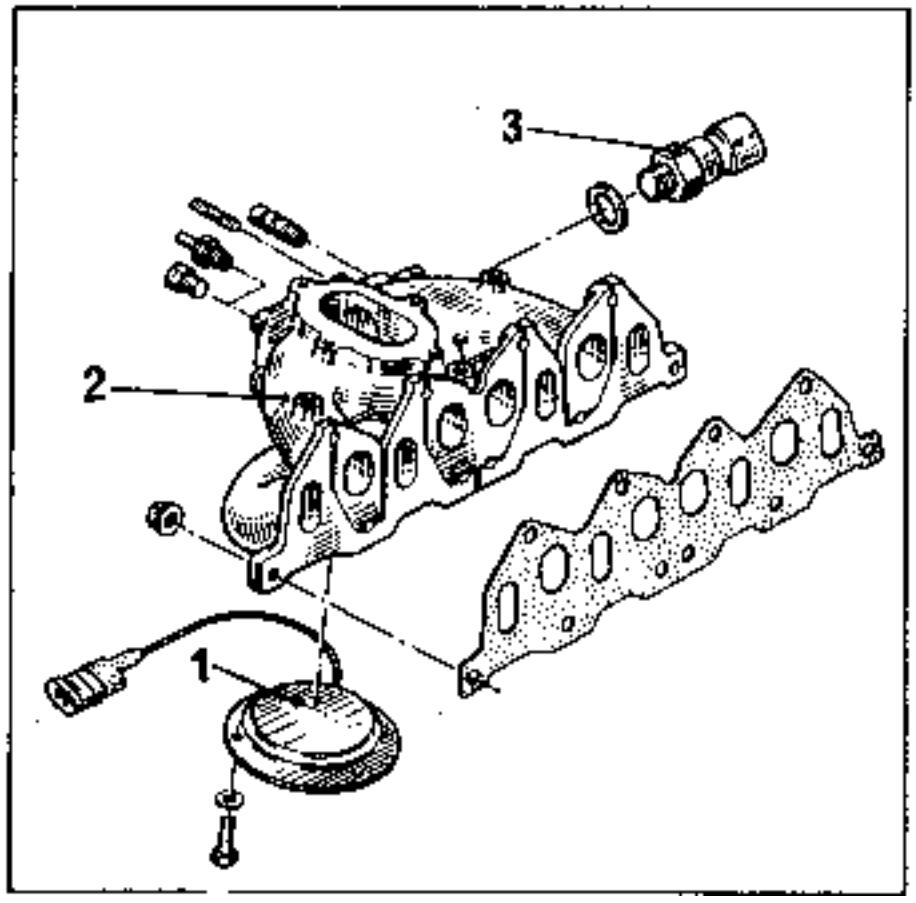
Vehicles fitted with type F2N 754 engines are fitted with an electric heater (1) in the lower part of the inlet manifold (2).

Its current supply is from the + after ignition switch circuit during the engine warmup phase.

A temperature switch (3) switches off the circuit at temperatures above 60°C.

Temperature switch:

- switches off the circuit: 63 ± 3°C,
- switches the circuit back on: 56 ± 3°C



METHOD OF ADJUSTING THE IDLING SPEED

This adjustment must be carried out accurately to obtain a CO percentage that remains stable between two maintenance inspections. We should also like to remind you that its adjustment must be carried out under accurately defined conditions:

1) The vehicle must be run in for a minimum of 1,000 km (600 miles)(any adjustment carried out on a vehicle which is not run-in could change very quickly.)

2) The choke must not be operating (check this).

3) The engine must be at its normal operating temperature. To obtain this, run the engine at approximately 2,000 rpm until the thermostat opens; however, do not leave it to warm up at idling speed as an engine which has run at idling speed for only a few minutes provides a CO reading which is not valid.

4) The idling speed must be within the manufacturer's limits (see chart).

5) The air filter must be fitted and its cartridge clean.

6) The ignition system must be in good condition and correctly adjusted.

7) There are to be no air leaks into the system (vacuum pipes, emission control system etc...).

8) There should be no extensive leakage of the exhaust system.

9) None of the heavy electrical consumers is to be operating (electric fan, heated rear screen etc...).

For the carburettor settings, consult the data sheets in the following workshop manuals,

M.R. Carb. S
M.R. Carb. W
M.R. Carb. Z

and the latest editions of their data sheets.

ADJUSTING THE IDLING SPEED USING AN EXHAUST GAS ANALYZER

In those countries where they are fitted, remove the tamper proofing cap from the mixture screw (B).

Turn screw (A) to obtain the average idling speed stated on the chart for the vehicle concerned.

Turn screw (B) to obtain the CO percentage stated on the chart.

Turn screw (A) to obtain the correct idling speed.

Repeat these two operations until both the CO percentage and the idling speed are correct.

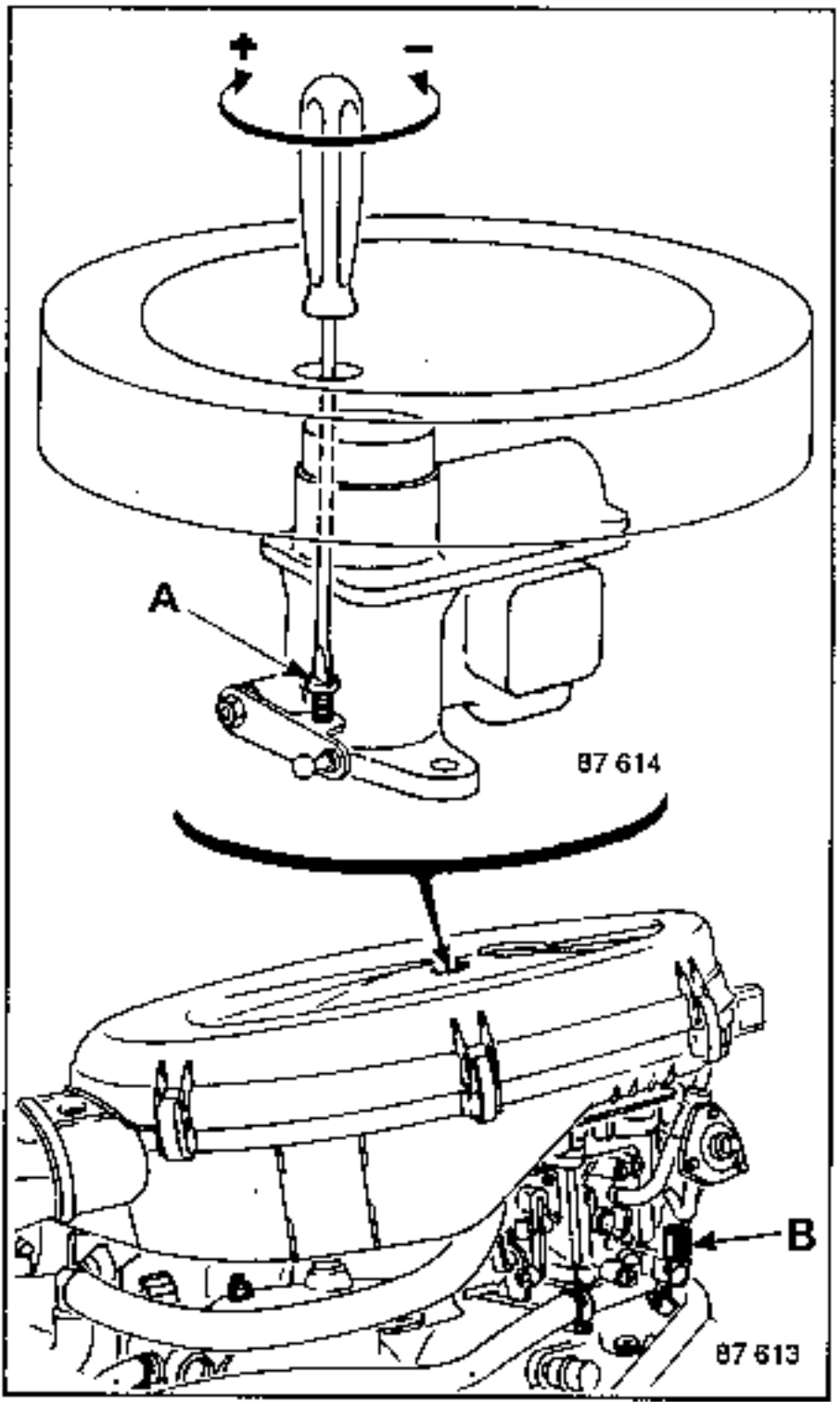
In those countries where the regulations require it, fit a tamper proofing cap to screw (B) after the adjustment.

TAMPER PROOFING CAP

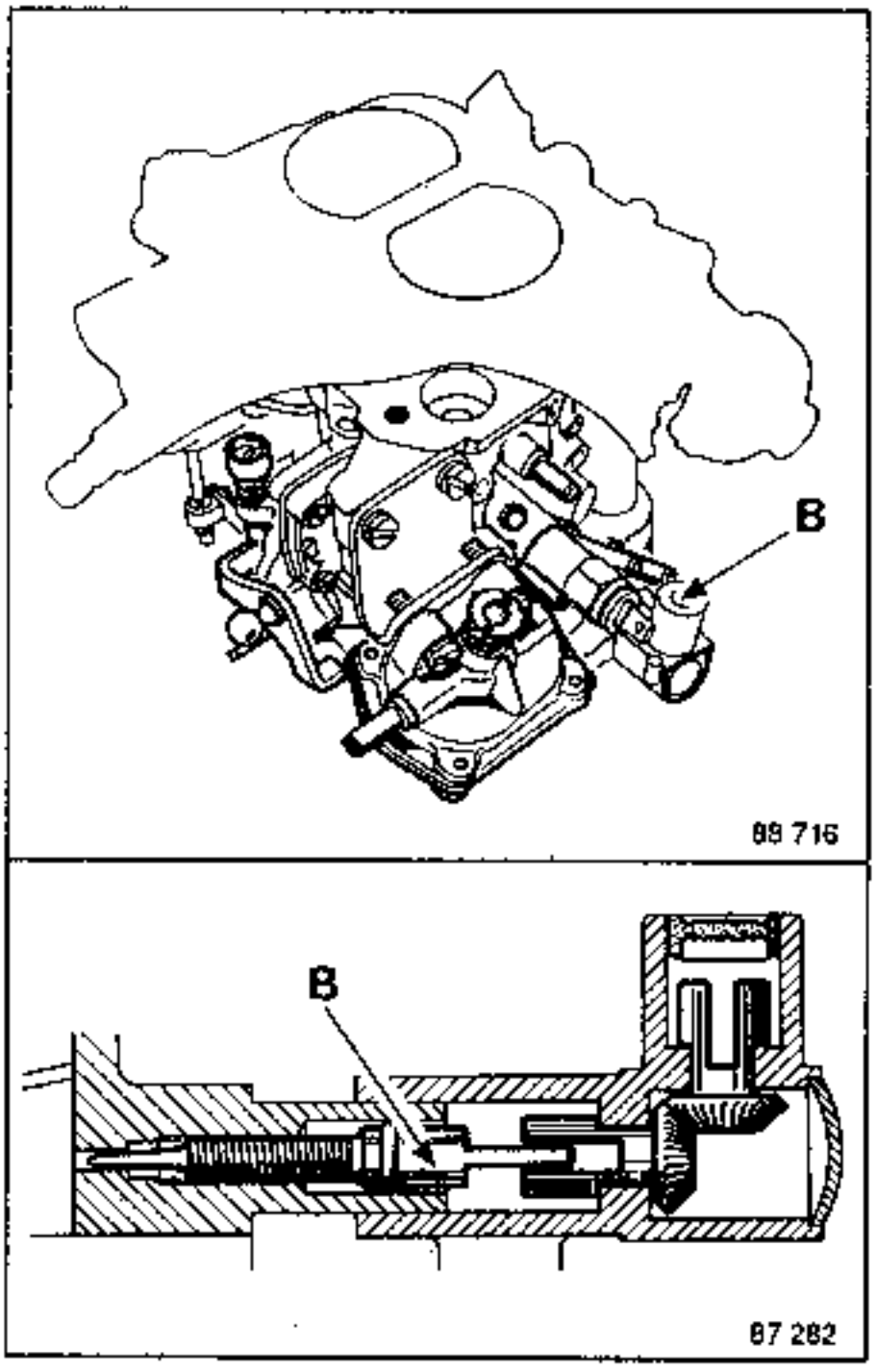
CARBURETTOR	Tamper Proofing Cap Part No.
SOLEX 28 x 34 Z	77 01 200 831
WEBER 32 DRT	77 01 200 833
Injection Bendix	77 01 200 832

Method of Adjusting the Idling Speed:
WEBER 32 DRT

Screw A:

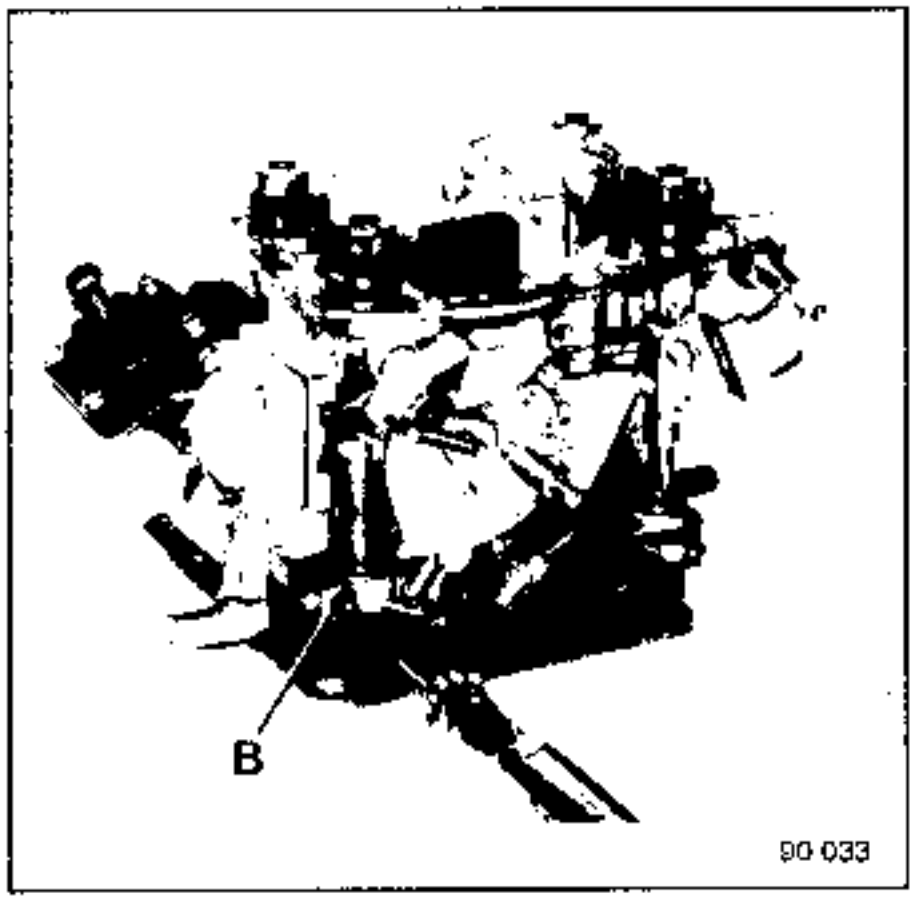


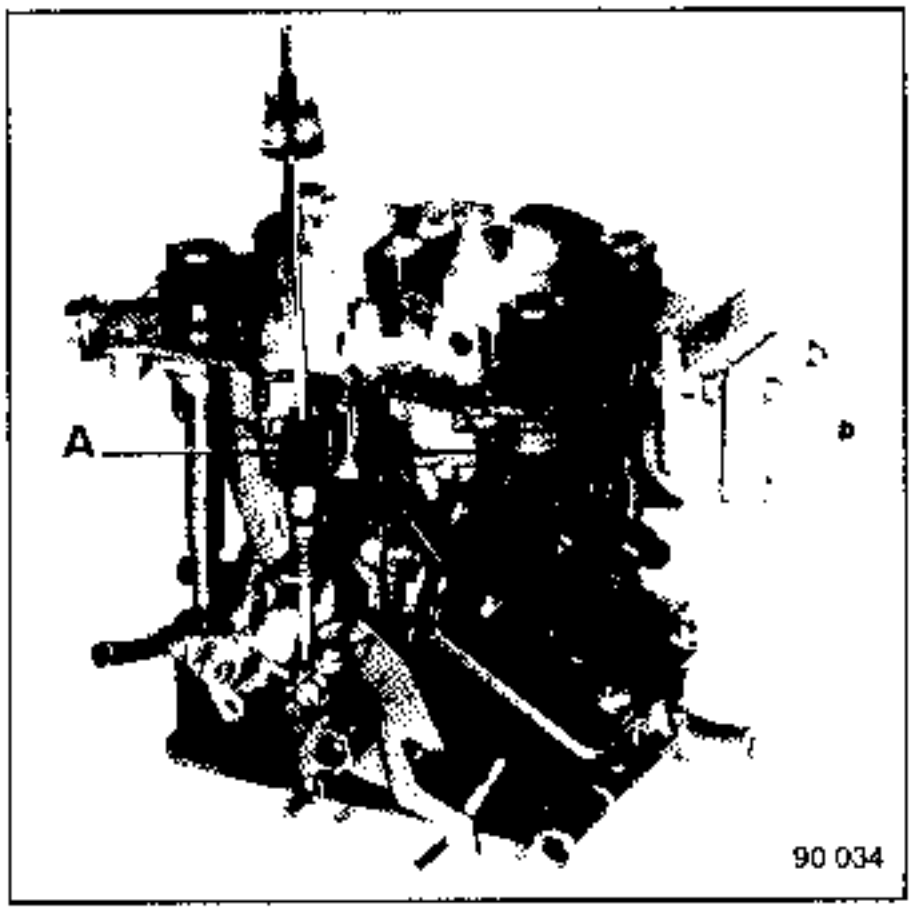
Screw B:



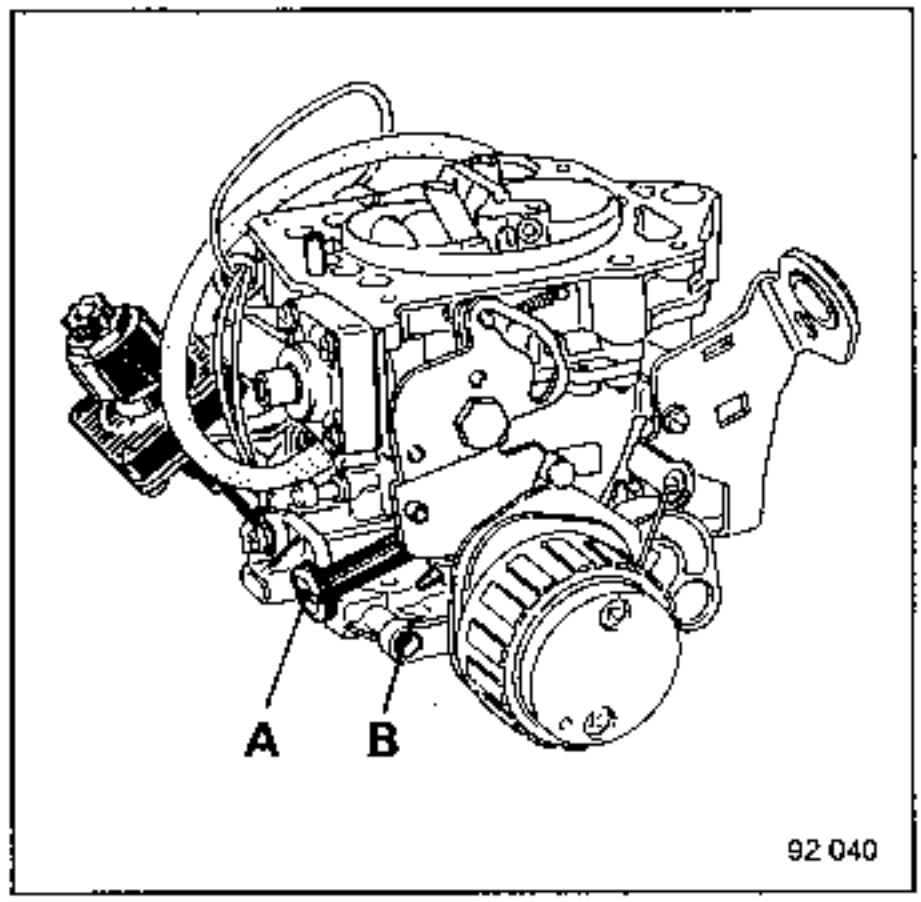
Method of Adjusting the Idling Speed:

SOLEX 28 x 34 Z 10

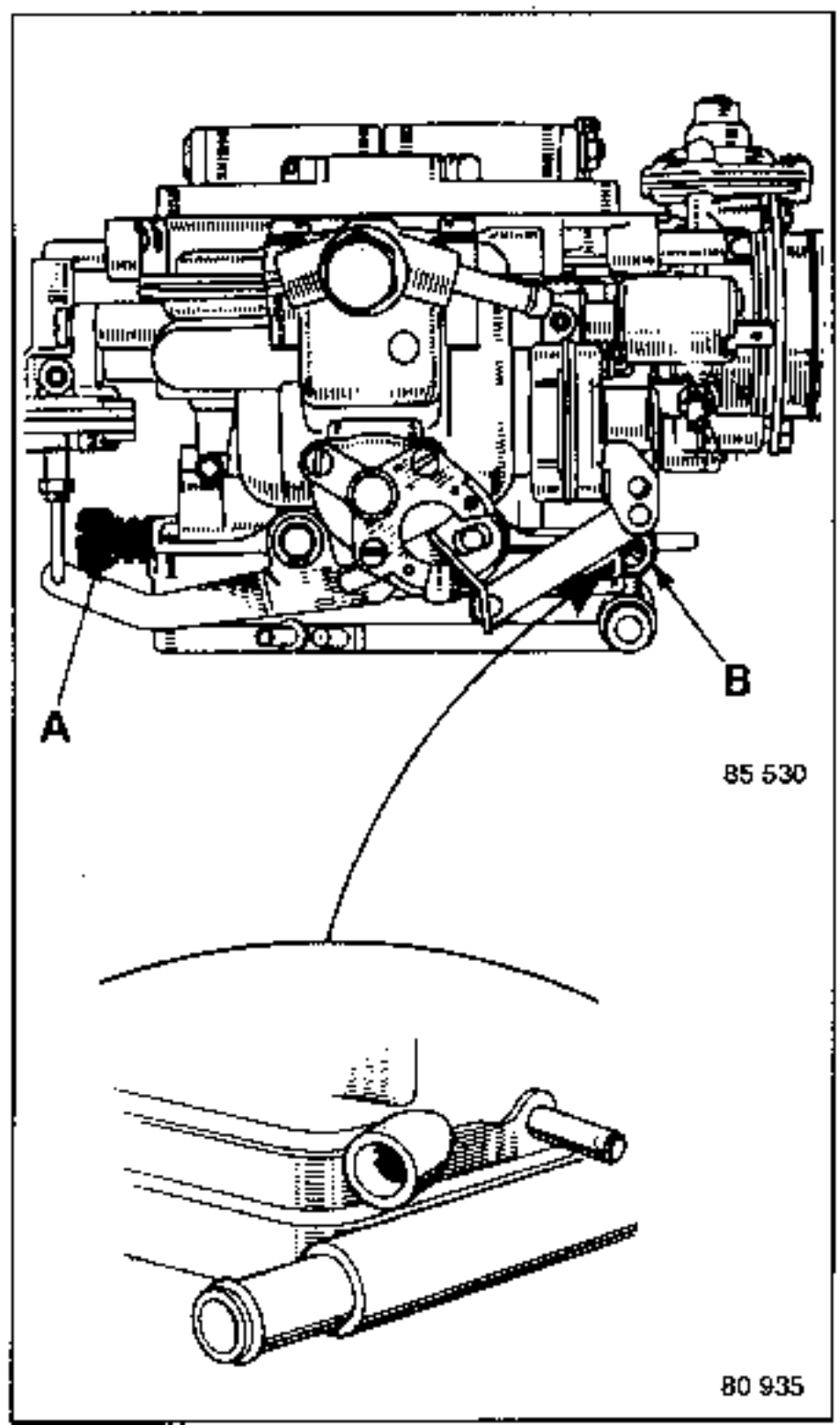




SOLEX 32 x 34 Z 13

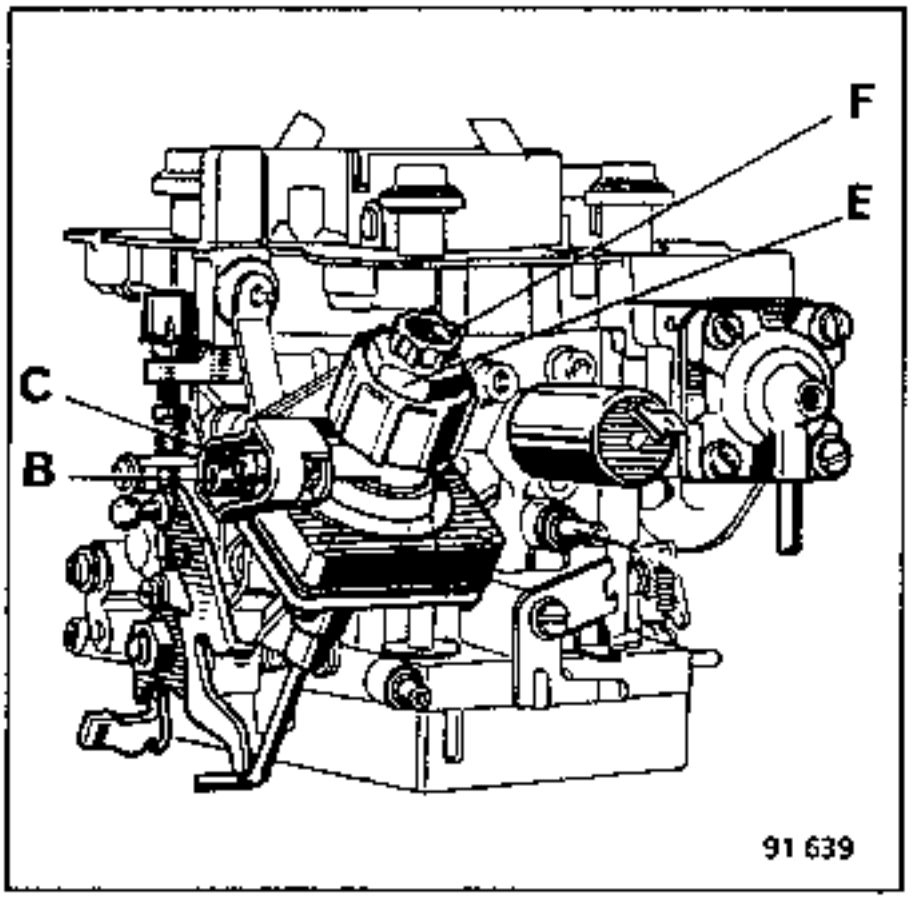


WEBER 32 DARA



VEHICLES X 481 and X 482

Fast Idling A.C. or P.S. or AC and PS



NOTE: Before adjusting the fast idling P.S. or A.C. or P.S. + A.C., check that the normal idling speed is correctly adjusted.

Adjustment on P.S. Vehicles:

With the engine warm, apply a vacuum of 600 mbars or the manifold vacuum to the throttle actuator (blue ring). With the electric fan switched off and the steering straight ahead, the speed should be 955 ± 50 rpm (with the steering turned through full lock, the speed should be 700 to 730 rpm).

Adjustment on A.C. Vehicles:
(after the P.S. adjustment, with the steering straight ahead and the electric fan switched off).

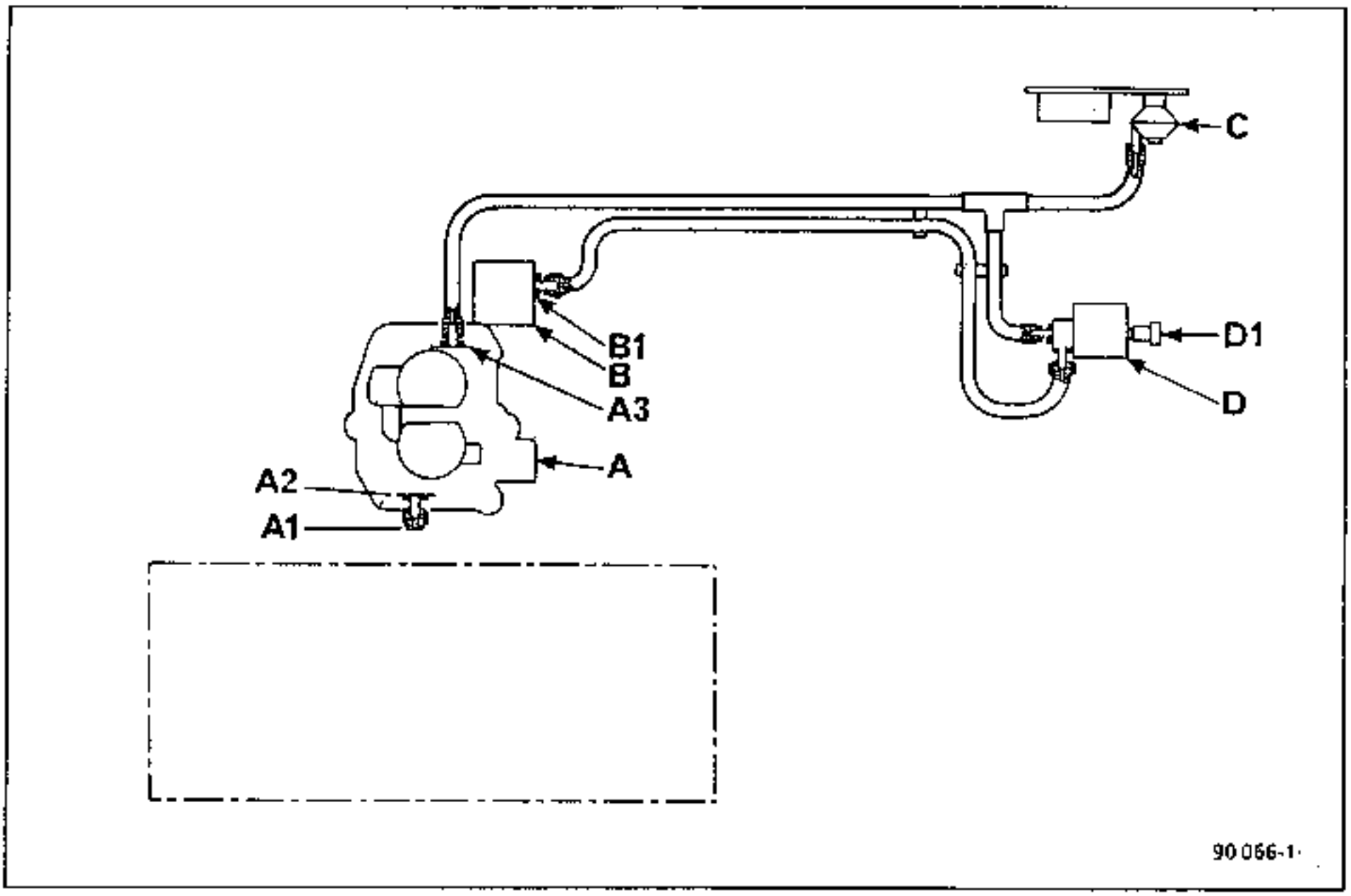
With the air conditioning on maximum, the speed should be 950 rpm.

P.S.: Power Steering
A.C.: Air Conditioning

B : Take-off point on actuator for PS
C : Take-off point on actuator for AC
E : Adjusting screw for P.S.
F : Adjusting screw for A.C.

X 481 - X 482 - 1st Arrangement

Pneumatic control system on vehicled fitted with air conditioning or power steering

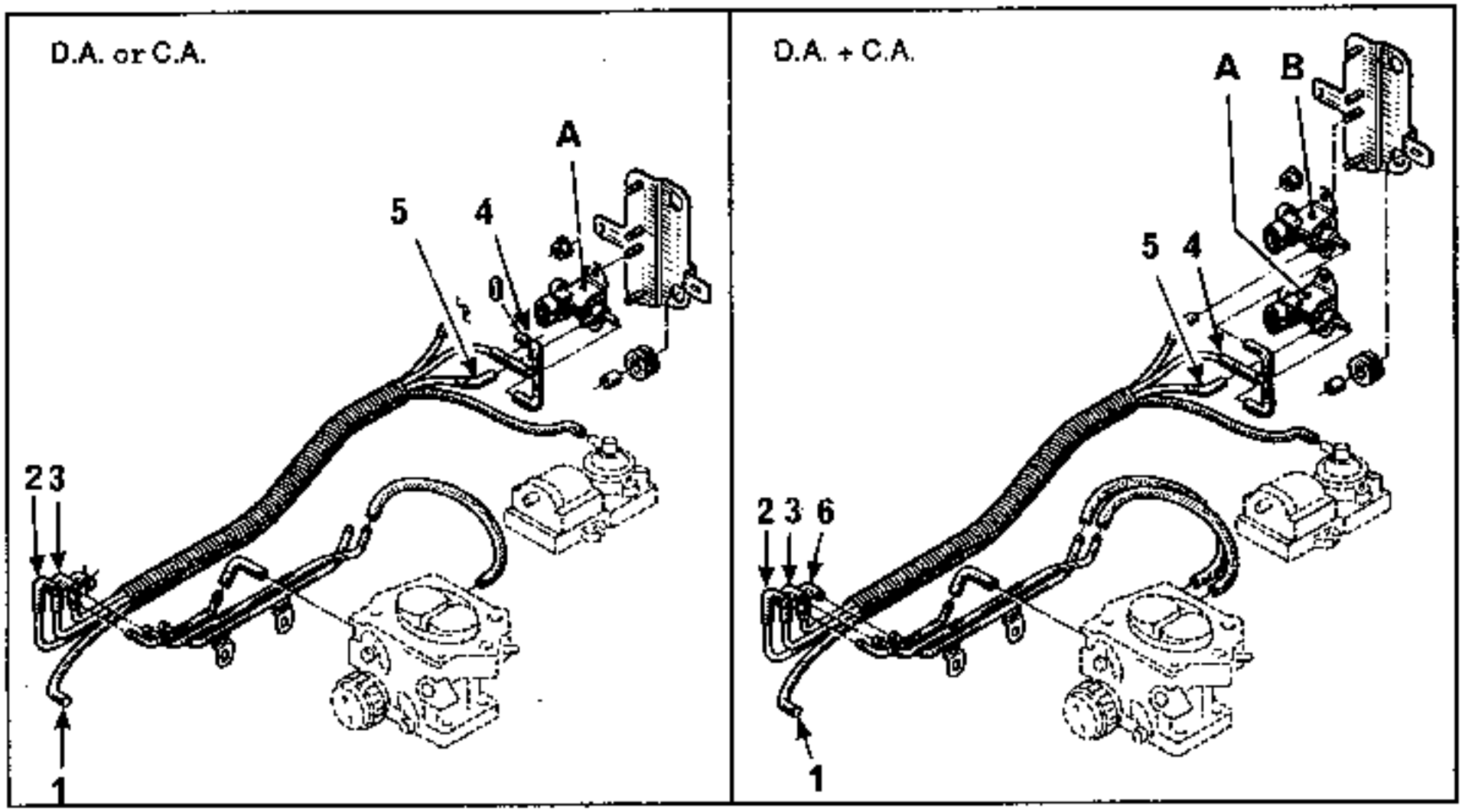


A : Carburettor
A1: Plug on pipe, colour black
A2: Identification ring on carburettor, colour red
A3: Identification ring on carburettor, colour black

B : Throttle actuator
B1: Identification ring, colour dark blue, on actuator
C : Electronic ignition system
On electronic ignition unit: no identification
D : Solenoid valve: near electronic ignition unit
D1: Filter on solenoid valve

X 482 - 2nd Arrangement

Fast Idling P.S. or A.C. or P.S. + A.C.



A.C. or P.S. Arrangement:

1 - Electronic ignition vacuum pipe
2 - Pipe, yellow ring
3 - Pipe, mauve ring
4 - Pipe, red rings
5 - Pipe, blue ring
A - P.S. or A.C. solenoid valve

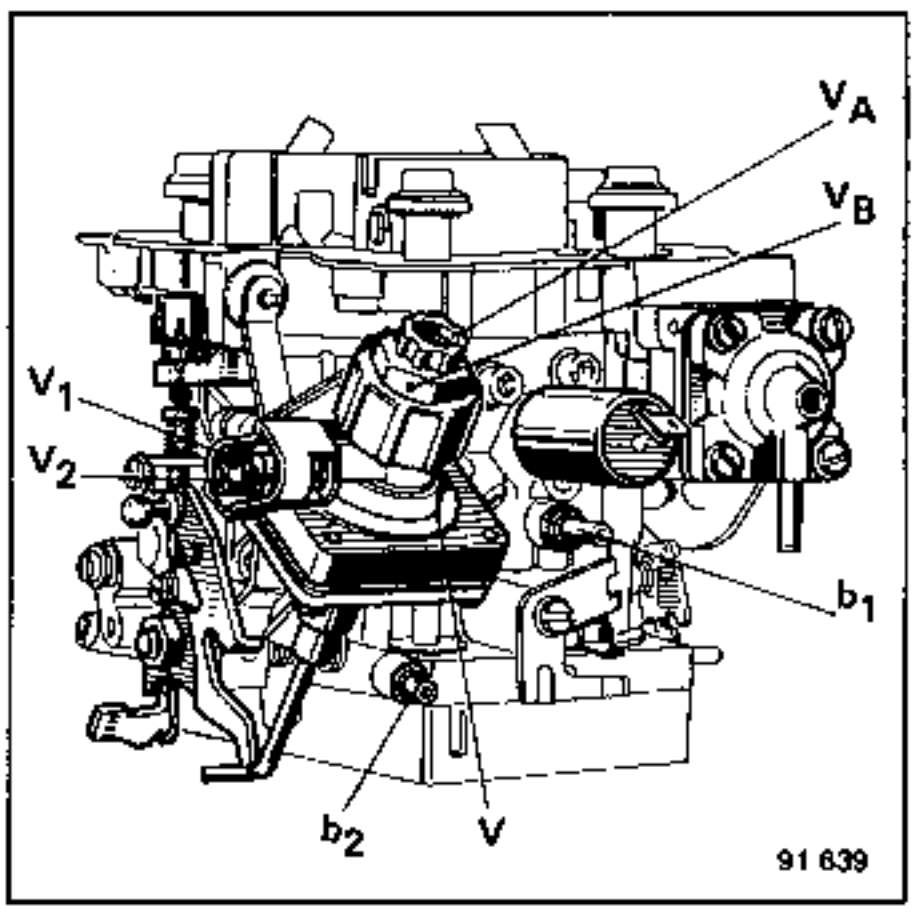
P.S. + A.C. Arrangement:

1 - Electronic Ignition vacuum pipe
2 - Pipe, yellow ring
3 - Pipe, mauve ring
4 - Pipe, red rings
5 - Pipe, blue ring
6 - Pipe, orange ring
7 - Pipe, grey ring
A - P.S. solenoid valve
B - A.C. solenoid valve

A.C.: Air Conditioning
P.S.: Power Steering

VEHICLES X 48 M and X 48 N

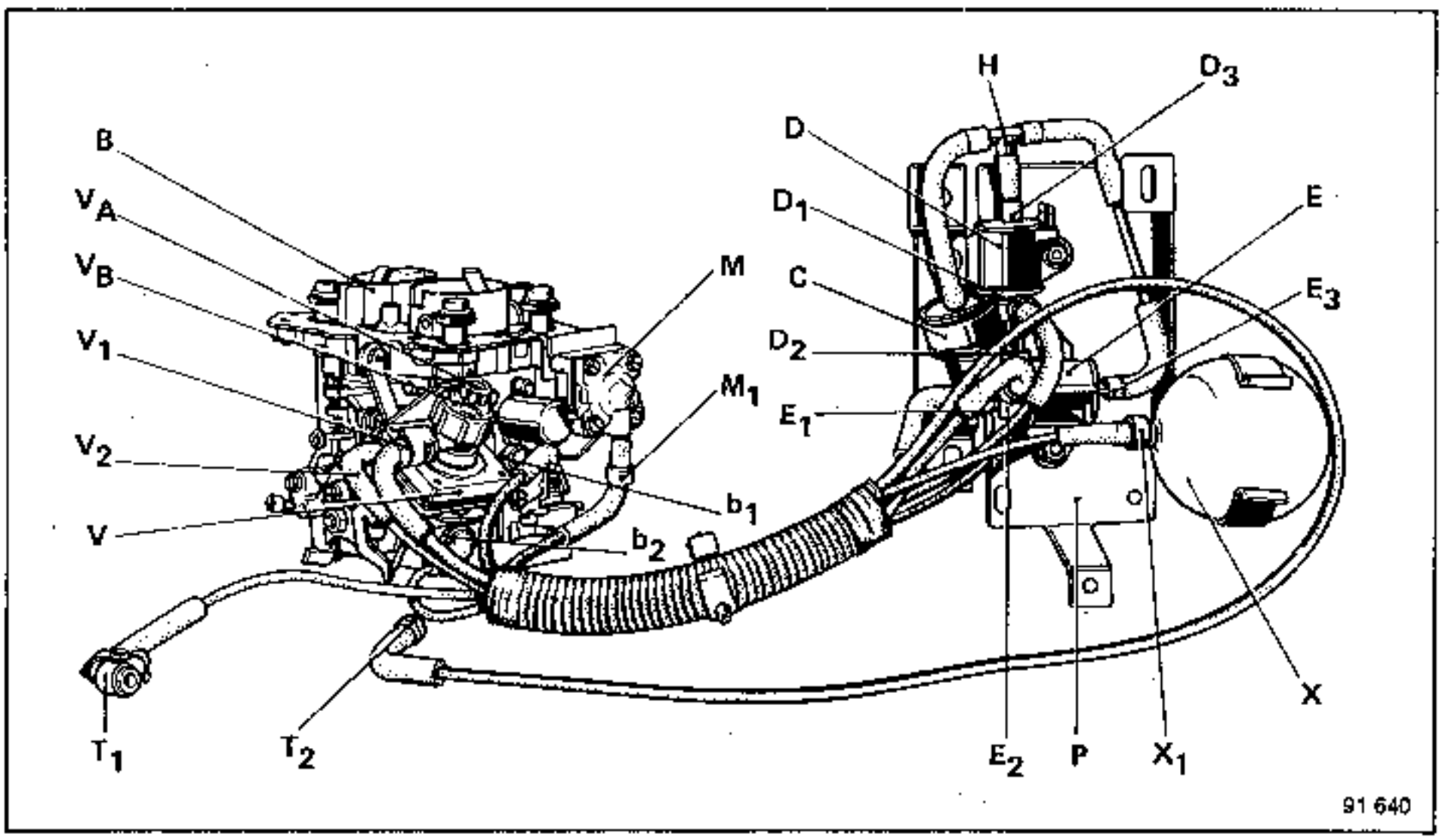
These vehicles are fitted with a two stage actuator. Each stage is controlled separately by its own solenoid valve.



V - Two stage throttle actuator
- V_A - Adjusting screw for air conditioned and emission control models
- V_B - Adjusting screw for power steering models
- V_1 - Take-off point on actuator for air conditioned models
- V_2 - Take-off point on actuator for power steering models
- b_1 - Emission control take-off
- b_2 - Take-off for power steering and air conditioned models

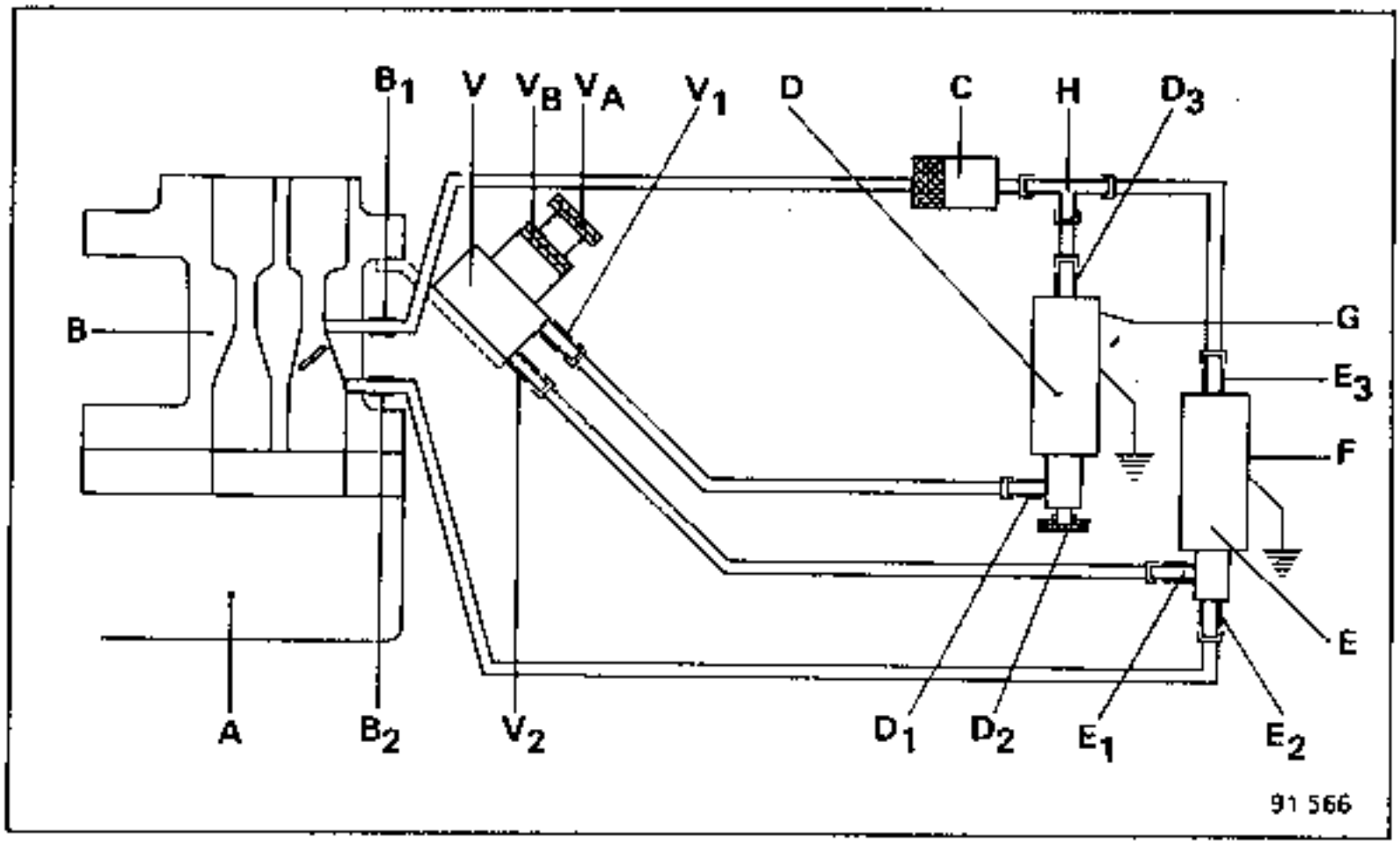
The adjustment of vehicles with air conditioning and power steering:

- Fast idling for power steering (screw V_B): 1050 $\pm$ 50 rpm.
- Fast idling for air conditioned and emission control models (screw V_A): 1500 $\pm$ 100 rpm.



VEHICLES X 48 M and X 49 N

Pneumatic control system circuit diagram:



A - Inlet manifold
B - Carburettor
- B_1 - White identification ring
- B_2 - Red identification ring

C - Retardation valve (coloured face towards carburettor)
D - Solenoid valve controlling stage V_1 on the throttle actuator V
- D_1 - Grey identification ring
- D_2 - Filter
- D_3 - White identification ring

E - Solenoid valve controlling stage V_2 on the throttle actuator V
- E_1 - Light blue identification ring
- E_2 - Red identification ring
- E_3 - White identification ring

F - Power steering signal
G - Air conditioning signal
H - T junction
V - Throttle actuator (on carburettor)
- V_1 - Grey identification ring
- V_2 - Light blue identification ring
- V_A - Adjusting screw for air conditioned and emission control models
- V_B - Adjusting screw for power steering models

M - Starting assistance diaphragm
- M_1 - Green identification ring

X - Starting assistance accumulator
- X_1 - Green identification ring

P - Support plate
T_1 - Electronic ignition take-off on manifold, yellow identification ring
T_2 - Electronic ignition take-off point, yellow identification ring

VEHICLES X 48 M and X 48 N

ADJUSTING THE IDLING SPEED

IMPORTANT:

It is essential, when adjusting or checking the idling mixture:

- **to cut out the exhaust air intake. Using clamp Mot. 453-01, pinch flat the air hose connecting the air filter to the pulsair valve.**
- **to start the adjusting procedure on the vehicle when its engine is cold.**

Adjusting Procedure:

- With the engine cold, the exhaust air intake shut off and the exhaust analyser connected.
- Start the engine on full choke, push in the choke to obtain approximately 900 rpm, and run it at this for approximately 1 minute, then fully push in the choke.
- Wait until the engine cooling fan cuts in for the first time before adjusting the idling speed.

IMPORTANT:

- It is essential to follow this adjusting procedure, and above all not to accelerate the engine to avoid the risk of engaging the catalyzer.
- If, during the gas analysis, the CO percentage tends to fall to 0 and the CO2 percentage rises to above 14%, the catalyzer will be engaged:
  - recommence the adjusting procedure when the engine has cooled down.

NOTE: On vehicles with a CO take off point before the catalyzer, use tool 843-01 to measure the CO percentage. In this case, the engagement of the catalyzer will have no effect on the idling speed adjustment operation.

Adjustment Figures:

Vehicle	Speed (rpm)	Mixture (CO %)	Conditions
K 48 M L 48 M	725 ± 25	1 ± 0,5	No air entering the exhaust system. Carry out the procedure described above.
K 48 N L 48 N	850 ± 50	1,25 ± 0,5	

VEHICLES X 48 M and X 48 N

OVERRUN FAST IDLING SPEED ADJUSTMENT

Vehicles without power steering:

Speeds to be Adjusted	Conditions	Adjustment Figures	Remarks
Normal idling speed	- Engine warm, after warmup procedure and electric fan cutting in. - Hose between pulsair and air filter pinched flat	850 ± 50 rpm CO : 1,25 ± 0,5 % KL 48 N 725 ± 25 rpm CO : 1 ± 0,5 % KL 48 M	Carry out the adjustment, after the electric fan has stopped, with the engine warm, running at idling speed, and the pipe between the air filter and the pulsair pinched flat. The catalyzer will disengage itself. After adjusting the normal idling speed, with the electric fan stopped.
Fast idling	- Engine warm (after normal idling speed adjustment). - Apply a vacuum of 800 mbars to the throttle actuator.	1 500 ± 100 rpm	

Vehicles with power steering:

Speeds to be Adjusted	Conditions	Adjustment Figures	Remarks
Normal idling speed	Identical to vehicle without power steering	See preceding section	Identical to vehicle without power steering
Fast idling speed on power steering model (screw V_B)	- Engine warm (after adjustment of normal idling speed). - Disconnect the pipe from the second stage of the actuator at solenoid valve D (grey identification ring). - Disconnect the pipe with the light blue ring from the first stage of the throttle actuator. - Apply a vacuum of 800 mbars to the first stage of the actuator (V_2 on the diagram).	1 050 ± 50 rpm	- After adjusting the normal idling speed. - Electric fan stopped. - Steering straight ahead.

VEHICLES X 48 M and X 48 N

Overrun Fast Idling Speed Adjustment

Vehicles with power steering:

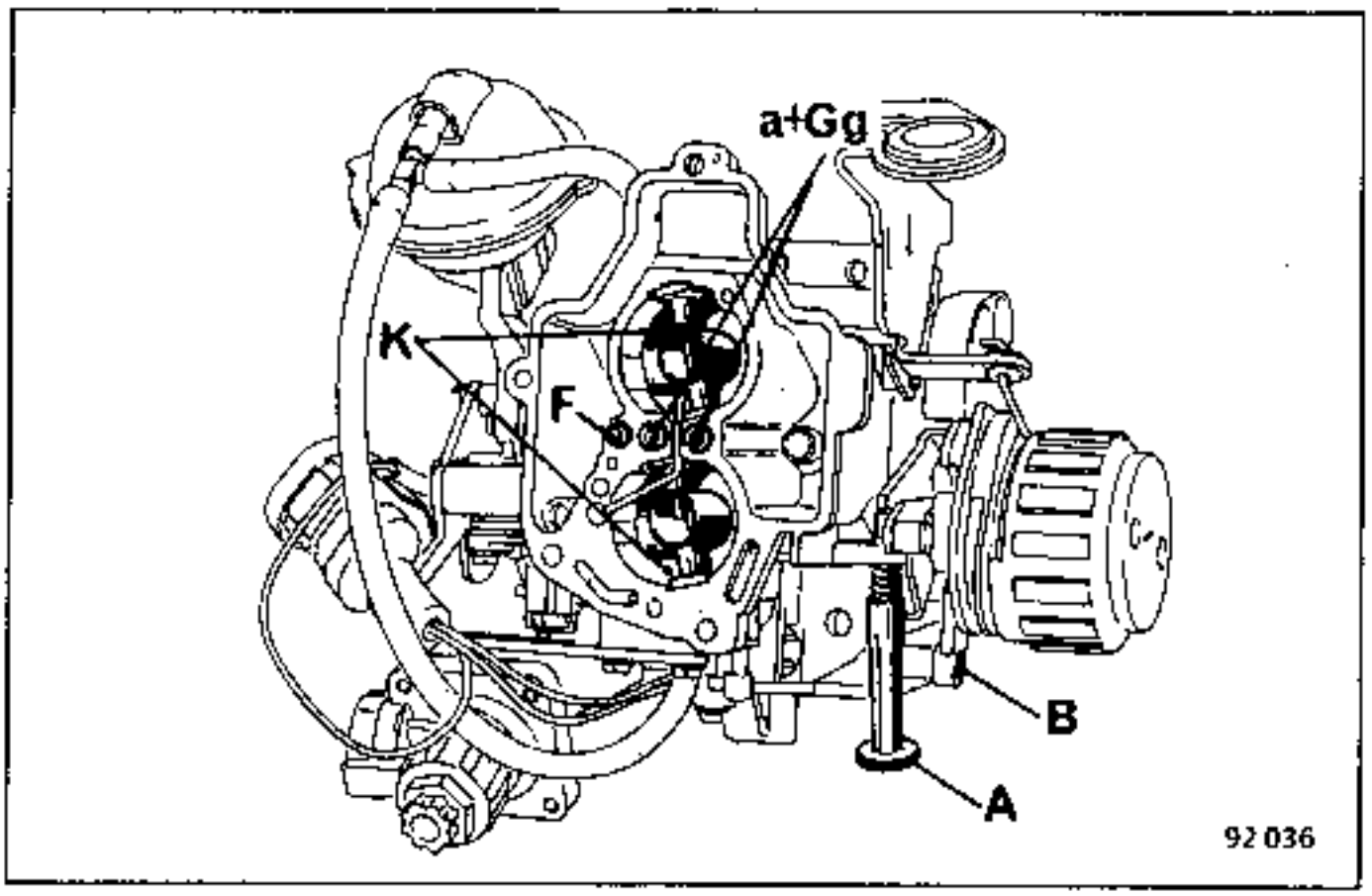
Speeds to be Adjusted	Conditions	Adjustment Figures	Remarks
Fast idling on emission control models (screw V_A).	- Disconnect the pipe from the first stage of the actuator at solenoid valve E (light blue identification ring). - Disconnect the pipe with the grey ring from the second stage of the throttle actuator. - Apply a vacuum of 800 mbars to the second stage of the actuator V_1 on the diagram).	1,500 ± 100 rpm.	- After adjusting the normal idling speed. - With the electric fan stopped. - The power steering stage of the actuator must already have been adjusted.

VEHICLES X 48 M and X 48 N

OVERRUN FAST IDLING SPEED ADJUSTMENT

Test Equipment	Conditions	Requirements	Remarks
NORMAL IDLING SPEED			
Tachometer exhaust gas analyzer	- With the engine warm, after warmup procedure, and electric fan cutting in. - Hose between pulsair and filter pinched flat.	Figures: - speed: 850 ± 50 rpm (2) 725 ± 25 rpm (1) - mixture: CO: 1.25 ± 0.5% (2) 1 ± 0.5% (1)	- Carry out the correct engine warmup procedure. - Adjust, if outside tolerances, with electric fan switched off.
POWER STEERING FAST IDLING (FIRST STAGE) (screw marked VB on the diagram)			
- Tachometer. - Keep the idling speed at the normal figure whilst operating the power steering.	- Engine warm. - Turn the power steering against the lock stop.	- Despite the power steering movement, the engine should maintain its normal idling speed of: 850 ± 50 rpm. DEFECTS: Speed dropping or too high.	- Adjust, if necessary. - Check the electrical connections on the pressure switch and solenoid valves. - Check the solenoid valve pneumatic connection.
EMISSION CONTROL FAST IDLING (SECOND STAGE) PLUS RETARDATION VALVE (screw marked V_A on the diagram)			
- Tachometer. - Stopwatch. - Time to fall from fast idling to normal idling speed.	- Engine warm. - Accelerate the engine to 3,000 rpm, then release the throttle.	- The engine speed should gradually fall after remaining constant at 1,500 ± 100 rpm for a period of 3 to 7 seconds. DEFECTS: Immediate return to idling speed. Return to idling speed after a very long period.	- Throttle actuator operating correctly (second stage). - Check that the retardation valve is fitted the correct way round (coloured face towards carburettor) and the force required to return the throttle. - Check: - The pneumatic connections on the two solenoid valves. - That the retardation valve is of the correct type. - The throttle control.

SOLEX 32 x 34 Z 13 CARBURETTORS (see MANUAL M.R. CARB S and NTs Nos. 1162 and 1380)



SETTINGS

ITEM	967 (C) (1) 967 (D) (2)	
	1st barrel	2nd barrel
Choke tube (K)	24	27
Main jet (Gg)	115	137,4
Air correction jet (a)	165	190
Idling jet (g)	43	50
Econostat	-	120
Enrichener	50	-
Needle valve	1,8	
Float level (mm)	33,5 ± 0,5	
Gauge number	71 644 082	
Accelerator pump injector	40 | 35	
Accelerator pump travel	cam	
Positive throttle opening (mm or °)	0,75 (22°30')	
Pneumatic initial opening (mm) COAS	3,5	
Degassing valve (mm)	0,30	
Fast idling (P.S. + A.C.)	13°	
Fast idling (P.S. or A.C.)	11°15'	
Clearance before diaphragm starts to move dim. X in mm	-	
Idling speed in rpm	800 ± 50	
CO %	1,5 ± 0,5	

(1) : P.S. or A.C.
(2) : P.S. and A.C.
A : Air adjustment screw
B : Mixture adjustment screw
F : Filter in idling fuel circuit

GENERAL - SPECIFICATIONS

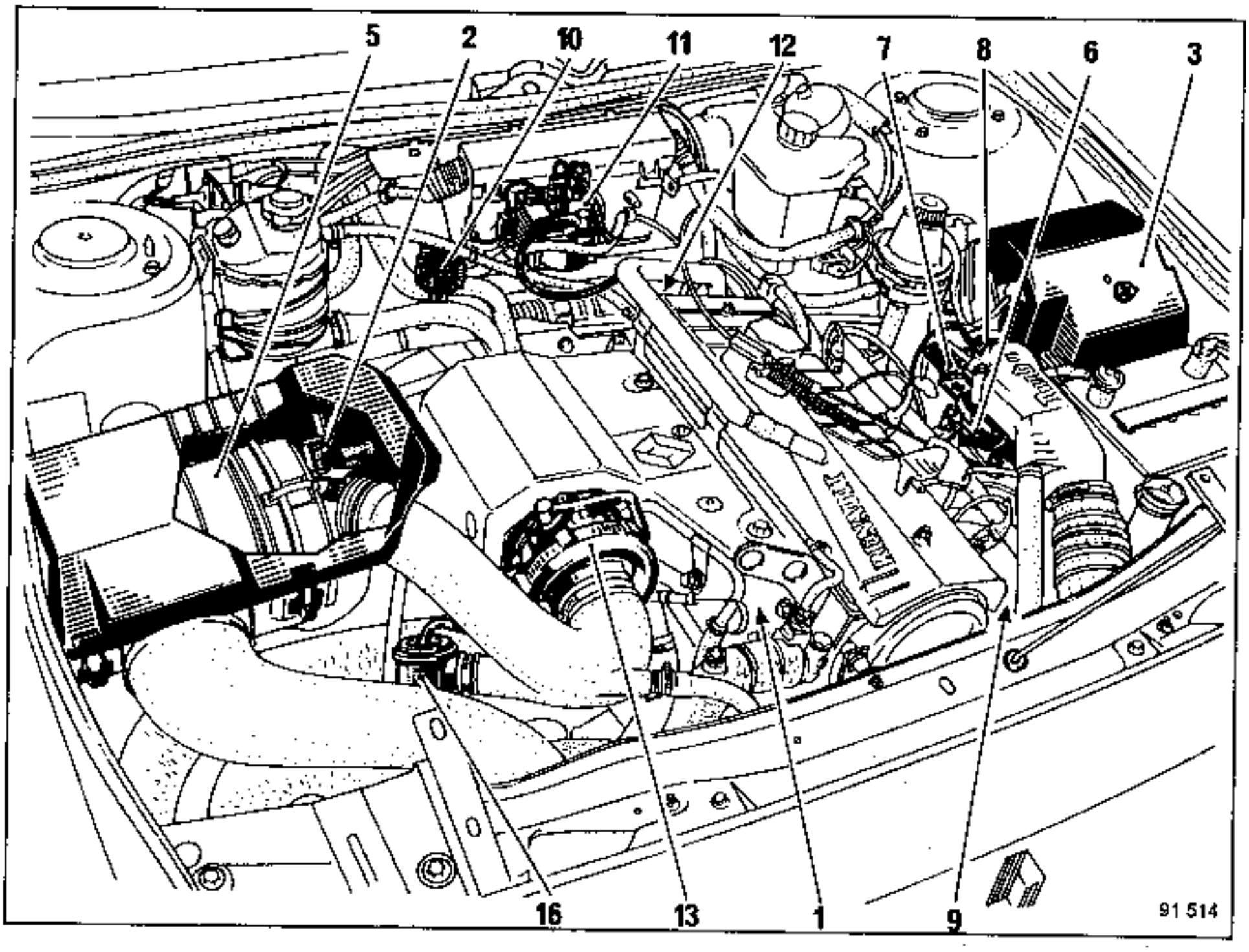
Vehicle Type	Engine	Turbocharger
RENAULT 21 X 488	J8S 714 J8S 742	GARRETT T2

Turbocharger	GARRETT T2	Turbocharging pressure: 0.6 - 0.025 bars at 2500 ± 250 rpm. Static opening pressure: 730 ± 30 mbars for an adjusting rod travel of 0.38 ± 0.02mm.

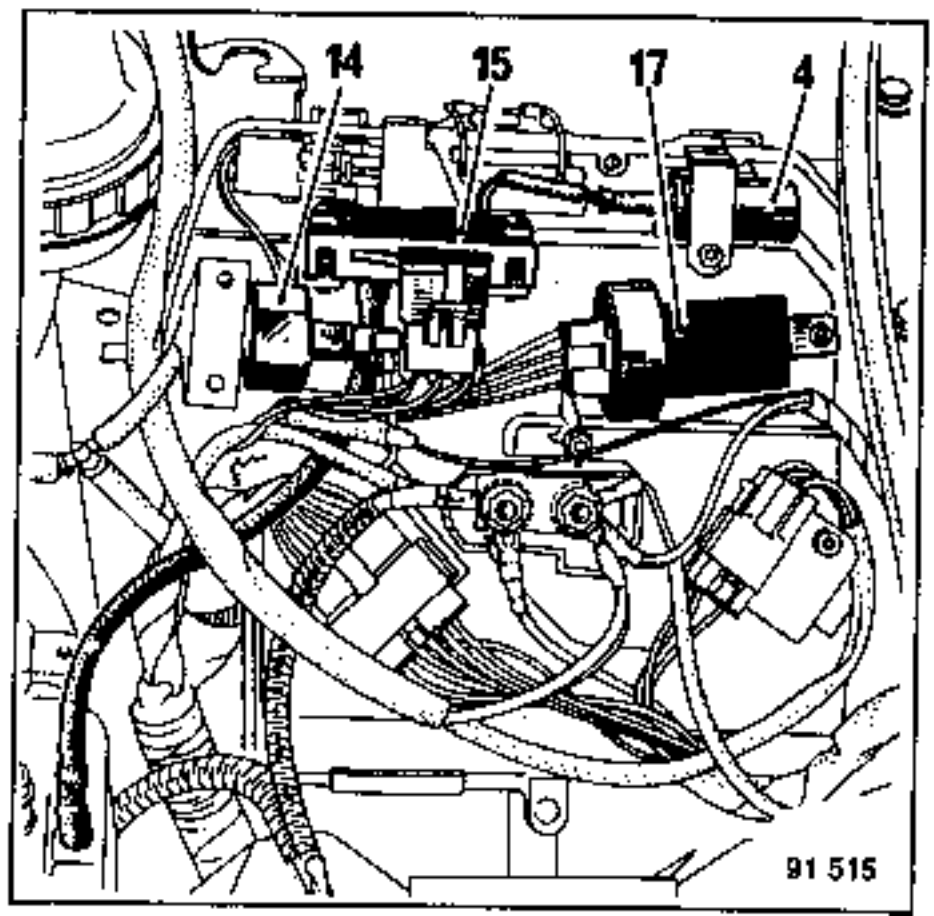
Vehicle Type	Engine	Turbocharger
RENAULT 21 X 485	J7R 752	GARRETT T3 with electronic turbocharging regulation

Turbocharger	GARRETT Type T3 with pressure limiting valve: Static pressure 520 ± 30 mbars for an adjusting rod travel of 0.38 ± 0.02mm
Turbocharging pressure (at full load, on the open road) NOTE: The maximum pressure is controlled by a solenoid valve operated by the injection computer.	Manifold pressure (measured with the XR 25) 900 ± 50 mbars between 2500 & 4000 rpm. (1,900 ± 50 mbars absolute pressure) 800 ± 50 mbars at maximum speed (1,800 ± 50 mbars absolute pressure)
Engine pressure safety switch	Operating pressure: 1,300 to 1,480 mbars
By-pass valve	Opens at a vacuum of: 200 ± 20 mbars

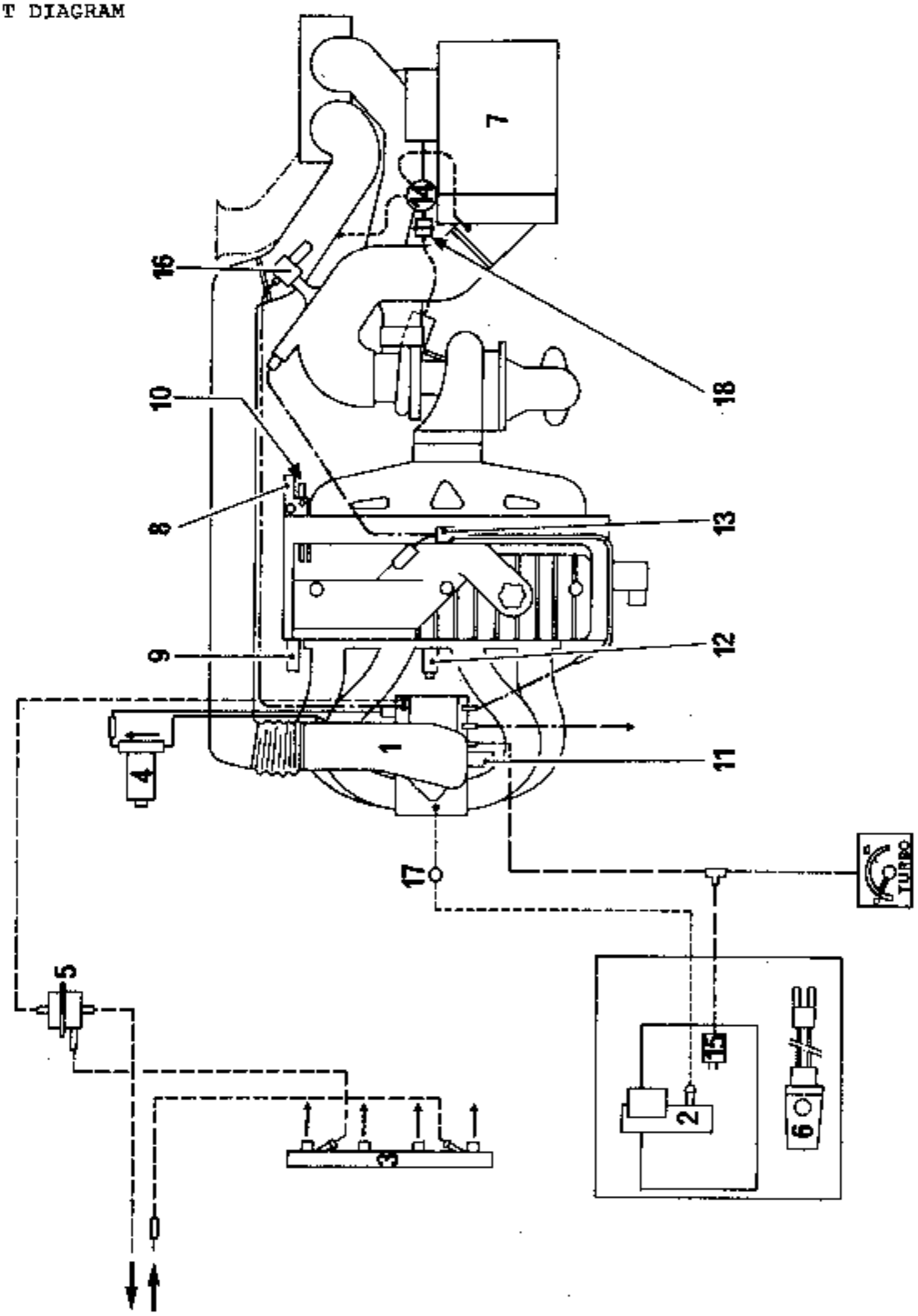
POSITIONS OF COMPONENT UNITS



1 - Coolant temperature sensor
2 - Turbocharging pressure regulator solenoid valve
3 - Computer + protective casing
4 - Idling adjustment potentiometer (CO%)
5 - Air filter
6 - Throttle unit
7 - Throttle potentiometer
8 - Air temperature sensor
9 - Idling speed regulator valve
10 - Diagnostic plug
11 - Ignition module
12 - Distributor
13 - Turbocharger
14 - Turbocharging pressure limiting pressure switch
15 - Pressure sensor
16 - By-pass valve
17 - Electric coolant pump timed relay



PIPE CIRCUIT DIAGRAM



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1 - Throttle unit
2 - Absolute pressure sensor
3 - Fuel injection gallery
4 - Electronic idling regulator
5 - Fuel pressure regulator
6 - Idling mixture potentiometer
7 - Resonator type air filter
8 - Coolant output pipe
9 - Combined temperature switch/ thermistor
10 - Coolant temperature sensor
11 - Air temperature sensor
12 - Pinking detector
13 - Non-return valve
14 - Turbocharging circuit pilot solenoid valve
15 - Turbocharger safety pressure switch
16 - Turbocharger by-pass valve
17 - 1.5mm diameter jet
18 - Resonator

ESSENTIAL SPECIAL TOOLS	
Mot. 1014	Turbocharging pressure checking and adjusting kit

CHECKING - REPLACING AND ADJUSTING THE TURBOCHARGING PRESSURE REGULATOR GATE)

The performance and reliability of a turbocharged petrol engine depends directly on the turbocharging pressure regulator adjustment. It is essential to adjust this component to the specified adjustment figures.

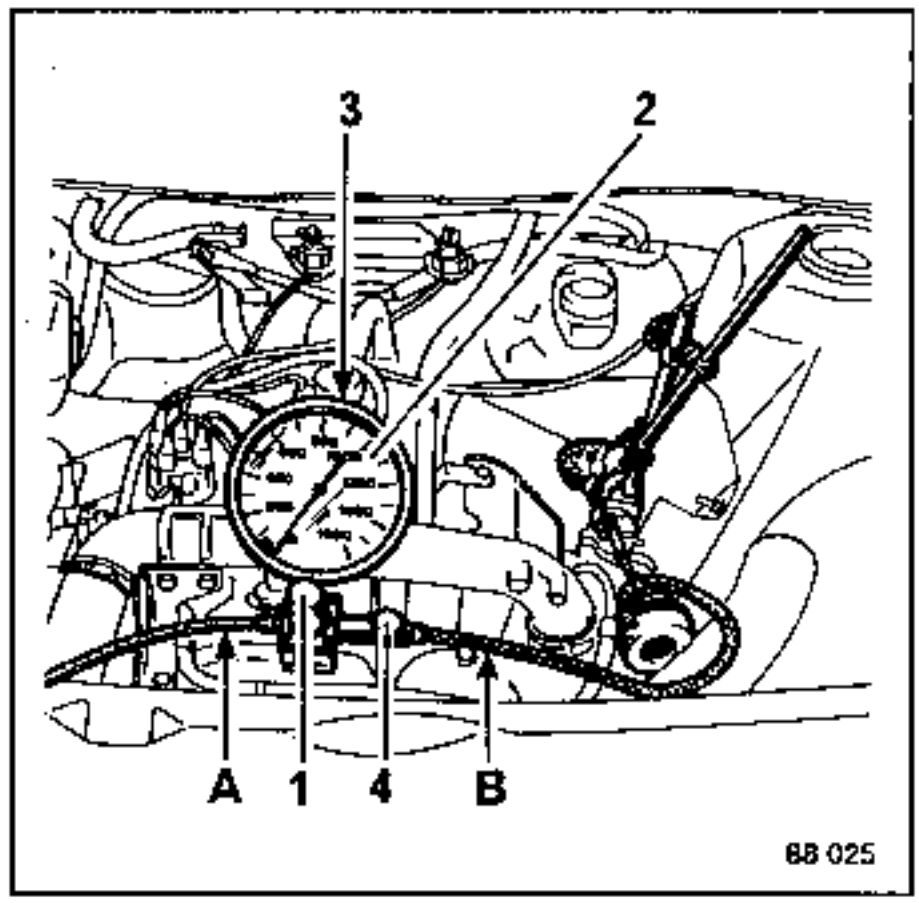
Checking, adjusting or replacing the turbocharging regulator can be carried out with the engine still on the vehicle and the turbocharger in place, by removing the adjacent components such as the heat shield, air filter and its support.

CHECKING AND ADJUSTMENT FIGURES

Checking Figure	Adjustment Figure	Adjustment Rod Travel
490 to 550 mbars	520 to 550 mbars	0.36 to 0.40 mm

METHOD OF USING SPECIAL TOOL KIT Mot. 1014

This kit consists of an adjustable pressure reducing valve (1), a test pressure gauge (2) graduated from 0 to 1.6 bars, fitted with a zeroing screw (3) and a leak screw (4).



Before using the equipment, zero the pressure gauge (screw 3), fully unscrew the pressure reducing valve screw (1) and the leak screw (4) and connect the inlet pipe (A) to the compressed air supply.

Connect the output pipe (B) to the take-off point on the turbocharging pressure regulator under test and tighten the leak screw (4).

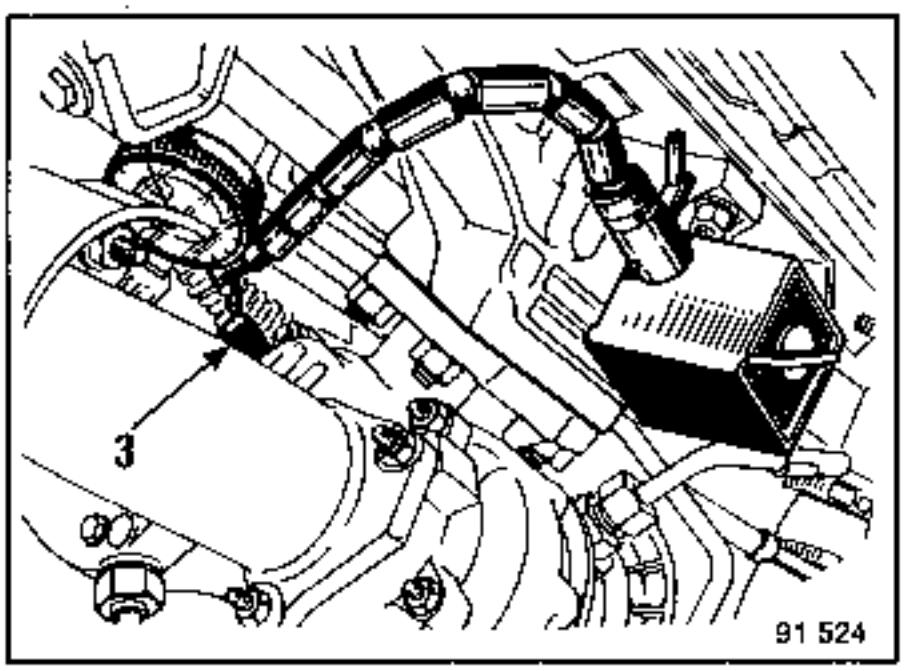
Then slowly screw in the screw on the pressure reducing valve (1) to obtain the required air pressure or the specified regulator rod travel (one stabilizes the pressure by slightly turning back the screw (1).

CHECKING THE SETTING PRESSURE

Remove the heat shield, the air filter and its support.

Disconnect the hose from the regulator unit take-off and connect tool Mot.1014.

Place a dial indicator, mounted on a magnetic base secured to the exhaust manifold, against the end of the adjusting rod (3) and zero the dial indicator.



Slowly increase the pressure until the adjusting rod has moved by 0.38 ± 0.02mm and note the pressure gauge reading which should be within the checking values stated.

If the setting pressure is outside these tolerances, replace the regulator unit (punch marked end fitting and rod) or adjust it (rod "sealed" with a dab of lacquer).

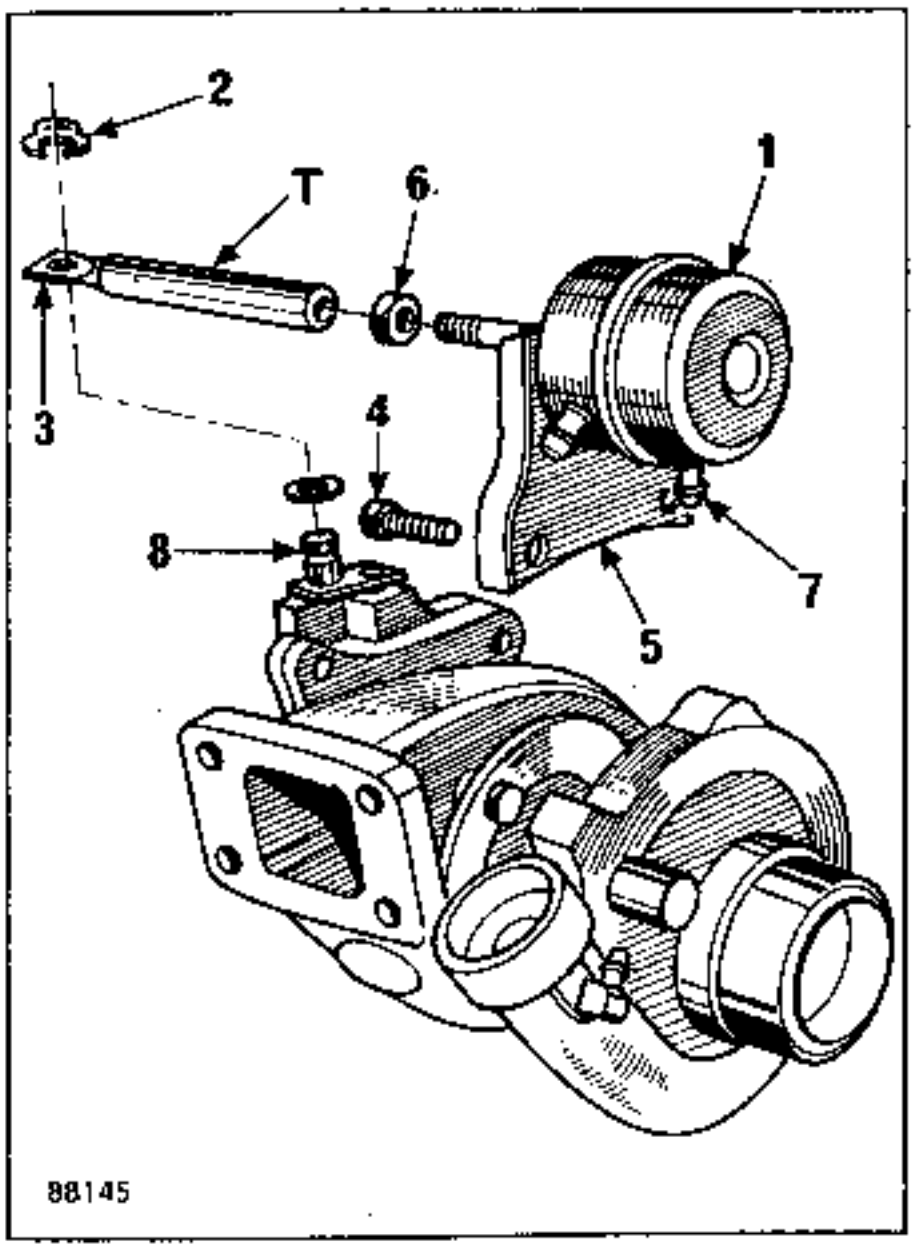
REPLACING THE REGULATOR UNIT

It may be necessary to remove the turbocharger coolant input pipe to facilitate access to the regulator unit.

Disconnect the pipe connected to the regulator unit (1).

Remove the circlip (2) and take off the screwed end fitting (3).

Remove the securing bolts (4) and take off the regulator unit.



Place the new unit in position, securing it with new bolts (tightening torque 1.65 to 1.85 daN.m).

Tighten the locknut (6) and the screwed end fitting (3) on the rod.

ADJUSTING THE SETTING PRESSURE

NOTE: Regulators the end fitting of which is locked by punching cannot be adjusted.

Connect tool Mot. 1014 to the take-off point (7) and apply the specified air pressure (see chart).

WARNING:

Ensure that there is no air leakage from between the pressure gauge and the regulator unit.

Push down the valve control arm (8) to keep the valve closed.

In this position, adjust the end fitting (3) so that the hole in its clevice just fits over the control arm (8) when it is held in the valve closed position.

Allow the pressure at the take-off point (7) to drop to zero.

Mount a dial indicator, with a magnetic base, against the end of the adjusting rod and zero the dial indicator.

Slowly increase the pressure until the adjusting rod has moved by 0.38 ± 0.02mm and note the pressure gauge reading, which should be within the tolerances (adjusting pressure) stated on the chart.

If the pressure is outside these tolerances, alter the position of the screwed end fitting (3) (screw it in to increase the pressure or screw it out to reduce the pressure) until the adjusting pressure required is obtained.

Screw up the locknut (6) against the end fitting (3) and tighten it to a torque of 0.6 to 0.7 daN.m

Apply a dab of paint across the locknut and end fitting (area T).

Tube of high temperature paint:
Part No. 77 01 407 679.

WARNING:
Do not get any of the paint on the smooth part of the regulator rod.

ENGINE TURBOCHARGING PRESSURE

Use tester XR 35 to check the actual turbocharging pressure (see injection system test procedure).

CHECKING THE SAFETY PRESSURE SWITCH

Remove the switch.

Connect it to tool Mot. 1014.

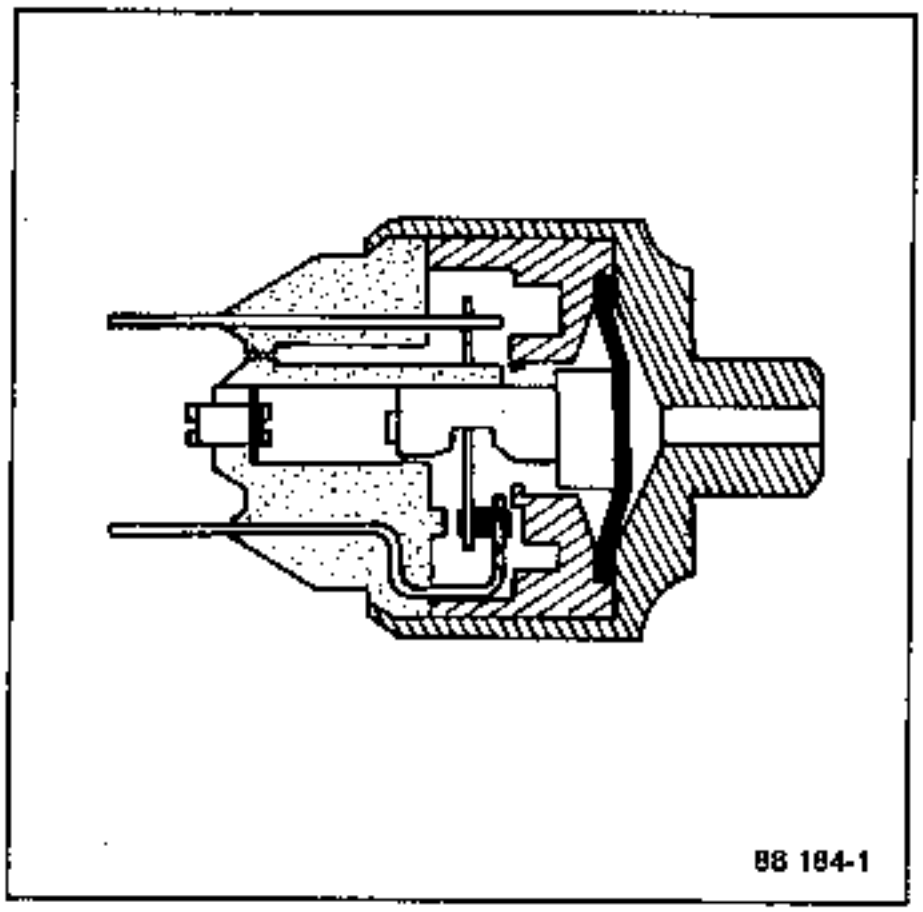
Connect up an ohmmeter.

Apply a rising pressure.

Pressure:
- less than 1,300 mbars
  resistance = 0 Ω

Pressure:
- 1,300 to 1,480 mbars
  resistance = infinity
  (check the readings with the pressure falling)

Pressure:
- approximately 1,100 mbars
  resistance = 0 Ω



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CHECKING THE AIR INTAKE SYSTEM FOR LEAKS

If the idling speed is unstable (hunting), check the condition of the air intake system pipes and connections.

At the same time check the no load/full load switch, which can cause similar symptoms.

FAULT FINDING USING THE XR 25

THE MEMORY FUNCTION

This is useful when carrying out road tests, if the warning light on the instrument panel switches on for a brief period (a flash of approximately 1 second). This function will place the readings on memory, and display them in the form of a bar graph.

Memory Selection (conditions)

The engine must be running or the vehicle moving: enter D 03, D 0 and then 0 at the moment that the warning light switches on or the defect occurs (a "Pip" will be heard and no. 20 on the bar graph will light up). Note down the various parameters held on memory. If the defect is not displayed, carry out several tests with the unit on memory, both with and without the defect, then compare the results.

Electronic turbocharger pressure correction

SOLENOID VALVE OPERATION

The computer controls the maximum turbocharging pressure by means of a solenoid valve, which oscillates at a frequency of 12 Hz. By doing this, the solenoid valve connects the waste gate through, alternately:

- either to the turbocharging pressure at the turbo outlet,

- or to the air intake pressure at the air filter.

The computer holds on memory the maximum turbocharging pressure, which it compares with the reading it obtains from the pressure sensor.

On the basis of the engine speed, the load and the pressure reading, the computer will apply either a positive or a negative correction. This reading can be obtained with tester XR 25 (code no. 20 which is the turbocharging pressure correction).

FAULT FINDING USING THE XR 25

INTERPRETING THE CORRECTION VALUES (no. 20)

(values noted with the engine stopped and the ignition on)

- Turbocharging pressure at its maximum with the computer limiting the pressure to the maximum permissible. In this case, the correction will be negative (0 to 17ms).

- Turbocharging at less than maximum pressure. The computer will correct the system to obtain the maximum permissible value.
  In this case, the correction will be positive (17 to 25.83 ms).

NOTE: A new computer which has never been used, or one on which the memory has been wiped, will show an intermediate reading of 17 ms.

Example of readings: on a vehicle which appears to lack power
Engine stopped - ignition on (no. 20 = 25.83 ms).

The reading shows a computer maximum positive correction if the turbocharging pressure is inadequate. Check the regulator setting, check the turbocharger circuit for leaks, and check its condition.

WARNING: The reading may be displayed or placed on memory on the XR 25 tester during a road test. However, the correction will vary following changes in the engine speed and the results will therefore have to be interpreted (see chart).

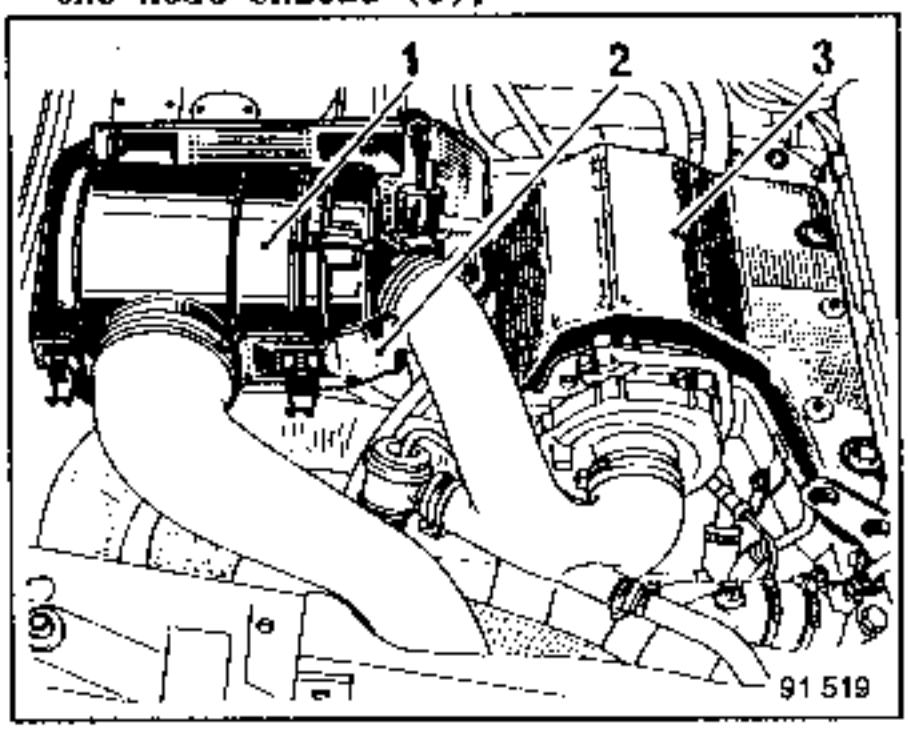
	Engine speed < 2 500 tr/min.	Engine speed < 5 600 tr/min.	Engine stopped Ignition on
Negative correction	0	0	0
Intermediate initial correction	Approximately 10	Approximately 14	17.00
Maximum correction	Approximately 15	Approximately 21	25.83

TURBOCHARGER

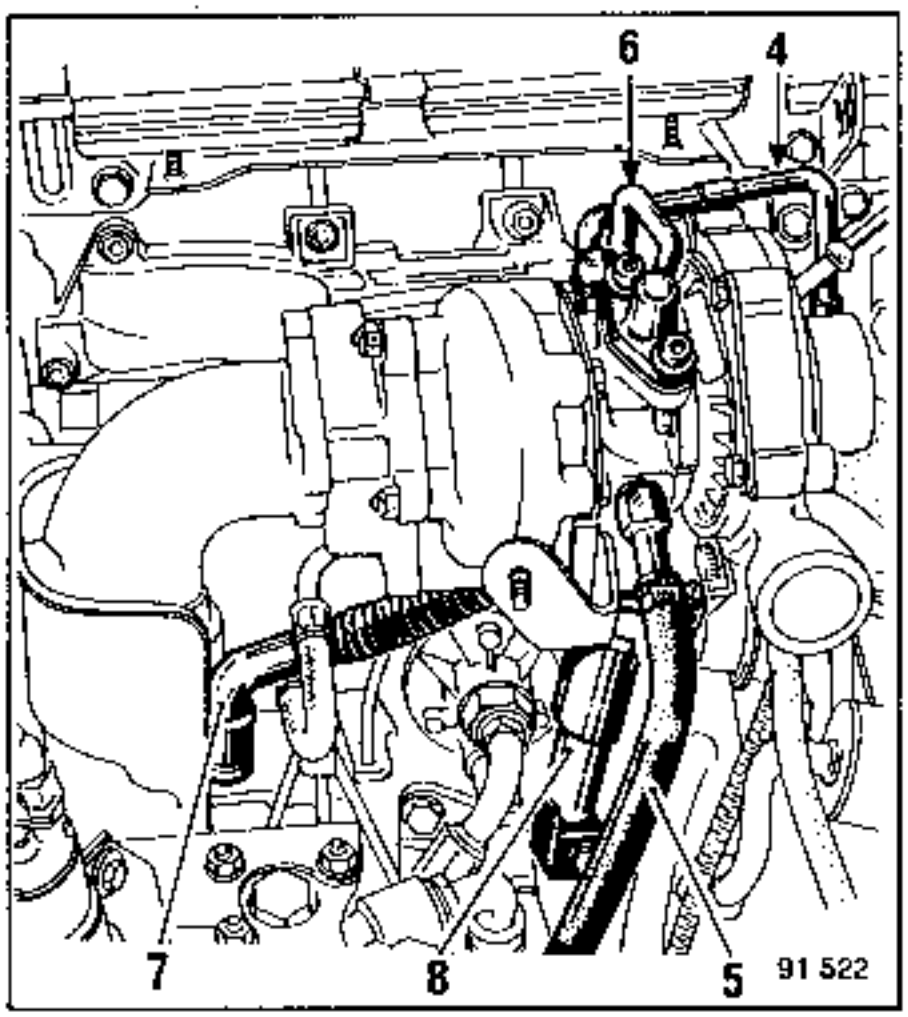
Removing:

Disconnect and remove, one after the other:

- the air filter and its ducting (1),
- the filter support (2),
- the heat shield (3),



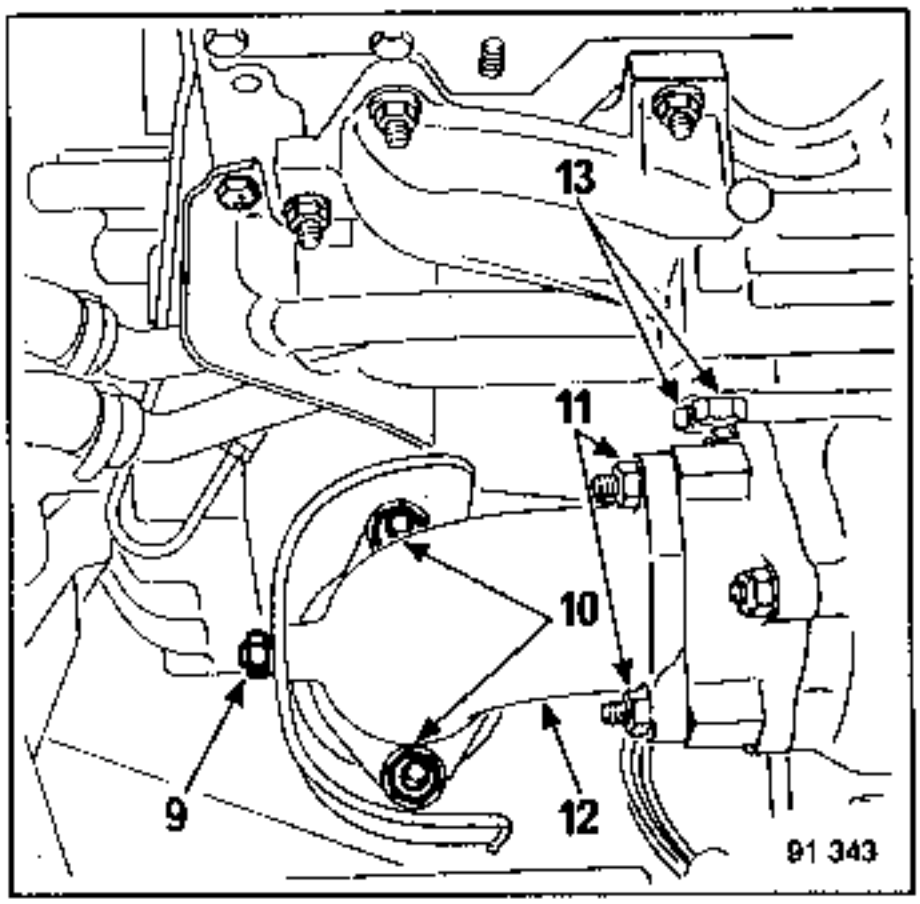
- the turbocharger air input and output ducts.



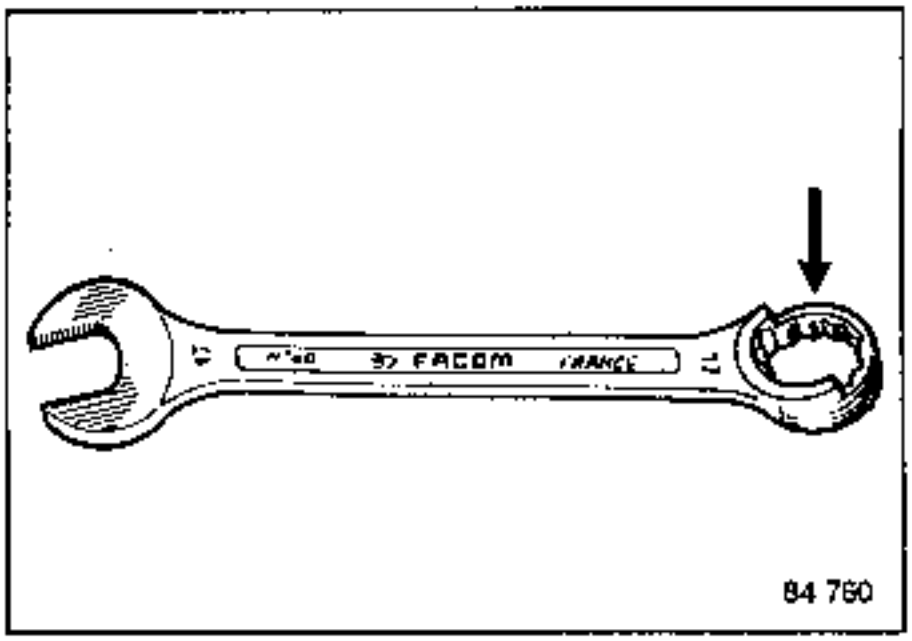
Pinch flat the coolant hoses (4) and (5) and disconnect them (clamps Mot. 453-01).

The oil input (6) and return (7) pipes and the support (8).

Remove the nut and the stud (9), the nuts (10) and (11), and take off the output elbow (12).



Using combination spanner FACOM No. 40, modified as shown in the illustration below, unscrew the turbocharger securing nuts (13) and remove it.



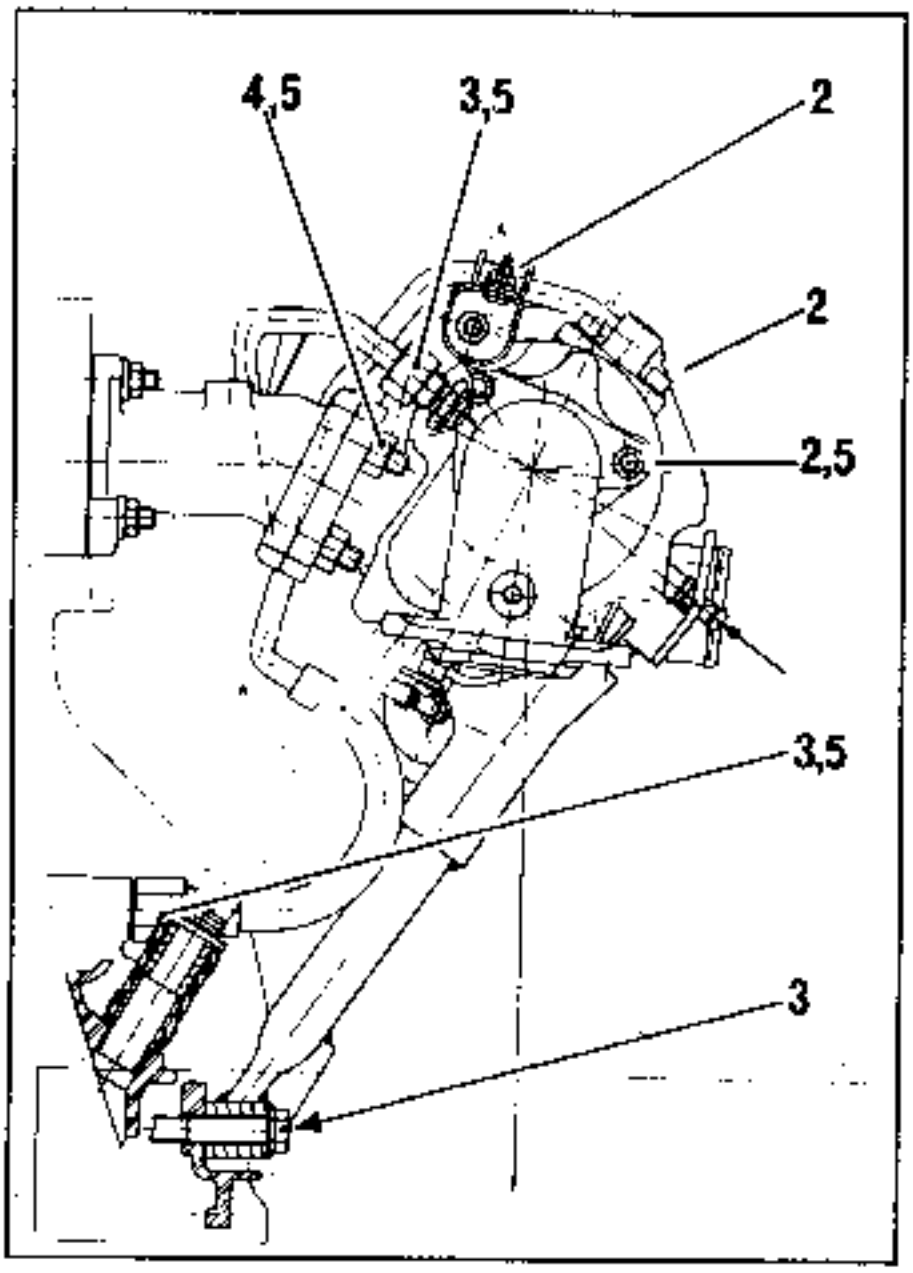
Refitting:

Thoroughly clean the joint faces on the exhaust manifold and the turbocharger and fit a new 'O' ring.

Replace the self-locking nuts securing the turbocharger to the exhaust manifold by new nuts ordered on the correct part number.

Replace the oil input and return seals.

TIGHTENING TORQUES in daN.m:



Fill the turbocharger with engine oil through the input hole.

Disconnect the 3 way connector from the ignition power module and turn the engine, with the starter, until oil runs out of the oil input union.

Tighten the oil input union. Reconnect the 3 way connector, start the engine and run it at idling to cause the oil to circulate.

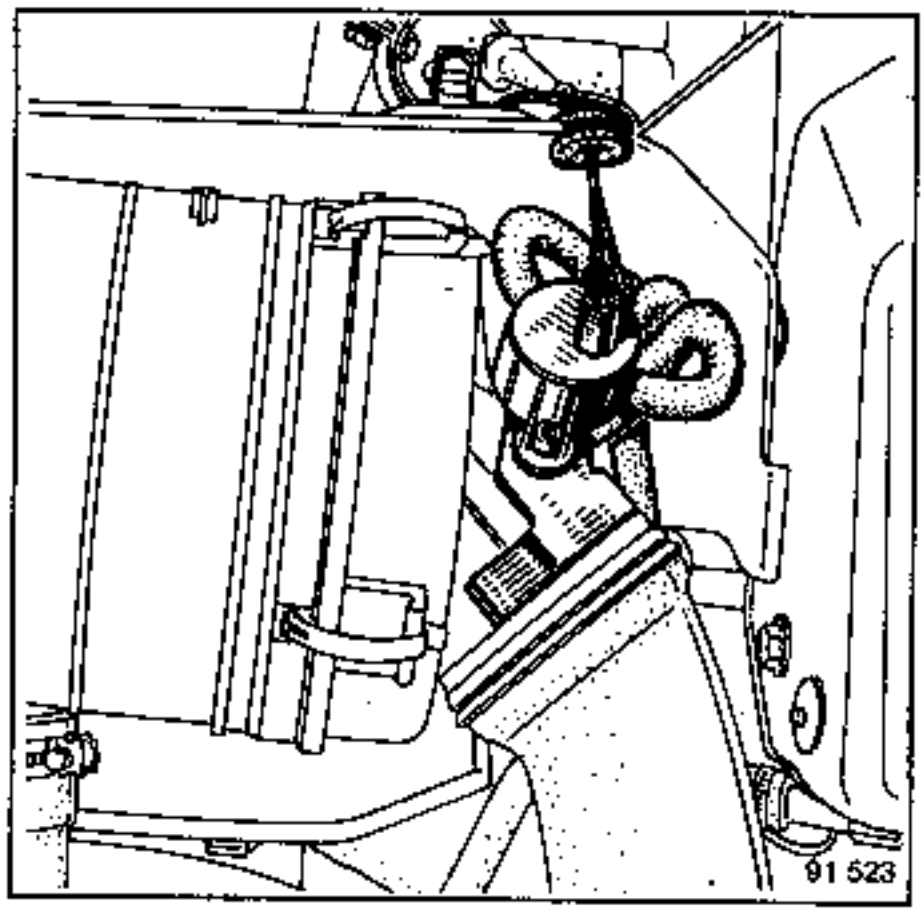
NOTE: Never run the engine with the air intake system disconnected.

TURBOCHARGING PRESSURE REGULATING SOLENOID VALVE

Removing:

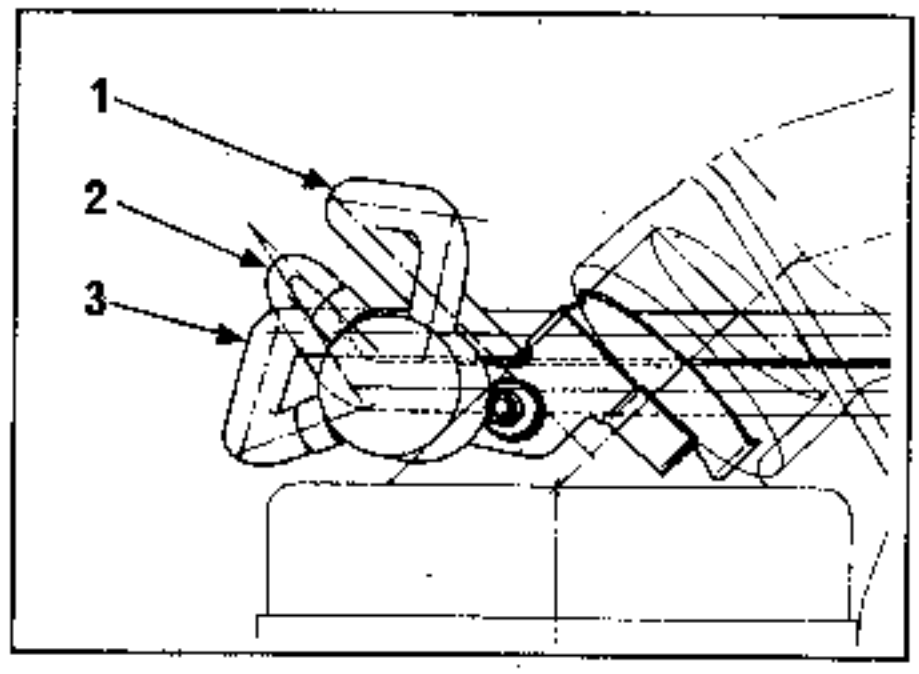
Remove the cover from the air filter support.

Disconnect the connector and the pipes and remove the solenoid valve and its support.



Refitting:

Ensure that the pipes are correctly connected.



1 - Air filter output (3.1mm ø jet)
2 - Intercooler output (2.3mm ø jet)
3 - Pressure regulator output

IDLING SPEED REGULATOR VALVE (1)

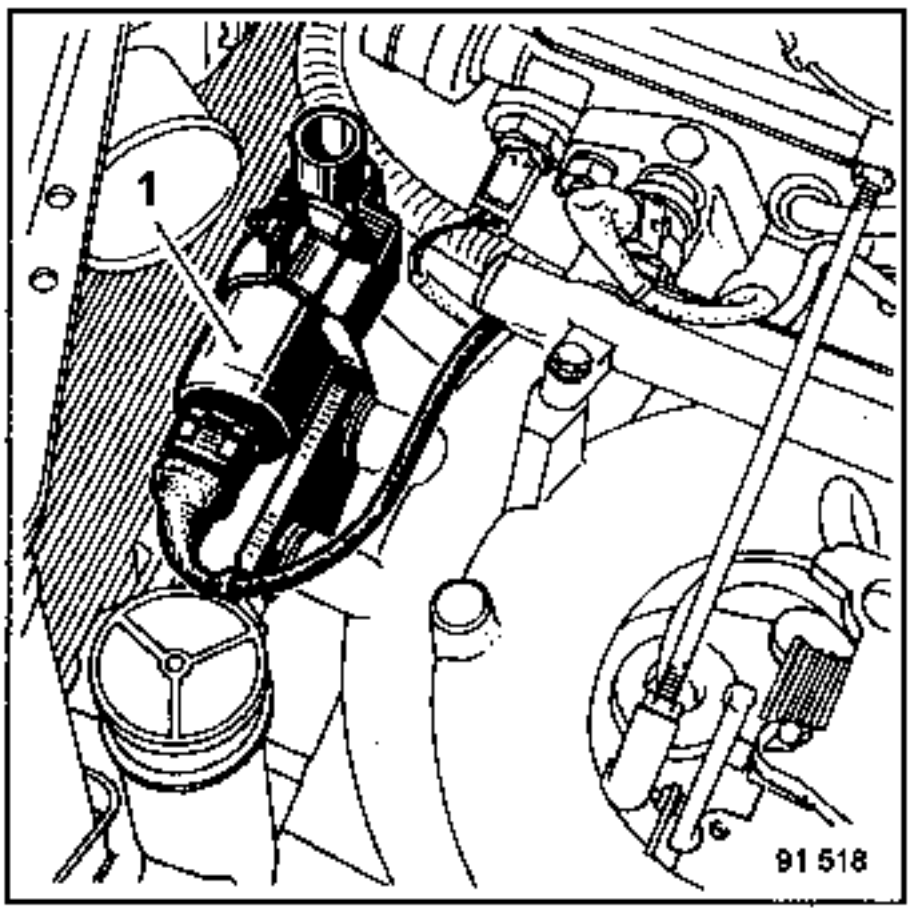
Removing:

Remove the air intake ducting above the throttle unit.

Disconnect:

- the connector which connects the regulator valve to the wiring harness,
- the air ducting,
- the screw from the regulator valve securing clip.

Remove the securing clip and take out the regulator valve.



Refitting:

IMPORTANT:

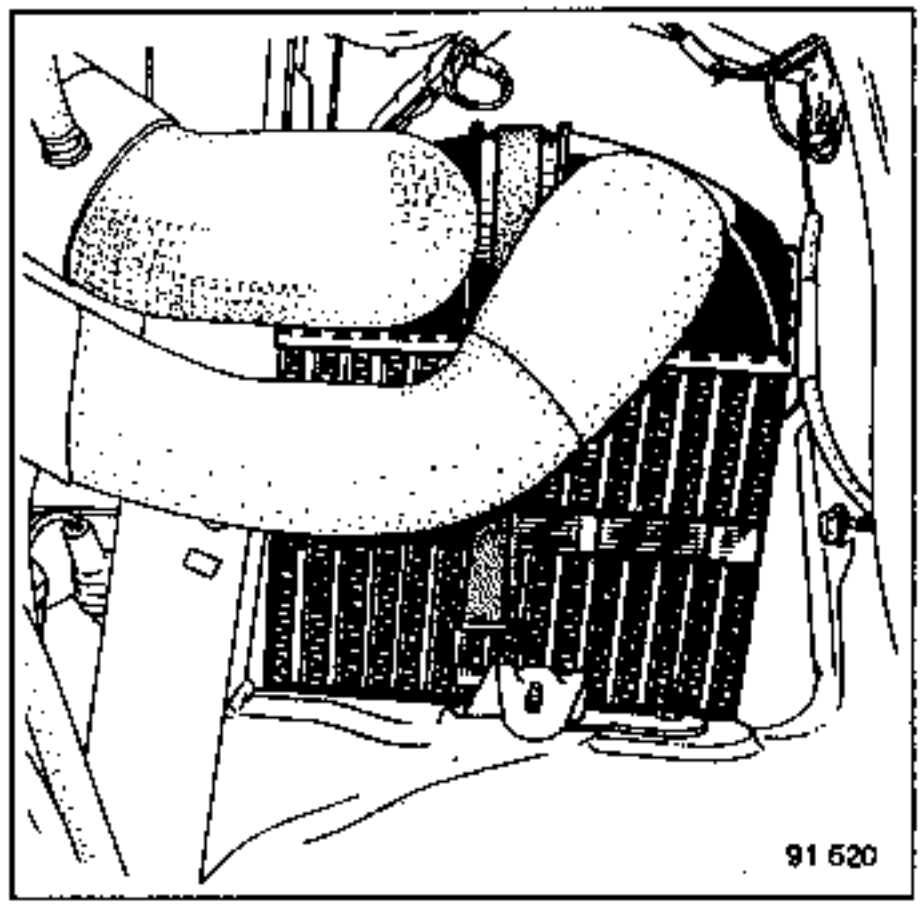
- Position the ducts so that they are not twisted or under stress.
- Ensure that the unit is the correct way round (the arrow on the bottom of the valve shows the direction of the air flow).

INTERCOOLER (under the air filter)

Removing:

Remove the air filter and its support.

Disconnect the 2 air ducts, free the strap and remove the intercooler from its location.



Refitting:

Ensure that the ducts securing clips are correctly tightened.

INTERCOOLER (on the front end panel)

To take out the intercooler, one must first remove the radiator grille and the cross member.

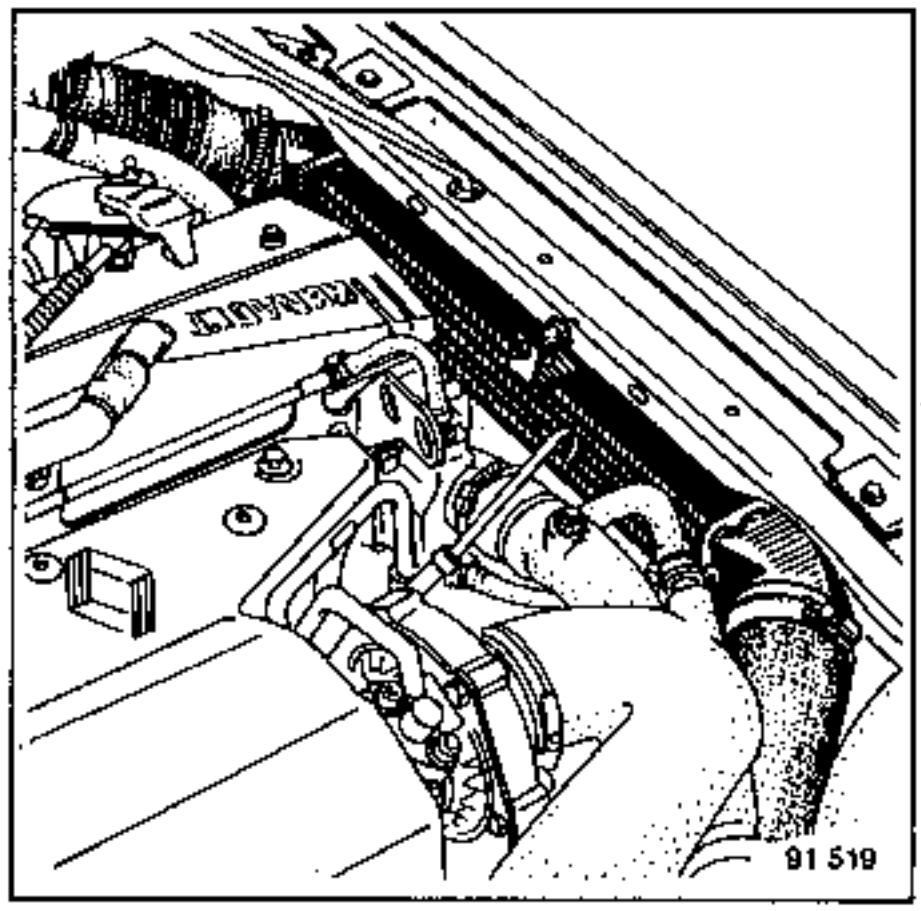
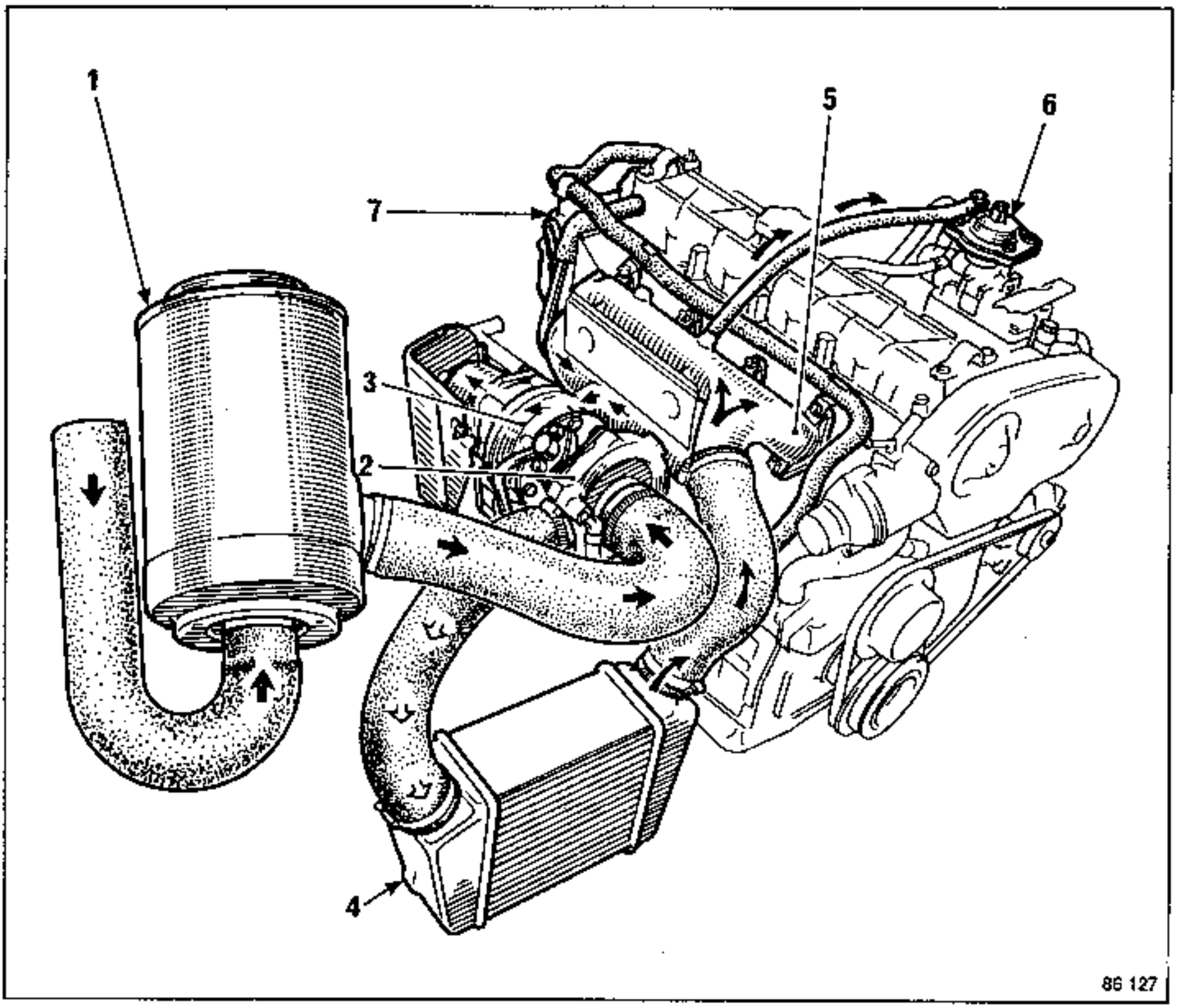


DIAGRAM OF AIR INTAKE SYSTEM



1 - Air filter

2 - Air intake compressor turbine

3 - Drive turbine operated by the exhaust gases

4 - Air intake intercooler

5 - Turbocharged inlet manifold

6 - Injection pump with "LDA" delivery corrector

7 - Oil drain casing

Air at atmospheric pressure

Turbocharged air

Turbocharged air after intercooling

Exhaust gases

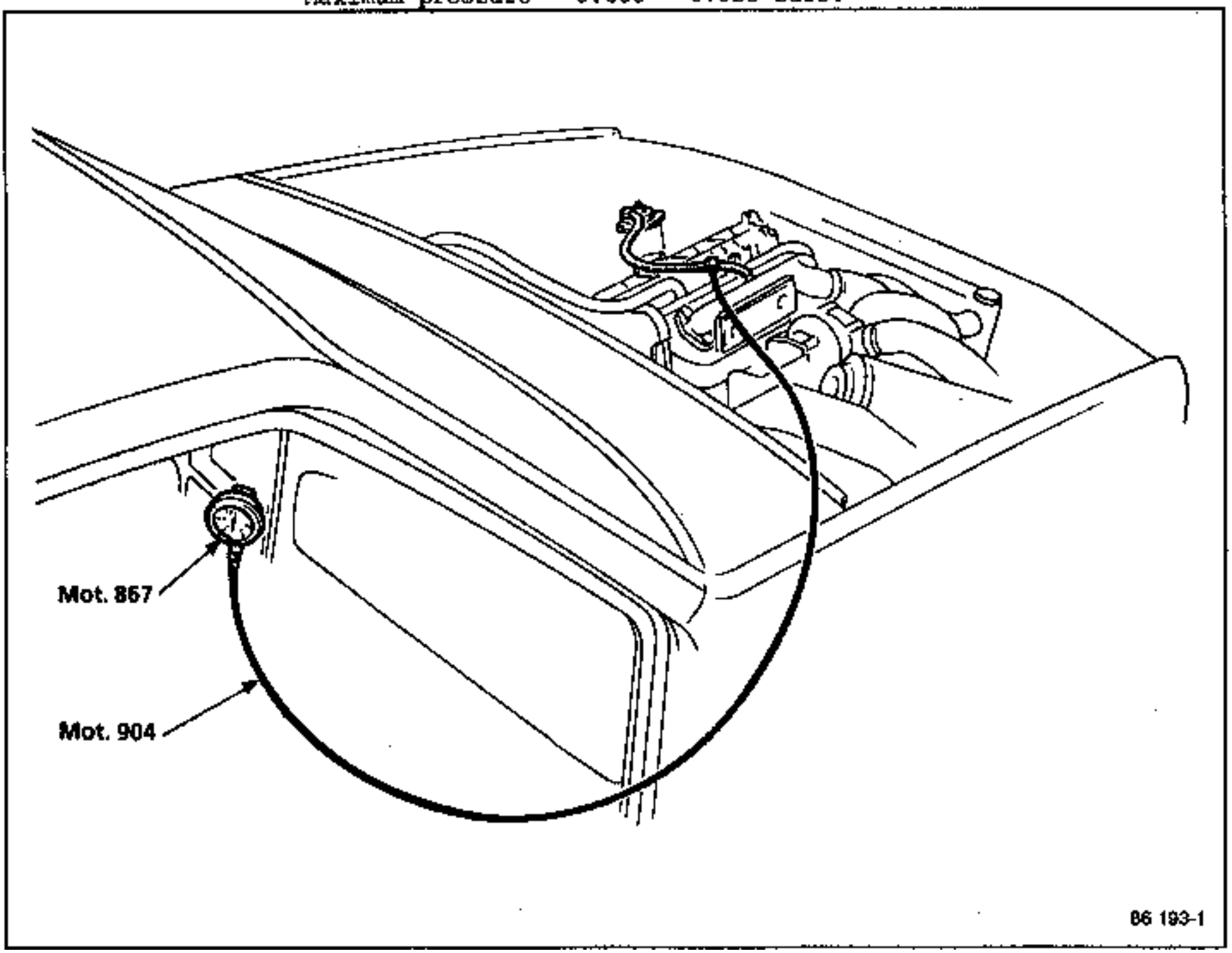
NOTE: The oil vapour from the crankcase condenses in casing (7) which is connected on one hand to the sump and on the other hand to the intake ducting on the input side of the turbocharger.

CHECKING THE TURBOCHARGING PRESSURE

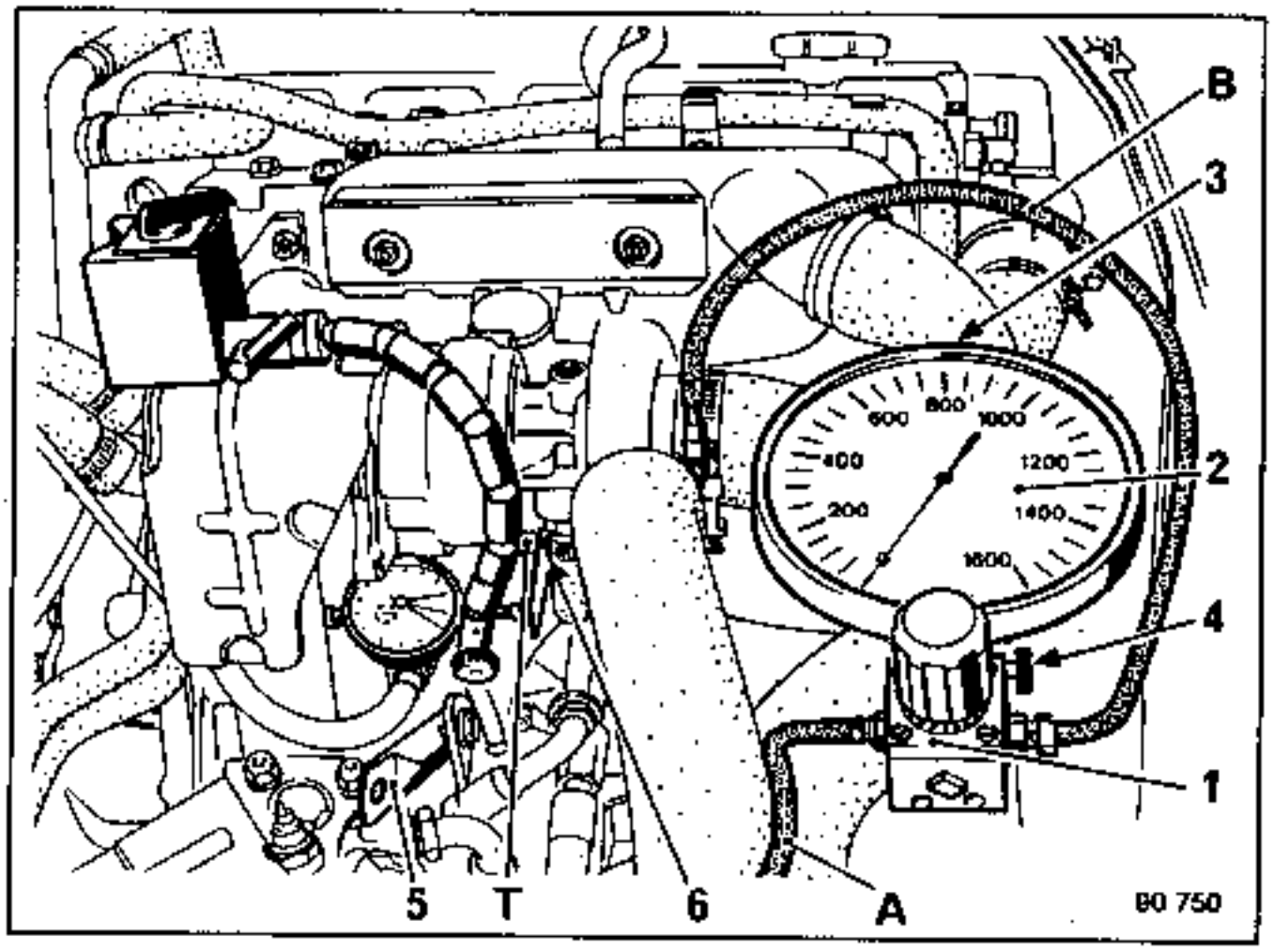
Connect pipe Mot.904 to the pipe which connects the inlet manifold to the "LDA" corrector on the injection pump and connect the other end to the pressure gauge from kit Mot.867.

Pass the pipe outside the bonnet (along the wing seal, securing it in place with adhesive tape, in such a way as to avoid any sharp edges that might cut it), then pass it through the front right hand window and hook the pressure gauge to the instrument panel.

Note the maximum turbocharging pressure when the engine is under load and running at 2 500 rpm $\pm$ 250 rpm.
Maximum pressure = 0.600 $\pm$ 0.025 bars.



CHECKING THE PRESSURE AT WHICH THE REGULATOR OPENS



METHOD OF USING TOOL KIT Mot.1014

This kit consists of an adjustable pressure reducing valve (1), a pressure gauge (2) graduated from 0 to 1.6 bars, fitted with a zeroing screw (3) and a leak screw (7).

Before using the equipment, zero the pressure gauge (screw 3) and fully unscrew the screw (1) on the pressure reducing valve and the leak screw (4). Connect the inlet pipe (A) to the compressed air supply.

Connect the output pipe (B) to the take-off on the turbocharging pressure regulator to be tested. Tighten screw(4).

Then slowly screw in the screw on the pressure reducing valve (1) until the required air pressure or the travel specified for the pressure regulator rod (the pressure is stabilized by slightly turning back the screw (1)is obtained).

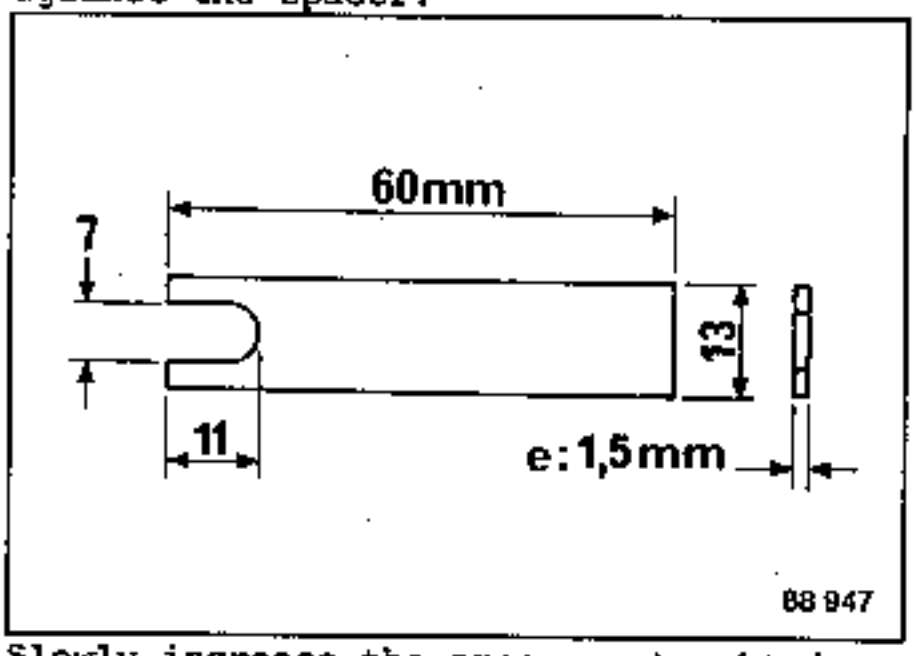
CHECKING THE CALIBRATION PRESSURE

Disconnect the oil input and the turbo-charger support (5).

Disconnect the hose from the take-off point on the regulator unit and connect up equipment Mot.1014.

Make up a spacer to the dimensions shown in the drawing below and clamp it between the rod (1) and the nut (6).

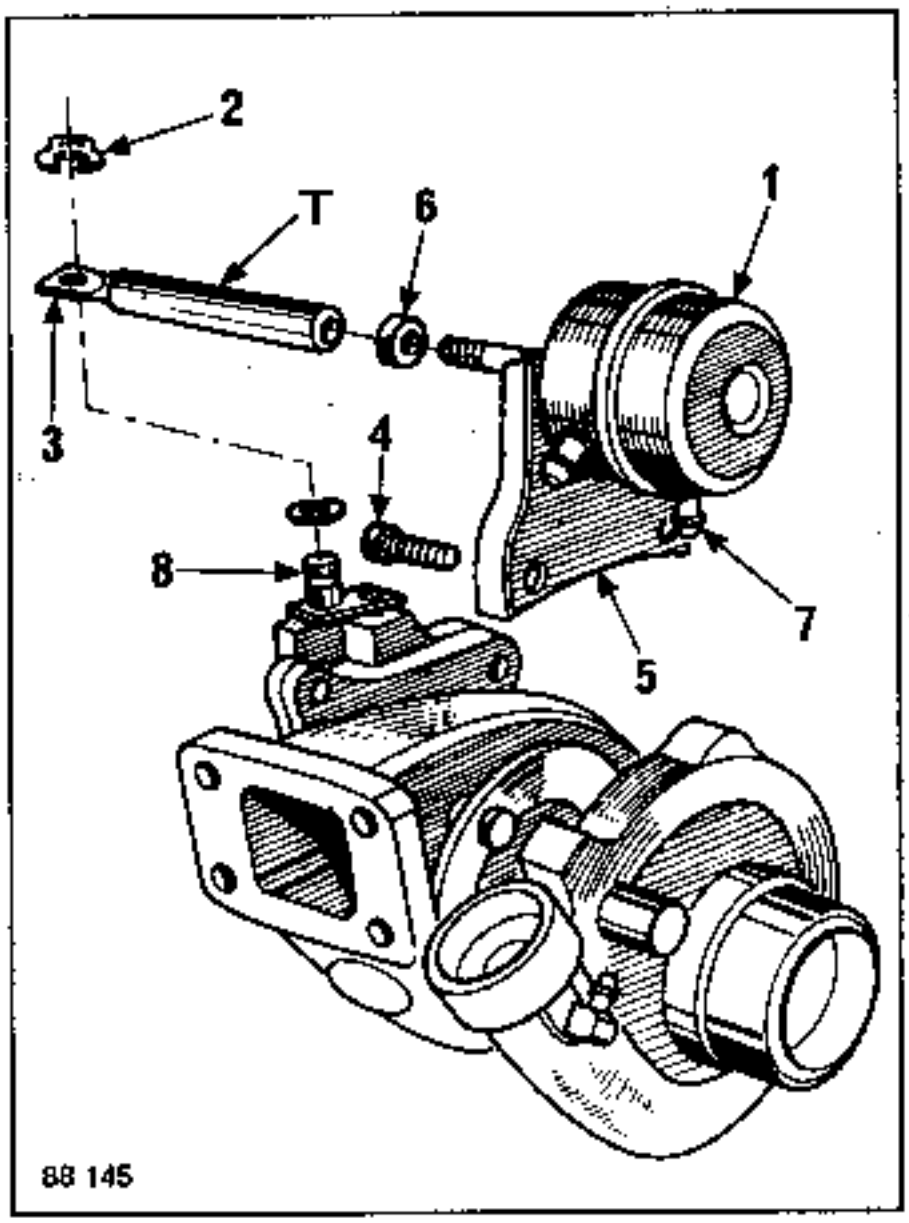
Place a dial indicator, mounted on the heat shield with a magnetic base, against the spacer.



Slowly increase the pressure to obtain a movement of the adjusting rod of 0.38 $^{+}_{-}$ 0.02mm and note the pressure gauge reading, which should be within the test figures stated.

If the calibration pressure is outside these tolerances, replace the regulator unit (punch locked end fitting) or adjust it (end fitting "sealed" with a dab of lacquer).

REPLACING THE REGULATOR UNIT



88 145

Disconnect the hose from the regulator unit (1).

Remove the circlip (2) and take off the screwed end fitting (3).

Remove the securing screws (4) and take off the regulator unit.

Place the new regulator unit in position and secure it with new screws (tightened to between 1.6 and 1.8 daN.m).

Tighten the locknut (6) and the screwed end fitting (6) on the rod.

ADJUSTING THE CALIBRATION PRESSURE

Connect tool Mot.1014 to the take-off point (7) and apply the specified adjusting pressure.

Test Pressure	Adjusting Pressure	Adjusting Rod Travel
640 to 700 mbar	670 to 700 mbar	0.36 to 0.40 mm

WARNING:

Ensure that there are no air leaks between the pressure gauge and the regulator unit.

Press down the valve control arm (8) to keep the valve closed.

Under these conditions, adjust the position of the end fitting (3) so that the hole in its clevice just fits over the control arm (8) when it is still held in the valve closed position.

Lower the pressure at the take-off point (7) to zero.

Mount a dial indicator, using a magnetic base, so that its plunger rests against the end of the adjusting rod and zero the dial indicator.

Slowly increase the pressure to obtain an adjusting rod movement of 0.38 ± 0.02mm and note the reading on the pressure gauge which should be within the adjustment pressure tolerances stated on the chart.

If the pressure is outside these tolerances, change the position of the screwed end fitting (3) (screw it in to increase and unscrew it to reduce the pressure) until the specified adjustment pressure has been obtained.

Bring the locknut (6)against the end fitting (3) and tighten it to between 0.6 and 0.7 daN.m.

Apply a dab of paint across both locknut and screwed end fitting.

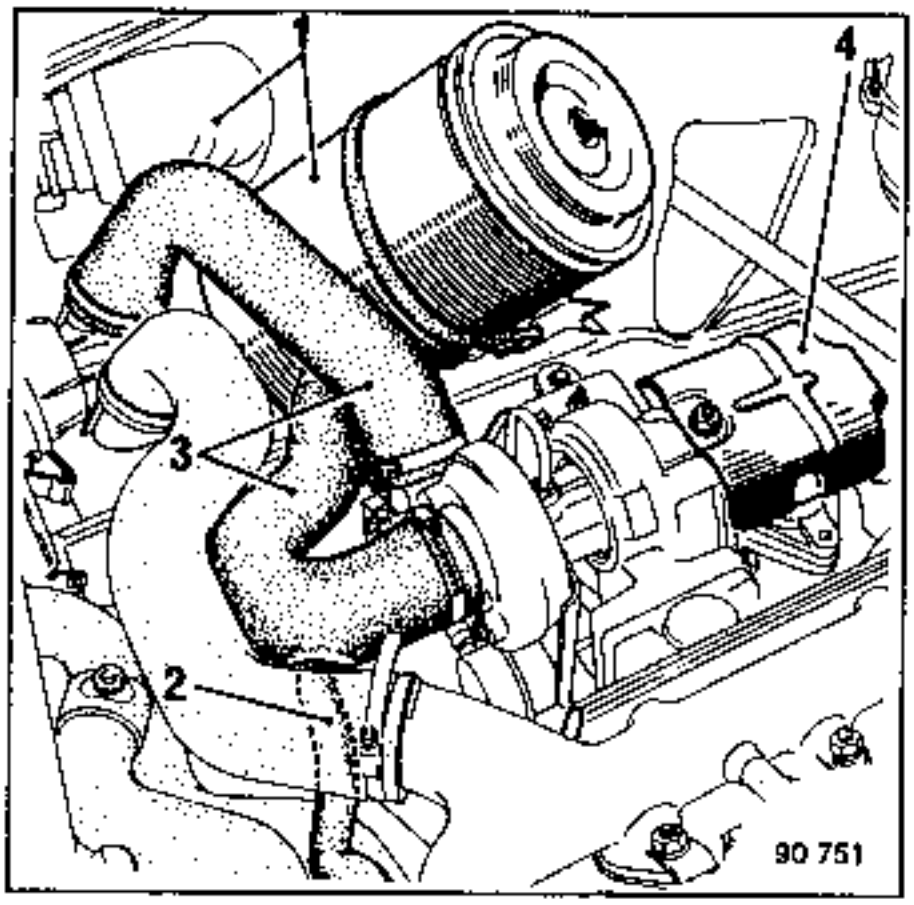
WARNING:

Do not get any of the paint on the smooth part of the regulator rod (part no. 77 01 407 679).

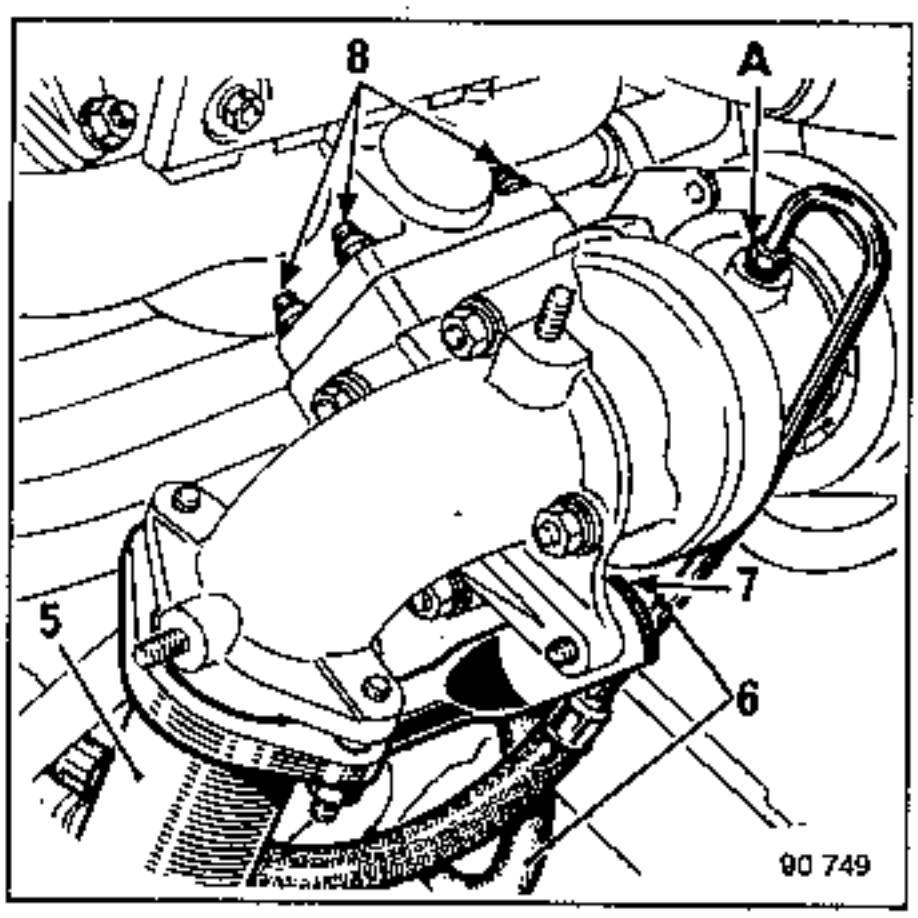
REMOVING - REFITTING

Removing:

Remove, one after the other:



- the air filter and its duct (1) and disconnect the crank case vapour re-intake pipe (2),
- the turbocharger input and output ducts (3),
- the heat shield (4),



- the exhaust downpipe (5),
- the oil input and return pipes (6),
- the support brackets (7),
- the turbocharger securing bolts (8) and remove the turbocharger.

Refitting:

Thoroughly clean the joint faces on the exhaust manifold and the turbocharger.

Replace the self locking nuts which secure the turbocharger to the exhaust manifold by new nuts of the correct part number.

Connect up the oil return pipe and secure it with a new screw type hose clip.

Fill the turbocharger with engine oil through its input orifice (A).

Tighten the union on the oil input pipe and run the engine at idling speed to circulate the oil.

Carburettor Vehicles

ESSENTIAL SPECIAL TOOLS	
Mot. 213-01	Pressure gauge
Mot. 453-01	Hose clamp

TEST METHOD

Before disconnecting the pipe connecting the fuel pump to the carburettor, run the engine at idling speed to be sure that the fuel in the carburettor float chamber is at its maximum level.

Stop the engine.

Disconnect the output pipe from the pump.

Connect up pressure gauge Mot.213-01 (this requires a 6 x 8mm union and a hose with an inside diameter of 8mm).

Pinch flat the hose returning to the tank with a clamp Mot.453-01.

The test connection hose must be:

- transparent,

- as short as possible.

With the pressure gauge held as high as possible (hose roughly vertical), start the engine and run it at idling speed.

When the level of the fuel in the hose becomes stable, lower the pressure gauge until the fuel level is at the same height as the diaphragm in the pump.

Note the static pressure reading.

The static pressure, with no pump output, should be:

- min: 0.170 bars,

- max: 0.320 bars.

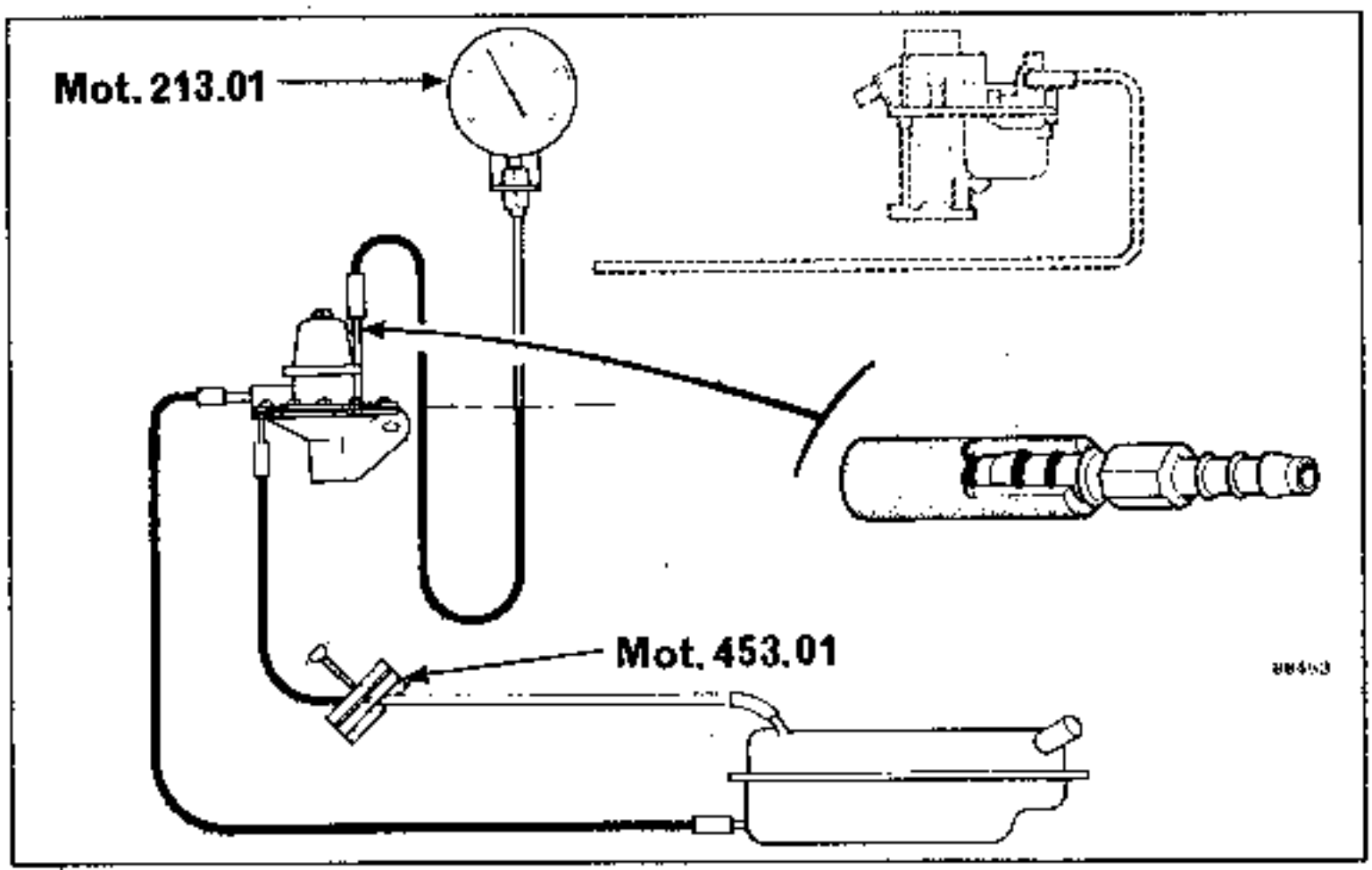
PRECAUTIONS

Under no circumstances must the pressure gauge be connected "in parallel".

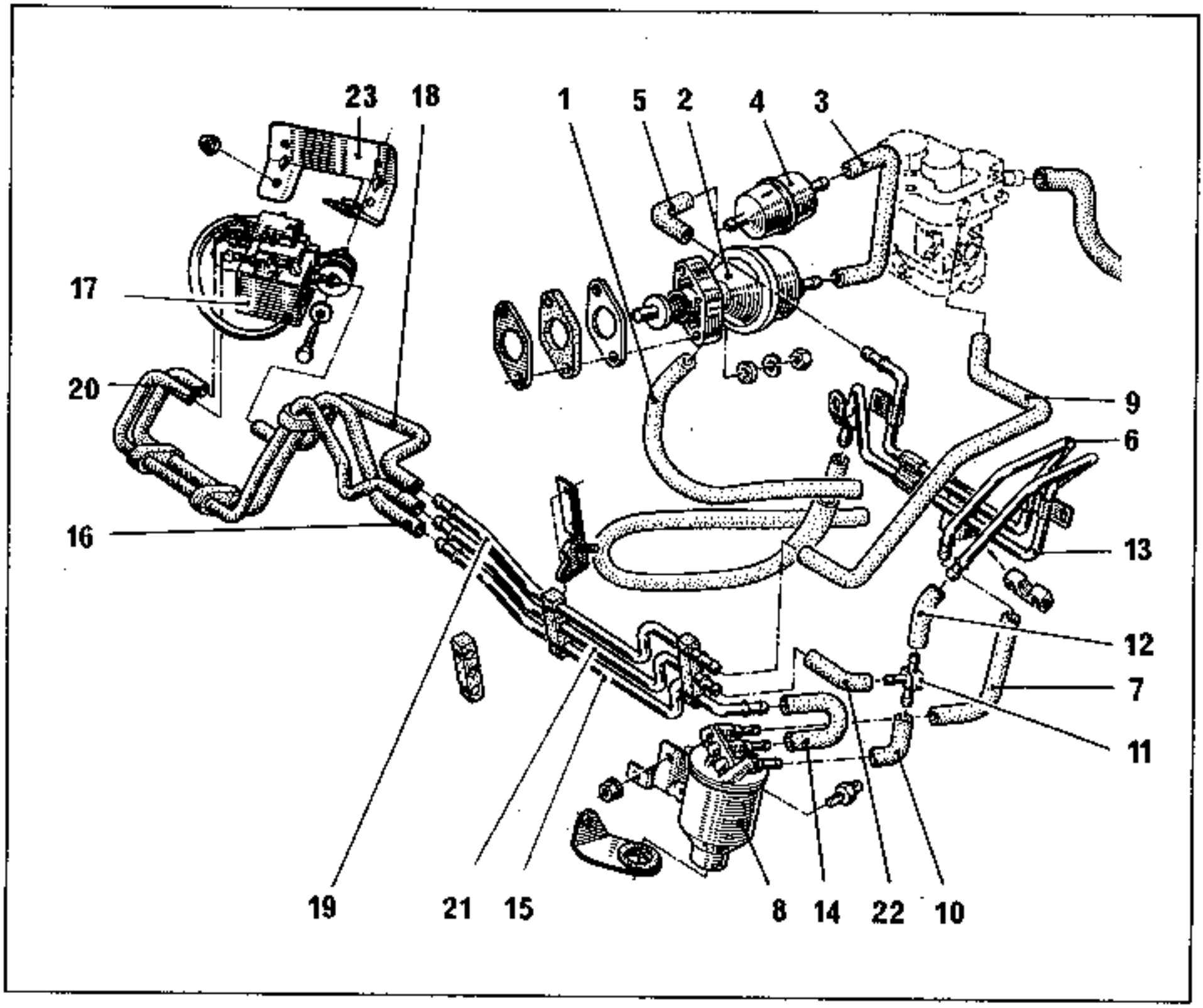
Checking the return to tank.

Check that the circuit is not blocked by loosening clamp Mot.453-01. The pressure should fall by 0.01 to 0.02 bars.

NOTE: For fuel injection vehicles, see MR INJ R(E)



A degassing valve is fitted between the fuel pump and the carburettor to improve starting when hot.



1 - Input pipe
2 - Fuel pump
3 - Pipe between pump and filter
4 - Fuel filter
5 - Connecting pipe
6 - Rigid fuel pipe on the engine
7 - Connecting pipe
8 - Degassing valve
9 - Pump between degassing valve and carburettor
10 - Connecting pipe
11 - "T" union
12 - Connecting pipe
13 - Rigid return pipe on engine
14 - Connecting pipe
15 - Rigid flow sensor input pipe
16 - Connecting pipe
17 - Flow sensor
18 - Connecting pipe
19 - Rigid pipe to carburettor
20 - Connecting pipe
21 - Rigid return to tank pipe
22 - Connecting pipe
23 - Flow sensor support

NOTE:

- components 10 to 12 and 14 to 23 are only fitted when the vehicle is fitted with a trip computer,
- on vehicles with no trip computer, pipes 10 and 12 and the "T" union 11 are replaced by a single pipe.

F2N... and C2J... Engines

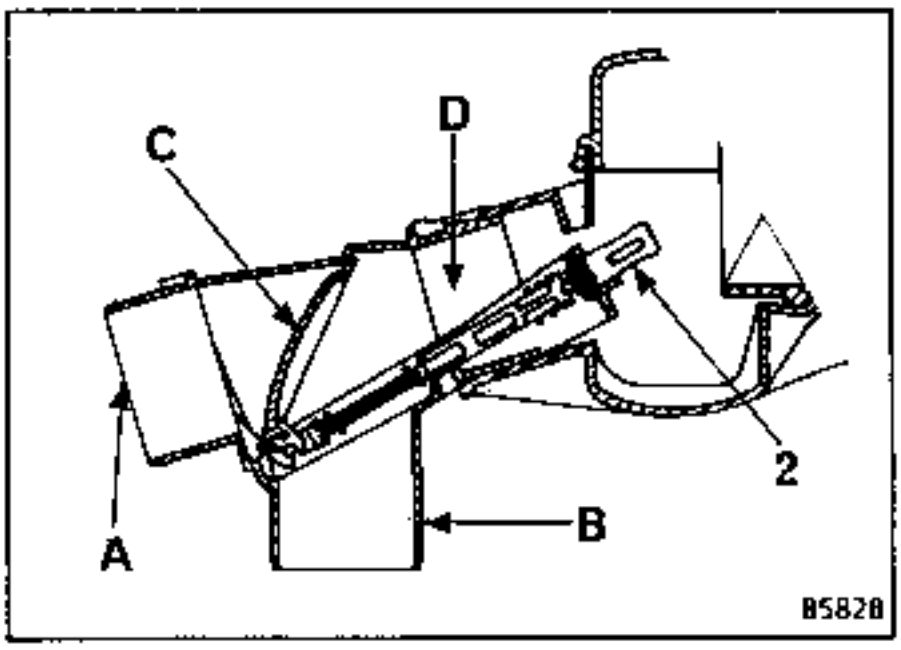
Vehicles fitted with F2N and C2J engines are equipped with an air intake heater.

DESCRIPTION

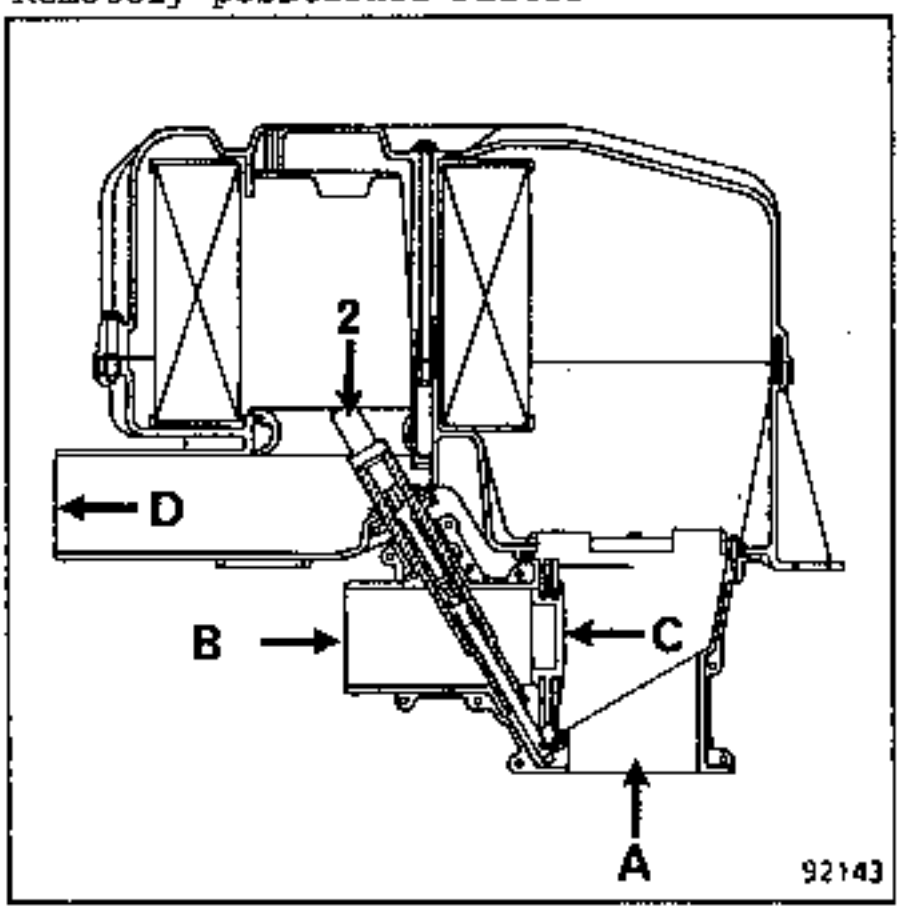
The system comprises an air filter with two inputs and a flap to control the amount of cold air entering the engine.

The control flap is operated by a wax element thermostat (2) mounted on the air filter body in the flow of mixed hot/cold air.

Filter Mounted on top of the Carburettor



Remotely positioned Filter



A - Cold air inlet
B - Warm air inlet
C - Flap
D - Mixed air passed to the carburettor

CHECKING

Immerse the air filter in water up to the height of the filter element.

After 5 minutes immersion:

in water at 26°C, the flap should close off the cold air inlet,

in water at 36°C, the flap should close off the warm air inlet.

ADJUSTING

The air regulator cannot be adjusted.

Replace the control valve and thermostat assembly with a new one.

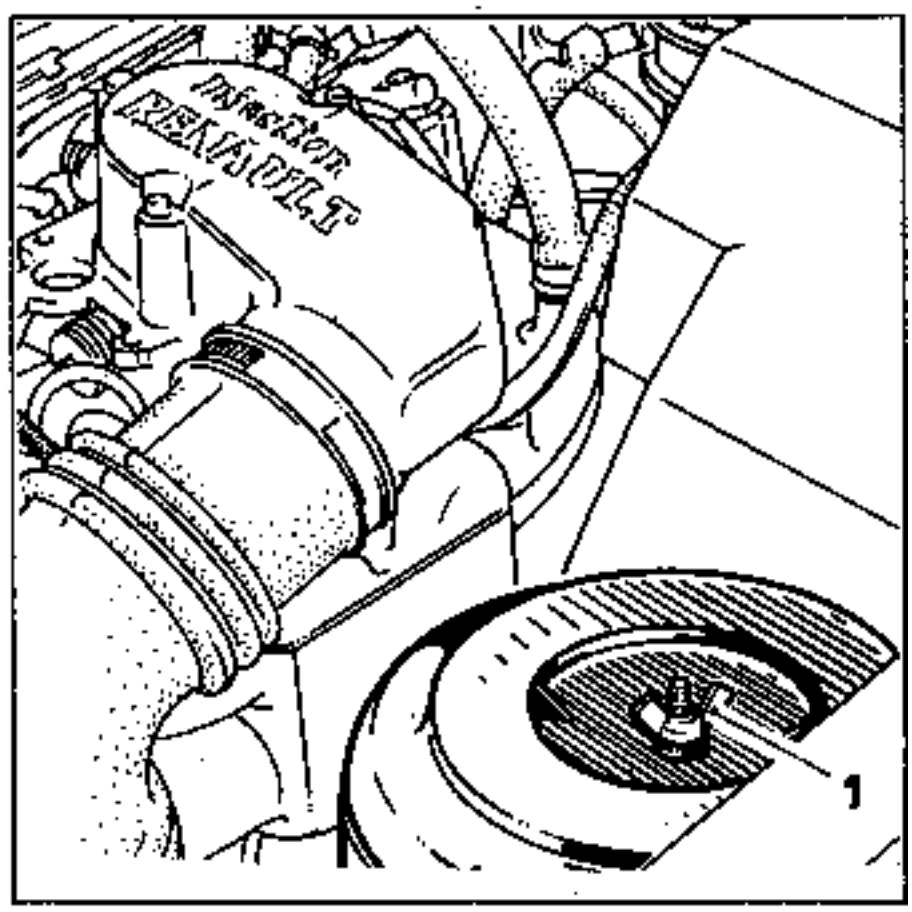
REPLACING THE FILTER ELEMENT (every 12,000 miles (20,000 km))

Remove the air filter cover.

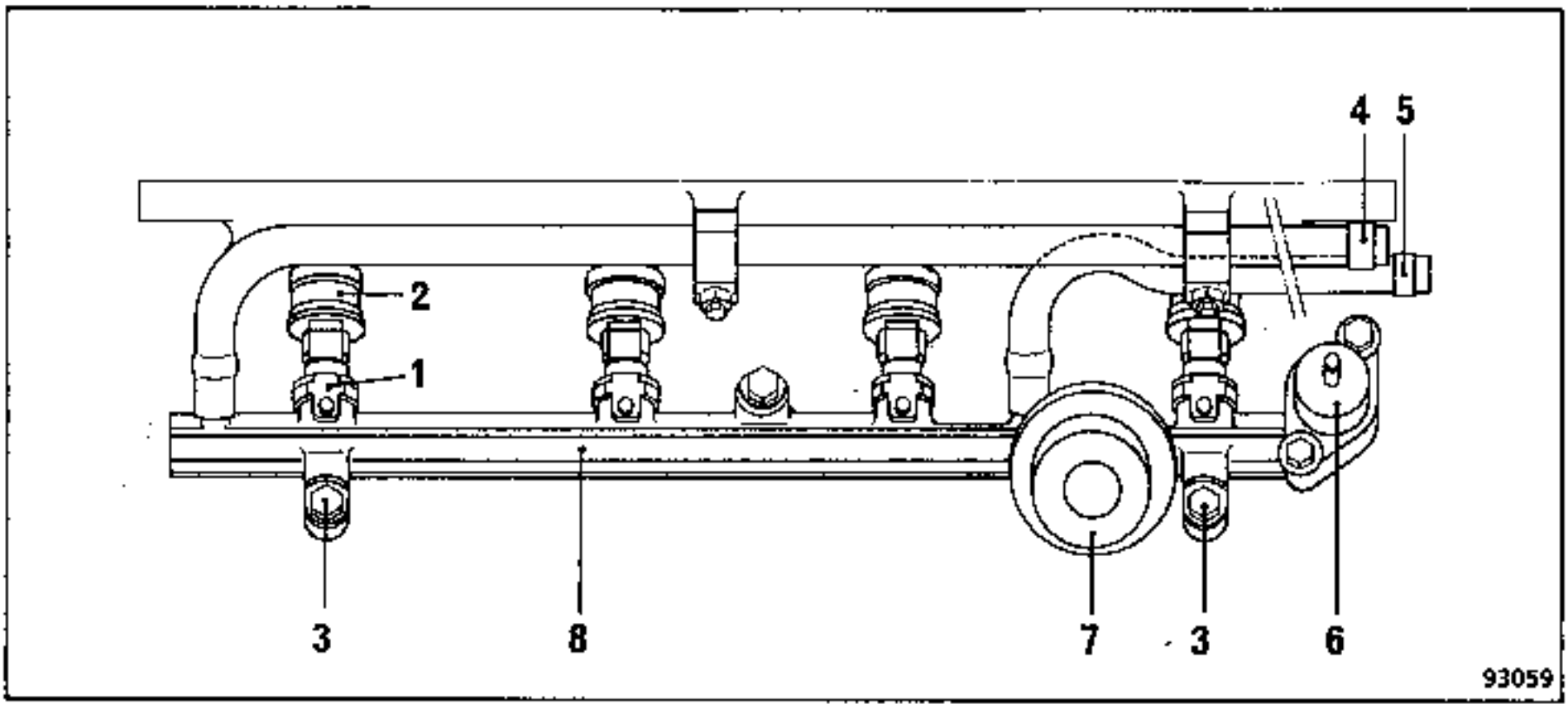
Remove the dirty filter element and replace it with a new one.

Refit the air filter cover and secure it in place.

Remotely positioned Air Filters on JXX Engines



Note: There may be screws round the periphery of the cover instead of the butterfly nut (1).



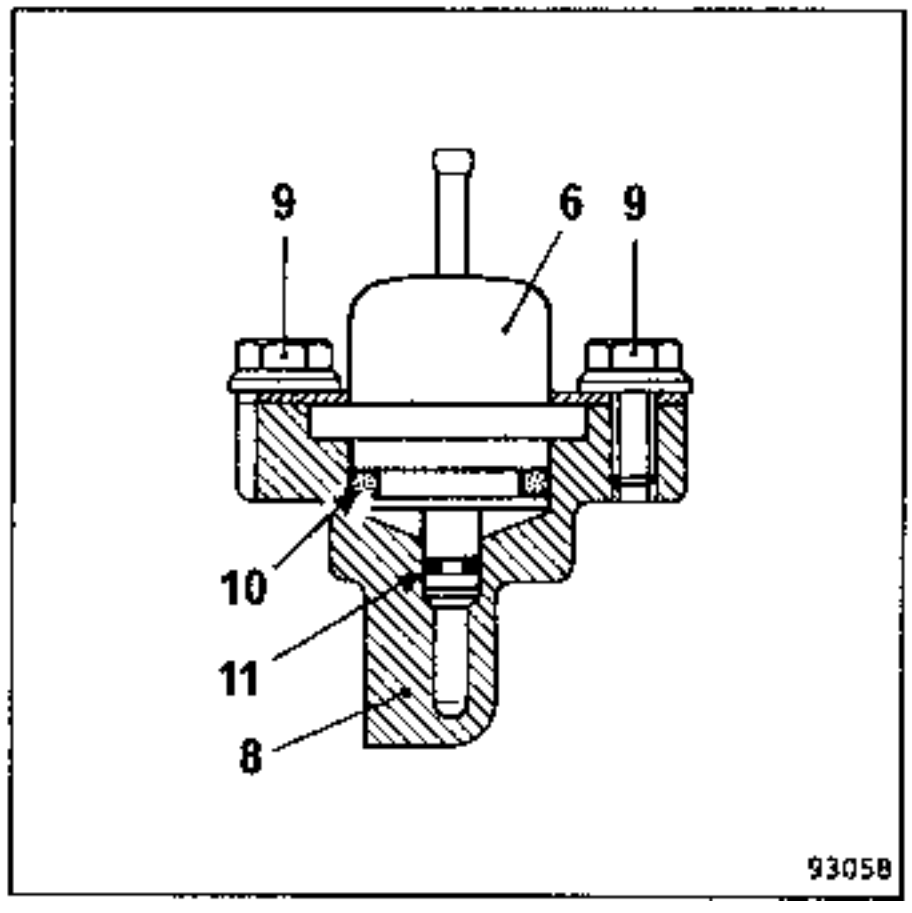
1 - Injector retaining clip
2 - Injector
3 - Injection gallery securing bolt
4 - Fuel input pipe (green colour code)
5 - Fuel return to tank pipe (pink colour code)
6 - Fuel pressure regulator
7 - Pulse damper
8 - Injection gallery.

The fuel pressure regulator is secured to the injection gallery by two bolts (9).

It is sealed by "O" rings (10 and 11).

On refitting:

Replace the seals (10 and 11) if necessary (smear silicone grease (e.g. MOLYKOTE 33 MEDIUM) on the new seals).



SPECIFICATIONS

NOTE: for all rectification or fault finding operations on this system see the "Diesel Injection" workshop manual.

Vehicle Type	Engine	Injection Equipment
RENAULT 21 X 486	J8S 704	BOSCH

Description	Make and Type	Remarks
Injection pump	BOSCH VE 4/9 F 2250 R 158	Single piston rotary pump with a mechanical centrifugal governor, hydraulic automatic advance, cold starting system, automatic fast idling and solenoid shut-off.
Pump timing (pump piston lift with engine at T.D.C.)	0,70 ± 0,02 mm	
Injector holders	BOSCH KBE 48 S 5/4	
Injectors	BOSCH DN OSD 189/	Opening pressure $^{+8}_{+0}$ bars, max. variation 8 bars
Fuel filter	BOSCH or ROTO DIESEL	With built in priming pump Since 1987, the Roto Diesel filter has a heater connected to the engine cooling system.
Injector pipes		Outside ø 6mm Inside ø 2mm Length 290mm

SETTINGS

Idling speed	825 $\pm$ 25 rpm
Maximum speed	4,900 $\pm$ 100 rpm
Smoke Density:	
Type approval figure	1,11m-1: 36%
Max. legal	2m-1: 55%

CHECKING THE TIMING (on diagnostic bay)

Injection Pump	Idling Speed rpm	Injection commences before T.D.C.
BOSCH VE... R 158	825 ± 25	13,5 ± 1°

SPECIFICATIONS

Vehicle Type	Engine	Injection Equipment
RENAULT 21 X 486	J8S 704	ROTO - DIESEL

Description	Make and Type	Remarks
Injection Pump	ROTO DIESEL R8443 A 400 A (A) R8443 A 401 B (A)	Single distributor rotary pump with two pressure pistons, mechanical centrifugal governor, automatic hydraulic advance, automatic fast idling system and solenoid shut-off.
	R8443 B 402 B (B) R8443 B 403 C (B)	
Pump timing T.D.C. Locked with a rod		1.80mm (A) Dimension (X) on pump (B)
Injector holders	ROTO DIESEL RKB 45 S 5456	
Injectors	ROTO DIESEL RDN OSDC 6751 C	Opening pressure 118 $^{+7}_{-5}$ bars Maximum variation 8 bars
Fuel filter	ROTO DIESEL	With built in priming pump. Note: Since 1987, the filter has a heater connected to the engine cooling system
Injector pipes		Outside Ø 6mm Inside Ø 1.5mm Length 330mm
Fast idling thermostat	CALORSTAT	Travel 7 to 8.5mm between 30 and 67°C

SETTINGS

Idling speed 825 $\pm$ 25rpm

Maximum speed 4,750 to 4900rpm

Smoke Density:

Type approval figures 1.11m-1: 36%

Maximum legal 2m-1: 55%

CHECKING THE TIMING (on diagnostic bay)

Injection Pump	Idling Speed in rpm	Injection commences before T.D.C.
ROTO DIESEL R 8443	825 ± 25	9,5 ± 1°

SPECIFICATIONS

Vehicle Type	Engine	Injection Equipment
RENAULT 21 X 488	J8S 714 (1) J8S 742 (2)	BOSCH BOSCH

Description	Make and Type	Remarks
Injection Pump	BOSCH VE 4/9 F 2200 R 153 (1) VE 4/9 F 2200 R 345 (2)	Single piston rotary pump with mechanical centrifugal governor, automatic hydraulic advance, automatic cold starting and fast idling system and solenoid shut-off. Corrector that adjusts the delivery to suit the turbocharging pressure (L.D.A.)
Pump timing (engine at T.D.C., pump piston lift)	0,70 ± 0,02 mm	
Injector holders	BOSCH KBE 48 S 7	
Injectors	BOSCH DN OSD 264	Opening pressure 130 +8 bars -0 Max. variation 8 bars
Fuel filter	BOSCH ROTO DIESEL	With built in priming pump. Since 1987 the Roto Diesel filter has a heater connected to the engine cooling system
Injector pipes		Outside Ø 6mm Inside Ø 2mm Length 275mm
Thermostat (fast idling)	(2) VERNET (CALORSTAT)	Travel 7 to 9.5mm between 15° and 45°C
Preheater unit	(2) CARTIER	With preheat and postheat functions (3 minutes max.)
Heater plugs	BERU	Current approx. 15A after heating 8sec
Heater plug post-heat temperature switch	(2)	Circuit opens: 65° ± 2°C Circuit closes: 55° ± 2°C
Turbocharger	GARRETT T2	Turbocharging pressure: 0.6 ± 0.025 bars at 2,500 ± 250 rpm Static opening pressure: 730 ± 30 mbars at an adjusting rod travel of 0.38 ± 0.02mm

SETTINGS

Idling speed 825 ± 25rpm (1) and (2)

Fast idling (2) 1,000 ± 50 rpm

Maximum speed 4,700 to 4,800 rpm

Smoke Density:

Type approval figure 1.6m-1: 48%
Maximum legal 2m-1: 55%

CHECKING THE TIMING (on diagnostic bay)

Injection Pump	Idling Speed in rpm	Injection commences before T.D.C.
BOSCH VE... R 153 VE... R 345	825 ± 25	13,5 ± 1°

SPECIFICATIONS

Vehicle Type	Engine	Injection Equipment
RENAULT 21 X 48H	F8Q 710	ROTO DIESEL

Description	Make and Type	Remarks
Injection Pump	ROTO DIESEL DPC : R8443 B471 C	Single distributor rotary pump with two pressure pistons, mechanical centrifugal governor, hydraulic automatic advance, automatic fast idling system and solenoid shut-off.
Pump timing at T.D.C. Locked with a rod		Dimension (x) on the pump
Injector holders	ROTO DIESEL LCR 67334	
Injectors	ROTO DIESEL RDN 4 SDC 6868C	Opening pressure 118 $^{+7}_{-5}$ bars Max. variation 8 bars
Fuel filter	ROTO DIESEL	With built in priming pump. The filter is fitted with a heater connected to the engine cooling system.
Injector pipes		Outside Ø 6 mm Inside Ø 2.5mm Length 330 mm
Fast idling thermostat	CALORSTAT	Travel 7 to 8.5mm between 15° and 45°C
Preheater unit	CARTIER	With preheating and postheating functions (3 minutes max.)
Heater plugs	BERU	Current approximately 15A after heating for 8 seconds
Heater plug post-heating temperature switch		Circuit opens: 65° $\pm$ 2°C Circuit closes: 55° $\pm$ 2°C

SETTINGS

Idling speed 825 $\pm$ 25rpm

Maximum speed 5,200 $\pm$ 100rpm

Smoke Density:

Type approval figure 1.17m-1: 38%

Maximum legal 2m-1: 55%

CHECKING THE TIMING (on diagnostic bay)

Injection Pump	Idling Speed in rpm	Injection commences before T.D.C.
ROTO DIESEL R 8443	825 ± 25	-

SPECIFICATIONS

Vehicle Type	Engine	Injection Equipment
RENAULT 21 X 48V	J8S 740	BOSCH

Description	Make and Type	Remarks
Injection Pump	BOSCH VE4/9F 2350 R 309	Single piston rotary pump with mechanical centrifugal governor, hydraulic automatic advance, thermo-stat controlled fast idling system and solenoid shut-off.
Pump timing (engine at T.D.C. - pump lift)	0,75 ± 0,02 mm	
Injector holders	BOSCH KCA 15S 66	
Injectors	BOSCH DN OSD 252 +	Opening pressure 130 $^{+8}_{-5}$ bars Maximum variation 8 bars
Fuel filter	ROTO DIESEL	With built in primer pump and heater connected to the engine cooling system
Injector pipes		Outside Ø 6 mm Inside Ø 2.5mm Length 400 mm
Thermostat (fast idling)	VERNET (CALORSTAT)	Travel 7 to 9.5mm between 15° and 45°C
Preheater unit	CARTIER	With preheating and postheating functions (3 minutes max.)
Heater plugs	BERU	Current approximately 15A after heating for 8 seconds
Heater plug postheat temperature switch		Circuit opens: 65° $^{+}_{-}$ 2°C Circuit closes: 55° $^{+}_{-}$ 2°C

SETTINGS

Idling speed	825 $^{+}_{-}$	25rpm
Fast idling	1,000 $^{+}_{-}$	50rpm
Maximum speed	5,200 $^{+}_{-}$	100rpm

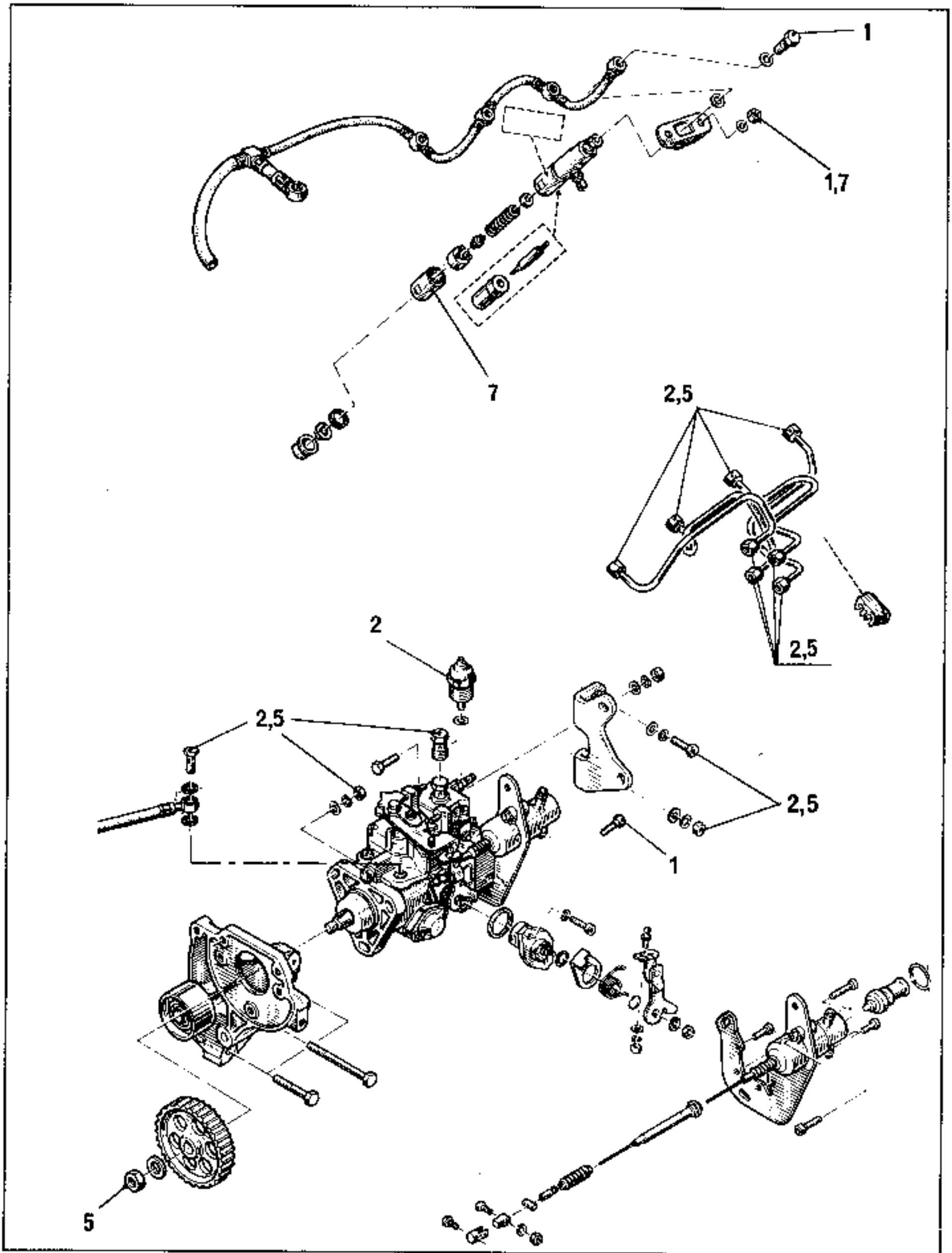
Smoke Density:

Type approval figure	0.77m-1:	28%
Maximum legal	2m-1:	55%

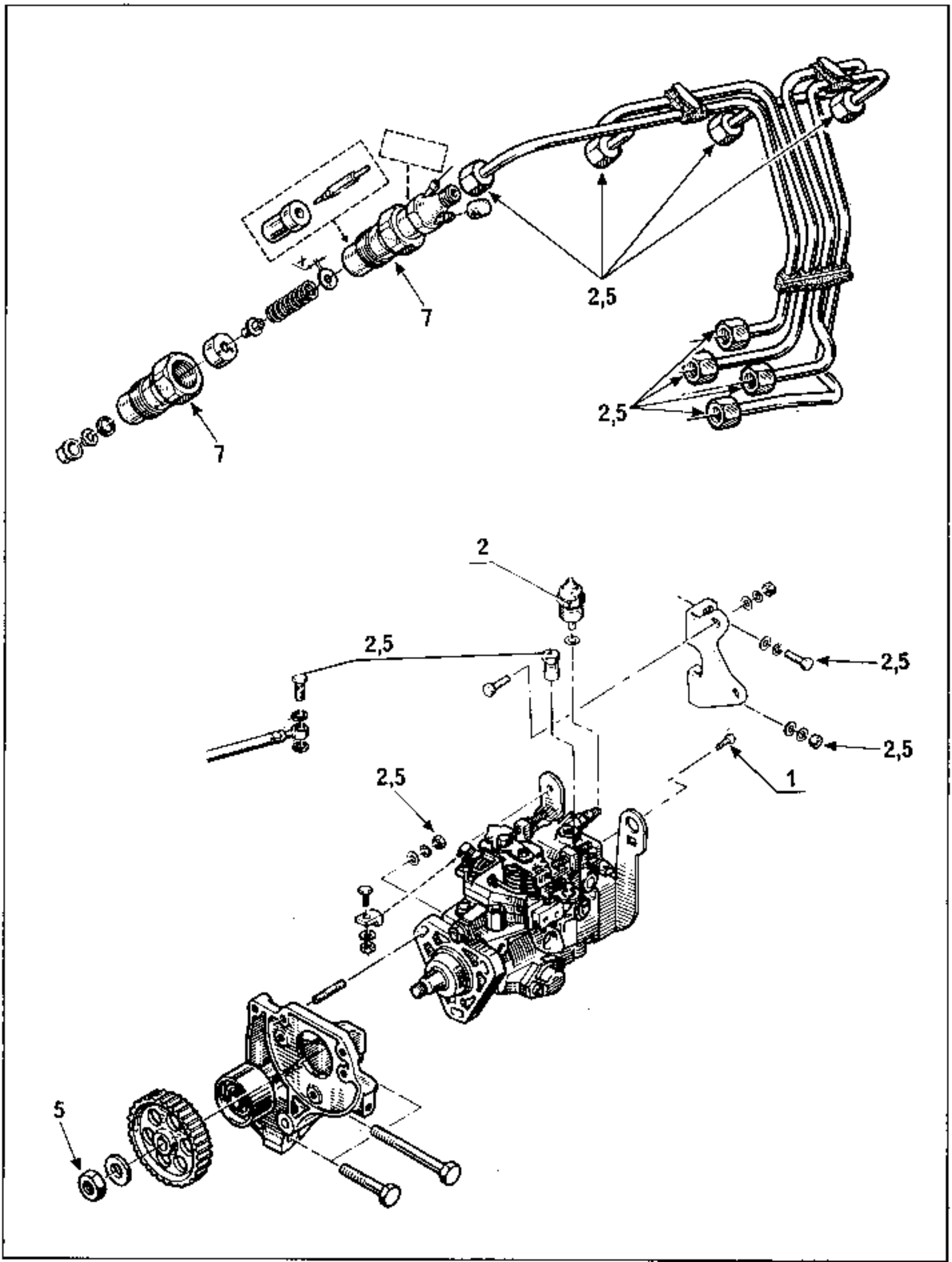
CHECKING THE TIMING (on diagnostic bay)

Injection Pump	Idling Speed in rpm	Injection commences before T.D.C.
BOSCH VE...R309	825 ± 25	14 ± 1°

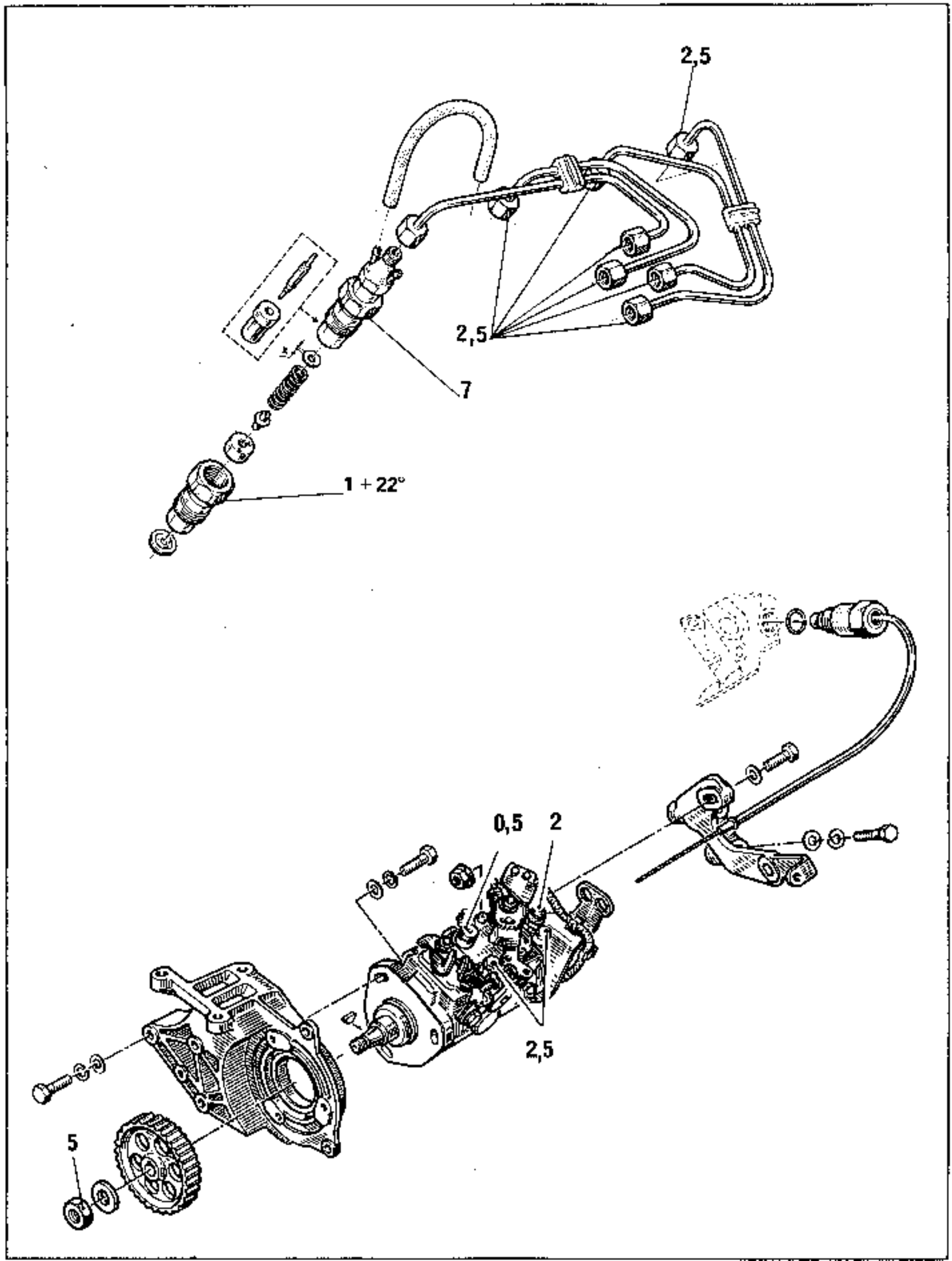
EXPLODED VIEWS - TIGHTENING TORQUES (in daN.m)



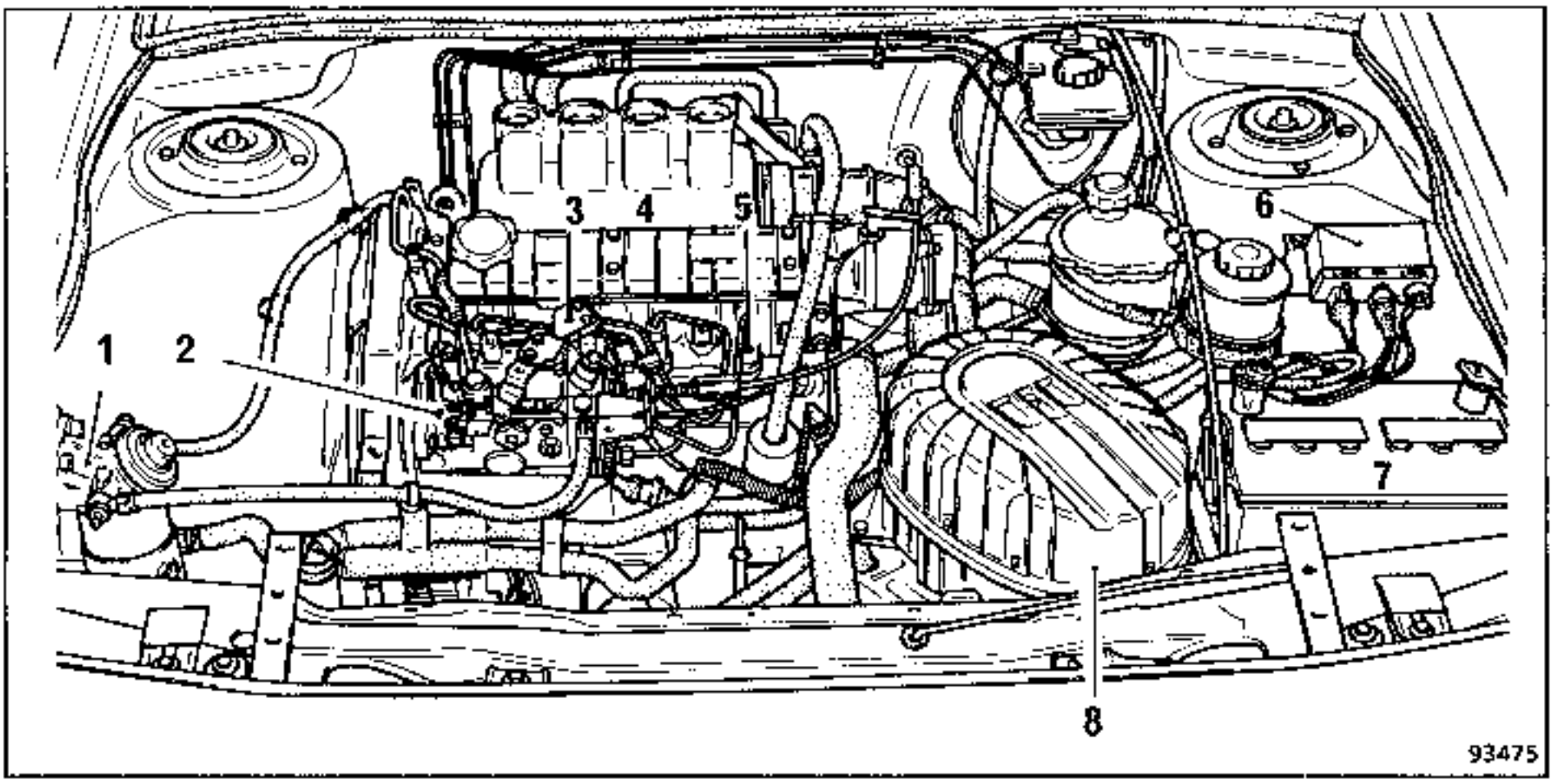
EXPLODED VIEWS - TIGHTENING TORQUES (in daN.m)



EXPLODED VIEWS - TIGHTENING TORQUES (in daN.m)



POSITIONS OF COMPONENT UNITS



1 - Fuel filter

2 - Injection pump

3 - Load microswitch

4 - Inlet manifold

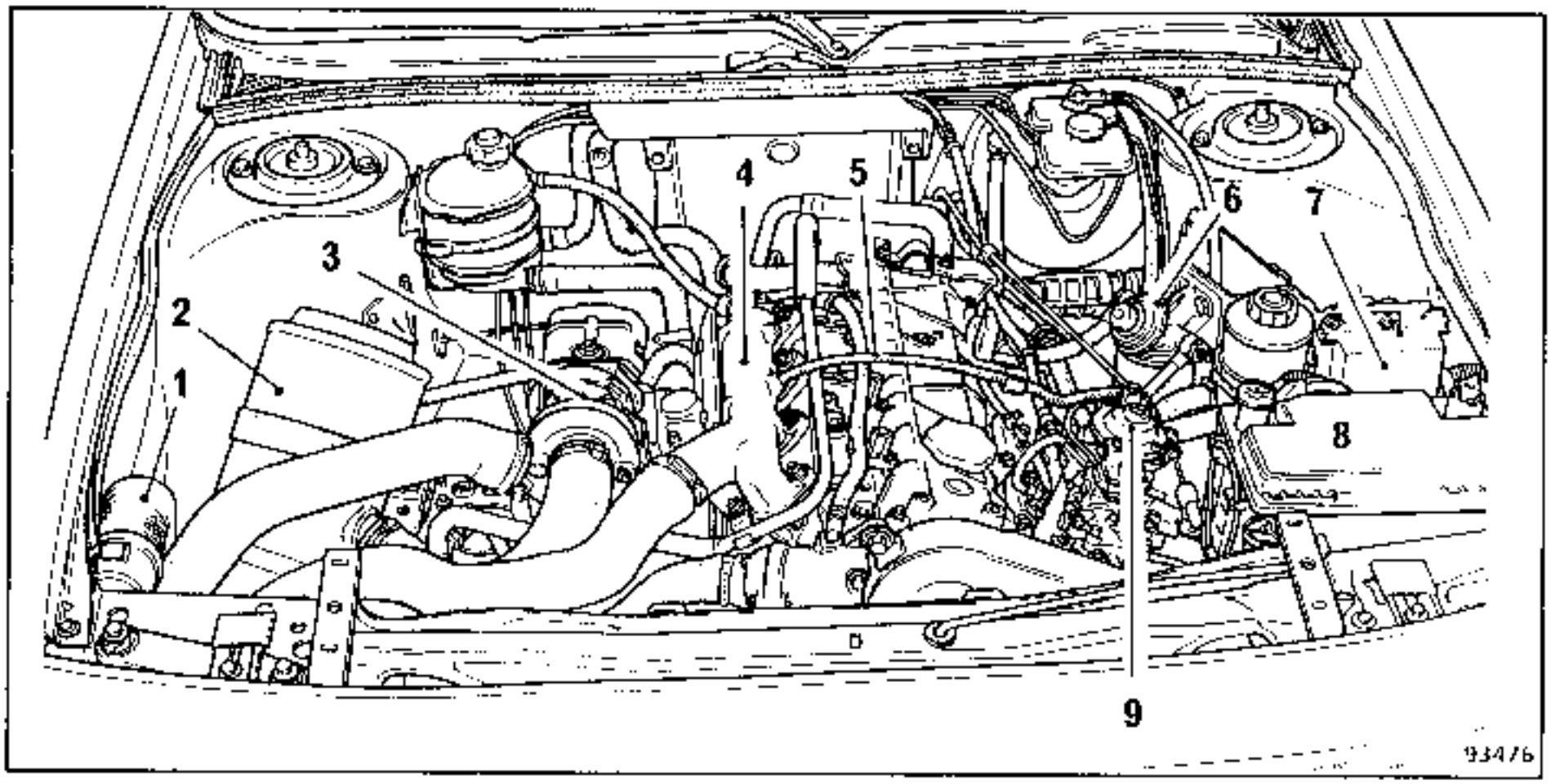
5 - Injector holder

6 - Preheat and postheat unit

7 - Battery

8 - Air filter

POSITIONS OF COMPONENT UNITS



1 - Engine air intake duct

2 - Air filter

3 - Turbocharger

4 - Inlet manifold

5 - Pipe connecting inlet manifold to injection pump supercharging pressure corrector.

6 - Fuel filter

7 - Preheating and postheating unit

8 - Battery

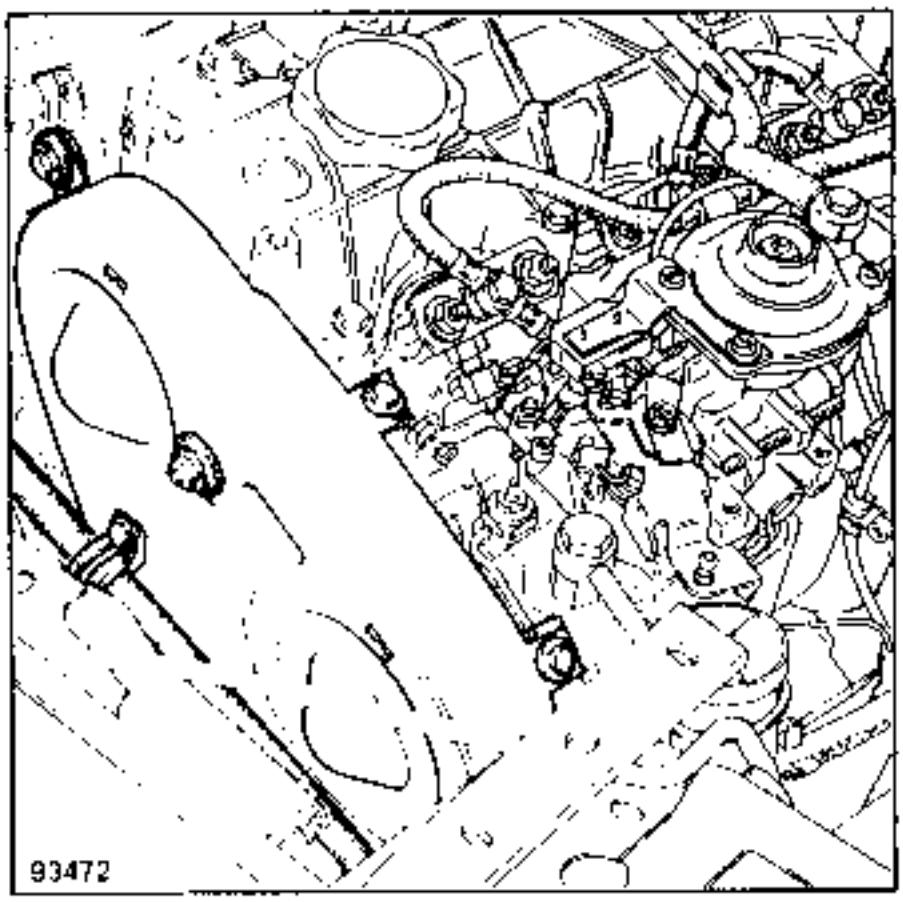
9 - Injection pump

REMOVING-REFITTING THE INJECTION PUMP

The method of removing, refitting and setting the timing of this pump is described in the diesel injection manual.

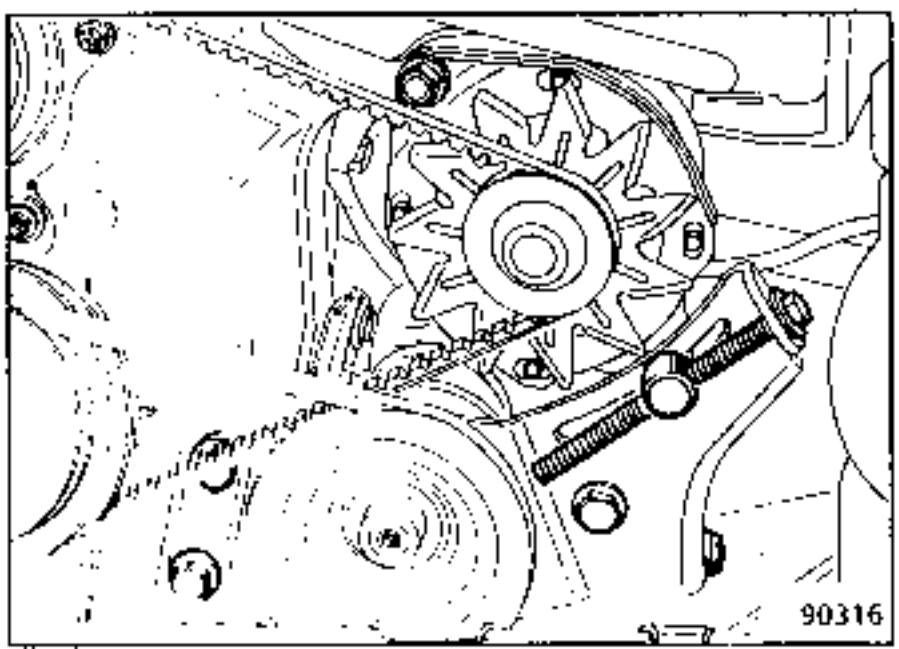
However, certain components have to be removed, depending on the vehicle type, to gain access to the timing gear casing:

- Disconnect and remove the battery.
- Remove the front cross member from above the radiator and push it as far as possible forwards.



Under the vehicle, remove:

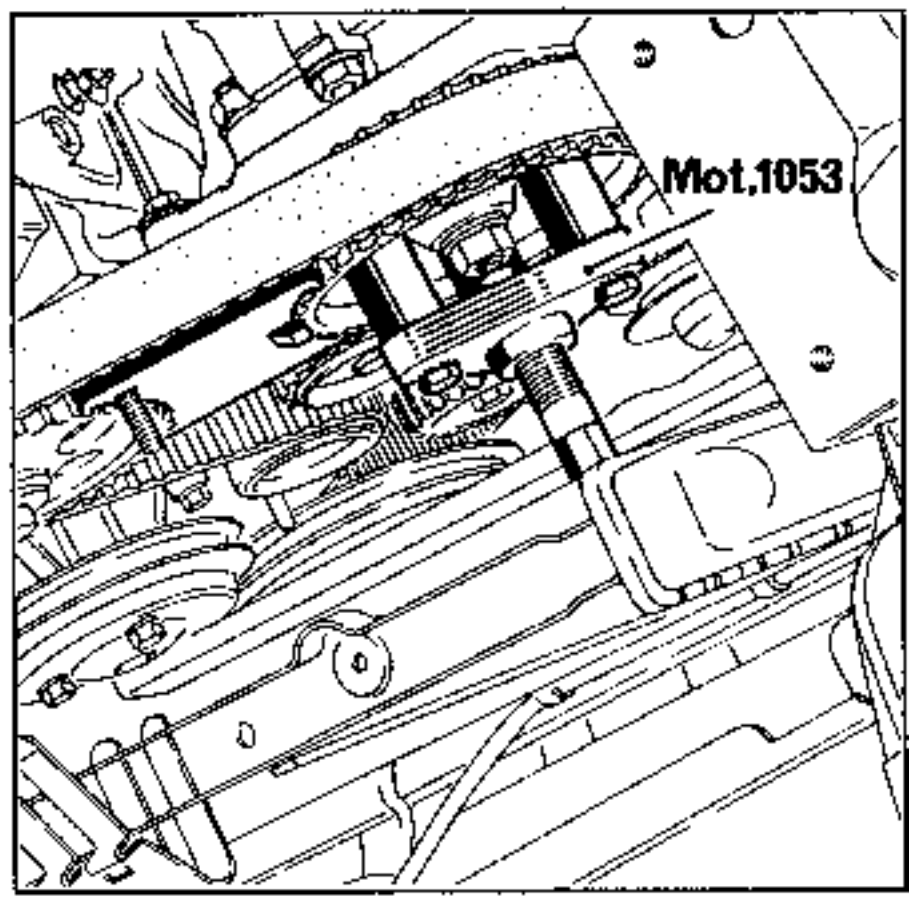
- the power steering pump belt,
- the alternator and coolant pump belt.



Remove the cable protector from the timing gear casing and pull it forwards.

Remove the timing gear casing.

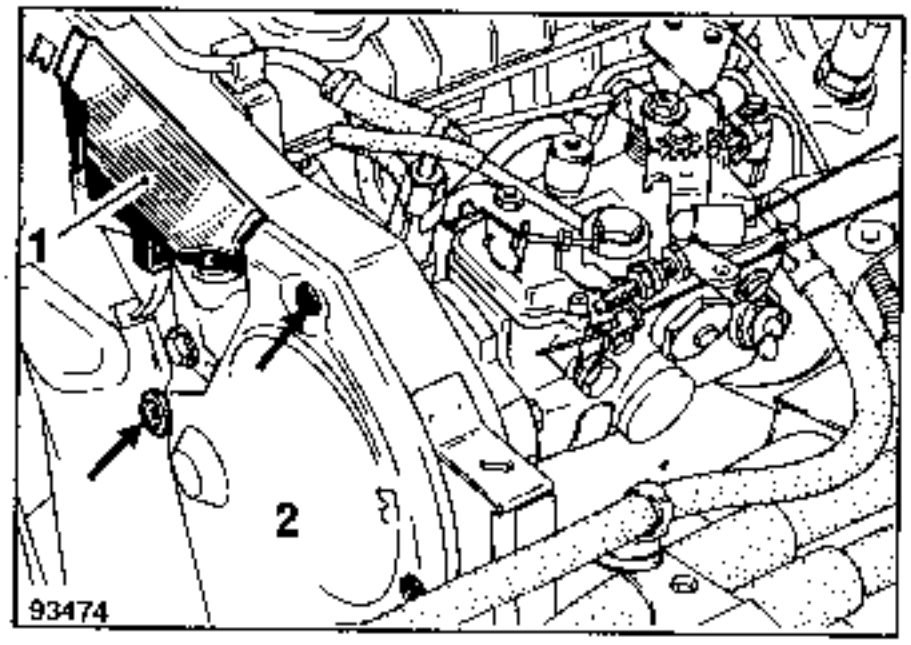
To free the injection pump drive sprocket, use tool Mot.1053.



REMOVING AND REFITTING THE INJECTION PUMP

The method of removing-refitting and adjusting the injection pump timing is described in the diesel injection manual (INJ "D").

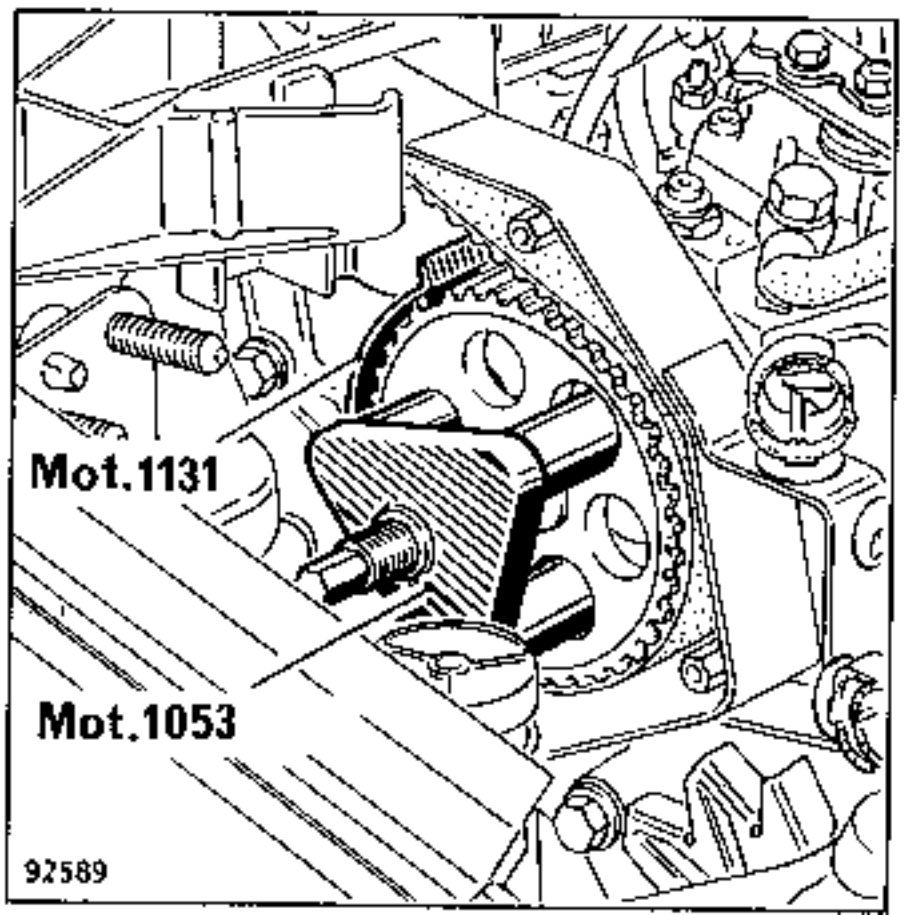
However, access is gained to the pump sprocket as follows:



Remove the plastic cover (1) and the pressed steel casing (2).

With the engine at injection T.D.C. on no. 1 cyl. (flywheel end), move back by one tooth, then insert tool Mot.1131 between the pump support and the sprocket.

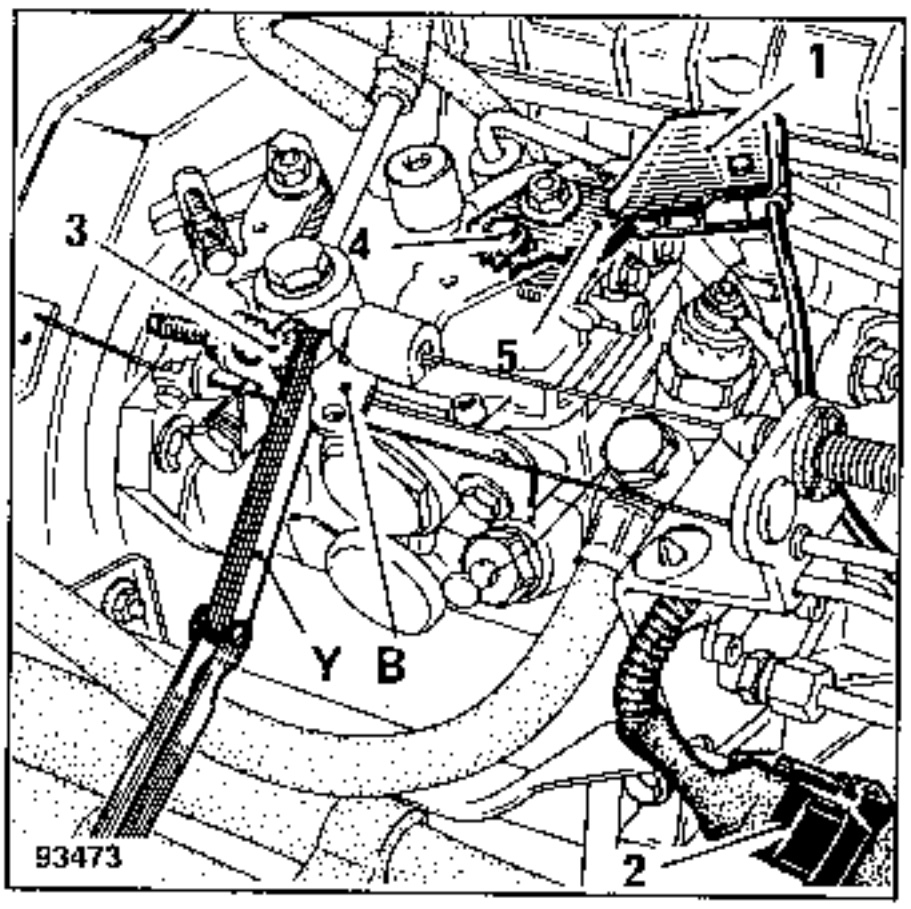
Loosen the pump securing nut without removing it, then, using tool Mot.1053, free the sprocket from its taper.



Load Micro switch (1)

The micro switch is to be adjusted or checked:

- when replacing a micro switch,
- after replacing burned out preheater plugs,
- after work has been carried out on the injection pump at a C.I.R. centre.



Use an ohmmeter or a test lamp connected to pins B and C on connector (2).

Place feelers (Y) between the throttle lever (B) and the anti stall stop (3):

Feeler th.(Y) in mm	Microswitch	Test Lamp	Ohmmeter
8	closed	on	0Ω
12	open	off	infinite.

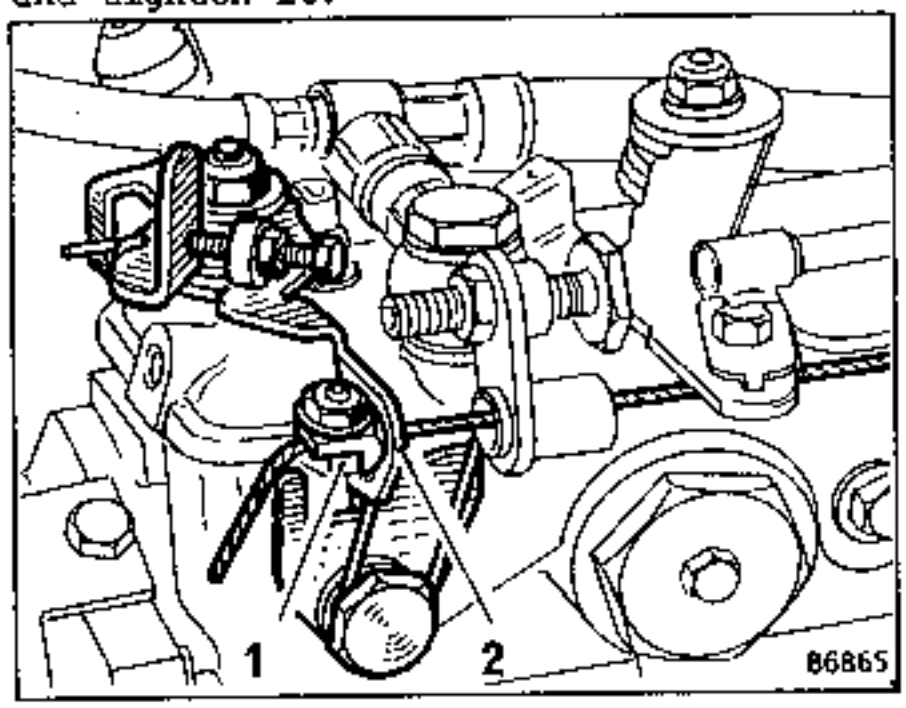
The switch is adjusted by loosening the screw (4) and moving the cam (5) with reference to the throttle lever.

ADJUSTING THE FAST IDLING

Fit the cable, the cable cover end stop and the cable clamp (1).

The engine is to be cold (coolant temperature less than 15°C).

Push the idling speed stop (2) to the end of its travel, tension the cable, hold the cable clamp against the stop and tighten it.



When the engine is warm, after the electric fan has cut in.

Check, with the cable tight, the clearance between the cable clamp (1) and the fast idling lever (2) in the minimum idling speed stop position:

- the clearance should be 2 to 3mm.

- if it is not, adjust the cable clamp (1) to obtain this clearance.

ADJUSTING THE ANTI STALL SYSTEM AND THE IDLING
(With the engine warm, after the electric fan has cut in)

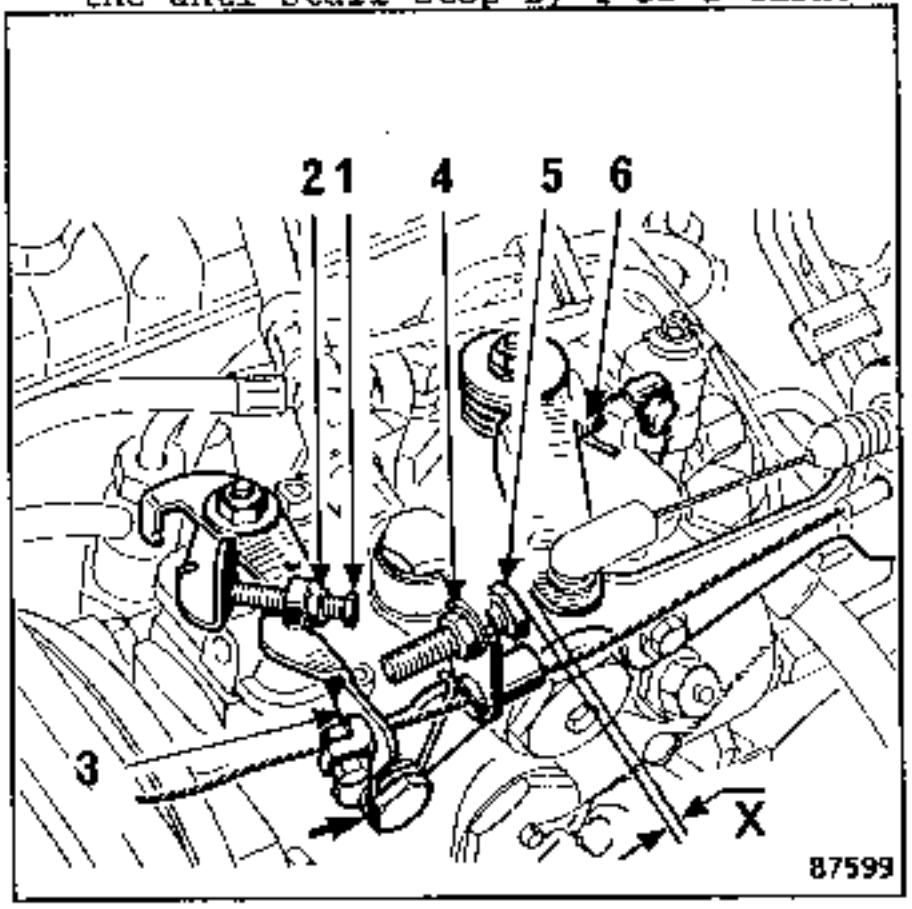
NOTE: When the engine is warm lever (3) should have returned against its minimum stop (see arrow).

Place a 5mm spacer (dim. X) between the stop (5) and the throttle lever, loosen the locknut (4) and move the stop (5) to obtain an idling speed of 1600 $\pm$ 100 rpm. Then remove the 5mm spacer and tighten the locknut (4).

Adjust the idling speed to 825 $\pm$ 25 rpm by turning screw (1), then tighten the locknut (2).

Accelerate positively and allow the engine to return to idling speed, several times in succession:

a) if the engine returns to a speed lower than the idling speed and tends to stall, unscrew the anti stall stop (5) by ¼ of a turn.
b) if the speed falls slowly, screw in the anti stall stop by ¼ of a turn.



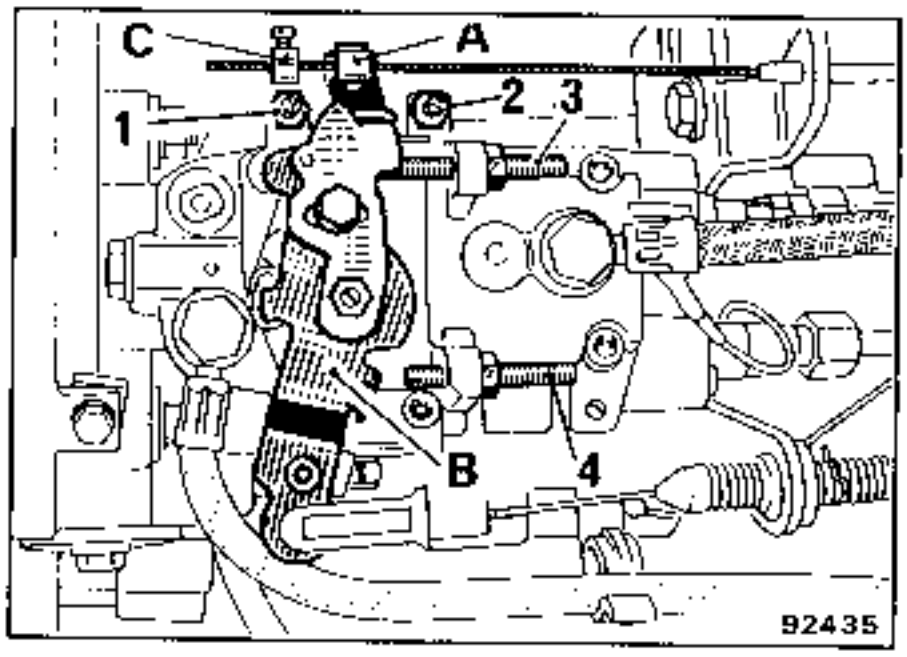
CHECKING THE MAXIMUM SPEED

With the engine warm, fully open the throttle against its stop.

The engine speed should be between 5100 and 5300 rpm.

As the maximum speed stop screw (6) is sealed at the factory, it must not be adjusted except by an injection specialist, who must then reseal the screw.

CHECKING THE SPEEDS



A - Idling and fast idling lever.

B - Throttle lever.

1 - Fast idling adjusting stop screw.

2 - Normal idling adjusting stop screw.

3 - Residual delivery (anti stall) stop screw

4 - Maximum speed stop screw

This screw is sealed at the factory with a dab of Shellac varnish. It is not to be adjusted except by an injection centre specialist (C.I.R.).

I - ADJUSTING THE IDLING SPEED - FAST IDLING AND ANTI STALL SYSTEM

NOTE: All the adjustments described below are to be carried out on a warm engine, i.e. with a coolant temperature of more than 80°C.

a) Check that the idling speed is correct (see specifications).

NOTE: If the idling speed is not correct, a complete adjustment sequence will have to be carried out (see II).

b) If the idling speed is correct, place a 1mm feeler gauge between the stop screw (3) and the throttle lever (B). The speed should increase by 10 to 20 rpm.

- If the speed increases by more than 20 rpm, the complete adjusting sequence must be carried out (see II).
- If the speed increases by less than 10 rpm, only adjustment (IId) will be required.

II - FULLY ADJUSTING THE IDLING SPEED

a) Loosen the locknut and unscrew the screw (3) until the fall in the engine speed is stable, then unscrew screw (3) by a further two turns.

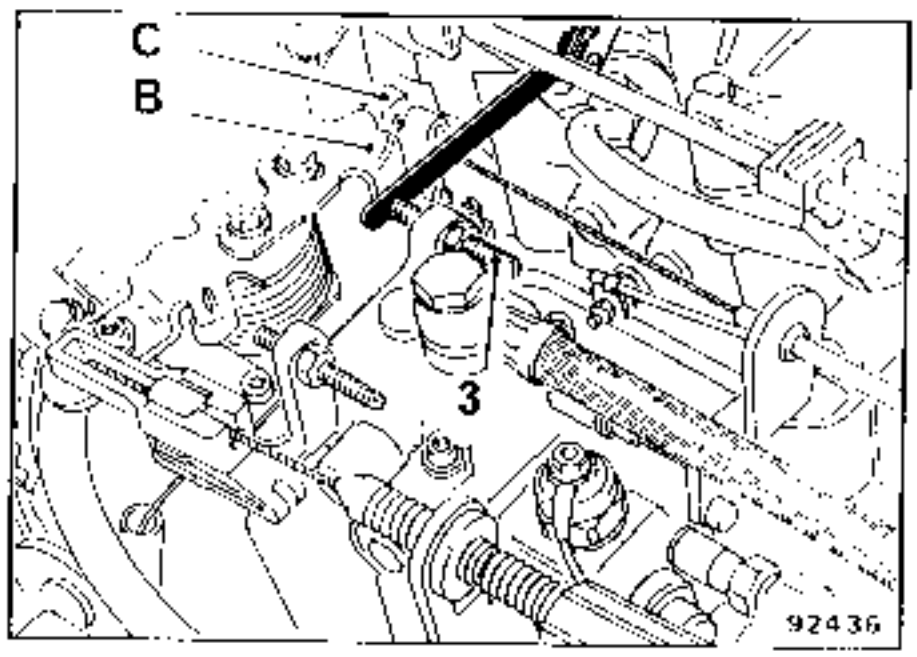
Check that the cable clamp (C) does not interfere with the movement of lever (A).

b) Loosen the locknut and turn screw (2) to obtain the required idling speed, then retighten the locknut.

c) Place a 1mm feeler gauge between the stop screw (3) and the throttle lever (B). The idling speed should not increase. If it does, repeat adjustments IIa and IIb.

d) With the 1mm feeler gauge still in position, tighten the stop screw (3) to increase the idling speed by 10 to 20 rpm. Remove the 1mm feeler gauge. The idling should return to the original speed.

Accelerate positively several times and allow the engine to return to idling speed.



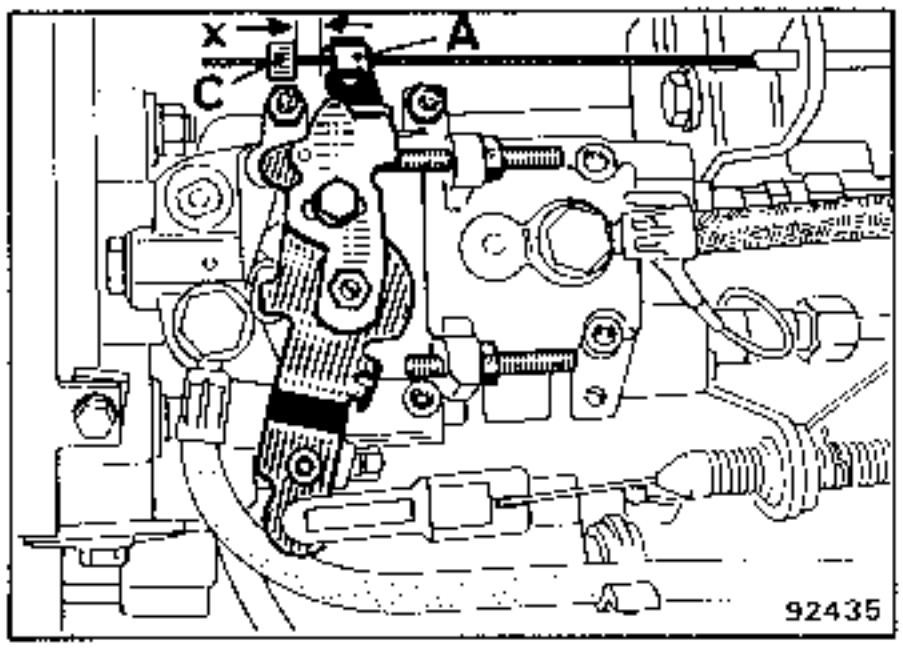
Check the initial idling speeds, with and without the 1mm feeler gauge, and if the speeds have altered, repeat the adjustments (b, c and d).

III - ADJUSTING THE FAST IDLING SPEED

Place lever (A) against its stop (1). Loosen the locknut and turn the screw (1) to obtain a speed of 1,000 $\pm$ 25 rpm, then retighten the locknut.

Recheck the fast idling speed and if it is outside the tolerances, repeat operation III.

IV - ADJUSTING THE FAST IDLING THERMO-STAT CABLE CLAMP



This operation must be carried out when the engine is warm after having adjusted the idling and fast idling speeds.

Pull the cable tight and place the cable clamp 6mm (dimension X) from lever (A), when in the idling position, then tighten the screw on the cable clamp(C).

Load micro switch (1).

The micro switch is to be checked or adjusted:

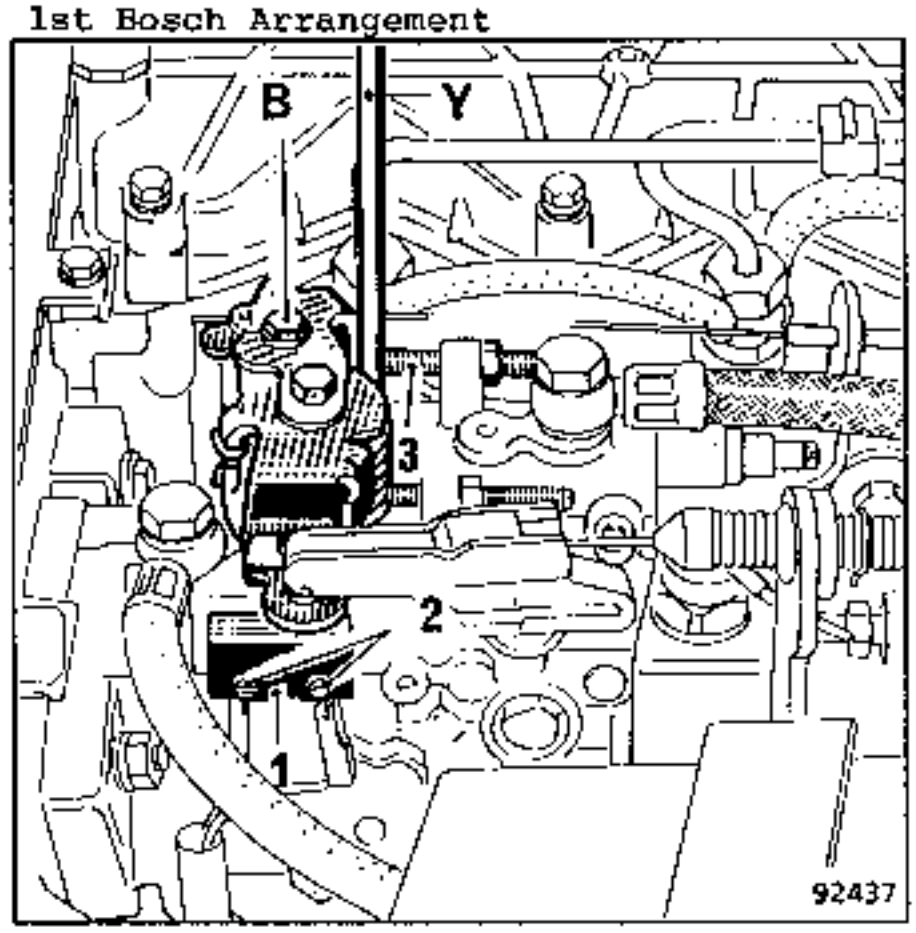
- whenever the micro switch has been replaced,
- following replacement of burnt out heater plugs,
- whenever work has been carried out on the injection pump at an injection centre (C.I.R.).

Use an ohmmeter or a test lamp.

Place a spacer (Y) between the throttle lever (B) and the anti stall stop (3):

Spacer (Y) in mm	Micro Switch	Test Lamp	Ohmmeter
10,2	closed	on	0Ω
11,5	open	off	Infinity

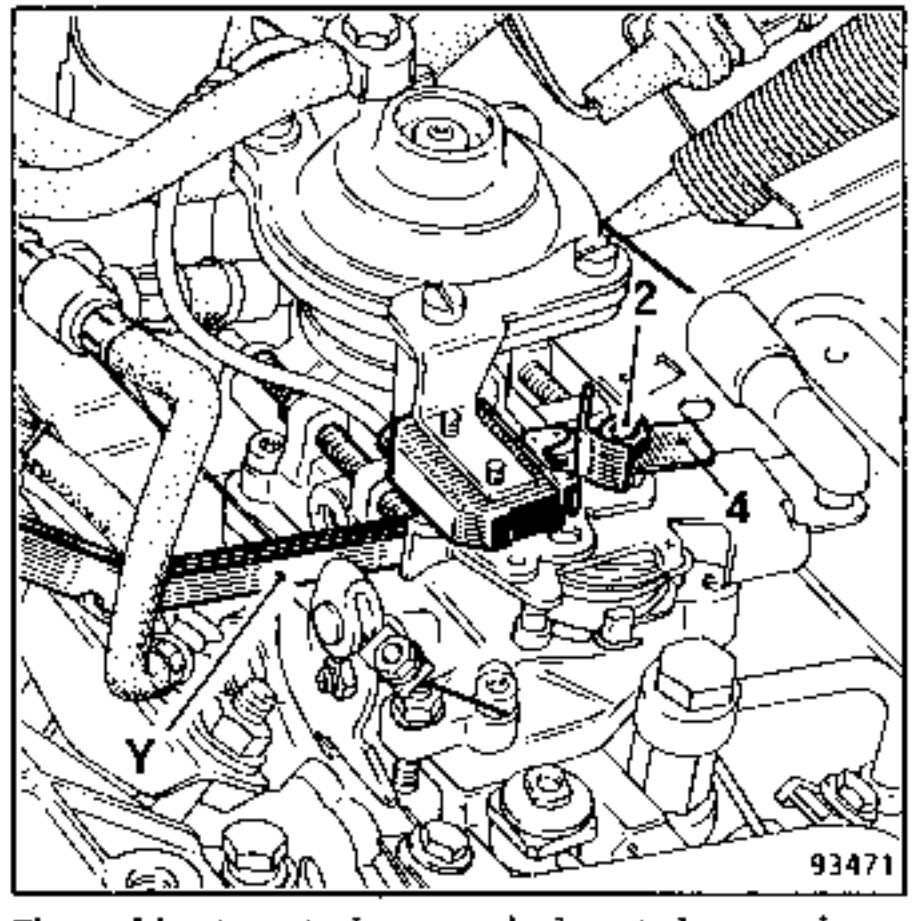
1st Bosch Arrangement



The system is adjusted by moving the micro switch (1) on its support.

Loosen the screws (2) and adjust the position of the micro switch to obtain the specified values.

2nd Bosch Pump Arrangement



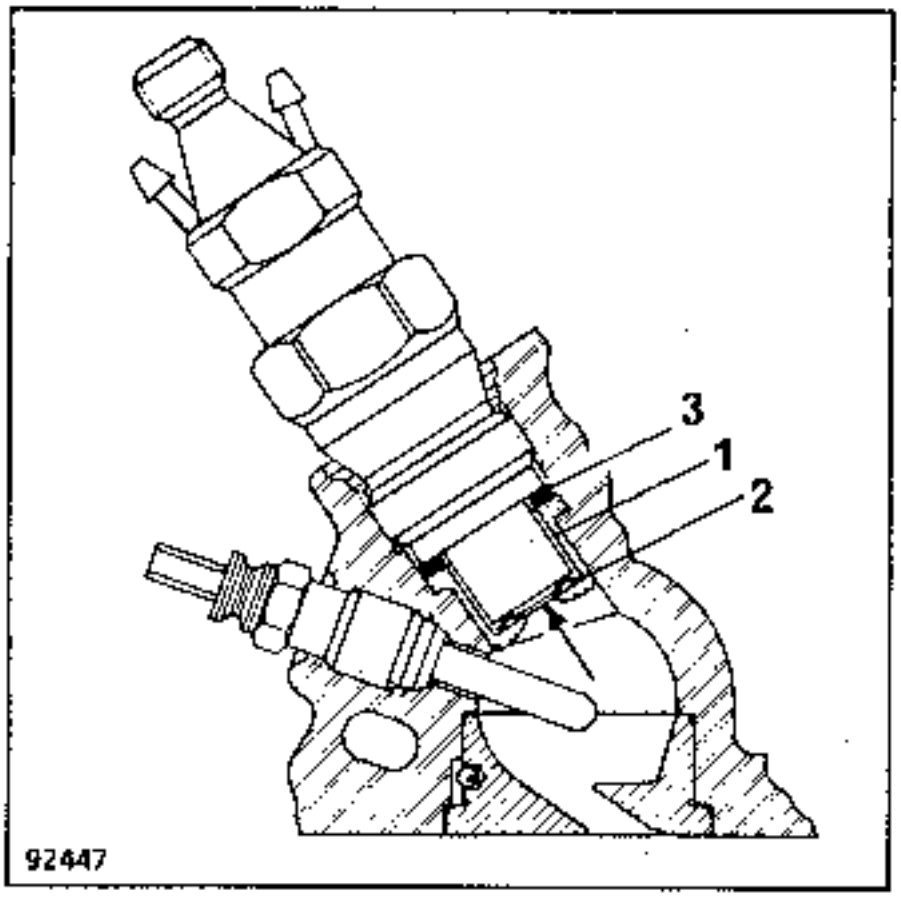
The adjustment is carried out by moving the cam on the throttle lever.

Loosen the screw (2) and move the cam (4) to obtain the specified value (Y).

Injector Holders (Special Features)

The cylinder head is machined to accommodate a flame baffle cap (1) and a flame baffle washer (2).

NOTE: with screw-in injector holders, the washer (2) is fitted the other way round.



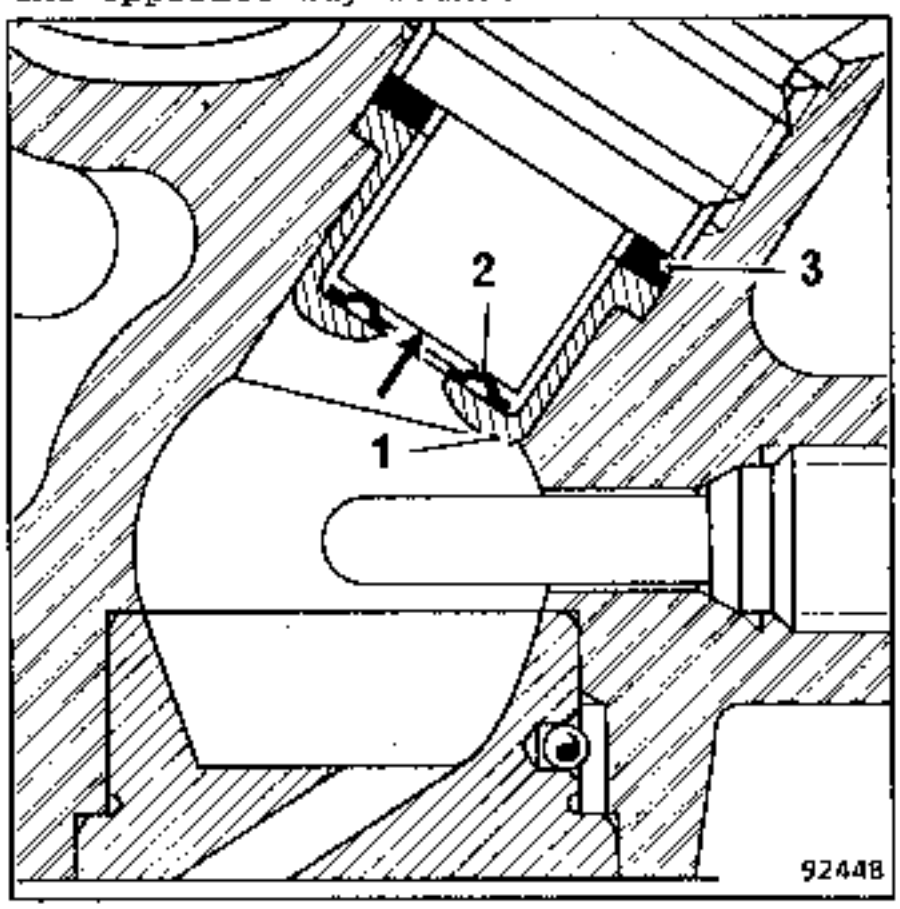
Each time an injector holder is refitted, fit a new seal (3) and a new flame baffle washer (2) (positioned as shown by the arrow).

Tighten the injector holder, using tool Mot.997, to a torque of 7 daN.m.

Injector Holders - Special Features

The cylinder head has been modified to accommodate screw-in injector holders of the BOSCH "KCA" type.

NOTE: with the screw-in injector holder the flame baffle washer (2) is fitted the opposite way round.



1 - Flame baffle cap

2 - Flame baffle washer

3 - Seal

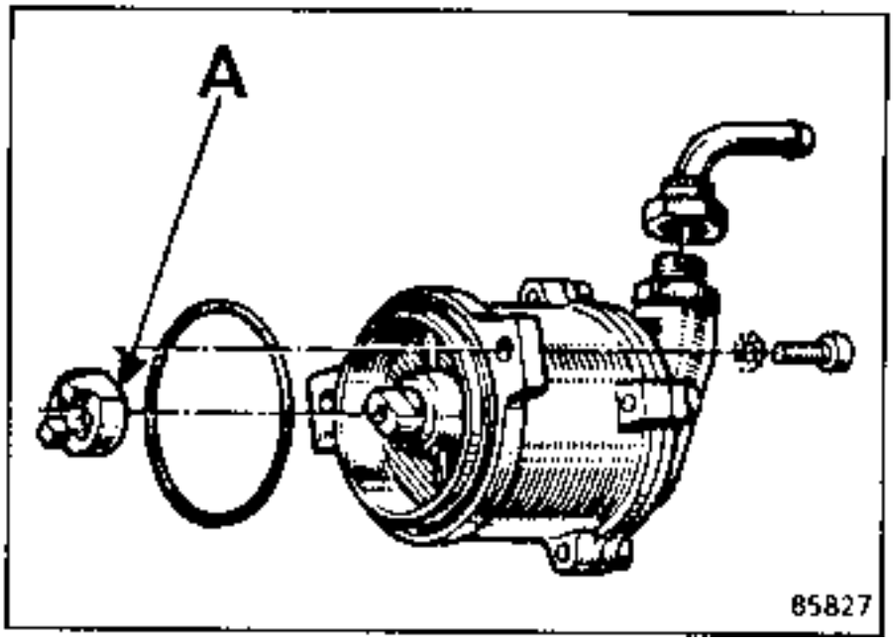
Each time an injector holder is refitted, fit a new seal (3) and flame baffle washer (2) (positioned as shown by the arrow).

Tighten the injector holder, using tool Mot.997, to a torque of 7 daN.m.

ESSENTIAL SPECIAL TOOLS
M.S. 870 Vacuum gauge

Whenever replacing the exhauster, its drive dog (A) must be replaced by a new one.

CHECKING: with the engine warm and running at 4,000 rpm, the vacuum should be a minimum of 700 mbars (525 mmHg) within 3 seconds.



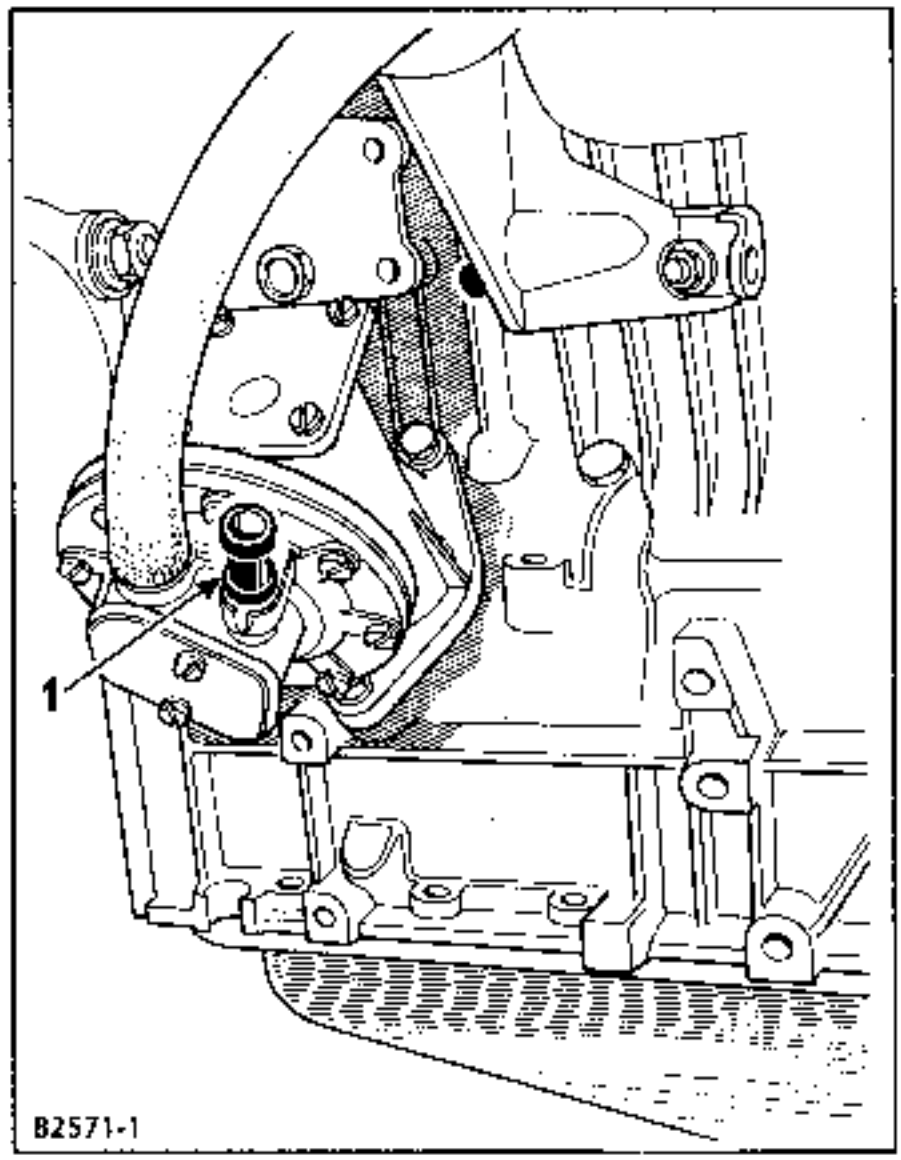
ESSENTIAL SPECIAL TOOLS	
M.S. 870	Vacuum gauge

This operation is carried out with the exhauster still on the vehicle.

Disconnect the vacuum pipe (1) from the exhauster and connect vacuum gauge M.S.870 in its place.

Run the engine at a minimum speed of 2,000 rpm.

The absolute vacuum reading should be greater than 770 mbars (570 mm Hg).



NOTE: the method of checking the entire servo system is identical to that used for the other vehicles in the range.

Grades of oil to be used:

- ELF RENAULTMATIC D2 or
- MOBIL ATF 220 or
- TOTAL DEXRON

CAPACITY: 1.1 litres.

Filling the system.

Fully fill the reservoir.

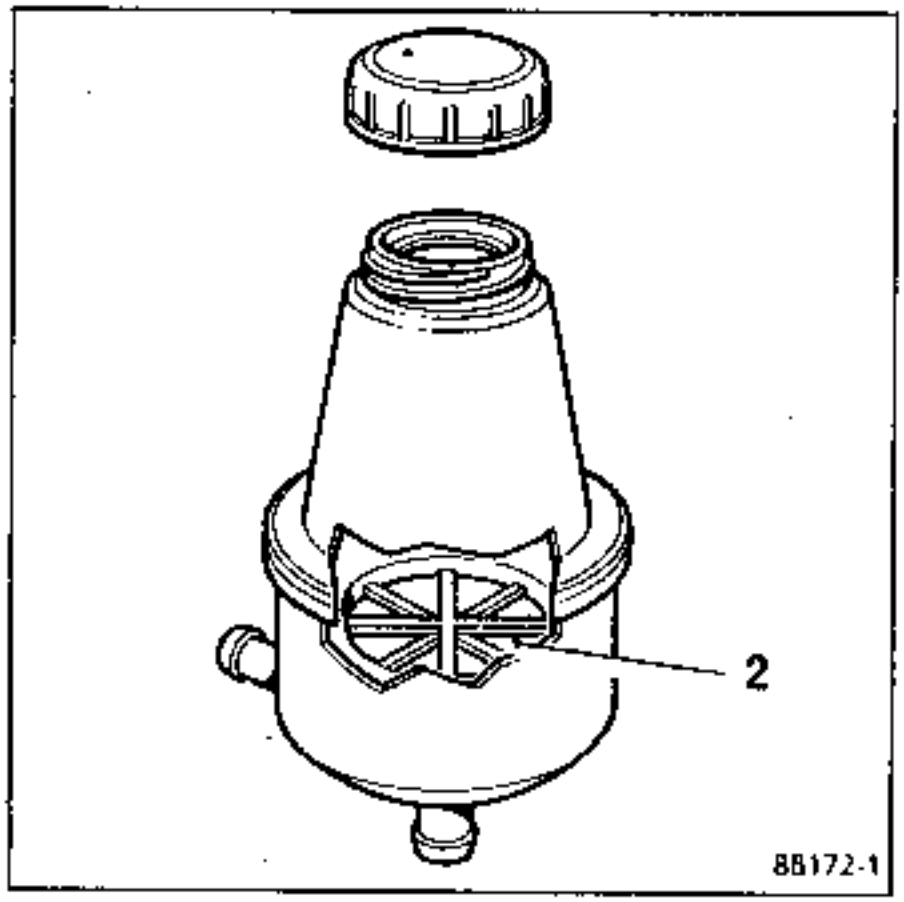
Slowly move the steering in both directions.

Top up the level.

Start the engine and slowly move the steering from lock-stop to lock-stop.

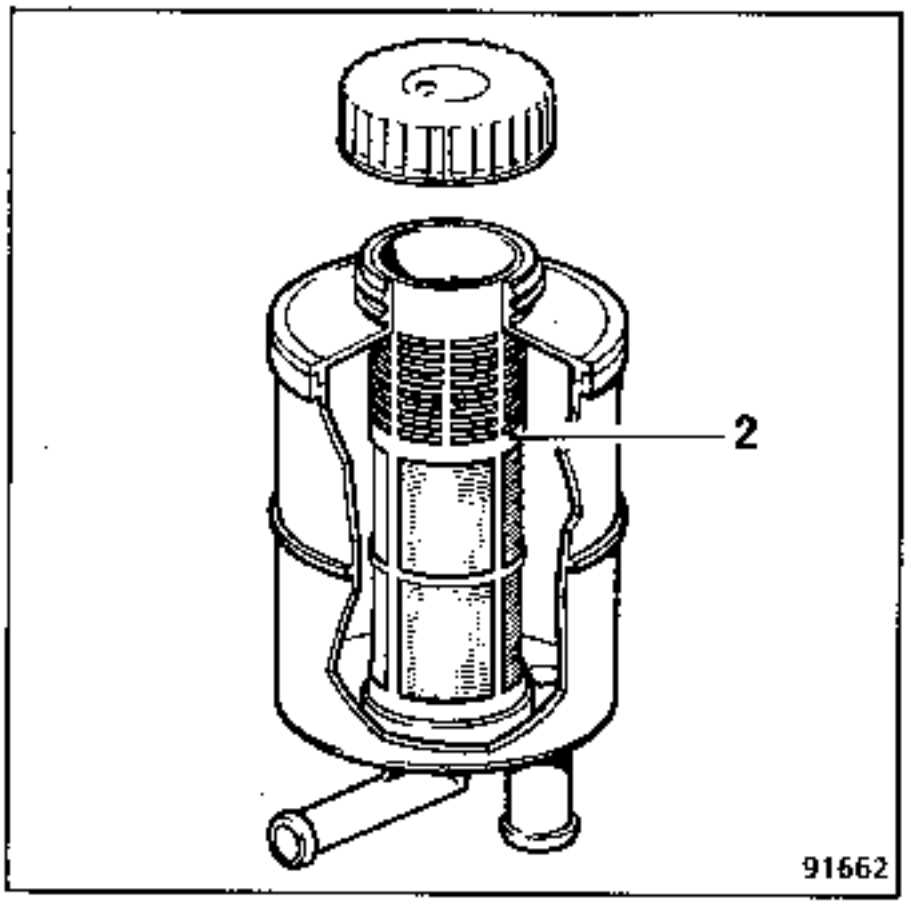
Top up the level.

1st Arrangement



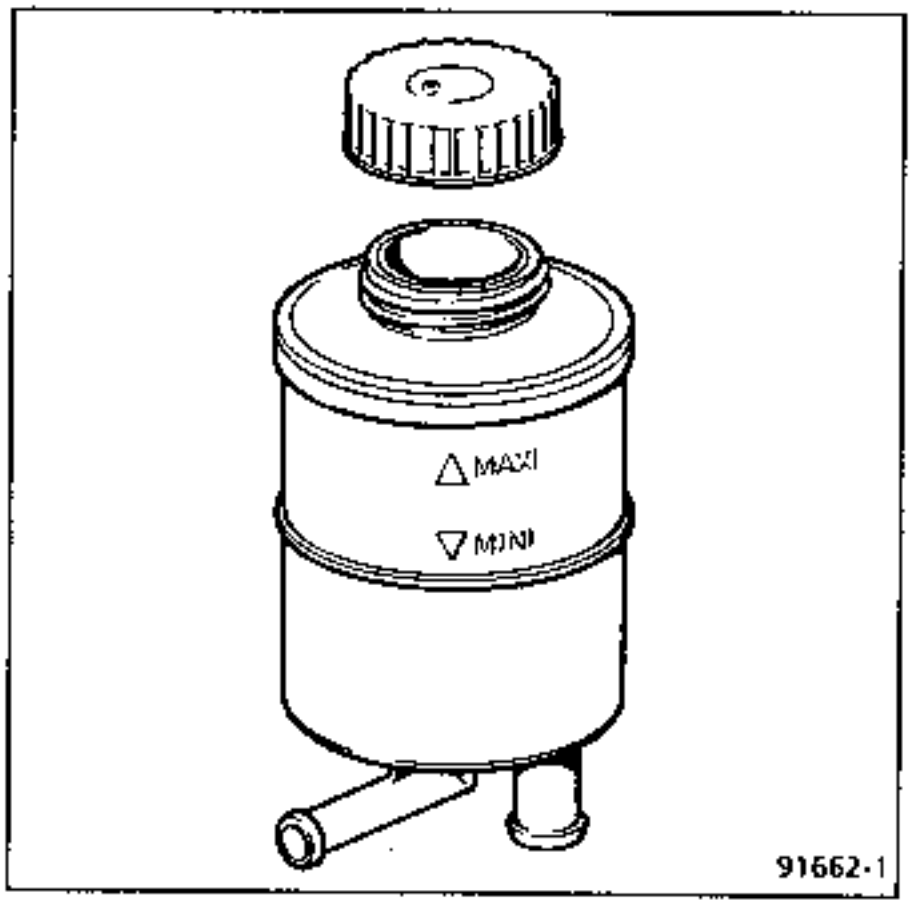
The oil should come up to the grille (2).

2nd Arrangement



The oil should come up to the band (2) on the filter sleeve.

3rd Arrangement



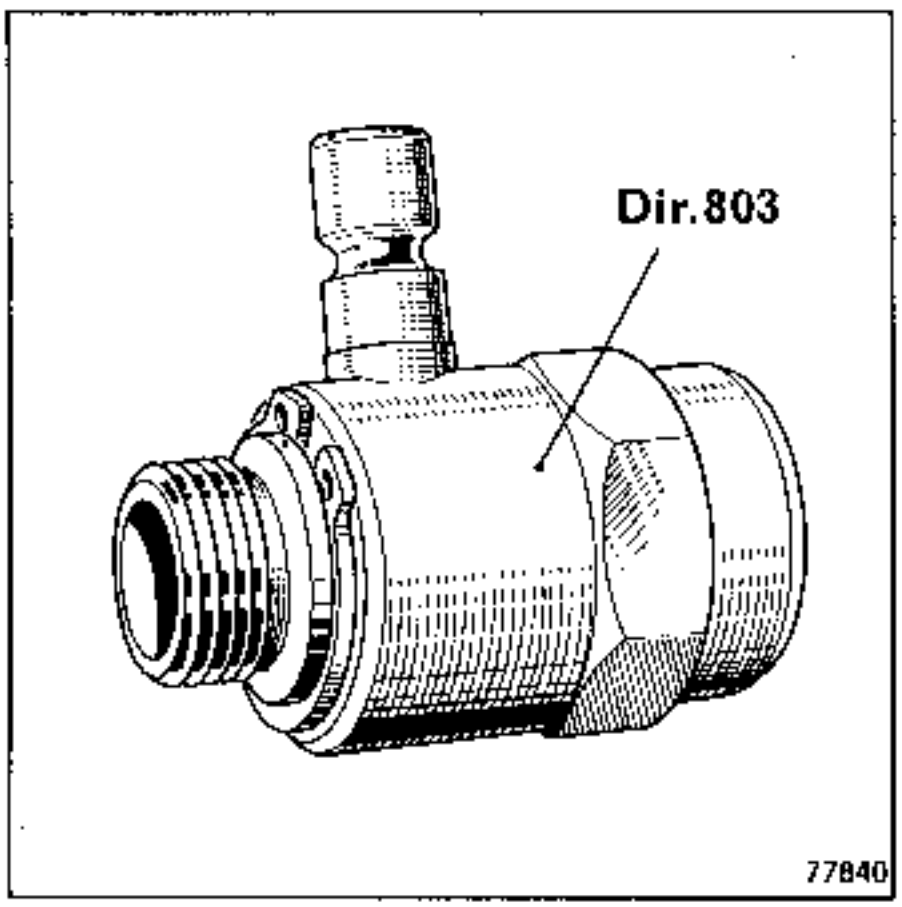
The oil should come up to the MAX level mark.

ESSENTIAL SPECIAL TOOLS		
Mot.	453-01	Hose clamps
Dir.	803	Union, with metric thread
Fre.	1085	
	or	Pressure gauge
Fre.	244-04	

Place a clamp Mot.453-01 on the pump low pressure hose.

Disconnect the high pressure pipe (provide a container to catch the oil).

Insert the metric union Dir.803 between the pipe and the pump.



Connect pressure gauge Fre.1085 or Fre 244-04.

Remove clamp Mot.453-01.

Top up the level in the pump and run the engine to test the pressure.

With the front wheels straight ahead, whatever the engine speed, the pressure must not exceed:
5 to 7 bars.

With the wheels through full lock to one side
Hold the steering on full lock. The maximum pressure should be:
80 to 85 bars.

Do not prolong this operation, as this could cause the oil to overheat rapidly.

Remove union Dir.803 and pressure gauge Fre.1085 or Fre.244-04 after shutting off the oil supply to the pump with clamp Mot.453-01.

Reconnect the high pressure pipe and remove clamp Mot.453-01.

Top up the level of the oil in the reservoir.

ESSENTIAL SPECIAL TOOLS	
Mot. 453-01	Hose clamps

REMOVING

Remove the alternator (see "Electrical System" section).

On Vehicles with Air Conditioning

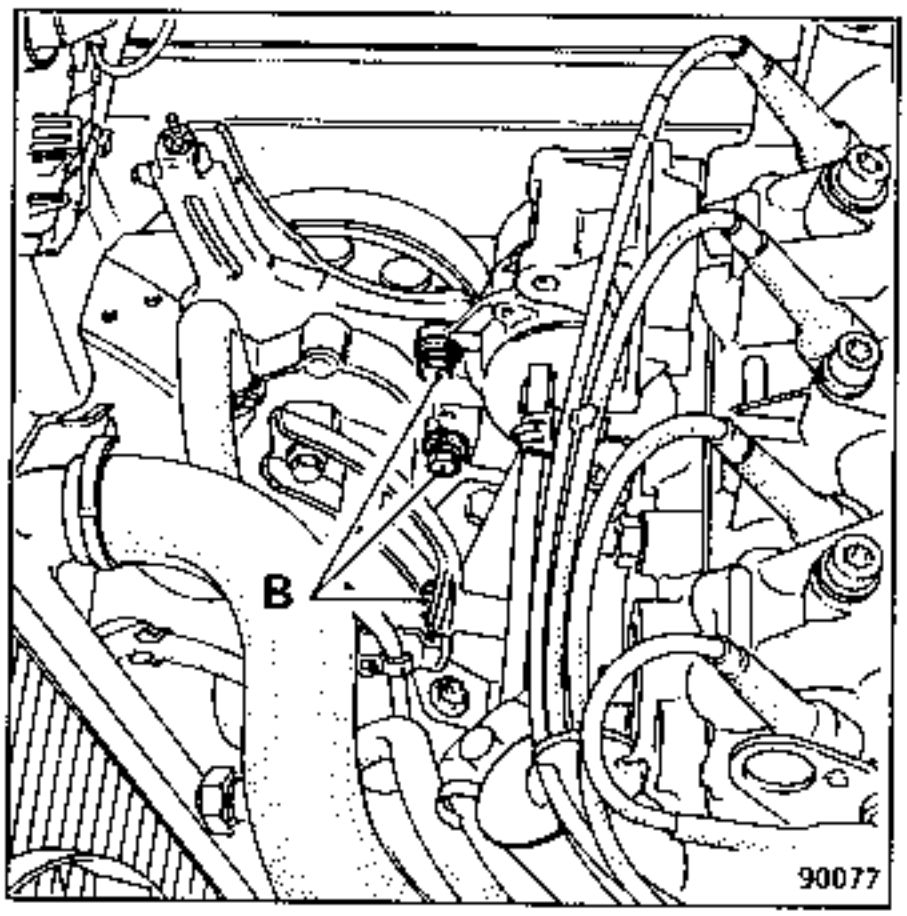
Remove the air conditioning compressor (see "Air Conditioning" section).

All Types

Place a clamp Mot.453-01 on the oil input pipe.

Disconnect the pipes from the:
- input,
- high pressure side.

Remove:
- the three bolts (B) which secure the pump support,



- the support-pump assembly.

If the pump is to be replaced, remove:
- the pulley (see corresponding section),
- the support.

REFITTING

If the pump has been replaced, fit:
- the pump support,
- the pulley (see corresponding section).

Refit:
- the pump-support assembly,
- the input and high pressure pipes.

Remove the clamp Mot.453-01.

On Vehicles fitted with Air Conditioning

Fit the air conditioning compressor.

All Types

Refit the alternator (see "Electrical System" section).

Adjust the belt tension (see corresponding section).

Fill and bleed the system (see corresponding section).

On Vehicles fitted with Air Conditioning

Fill and bleed the refrigeration (freon) system (see corresponding section).

ESSENTIAL SPECIAL TOOLS	
Mot. 453-01	Hose clamps

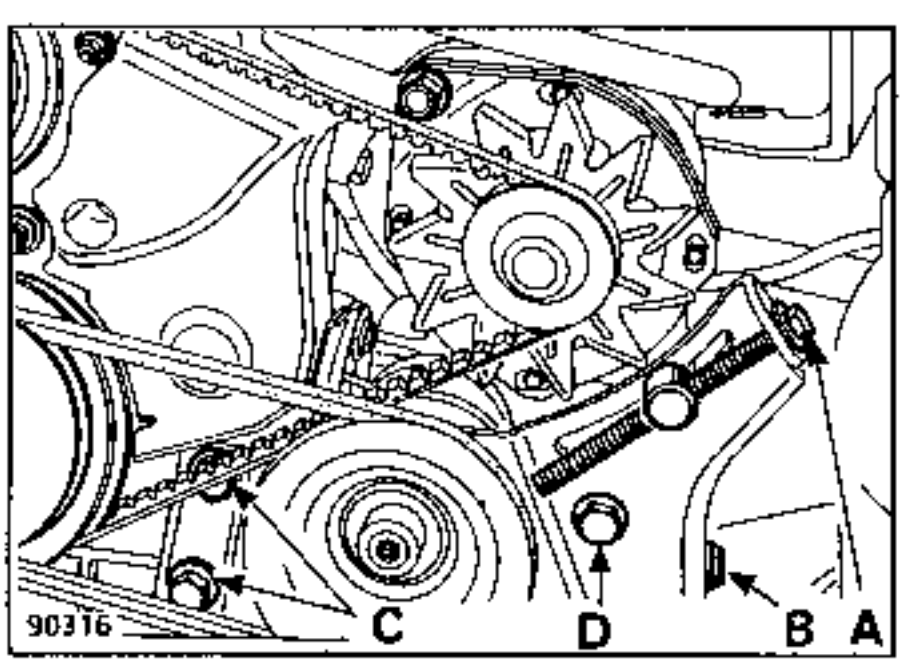
REMOVING

Place a clamp Mot.453-01 on the input pipe.

Position a container to catch the oil.

Disconnect the pipes from the:
- input,
- high pressure side.

Loosen:
- the alternator belt tensioner (A) and remove the alternator lower securing nut,
- the power steering pump tensioner(B),
- the two bolts (C), bolt (D) and the bolt from the pump rear support.



Take off the belt.

Remove:
- the bolt from the pump rear support,
- the two bolts (C),
- the pump-support assembly.

If the pump is to be replaced, remove:
- the pulley (see corresponding section),
- the support.

REFITTING

If the pump has been replaced, fit:
- the pump support,
- the pulley (see corresponding section).

Refit:
- the pump-support assembly,
- the input and high pressure pipes.

Remove the clamp Mot.453-01.

Adjust the belt tension (see corresponding section).

Fill and bleed the system (see corresponding section).

REPLACING THE PULLEY

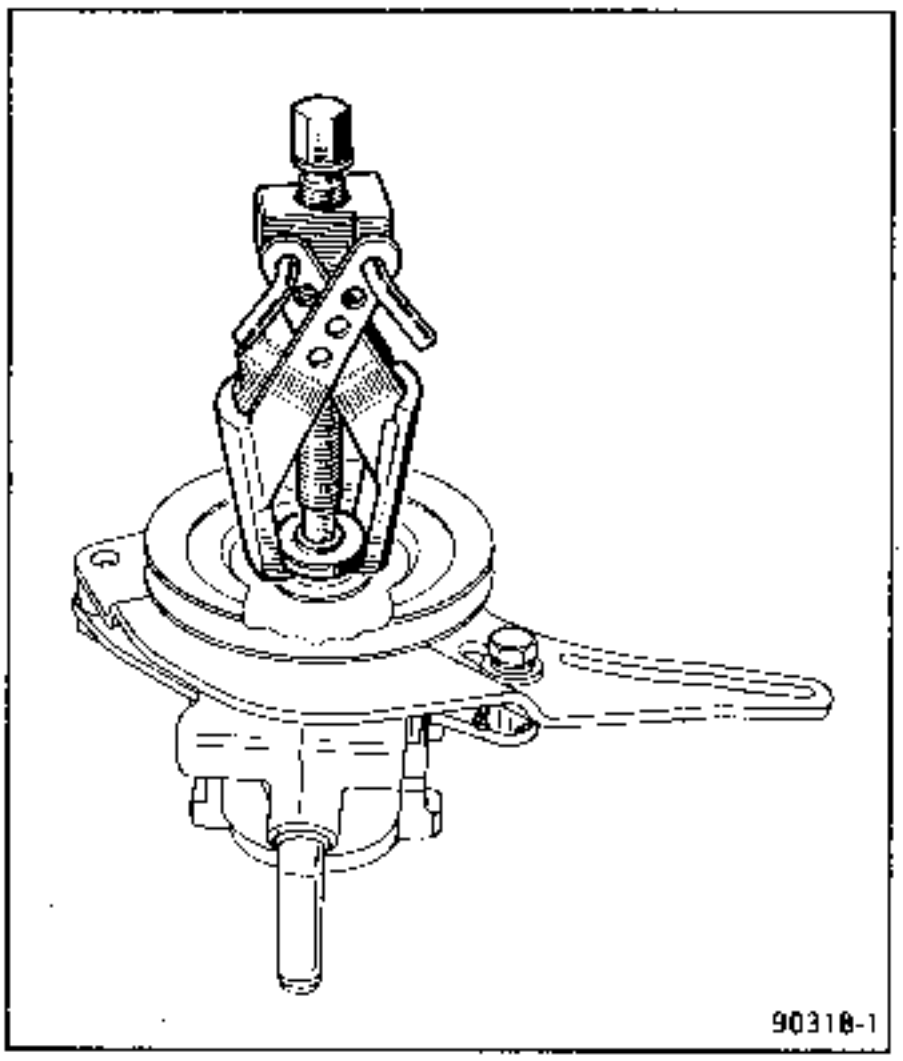
ESSENTIAL SPECIAL TOOLS	
Mot. 1083	Tooling for refitting the power steering pump pulley

REMOVING

Depending on the arrangement, extract the pulley after measuring the distance between it and the end of the shaft.

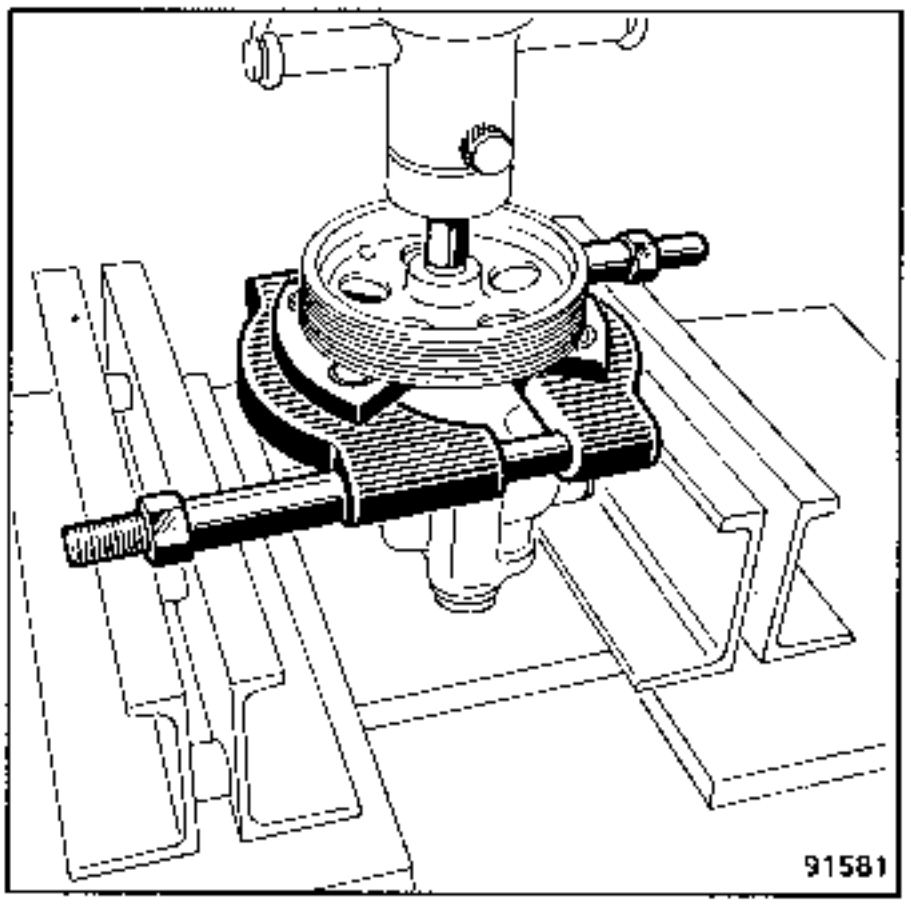
"V" Groove Pulleys

Use an extractor.



Flat Belt Pulleys

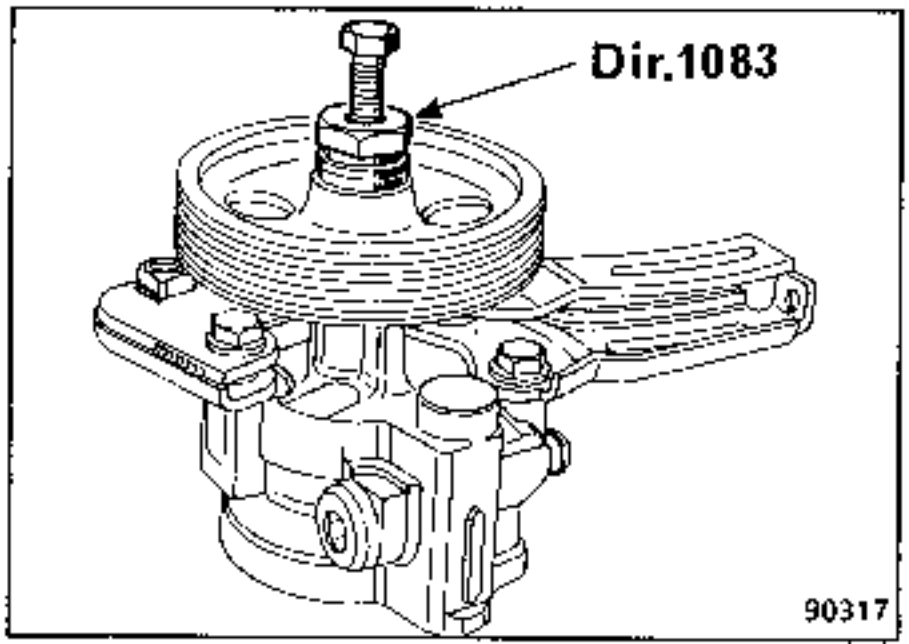
Use a press and an extractor of the FACOM U53G type.



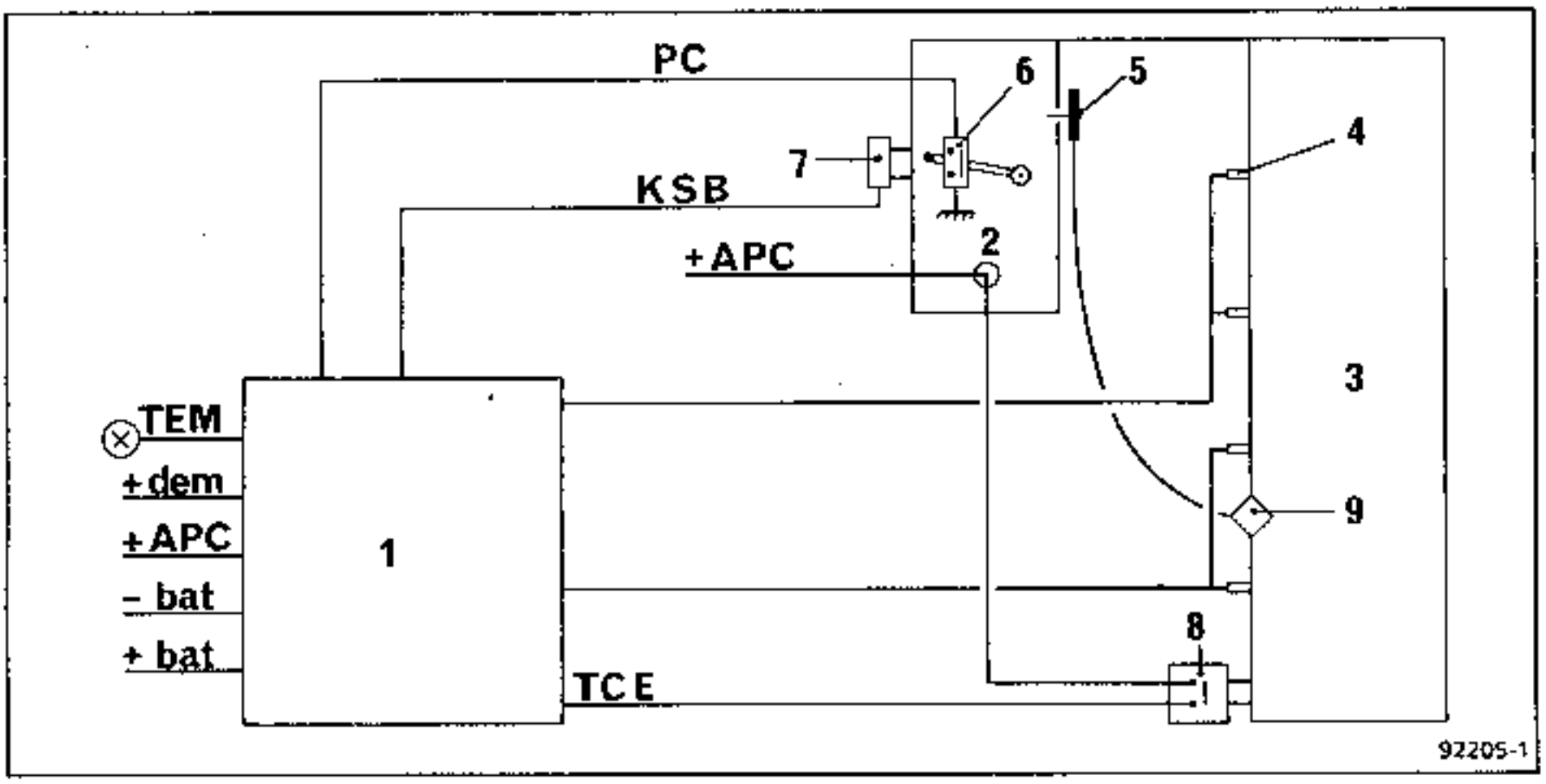
REFITTING

NOTE: before refitting the pulley, it is essential to ensure that the pump support can be fitted afterwards, otherwise place it in position before fitting the pulley.

Fit the pulley, using tool Dir.1083, until the dimension measured during removal has been reobtained (copiously grease the thread and the locating area on the pulley).



COLD STARTING SYSTEM CIRCUIT DIAGRAM



1 - Electronic preheater unit

2 - Injection pump

3 - Engine

4 - Preheater plugs

5 - Idling and fast idling lever

6 - Solenoid valve (circuit closed at idling)

7 - Cold advance solenoid (KSB)

8 - Temperature switch (circuit closed temperatures below approx. 60°C)

9 - Thermostat (providing fast idling when the engine is cold)

Principle of Operation of Electronic Preheater Unit

A - System switched on (ignition - starting switch)(T.I.: preheater plug warmup time)

NOTE: the time the warning light is switched on will vary depending on the temperature of the unit:
- approximately 20 seconds at -30°C
- switches off immediately at 80°C

B - Preheater plug switched off (if the starter does not operate, supply to plug ceases after 4.5 seconds T.2).

C - Engine starts (after the starter operates, the current supply to the plugs continues at 100% for approximately 10 seconds T.3).

D - Postheating period T.4. This period may last for a maximum of 3 minutes during which the preheater plugs are supplied with current, alternately, 2 by 2.

NOTE: period T.3 may be interrupted:

- by the cooling temperature exceeding approx. 60°C (temp. switch 8).
- 3 seconds after the load switch(6) opens, the supply to the plugs is reestablished as soon as the circuit PC is open.

E - Cold starting advance. The KSB solenoid valve is supplied with current, whilst the starter is operating and for 5 to 10 seconds after it stops.

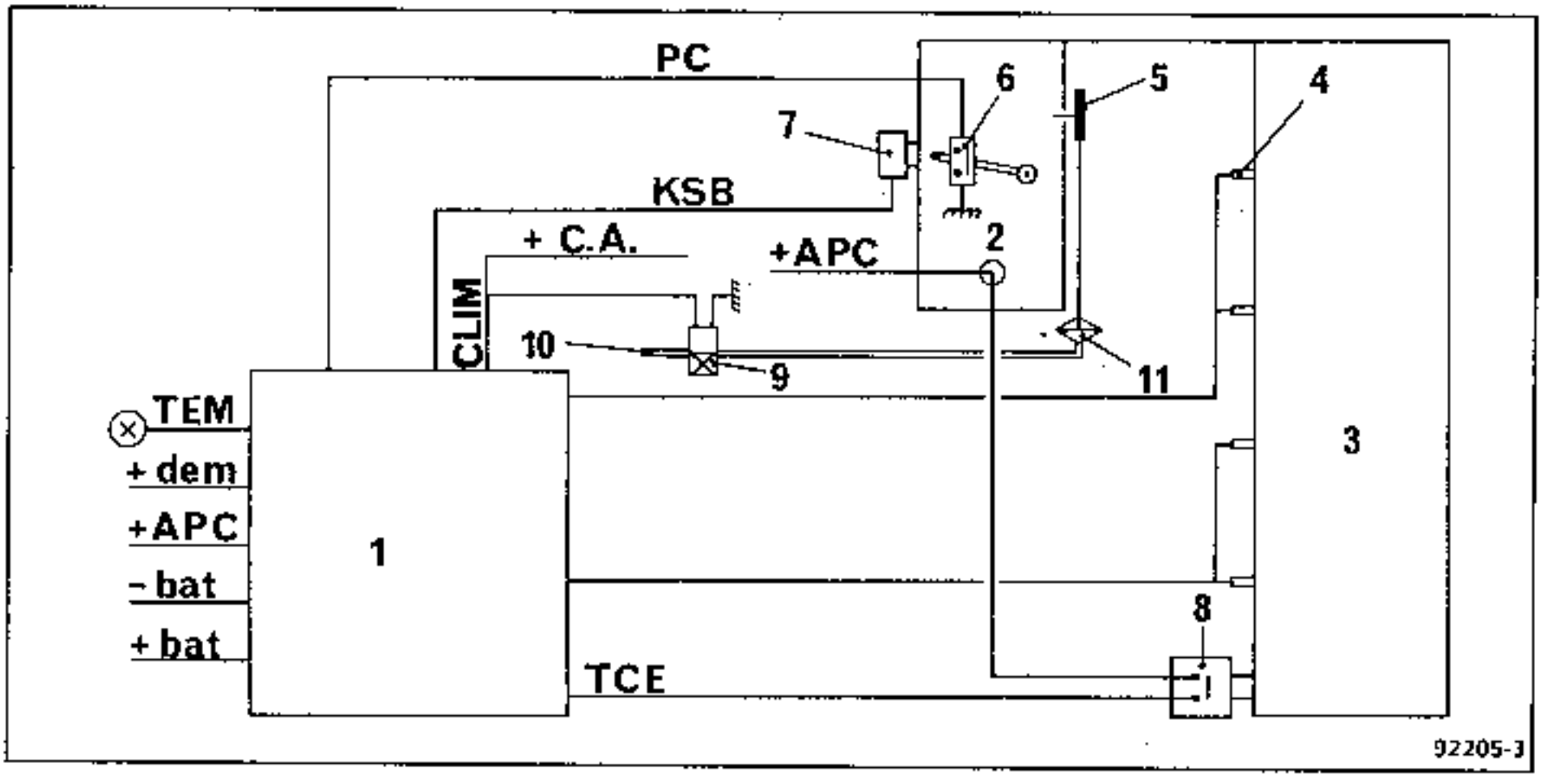
Supplying the KSB solenoid valve with current causes an increase in the injection pump automatic advance.

Fast Idling when the Engine is Cold

A thermostat (9) holds the idling lever (5) in the fast idling position.

As the temperature rises, the lever gradually returns to the normal idling position.

COLD STARTING SYSTEM CIRCUIT DIAGRAM (AIR CONDITIONED VEHICLES)



1 - Electronic preheater unit

2 - Injection pump

3 - Engine

4 - Preheater plugs

5 - Idling and fast idling lever

6 - Solenoid valve (circuit closed at idling)

7 - Cold advance solenoid valve (KSB)

8 - Temperature switch (circuit closed at temperatures lower than approximately 60°C)

9 - Fast idling control solenoid valve (on cold starting and when A.C. is operating)

10 - Vacuum

11 - Fast idling control vacuum capsule

Principle of Operation of Electronic Preheater Unit

A - Circuit closed (ignition-starting switch)(T.1: preheater plug warmup time).

NOTE: the time the warning light is switched on will vary depending on the temperature of the unit:

- approximately 20 seconds at -30°C
- it switches off immediately at 80°C

B - Current supply to plugs switched off (if the starter does not operate, the supply to the plugs ceases after 4.5 seconds T.2).

C - Engine starts (after the starter operates, the current supply to the plugs continues at 100% for approximately 10 seconds T.3).

D - Postheating period T.4. This period may last for a maximum of 3 minutes during which the plugs are supplied alternately at 50% (2 by 2).

NOTE: period T.3 can be interrupted:

- as soon as the coolant temperature exceeds approximately 60°C (temperature switch (8)),
- 3 seconds after the load switch (6) opens. The supply to the plugs is reestablished as soon as circuit PC is open.

E - Cold starting advance. The KSB solenoid valve is supplied with current whilst the starter is operating and 5 to 10 seconds after it has stopped.

Supplying the KSB solenoid valve with current increases the injection pump automatic advance.

F - Fast Idling

On vehicles fitted with air conditioning, the fast idling system (5) is controlled by a vacuum capsule (11) connected to the servo circuit exhaust (10).

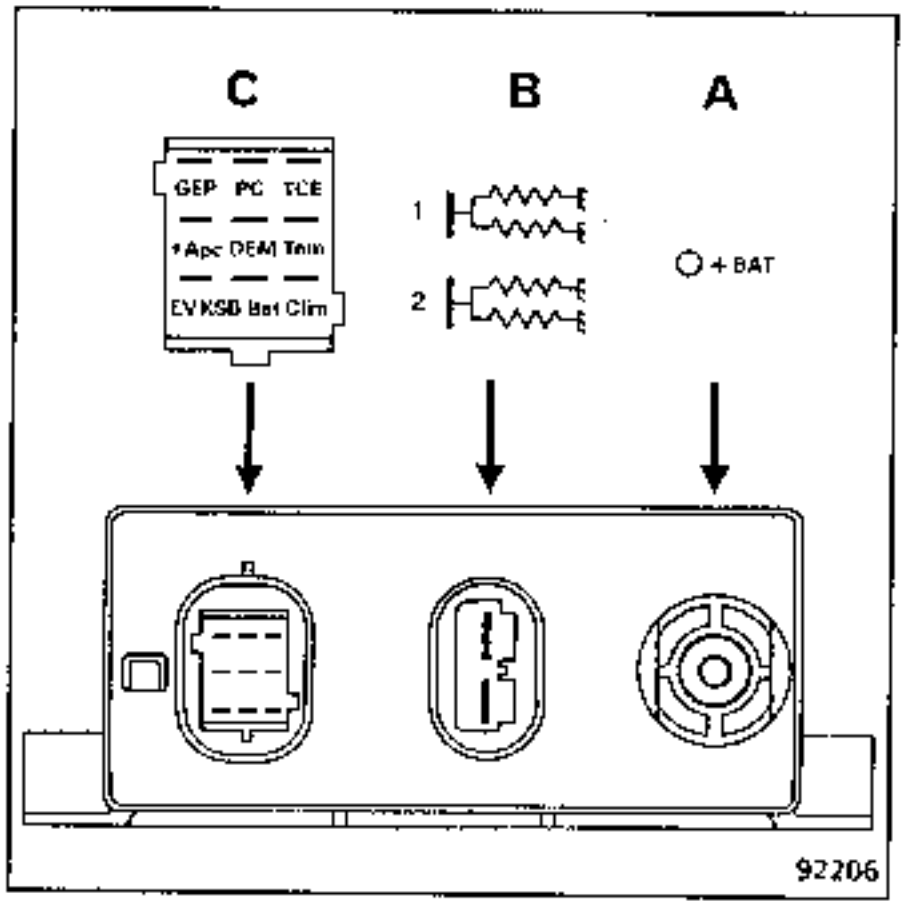
a - Fast Idling when the Engine is Cold

Solenoid valve (9) is supplied with current during the same period as the preheater plugs (T.1 + T.2 + T.3 + T.4).

b - When the Air Conditioning is Operating

The solenoid valve (9) is supplied with current as soon as the air conditioning compressor engages.

ELECTRONIC PREHEATER UNIT



Circuit Channel Functions

A - + BAT = battery +

B - 1: Power supply to plugs 1 and 2
2: Power supply to plugs 3 and 4

C - GEP: not used (electrically driven power steering pump).

P.C.: load switch on injection pump control lever (circuit closed at idling speed)

TCE: coolant temperature switch (circuit open at temperatures above approximately 60°C).

+ APC: + after ignition switch.

DEM: + starter signal

TEM: preheater warning light

EV KSB: cold starting advance solenoid valve.

-BAT: battery earth (ground).

Clim: + fast idling solenoid valve supply (air conditioning option).

FAULT FINDING

GENERAL

The pre and post heating unit is fitted with protective systems which cut it out in part or in full if there is:

- a short-circuit on the plugs or the power circuit,

- a short-circuit on the instrument panel warning light,

- a power supply voltage higher than 16 $\pm$ 1 volt.

NOTE: the unit returns to normal operation as soon as the above defect has disappeared.

The cause of the preheater unit not operating can be determined on the basis of the symptoms listed below:

1 - If the preheating warning light is not operating and the engine will not start from cold.

2 - If the preheating warning light is operating, but the engine will not start from cold.

3 - If the preheating warning light is not operating, but the engine starts normally from cold after approximately 10 seconds preheating.

4 - If the preheating system is operating normally, but postheating is not.

5 - If both pre and post heating are operating normally, but the KSB cold starting advance system is not operating.

6 - If the fast idling, when cold (air conditioning option), is not operating.

FAULT FINDING

1 - If the preheating warning light is not operating and the engine will not start from cold.

CHECK	REMEDY
Disconnect the plug supply connector (B) and test the preheating system:	
- if the warning light switches on correctly.	Check the preheater plug wiring. If it is correct, check and replace the defective plug or pluge.
- If the warning light does not switch on, but current is present at the outputs from the connector (B).	Check the preheater plug and instrument panel warning light circuits. Rectify if necessary.
- If the warning light does not switch on, but there is no current at the output from connector (B).	Check: - the battery + on connector (A), - the + after the ignition switch on connector (C), - the battery earth - on connector (C). If the power supply is correct, replace the preheater unit.

2 - If the preheating warning light is operating and the engine will not start from cold.

CHECK	REMEDY
Disconnect the connector (B) and carry out a test on the preheating system:	
- if the warning light switches on and current is available at the outlets from the connector (B).	Check that the plug supply circuit is correct and replace any defective plug or plugs.
- If the warning light switches on, but there is no current available at the outlets of connector (B).	Replace the preheater unit.

3 - If the preheating warning light is not operating, but the engine starts normally from cold, after approximately 10 seconds preheating.

CHECK	REMEDY
Earth the output (warning light) from connector (C) through a two amp fuse, with the ignition switched on:	
- if the fuse burns out.	The instrument panel warning light is short-circuited. Rectify the wiring.
- If the warning light does not switch on.	The bulb is burnt out or the wiring is defective. Réplace the bulb or rectify the wiring.
- If the warning light switches on.	Replace the preheater unit.

FAULT FINDING

4 - If the preheating system is operating normally, but postheating is not.

CHECK	REMEDY
Disconnect the connector (C) and, with a voltmeter/ohmmeter, check:	
- The resistance across the outputs (PC and -bat): . accelerator at idling: resistance = 0 ohms, . accelerator fully depressed: resistance = infinity.	If the circuit is broken, check the wiring, the microswitch and its connectors. Rectify any defects.
- With the ignition on, across the outputs (TCE and -bat):	If the circuit is closed, check that the micro switch is of the correct type and correctly adjusted.
. when the engine is cold, coolant temperature less than 55°C $\pm$ 2°C = 12 Volts.	If there is no current present: check the wiring, the temperature switch and its connector.
. engine warm coolant temperature more than 65°C $\pm$ 2°C = 0 volts.	If current is present: check the wiring and ensure that the temperature switch is of the correct type.
If the checks carried out are correct, but the postheating system will not operate, after cold starting.	Replace the preheater unit.

5 - If both pre and post heating systems are operating normally, but the KSB cold starting advance system is not operating

CHECK	REMEDY
Disconnect the connector (C) and measure the resistance across (EV KSB and -bat).	
The resistance should be around 5 ohms.	If the resistance is not correct, check the wiring and the solenoid valve and rectify.
Start the engine and run it at idling speed with connector (C) disconnected. Connect (+APC to EV KSB). There should be a slight change in the engine note (sharper sound).	If there is no change in the noise, check that a 12V current is available at the KSB solenoid valve and that the valve is correct. If the engine note changes, the preheater unit is defective. WARNING: the KSB system only operates for a very short time (5 to 10 seconds after the engine has started).

FAULT FINDING

6 - If the fast idling when cold (air conditioning option) is not operating.

CHECK	REMEDY
Run the air conditioning:	
- If the fast idling system does not operate.	Check that the solenoid valve (9) does in fact open the pneumatic system. If it does not, check the wiring and replace the solenoid valve if it is defective.
- If the fast idling system is not operating, despite the solenoid valve being selected.	Check the pneumatic system between the exhaust, the solenoid valve (9) and the capsule (11). Rectify any defects or poor connections.
If the fast idling system operates when the air conditioning starts, but does not operate for cold starting (whilst the preheating warning light is switched on).	Check the electrical wiring between the preheater unit and the solenoid valve. If there is no current from output point "CLIM" whilst the preheater warning light is switched on, replace the preheater unit.
If the fast idling system is operating normally during preheating, but switches off and on again during postheating.	The preheater unit is defective. Replace it.

X 48 M and X 48 N engines are equipped with a system which injects air into the exhaust.

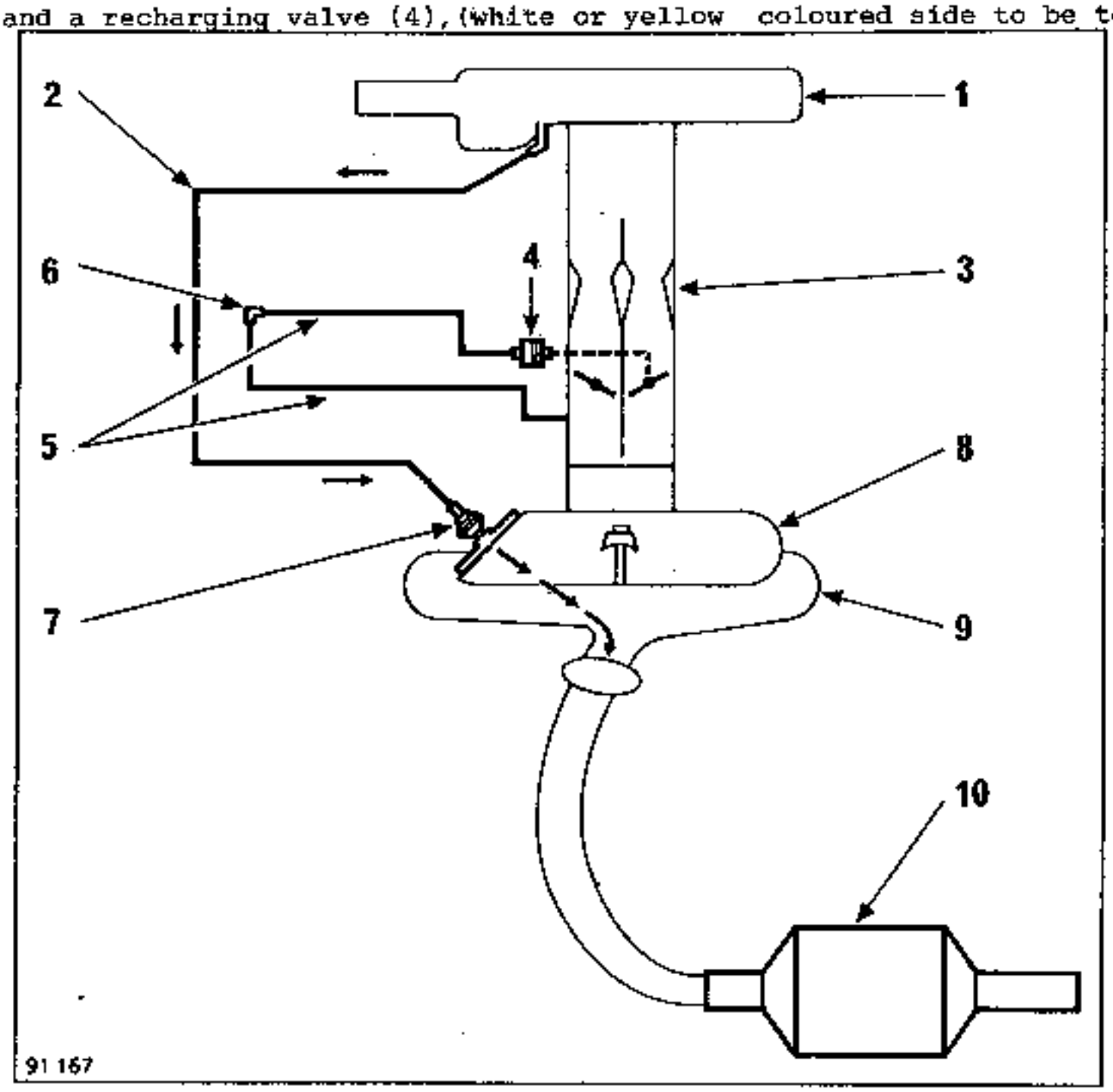
PRINCIPLE OF OPERATION

The emission control system consists of a valve known as a pulsair (7) mounted on the inlet manifold (8) and connected to the air filter (1) on one side and to the exhaust manifold (9) on the other.

Pulses in the exhaust manifold (9) set up a vacuum behind the pulsair (7) and thus open the air circuit between the air filter (1) and the exhaust (9) on the input side of the catalyzer (10).

The entry of carbon free air (oxygen) into the exhaust system, before the catalyzer, raises the temperature of the exhaust gases, by combustion, and permits a catalytic reaction to take place in the catalyzer. This causes the oxydization and reduction of the hydrocarbons (HC) and carbon monoxide (CO).

The hydrocarbon output during overrun is reduced by means of a device that opens the throttle and a recharging valve (4), (white or yellow coloured side to be towards the



output connection on the carburettor).

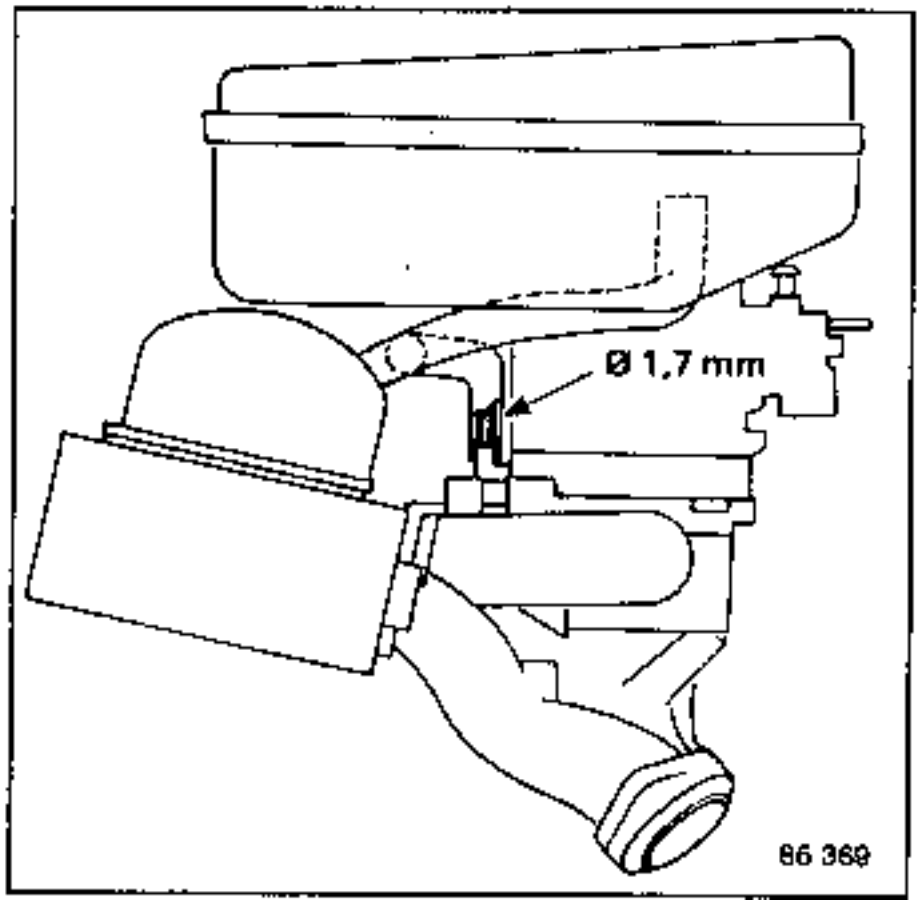
1 - Air filter
2 - Pipe connecting air filter (1) to pulsair (7)
3 - Carburettor
4 - Retardation valve
5 - Pipe connecting vacuum takeoff to the actuator
6 - 2 way union
7 - Pulsair valve
8 - Inlet manifold
9 - Exhaust manifold
10 - Catalyzer

The crankcase gases are recirculated by being passed from the rocker arm cover into the inlet manifold through a dual circuit (input and output) so that they are burnt in the combustion chambers.

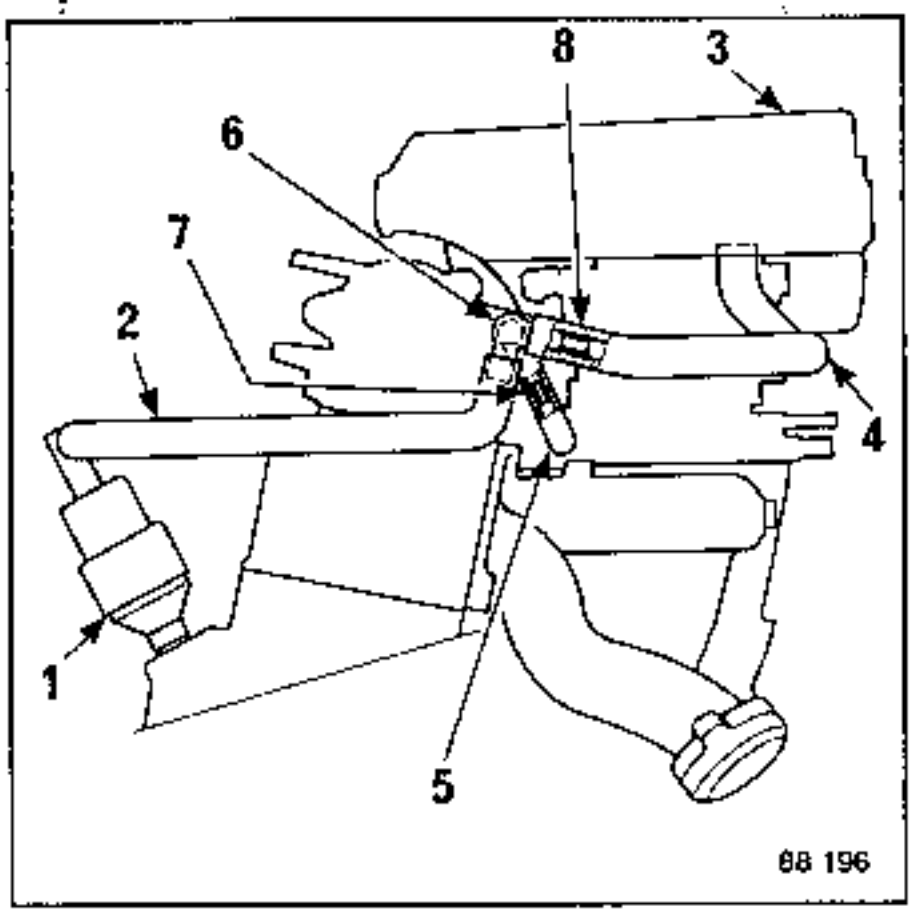
CHECKING

To ensure that the emission control system is operating correctly, the crankcase oil vapour reintake system must always be kept clean and in good condition. Check that the jets are in place and are of the correct sizes.

C2J Engine

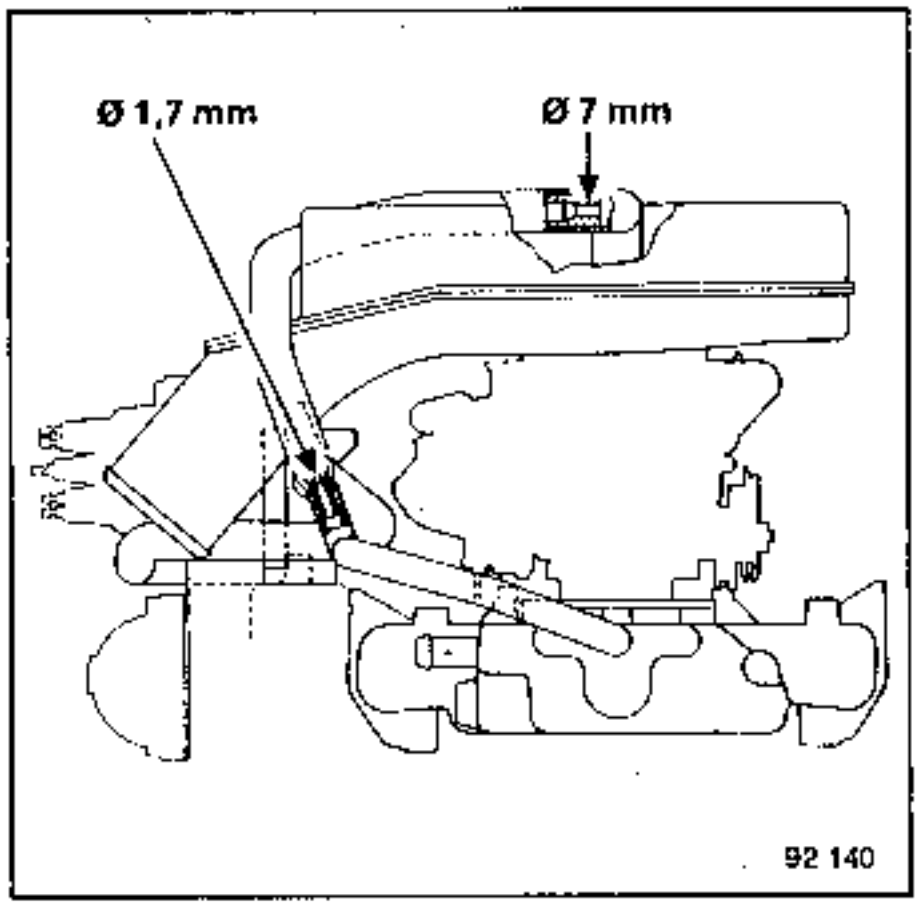


F2N... engine with the filter mounted on top of the carburettor

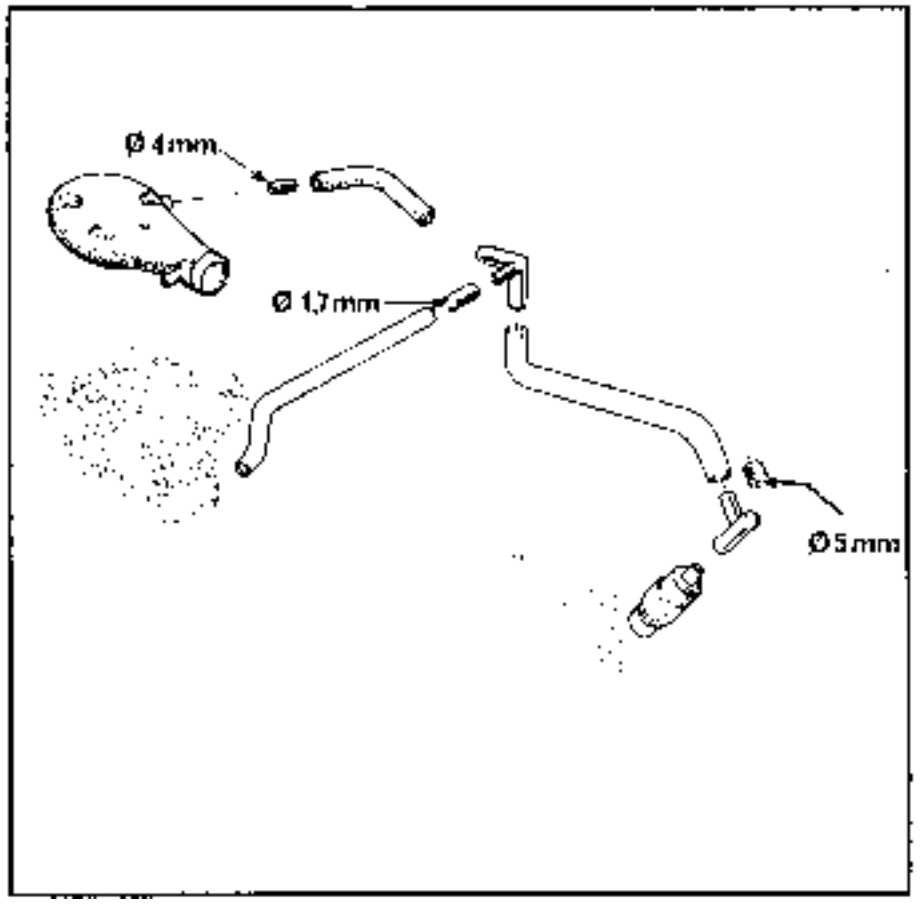


1 - Drain unit
2 - Pipe (drain casing, 3 way union)
3 - Air filter
4 - Pipe (filter, 3 way union)
5 - Pipe (3 way union to carburetter base)
6 - 3 way union
7 - 1.7mm Ø jet
8 - 7mm Ø jet

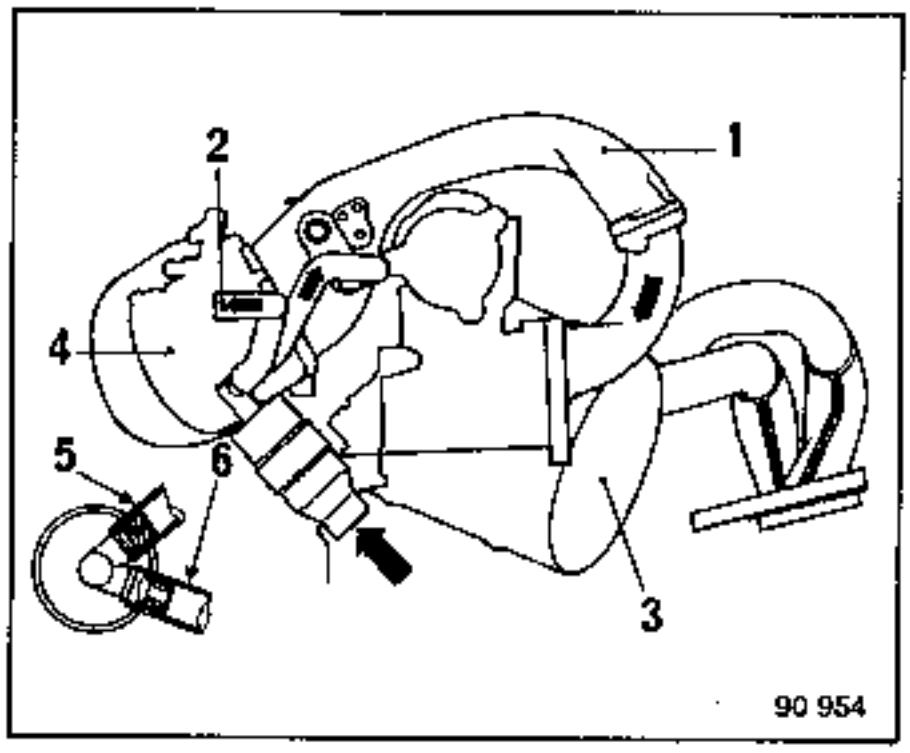
F2N... engine with remotely mounted filter



F2R... Engine

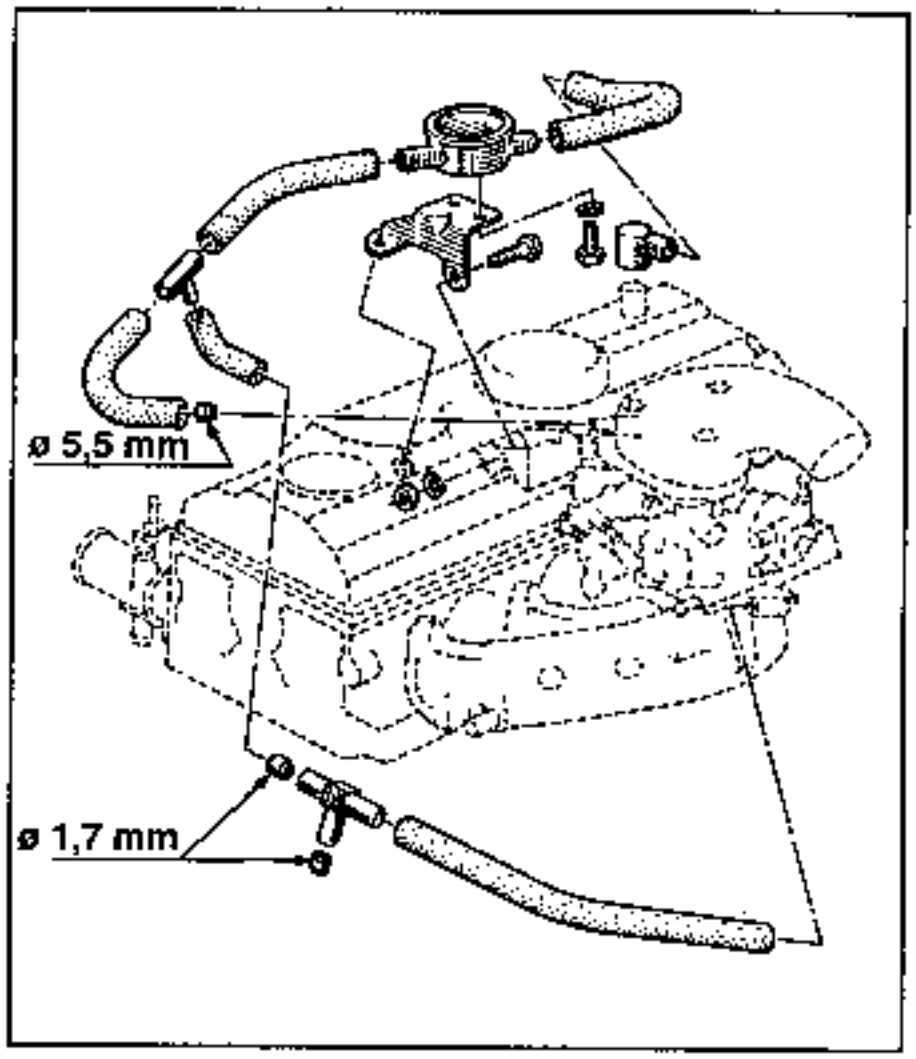


F3N... Engine

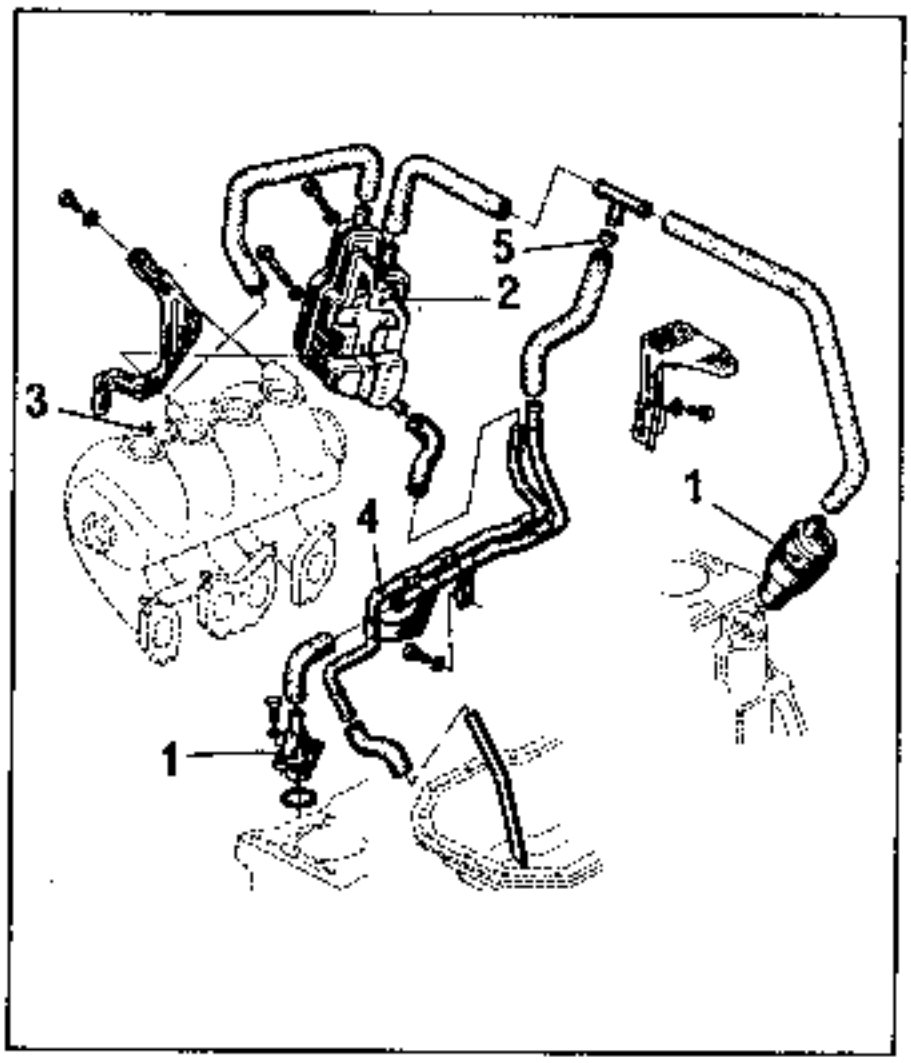


1 - Air intake distributor
2 - Connecting pipe
3 - Air filter
4 - Throttle unit
5 - 1.5mm jet (on distributor side)
6 - 6.5mm jet (on connecting pipe side)

J6R... Engine

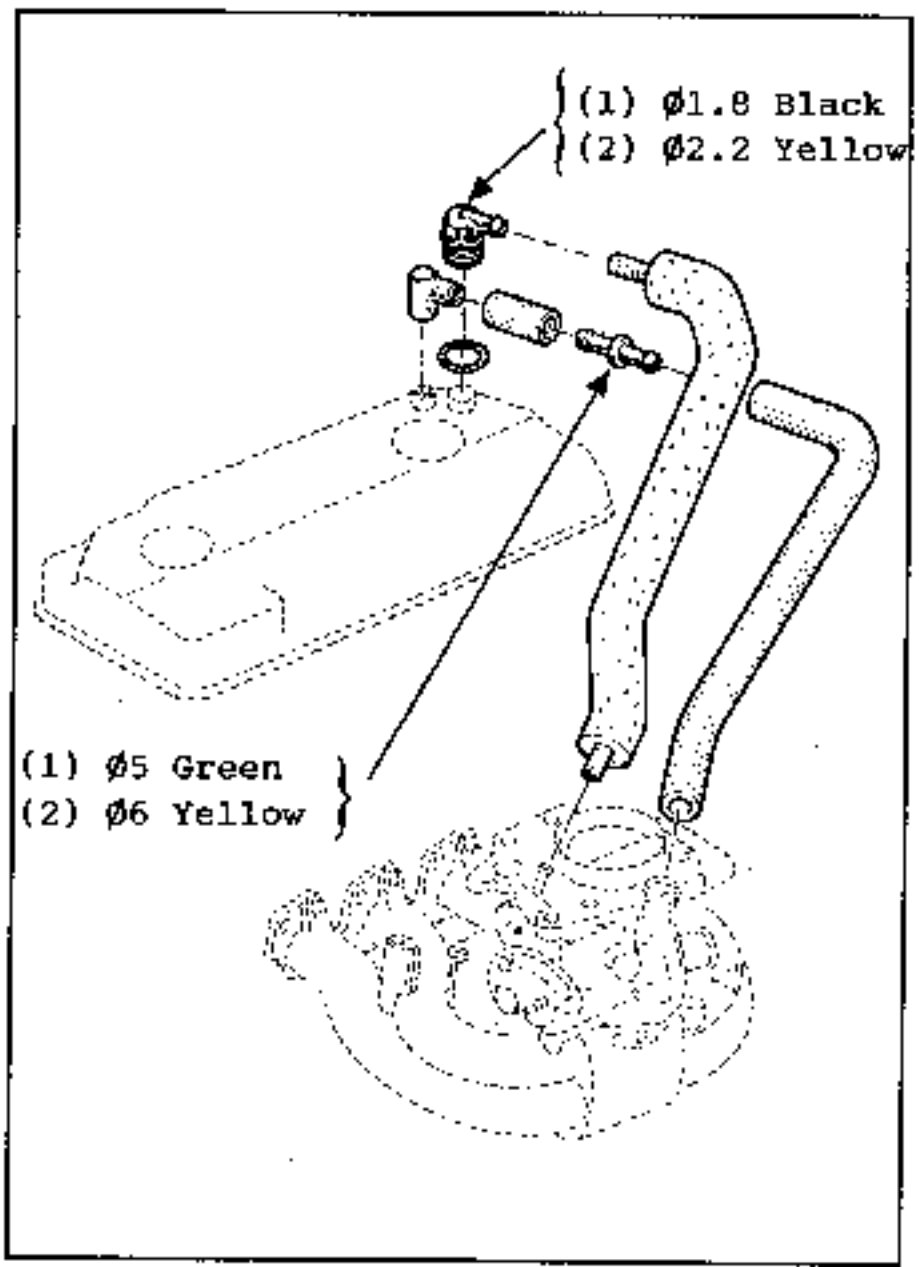


F8Q Engine

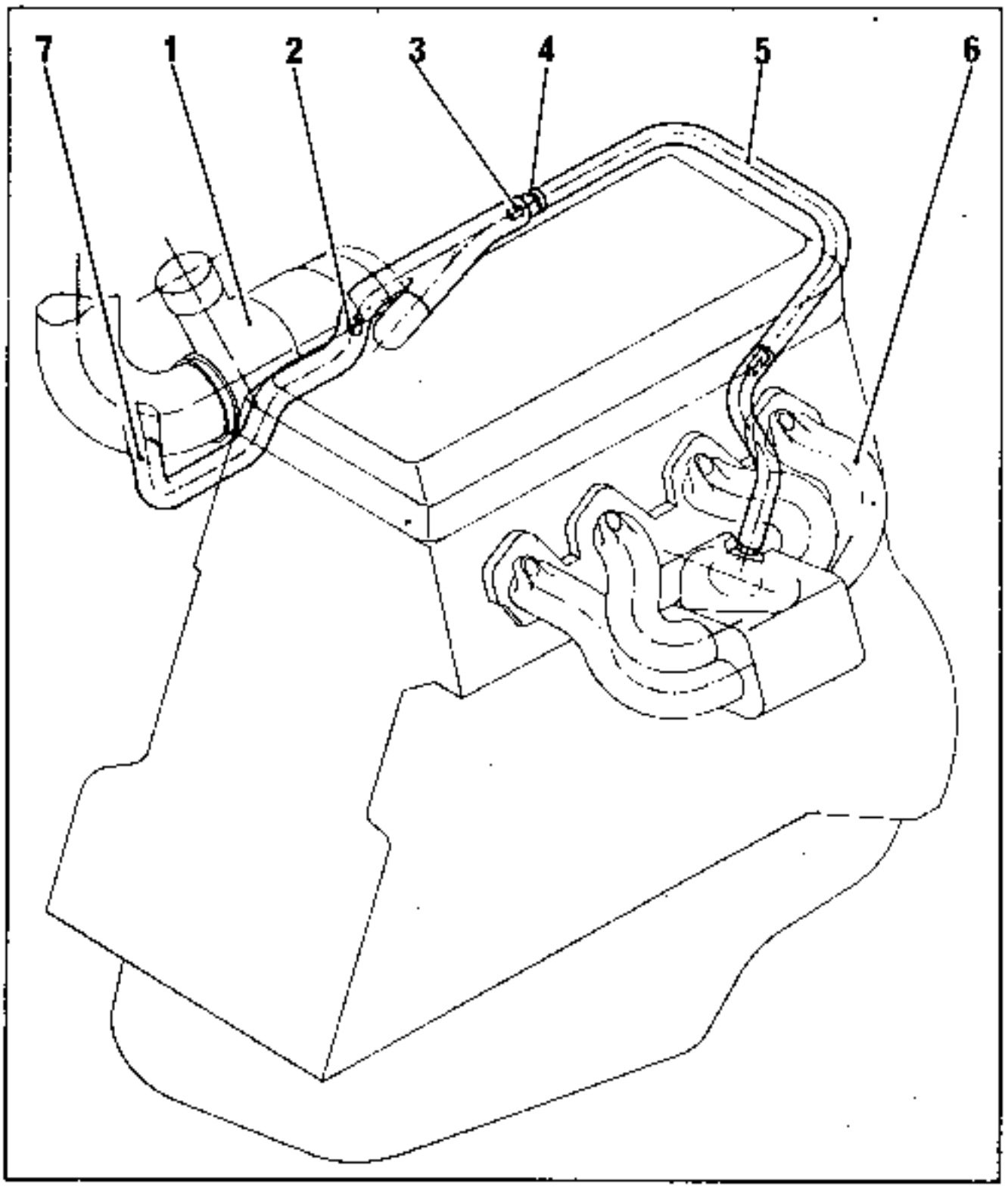


1 - Drain unit
2 - Drain unit
3 - Resonator
4 - Return pipe to crankcase
5 - 8mm Ø jet

J7R... (1) J7T...(2) Engine



RENAULT 21 - 2 l. Turbo X 485



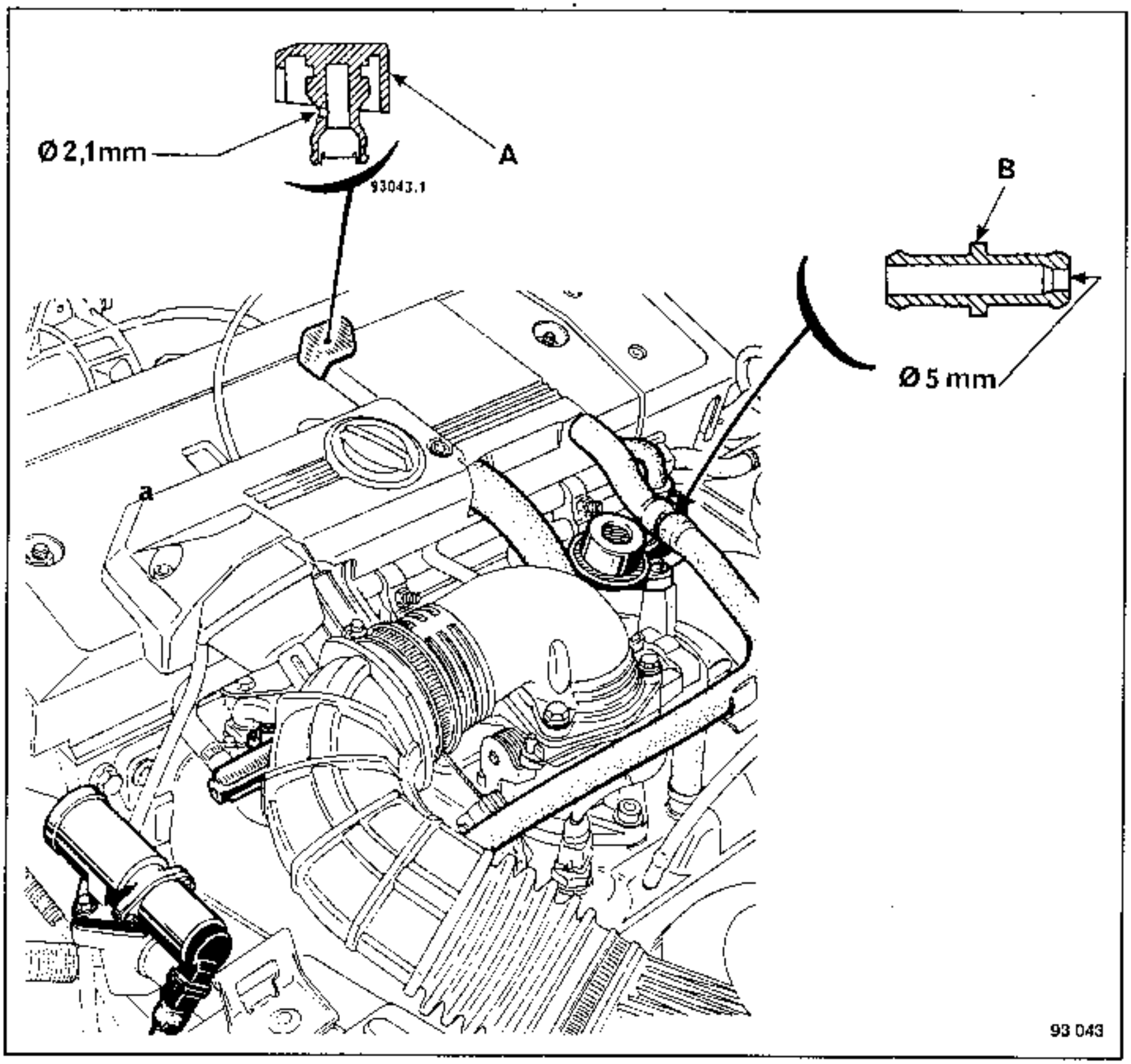
The crankcases gases are recirculated. They are taken from the rocker arm cover to the inlet manifold through a dual circuit (input and output) to be burnt in the combustion chambers. When the turbocharger is operating, valve (4) closes the output circuit.

1 - Turbocharger
2 - 6mm jet
3 - 2.2mm jet
4 - Non return valve
5 - Output circuit
6 - Air intake distributor
7 - Input circuit

CHECKING

For the emission control system to operate correctly, the crankcase oil vapour reintake system must be kept clean and in good condition.

Check that the jets are in position and are the correct sizes.



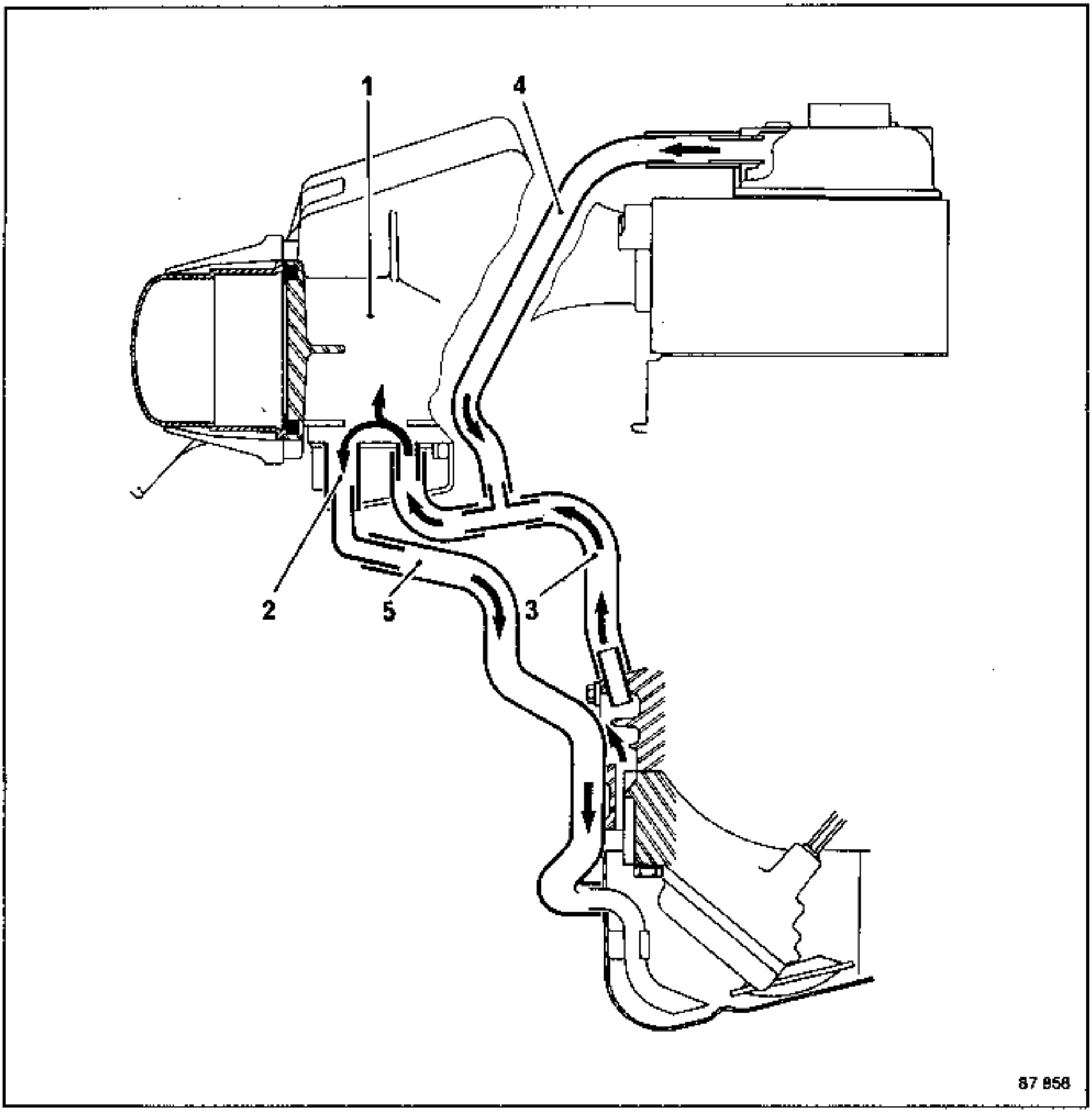
A - Output side reintake (jet Ø 2.1mm, colour yellow)
B - Input side reintake (jet Ø 5mm, colour yellow).

CHECKING

For the emission control system to operate efficiently, the crankcase oil reintake system must be kept clean and in good condition.

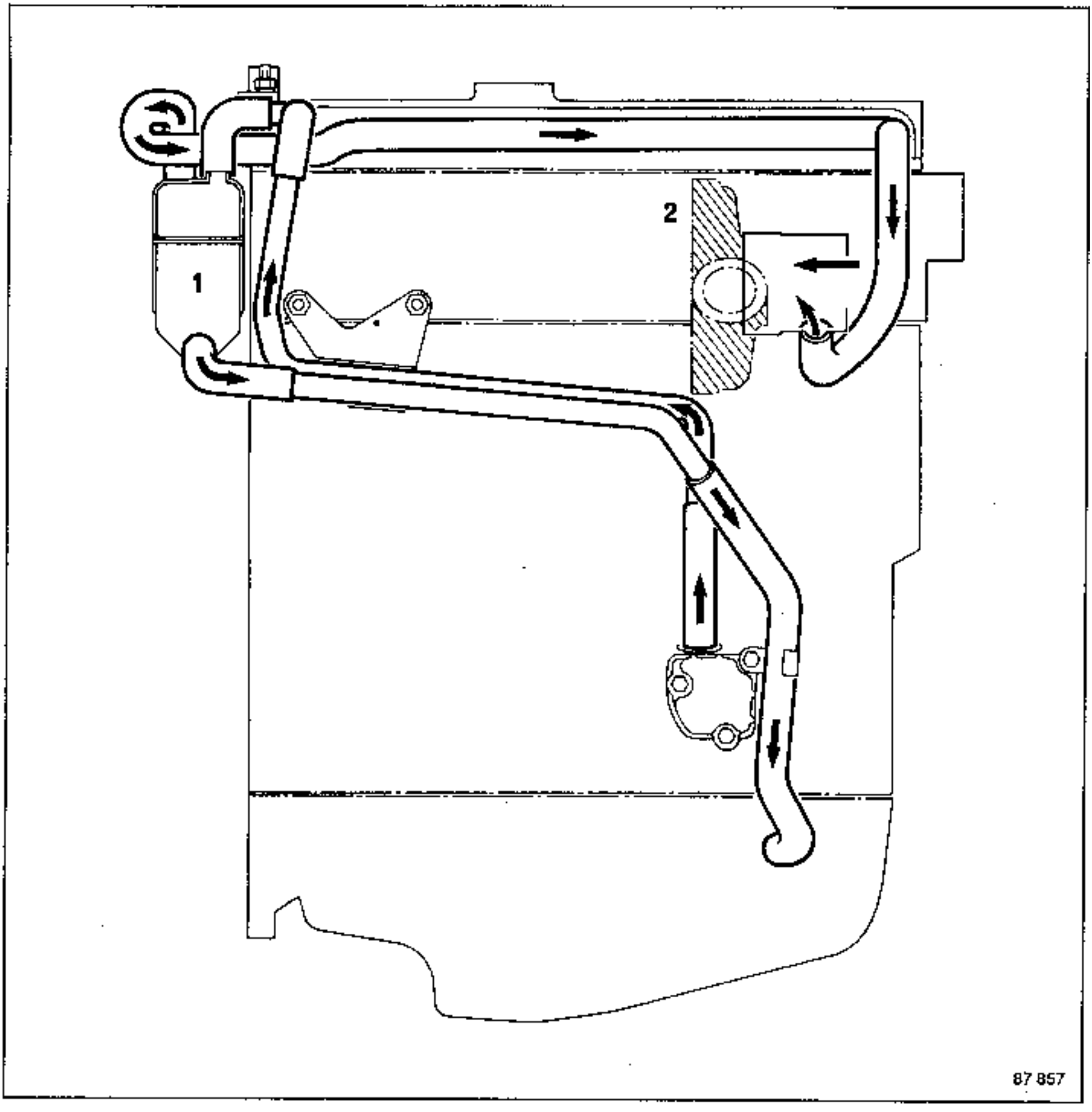
Check that the jets are in position and of the correct sizes.

J8S Naturally Aspirated Engine



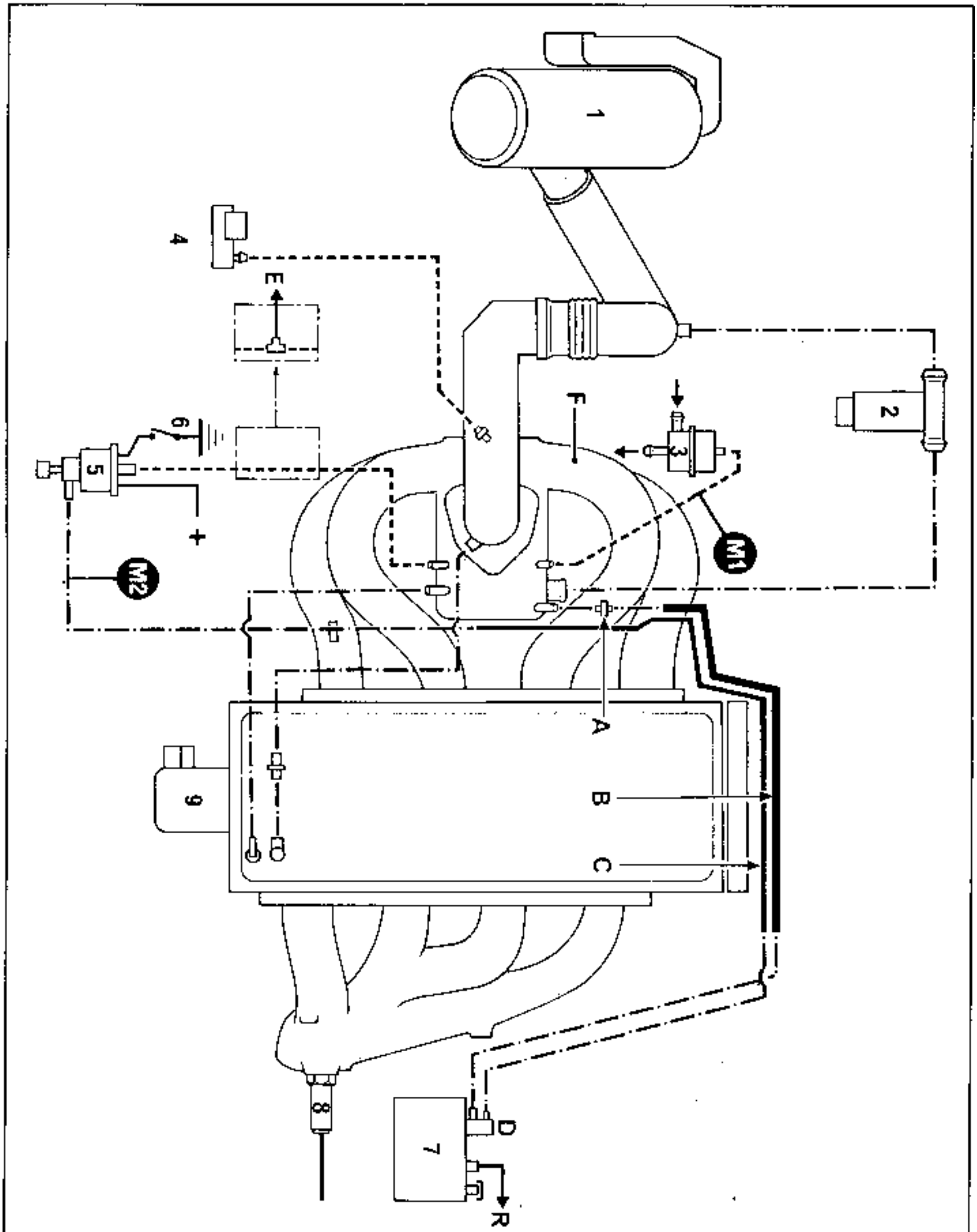
1 - Air casing
2 - Drain unit
3 - Oil vapour reintake pipe (lower engine)
4 - Oil vapour reintake pipe (upper engine)
5 - Return to sump pipe

J8S Turbo Engine



1 - Drain unit
2 - Turbocharger

X 48 Vehicles (for certain markets)



1 - Air filter
2 - Idling speed regulator valve
3 - Fuel pressure regulator
4 - Pressure sensor
5 - Solenoid valve controlling fuel vapour absorption canister
6 - Electronic computer
7 - Fuel vapour absorption canister
8 - Oxygen sensor or Lambda sensor
9 - Ignition distributor

A - 1.8mm Ø jet: colour white
B - Fuel vapour canister bleed pipe (intake distributor - canister)
C - Fuel vapour canister bleed control pipe (canister - solenoid valve)
D - Fuel vapour canister valve
E - To automatic transmission
F - Air intake distributor
R - To fuel tank

For certain markets, X 48K vehicles are fitted with a system for absorbing the vapours emanating from the fuel tank:

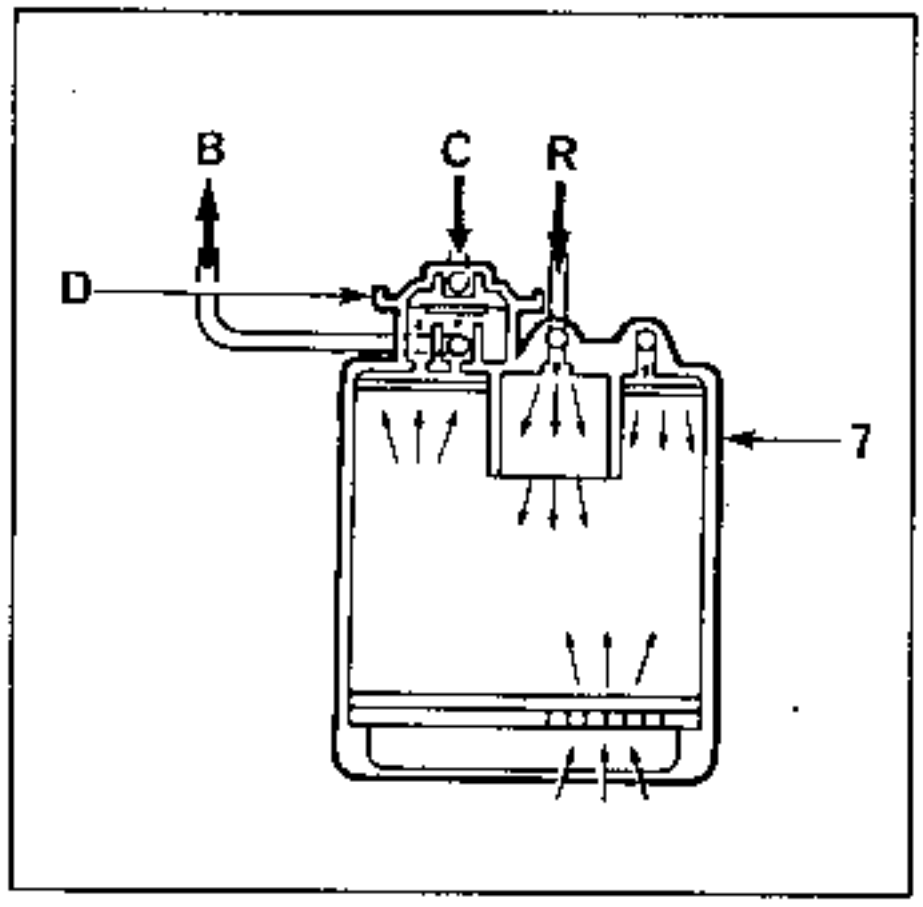
- The circuit consists of a fuel vapour absorption canister connected to the tank by a pipe (R).

- The fuel vapour absorption canister contains active carbon. It carries a valve (D) connected to the air intake distributor and controlled by the injection computer (6) through solenoid valve (5) and pipe (C). The fuel vapour canister is bled via pipe (B) calibrated by a jet (A) 1.8mm in diameter and colour white.

PRINCIPLE OF OPERATION:

- When the engine is stopped:
  The fuel vapour is collected in the fuel vapour absorption canister.

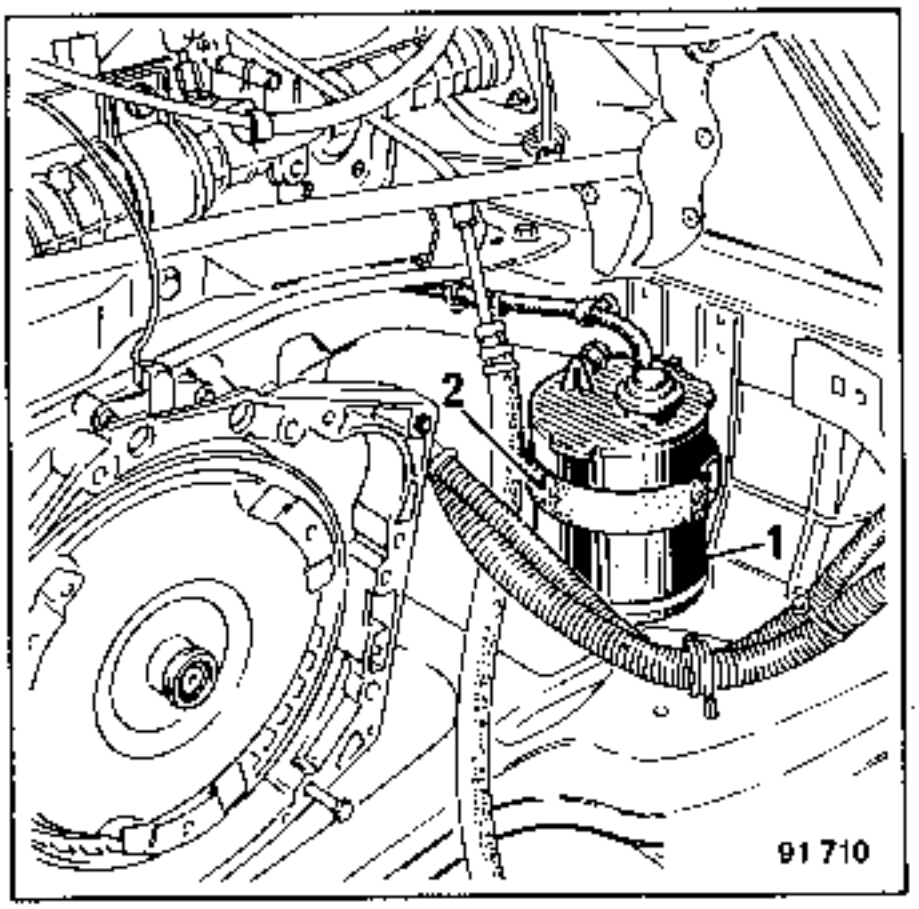
- When the engine is running at idling speed:
  There is no bleed signal to the solenoid valve (5) (no control signal from the injection computer (6)).



- When the engine is running at speeds other than idling:
  Under certain conditions, when the system is warm, the injection computer (6) sends an electrical signal to the solenoid valve (5) to open the pneumatic circuit (C) between the air intake distributor (F) and the fuel vapour canister (7). The fuel vapour contained in it is then bled off.

POSITIONS OF THE ANTI-EVAPORATION SYSTEM COMPONENTS

The fuel vapour absorption canister (1) is secured to the left hand side member (on the same side as the air intake distributor and below the injection and ignition computer).

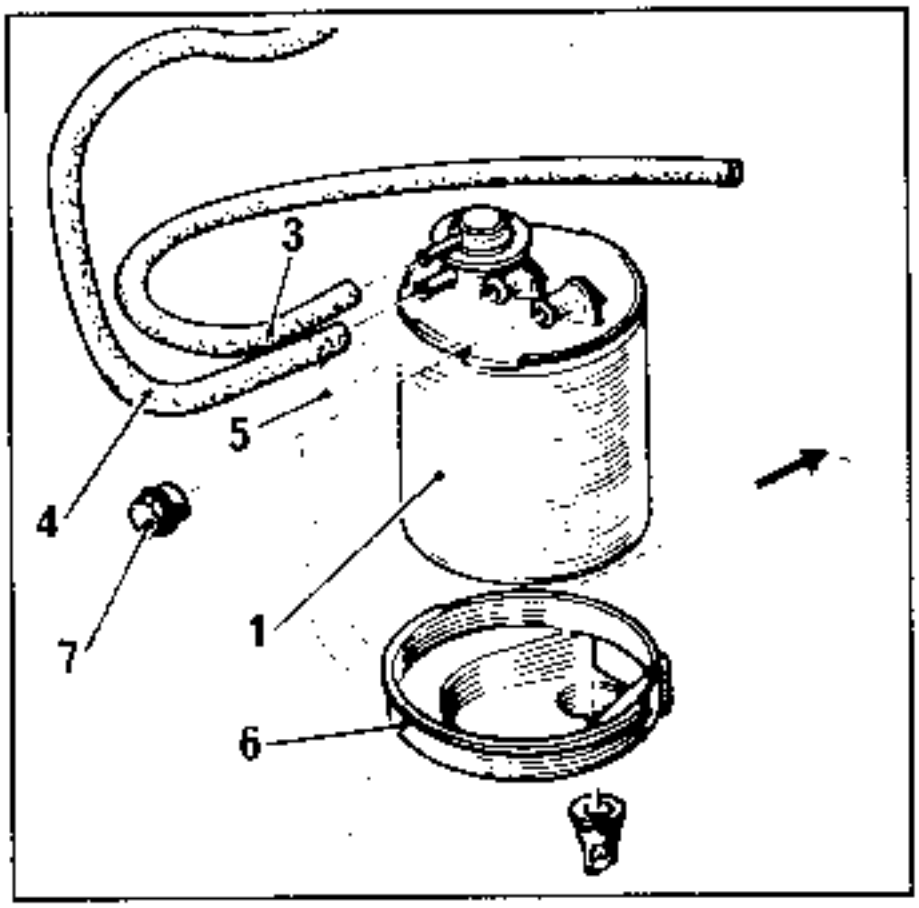


The canister bleed solenoid valve is mounted, together with the pressure sensor, on the injection computer protective casing.

REPLACING THE FUEL VAPOUR ABSORPTION CANISTER

Disconnect the pipes from the top of the canister.

Remove the securing strap (2) and take out the canister from under the vehicle.



1 - Fuel vapour absorption canister
2 - Securing strap (left hand drawing)
3 - To solenoid valve
4 - To air intake distributor
5 - To fuel tank
6 - Support
7 - Plug

When refitting the canister, ensure that the pipes are correctly connected.

CHECKING THE SYSTEM

FUNCTION TESTED	TEST EQUIPMENT	CONDITIONS	FINDINGS	REMARKS
Anti-evaporation system bleed	Vacuum gauges connected, in parallel: - at M1 - at M2 - voltmeter	Engine hot, after electric fan has cut in twice: At idling When accelerator is depressed	Zero vacuum at M2 Voltage = 12 volts across the 2 solenoid valve terminals Note the voltage across the solenoid valve terminals Vacuum at M2 = vacuum at M1 Voltage drops to 0 volts when accelerator is depressed	If the vacuum at M2 = M1, check the air and electrical circuits If there is a voltage at the solenoid valve and vacuum M2 does not equal vacuum M1, check the wiring between the solenoid valve and the computer
Anti-evaporation system bleed Checking the solenoid valve	Test XR 25 2 vacuum gauges - at M1 - at M2 - tachometer	Engine hot after electric fan has cut in twice At idling	Disconnect one of the wires from the solenoid valve Disconnect the 2 wires from the solenoid valve. Connect one (+)12 volts to the solenoid valve terminal and earth (-) to the other terminal, then disconnect one of these 2 wires vacuum at M1 = vacuum at M2 Engine speed and vacuum at M1 fall	At idling: variation in idling speed and R.C.O. Select 12 on the XR 25 If not: check the operation of the solenoid valve and the air circuit connections
Check on the air circuits			Disconnect the pipe from the solenoid valve at M2. Apply a vacuum of approximately 300 mbars with a manual vacuum pump connected to the pipe	At idling: there should be a change in the speed (increase) and a reduction in the R.C.O. If there is not: check the air circuits

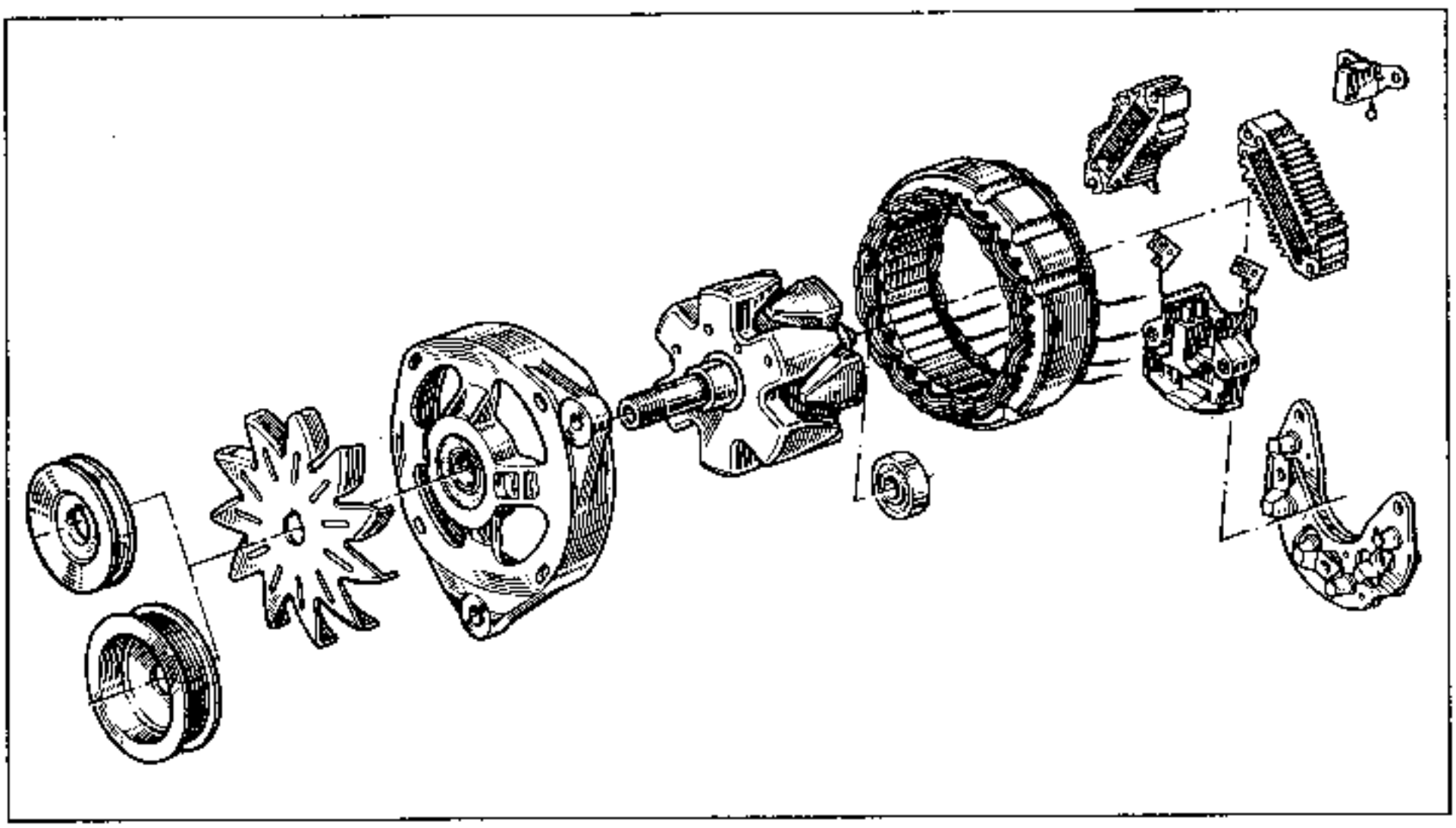
CHECKING

After 15 minutes warmup at 13.5 volts.

rpm	PARIS RHONE A 13 N 87 A 13 N 88 A 13 N 120 A 13 N 124 60 amperes	PARIS RHONE A 14 N 62 A 14 N 64 70 amperes	PARIS RHONE A 14 N 73 A 14 N 75 A 14 N 140 105 amperes	PARIS RHONE A 14 N 102 A 13 N 159 A 13 N 164 70 amperes	PARIS RHONE A 13 N 172 A 14 N 134 A 14 N 171 A 14 N 173 70 amperes	DUCELLIER 516067 60 amperes
1 250	5 A	22 A	30 A	5 A	12 A	35 A
3 000	53 A	61 A	82 A	62 A	61 A	50 A
6 000	60 A	70 A	105 A	70 A	70 A	58 A

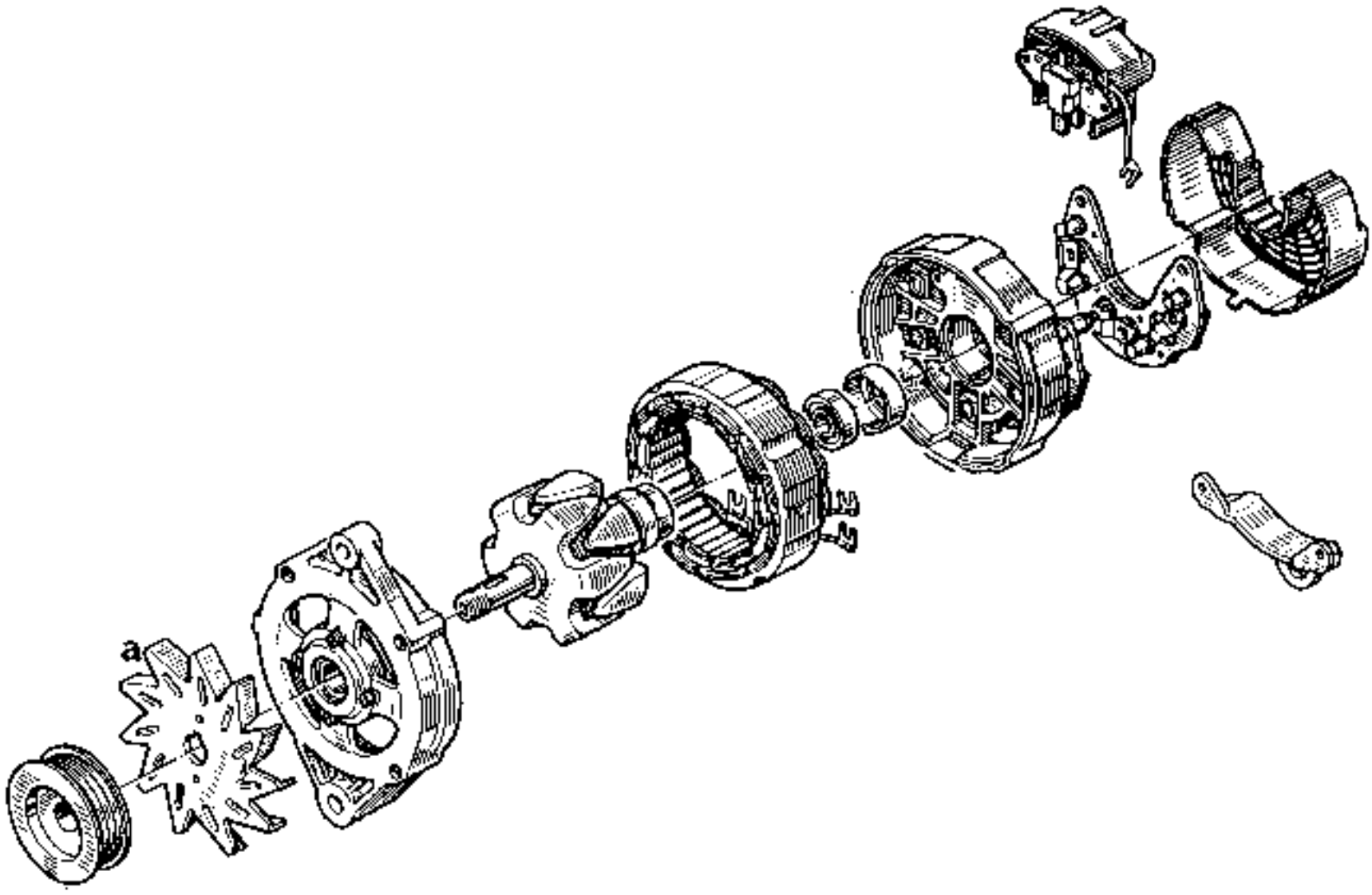
EXPLODED VIEW

PARIS RHONE 105 A

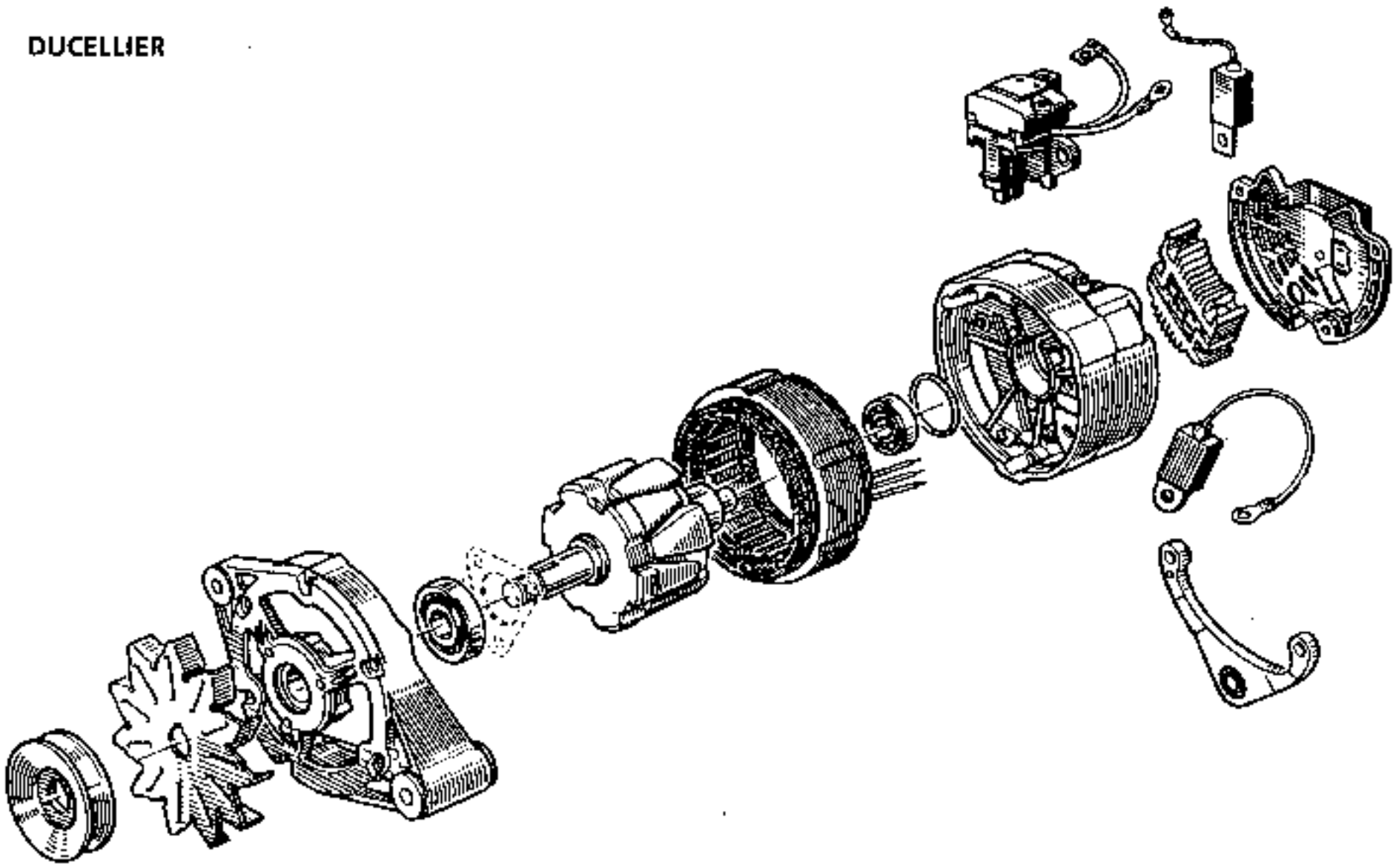


rpm	PARIS RHONE A 14 N 150 75 amperes	PARIS RHONE A 14 N 142 90 amperes
1 250	-	-
3 000	61 A	76 A
6 000	72 A	90 A

PARIS RHONE

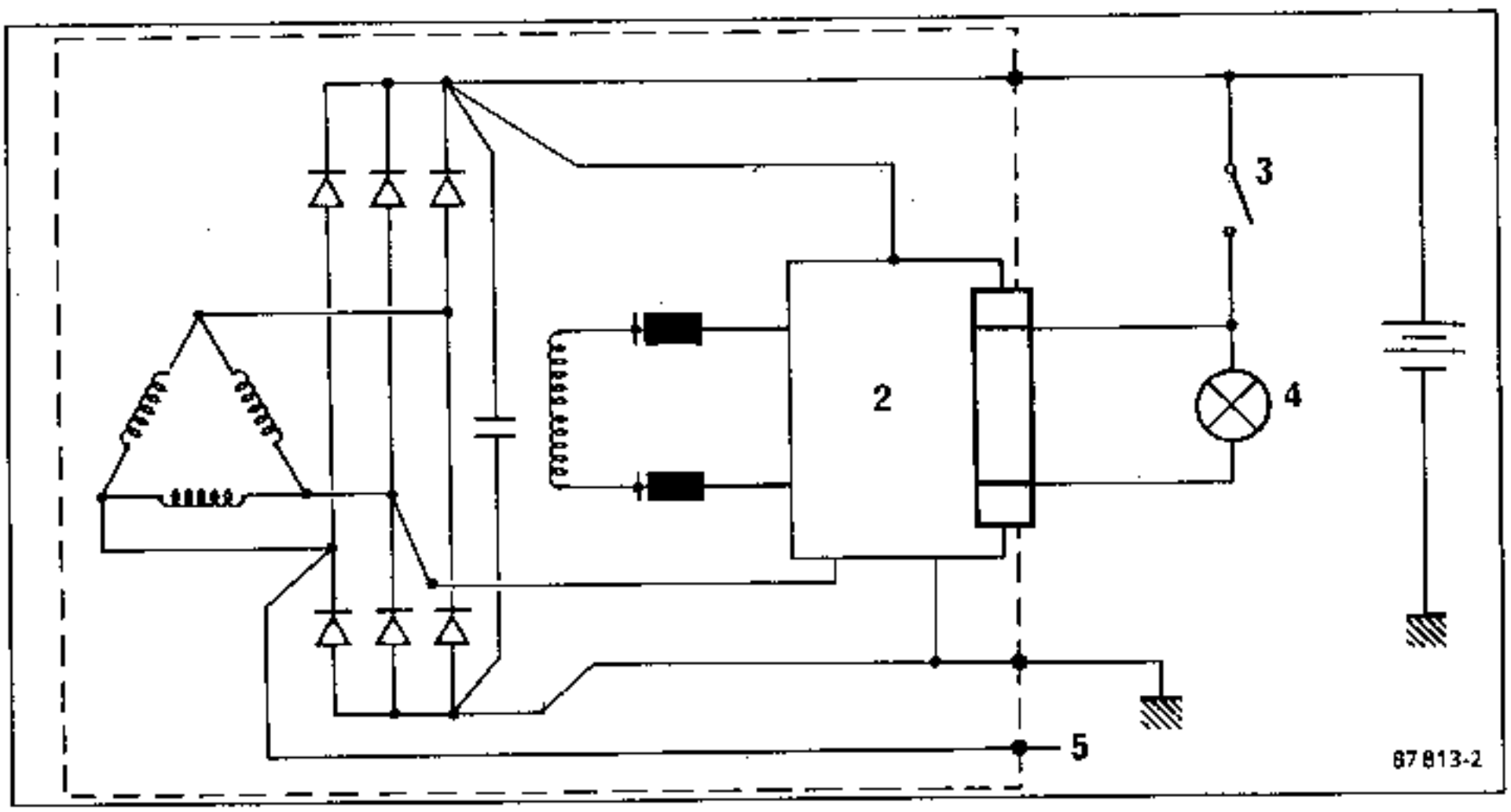


DUCELLIER

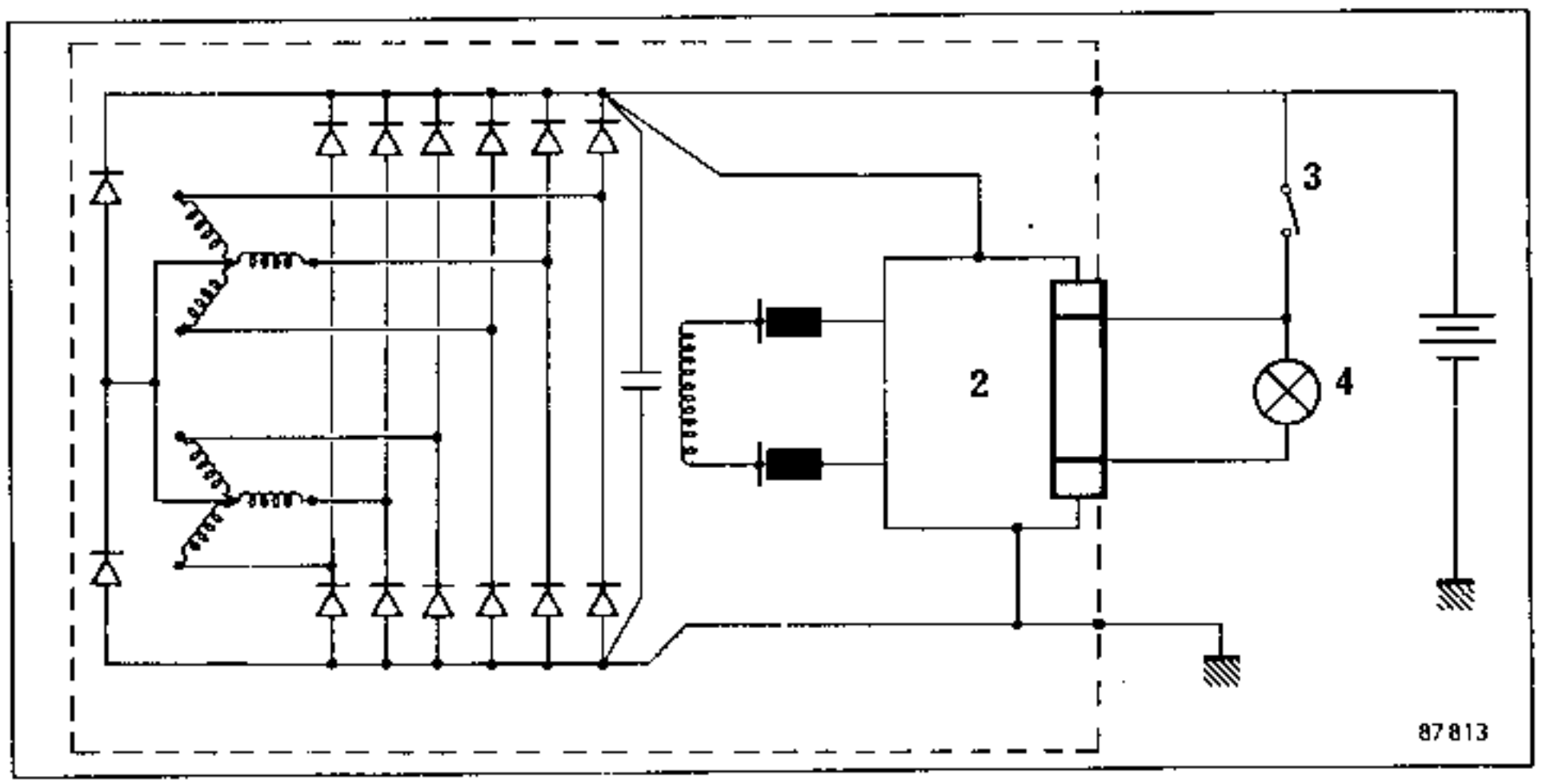


CIRCUIT DIAGRAM

All types except the 105 A



105 A



2 Regulator
3 Starter switch
4 Light on instrument panel

OPERATION-FAULT FINDING

These vehicles are equipped with an alternator with a built in regulator and a warning light in the instrument panel which operates as follows:

- when the ignition is switched on, the light switches on,

- when the engine starts, the light switches off,

- if the warning light switches on whilst the engine is running, it is an indication of a "charging" defect.

FAULT FINDING

If the warning light does not switch on when the ignition is switched on.

Check if the connector on the regulator is connected.

Check whether the bulb has burnt out (to do this, earth the 6.3mm pin on the connector. The light should switch on).

If the warning light switches on when the engine is running:

It is an indication of a "charging" defect, the source of which may be:

- breakage of the alternator drive belt, breakage of the charging wire,

- internal damage to the alternator (rotor, stator, diodes or brushes),

- defective regulator.

If the customer complains of a charging defect, but the warning light operates correctly.

If the regulated voltage is less than 13.5 V, check the alternator. The source of the defect may be:

- a damaged diode,

- a phase broken,

- fouled or worn tracks.

Checking the Voltage

Connect a voltmeter to the battery terminals and note the battery voltage.

Start the engine and raise its speed until the voltmeter pointer stabilizes at the regulated voltage.

This voltage should be between 13.5 V and 14.8 V.

Switch on as many current consuming accessories as possible. The regulated voltage should remain between 15.5 V and 14.8 V.

WARNING: It is essential to disconnect the battery and the voltage regulator before carrying out any arc welding work on the vehicle.

REMOVING-REFITTING

REMOVING

Never remove a belt by levering it off with a screwdriver. It is made up of synthetic fibres and could be damaged.

Disconnect:

- the battery,

- the electrical wires.

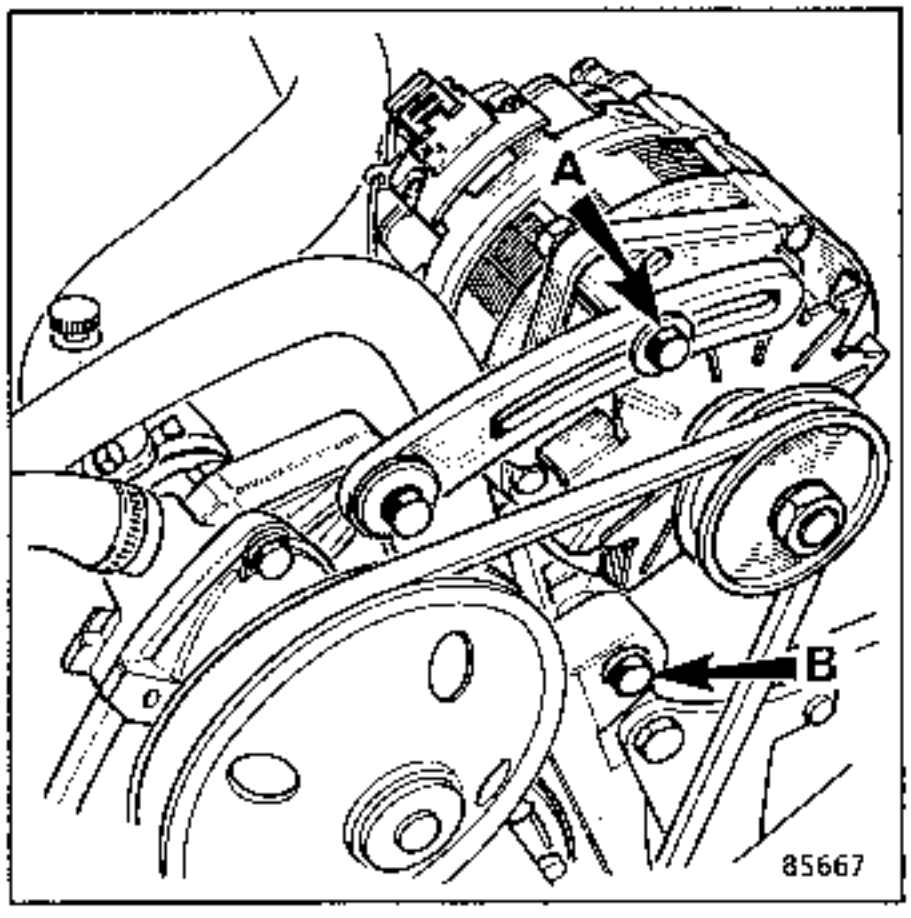
Remove:

- the bolt from the tensioner (A),

- the securing bolt (B) and remove the alternator.

REFITTING

After refitting the alternator, tension the belt.



REMOVING-REFITTING

REMOVING

Never remove a belt by levering it off with a screwdriver. It is made up of synthetic fibres which may be damaged.

Disconnect:

- the battery,

- the electrical wires.

Loosen the tensioner (A).

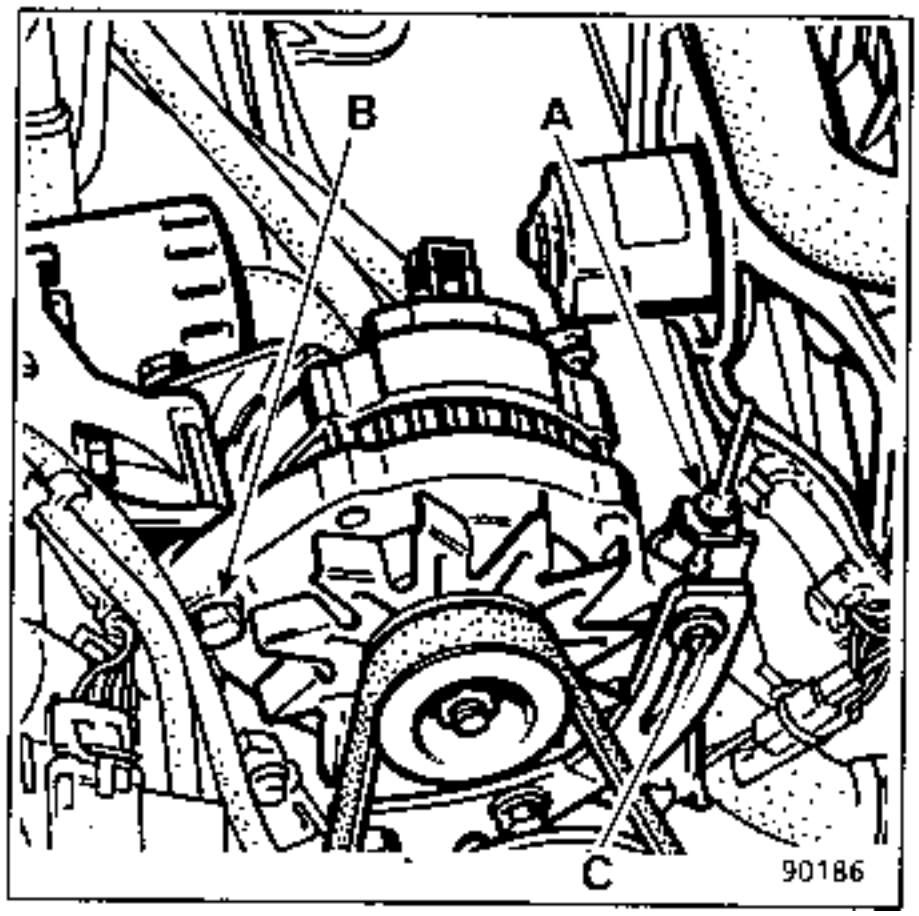
Remove the bolt (C).

Remove the alternator securing bolt (B).

Remove the alternator.

REFITTING

After refitting the alternator, tension its belt.



REMOVING-REFITTING

REMOVING

Never remove a belt by levering it off with a screwdriver. It is made up of synthetic fibres which could be damaged.

Disconnect:

- the battery,

- the electrical wires.

Loosen bolt (B) and remove the nut.

From below:

- remove the engine protection panel,

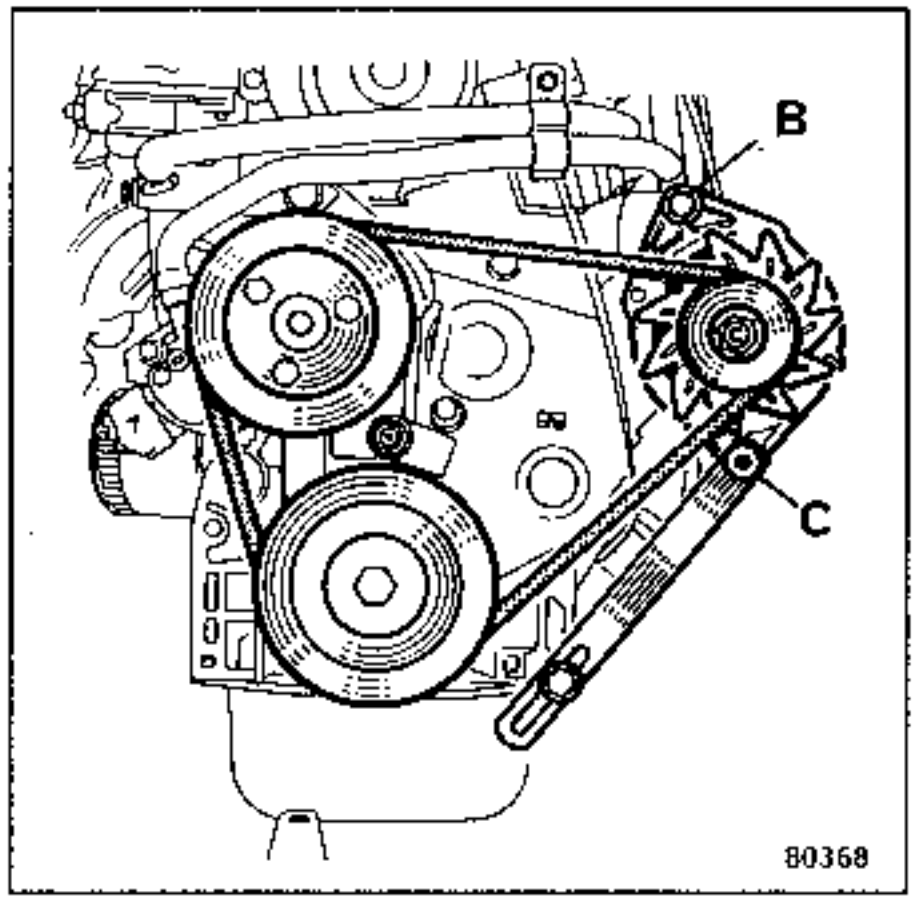
- remove the bolt (C),

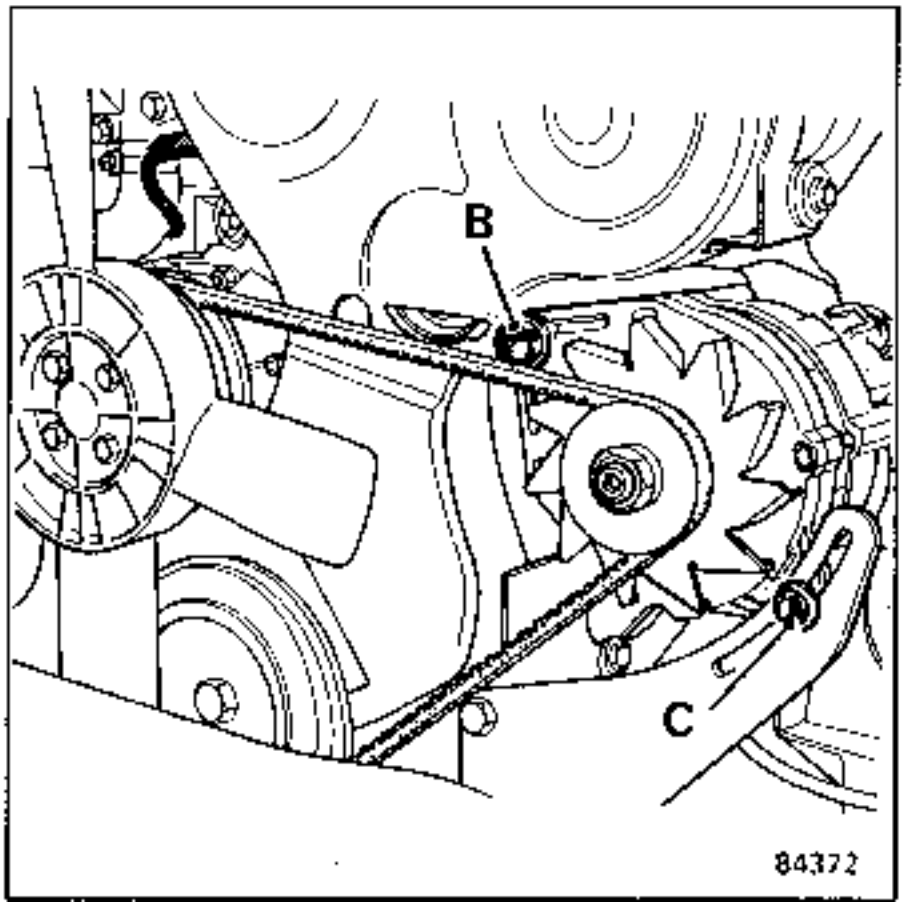
- remove the alternator securing bolt (B),

- remove the alternator.

REFITTING

After refitting the alternator, tension the belt.

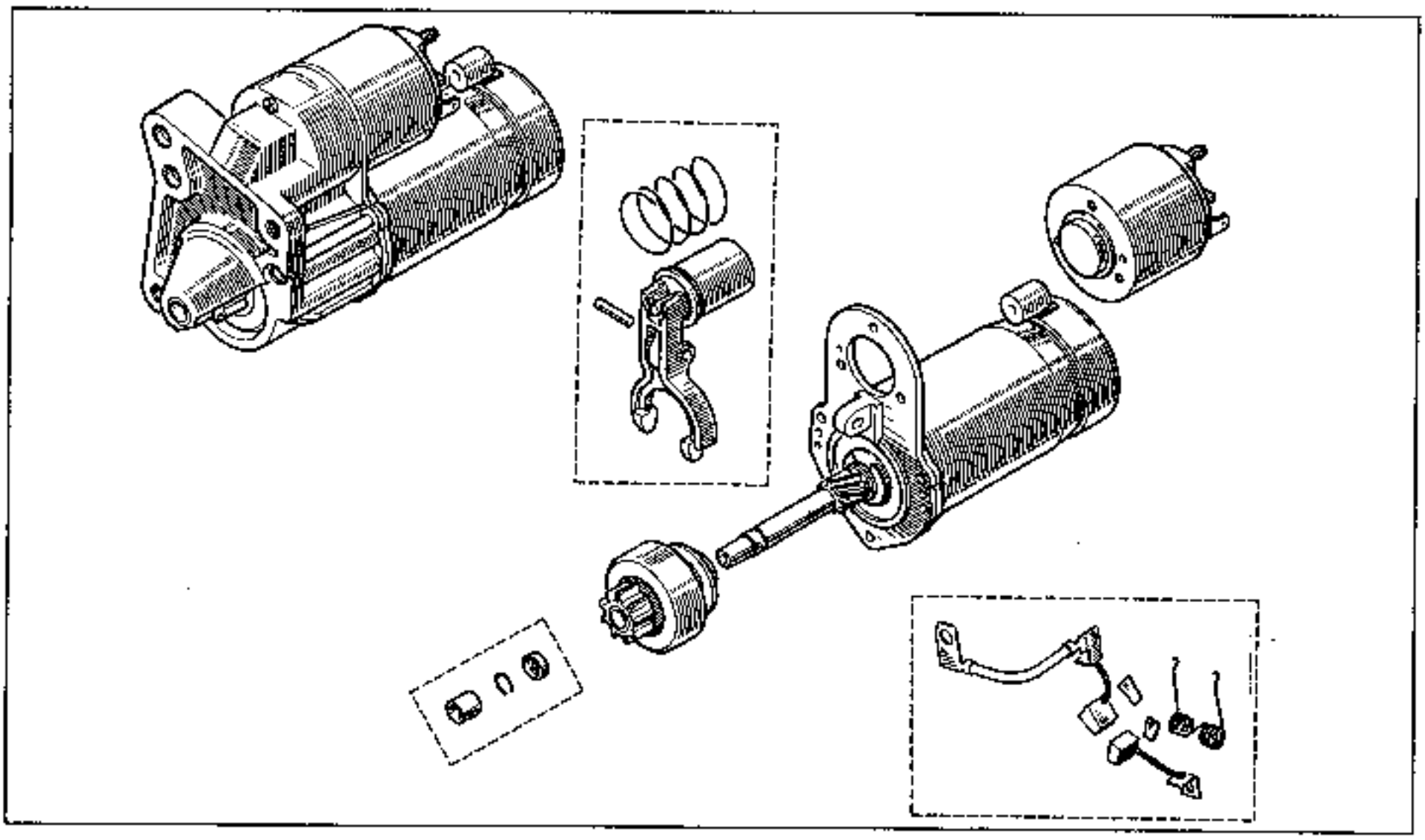




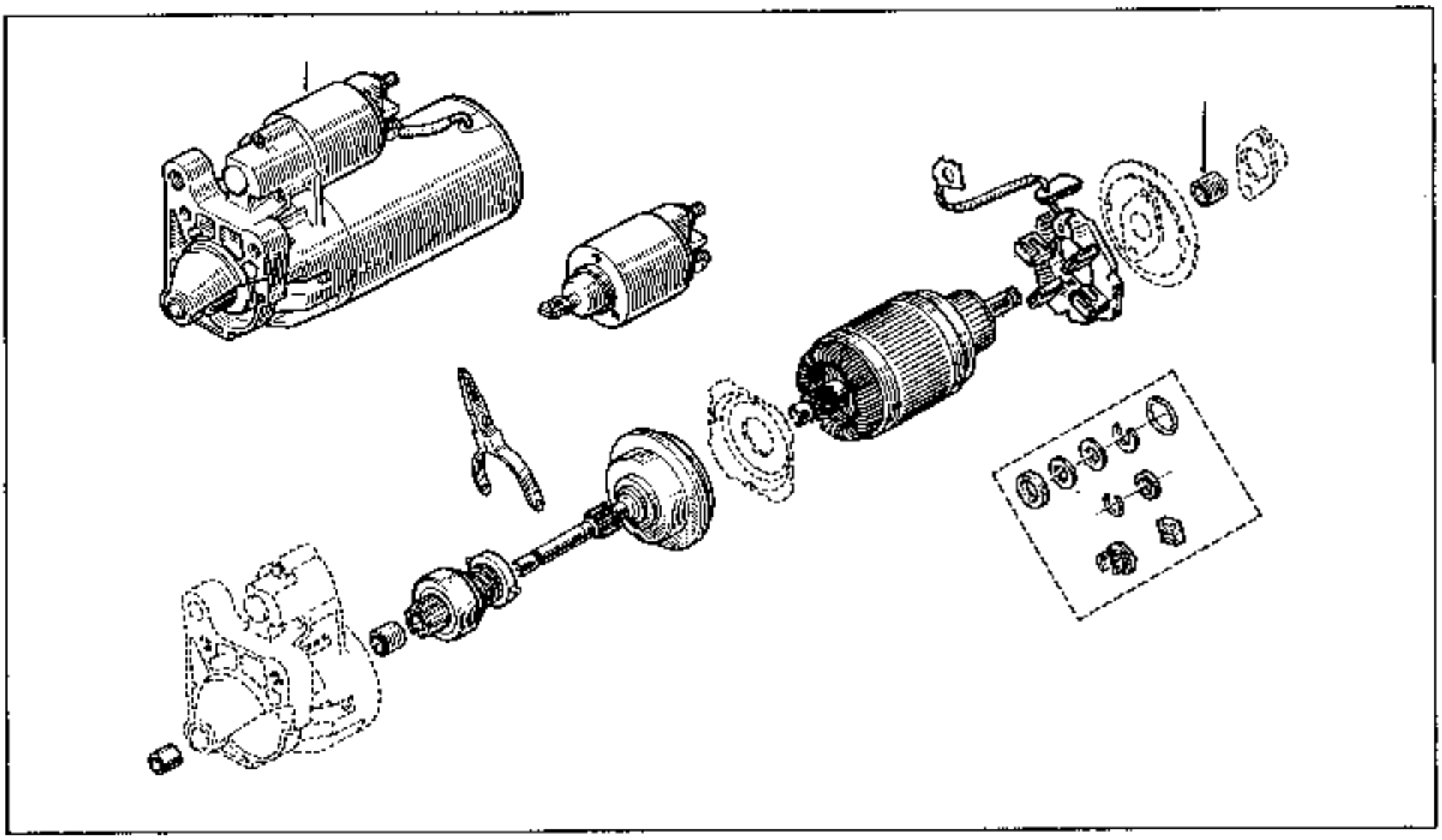
CHECKING

Make	Type	Torque (pinion locked)	Current (pinion locked)
BOSCH	00 01 110 026	3,4 daN.m	1 000 A
BOSCH	90 00 333 117	1,1 daN.m	350 A
BOSCH	90 00 333 114	1,3 daN.m	400 A
PARIS RHONE	D 9E 70	1,3 daN.m	470 A
PARIS RHONE	D 9E 76	1,3 daN.m	420 A
PARIS RHONE	D 9E 85	1,3 daN.m	400 A
PARIS RHONE	D 9R 73	6 daN.m	1 350 A
PARIS RHONE	D 9E 701	0,8 daN.m	300 A
PARIS RHONE	D 9E 771	0,8 daN.m	460 A
PARIS RHONE	D 9E 851	0,8 daN.m	350 A
PARIS RHONE	D 9E 881	1,5 daN.m	500 A
PARIS RHONE	D 10E 74	2,2 daN.m	650 A
PARIS RHONE	D 10E 88	1,2 daN.m	500 A
PARIS RHONE	D 10E 92	2,4 daN.m	725 A
PARIS RHONE	D 6RA 6	-	-
MITSUBISHI	JM 003 A329 86	-	-
MITSUBISHI	JM 003 A425 81	-	-

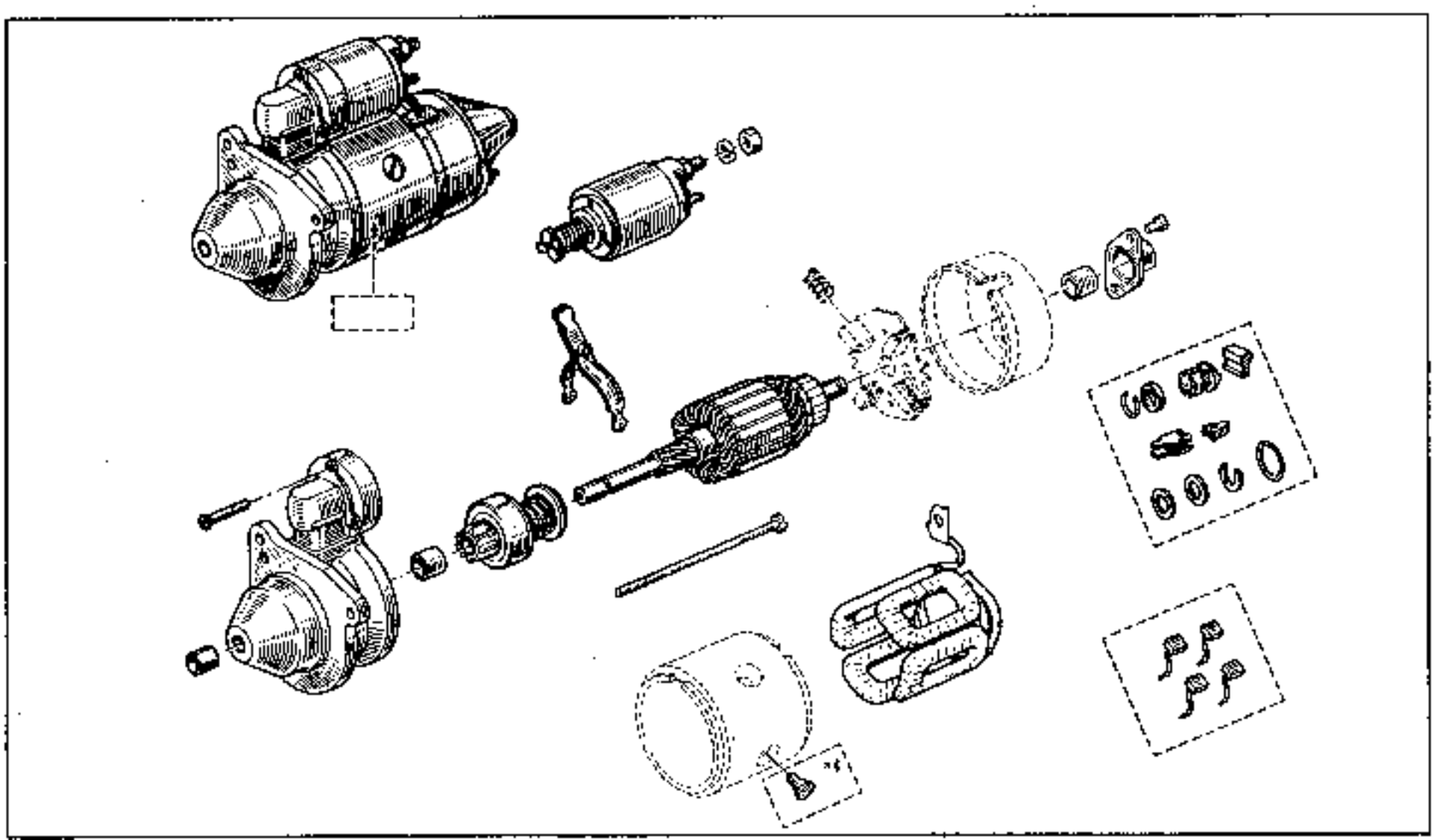
EXPLODED VIEW
PARIS RHONE
D 6R A6



EXPLODED VIEW
BOSCH
0 001 110 026

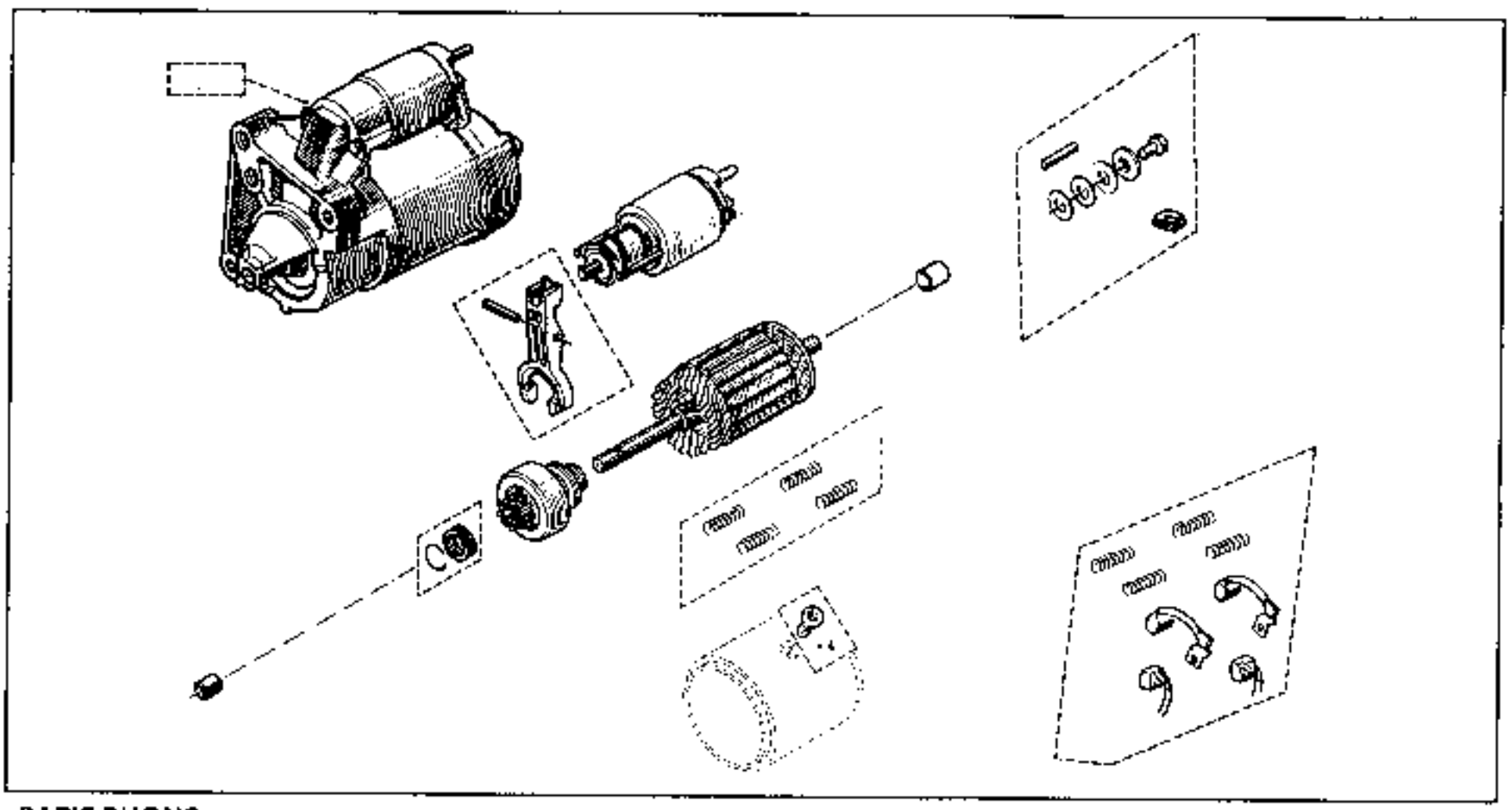


BOSCH
9 000 333 117
9 000 333 114

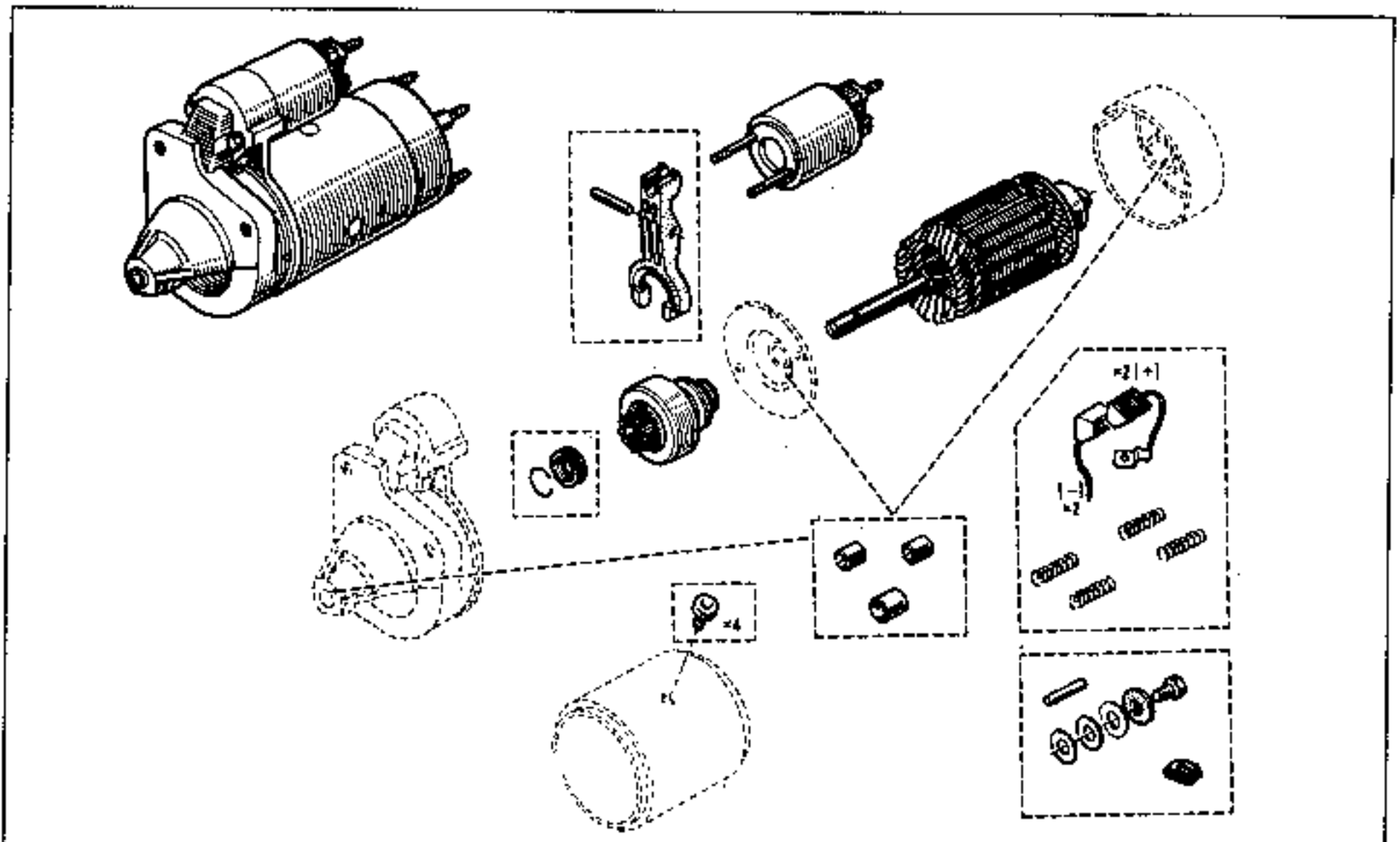


EXPLODED VIEWS

PARIS RHONE
D 9E 85
D 9E 771

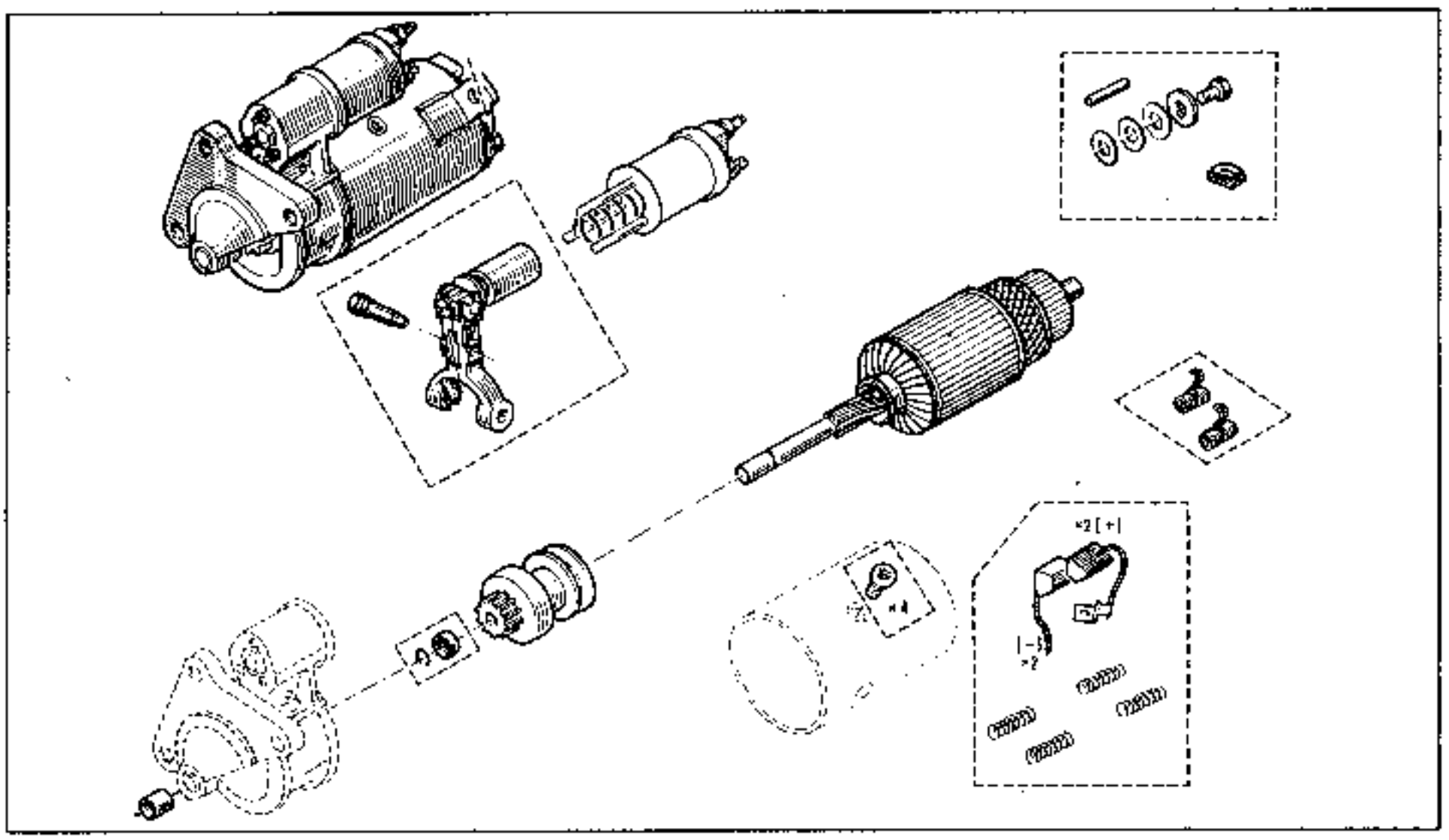


PARIS RHONE
D 10E 88
D 10E 92

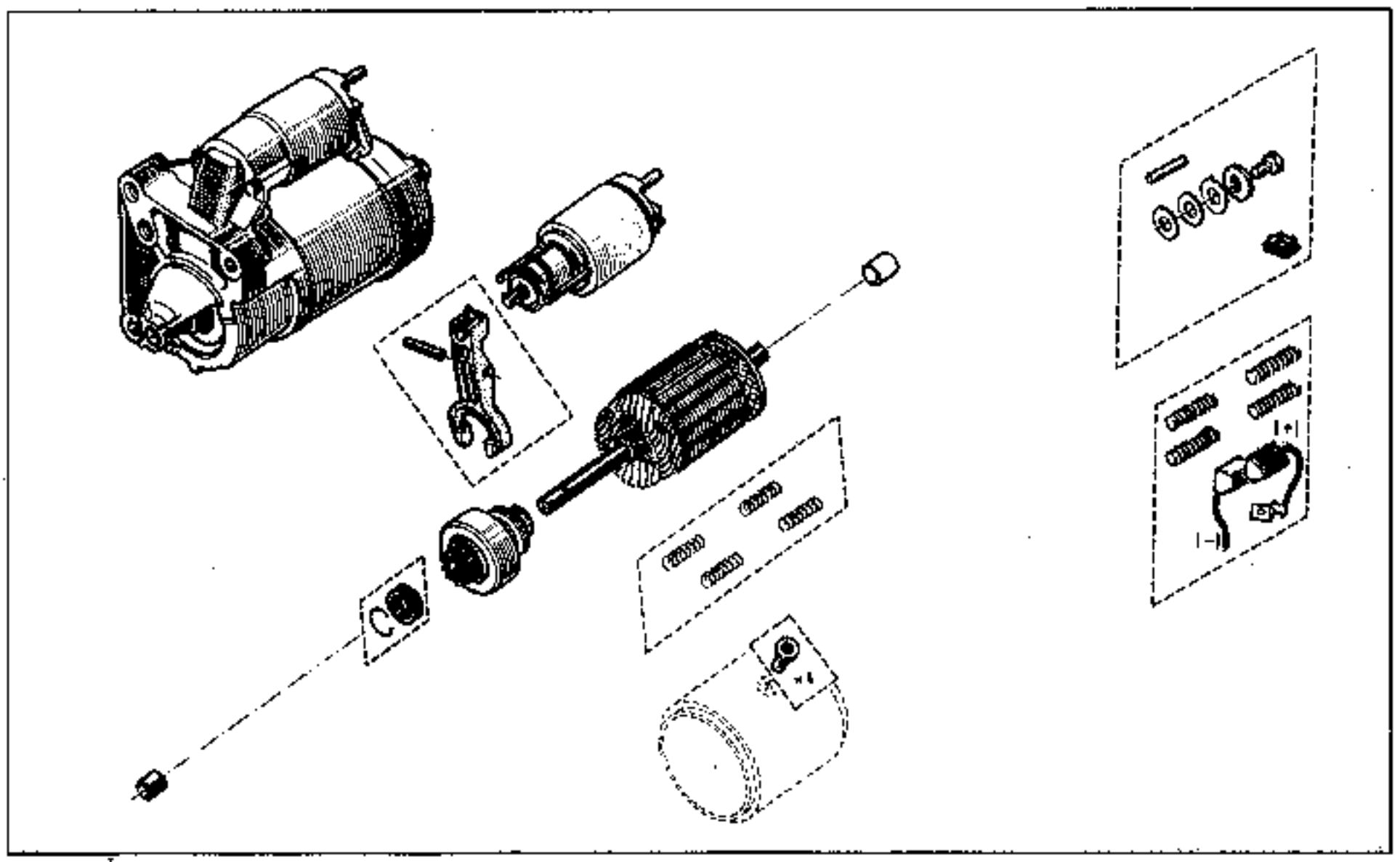


EXPLODED VIEWS

PARIS RHONE
D 10E 74

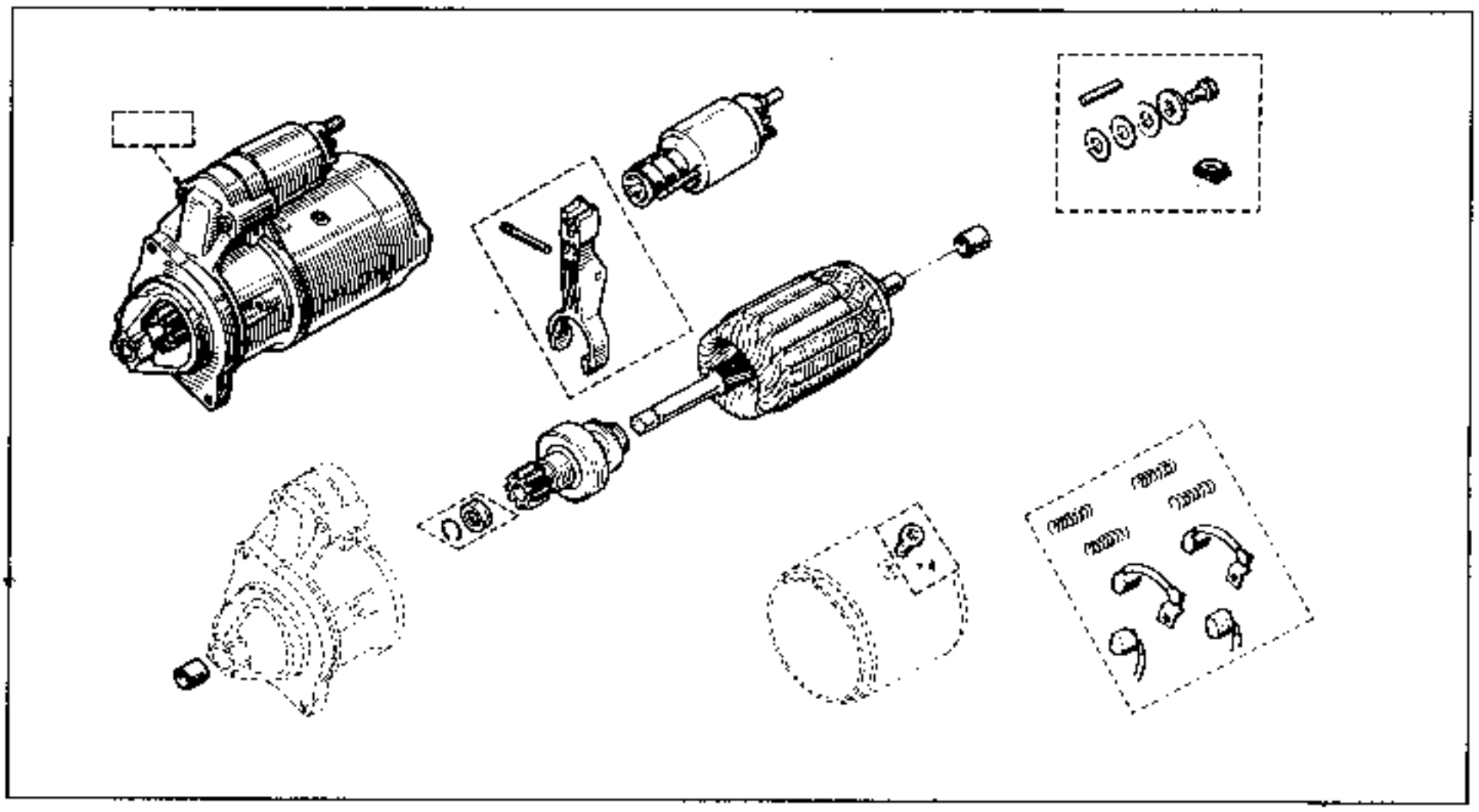


PARIS RHONE
D 9E 76

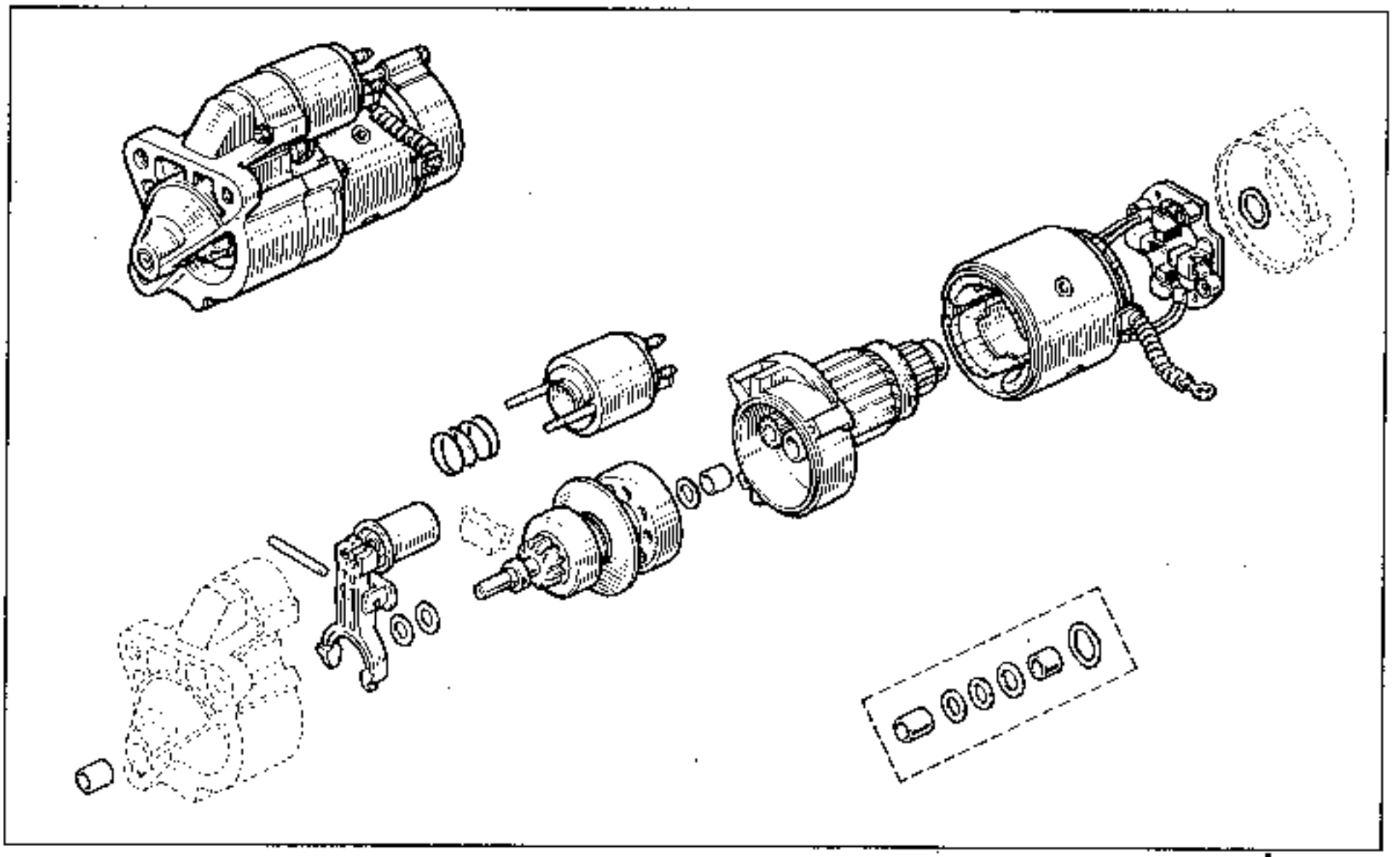


EXPLODED VIEWS

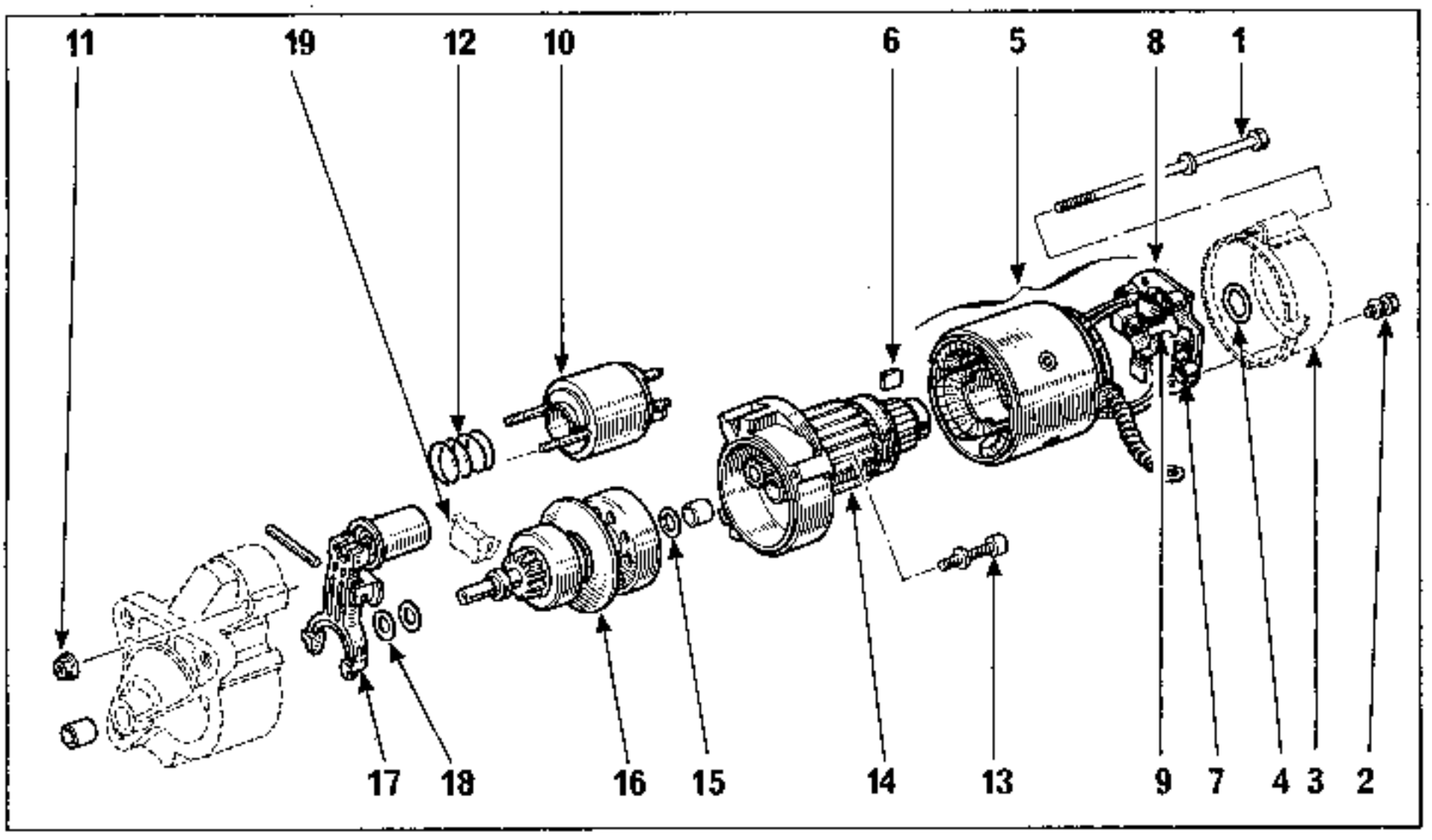
PARIS RHONE
D 9E 70



PARIS RHONE
D 9R 73



OVERHAULING THE D 9R 73



SPECIFICATIONS

- Low weight and overall dimensions.
- Relatively high power.
- High speed armature (17,000 rpm).

REMOVING THE REAR END OF THE STARTER

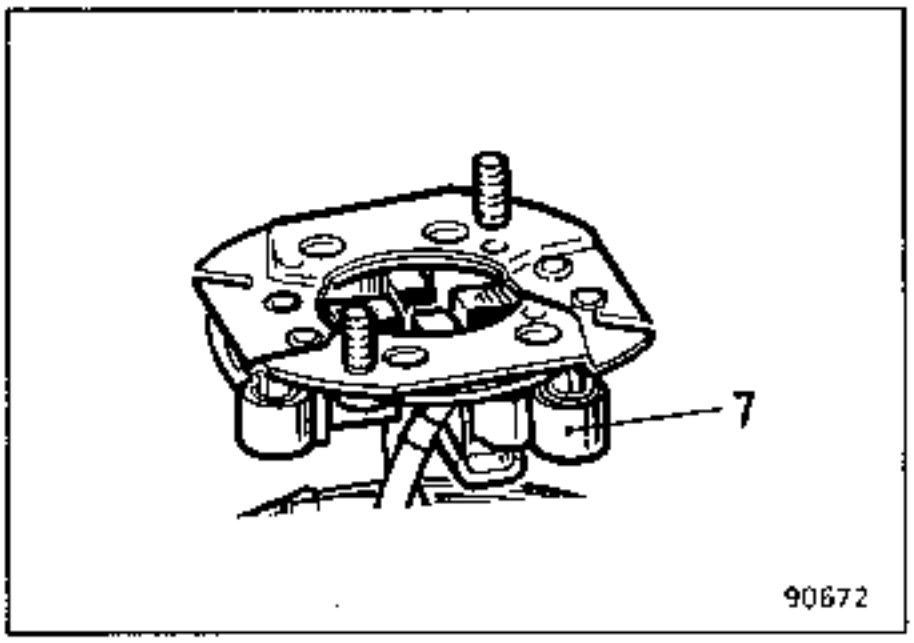
Remove:

- the assembly tie bolts (1),
- the nuts (2) securing the brush holders,
- the casing (3),
- the washer (4),
- the field coil and brush holder assembly (5).

Remove positioning plate (6).

WARNING

Removing the brush springs (7) is forbidden. This type of starter has brushes which are held down at high pressure (force applied: 5.5daN.m) by springs (7). Removing these could be highly dangerous.



REPLACING THE BRUSHES

It is not possible to replace just the brushes (9).

As the operating temperature in the region of the brushes is high, it is forbidden to soft solder the brushes.

Consequently, the brushes are supplied on their plate (8), together with the field coils, as a complete assembly.

OVERHAULING THE D 9R 73

DISMANTLING THE STARTER PINION ASSEMBLY

Remove:

- the switch (10) by taking off the nuts (11) and take out its spring (12)
- the reduction gear housing retaining bolt (13),
- the armature (14),
- the washer (15),
- the seal (19),
- the pinion assembly (16) and control lever (17),
- the shim washers (18).

SPECIAL FEATURES

The armature and reduction gear housing assembly cannot be dismantled (the pinion is bonded to the armature).

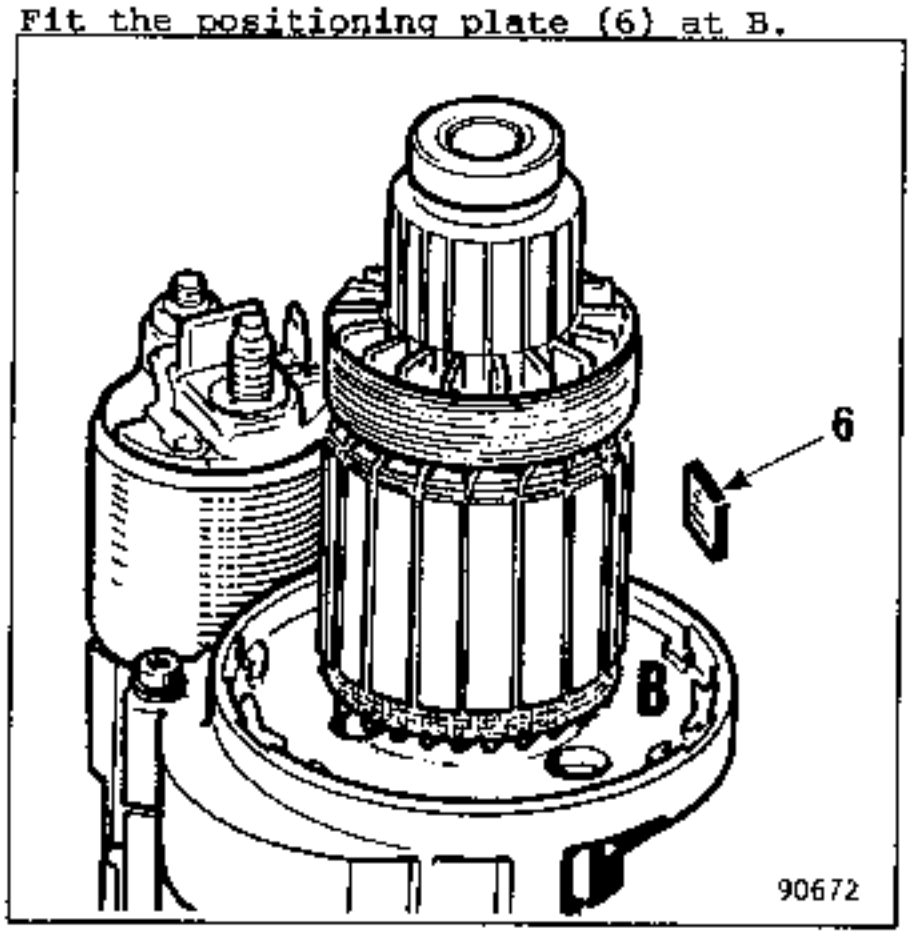
The pinion and ring gear assembly cannot be dismantled (the ring gear is crimped on to the shaft).

REASSEMBLING THE STARTER PINION ASSEMBLY

Refit the shim washers removed during dismantling.
Grease the pinion assembly.
Refit all the parts in reverse order.

SPECIAL FEATURES

Refitting the field coil and brush assembly.
Fit the positioning plate (6) at B.



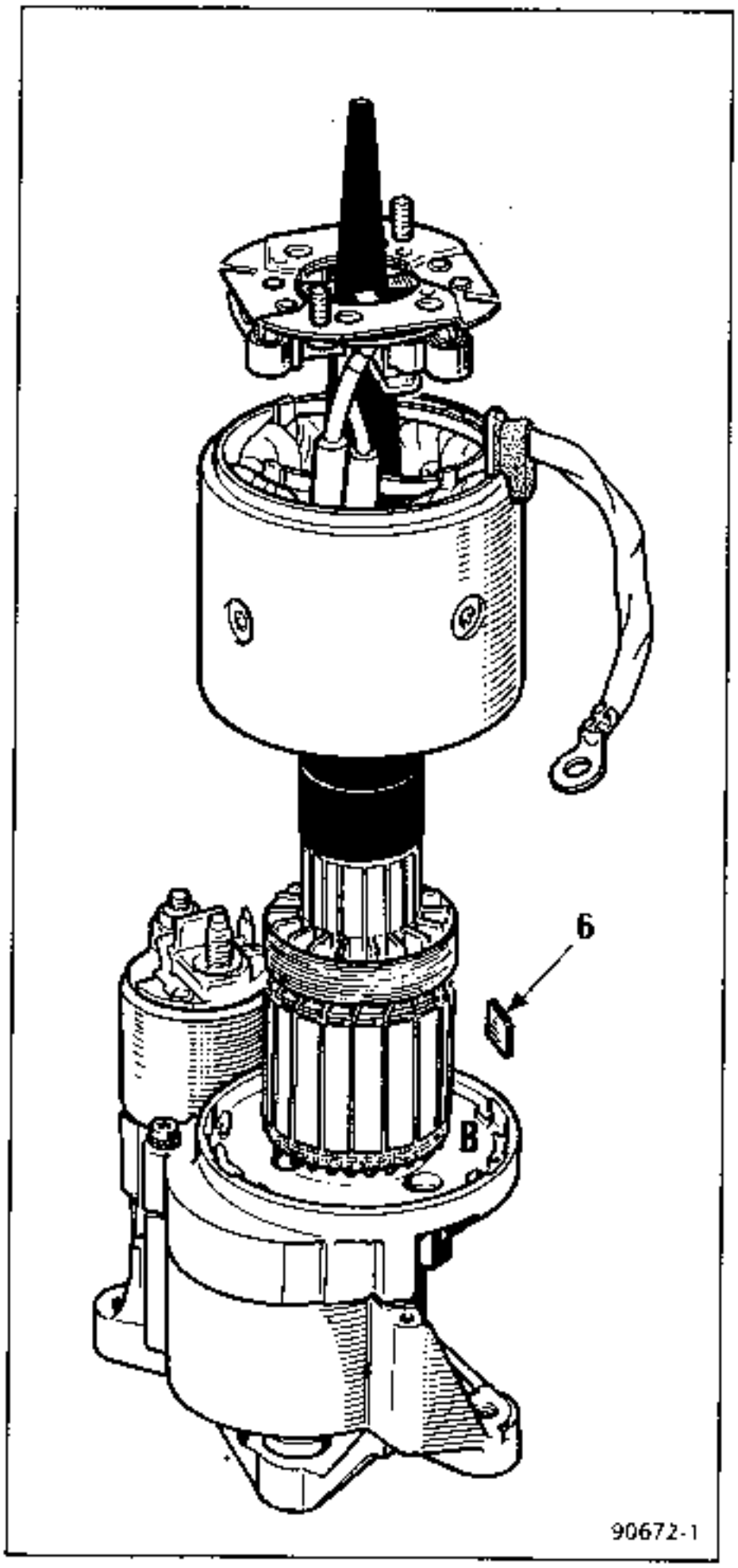
Place VALEO tool reference 182 144 M* on the armature bearing and place the field coil and brush carrier plate assembly on the tool. Slide it into place.

Correctly position the field coil assembly with reference to the positioning plate (6).

When the brushes are in position, remove the tool.

(*) NOTE:

This tool is to be ordered from VALEO.



REMOVING-REFITTING

REMOVING

Disconnect the battery.

Remove the exhaust heat shield.

Disconnect the wires.

Remove the three starter securing bolts.

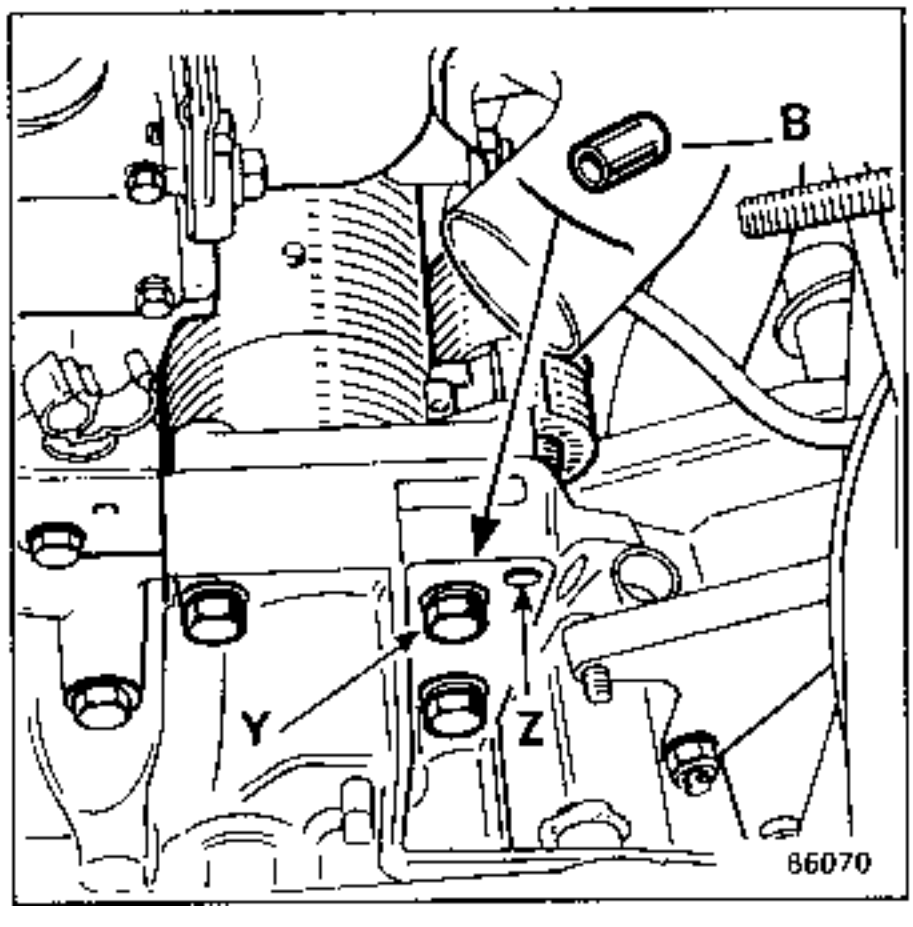
Remove the two bolts from the starter securing lug.

Remove the starter.

REFITTING

Special Point

Ensure that the locating dowel (B) is in position. It must be in bolt hole (Y) on type (C) engines and bolt hole (Z) on type (F) engines.



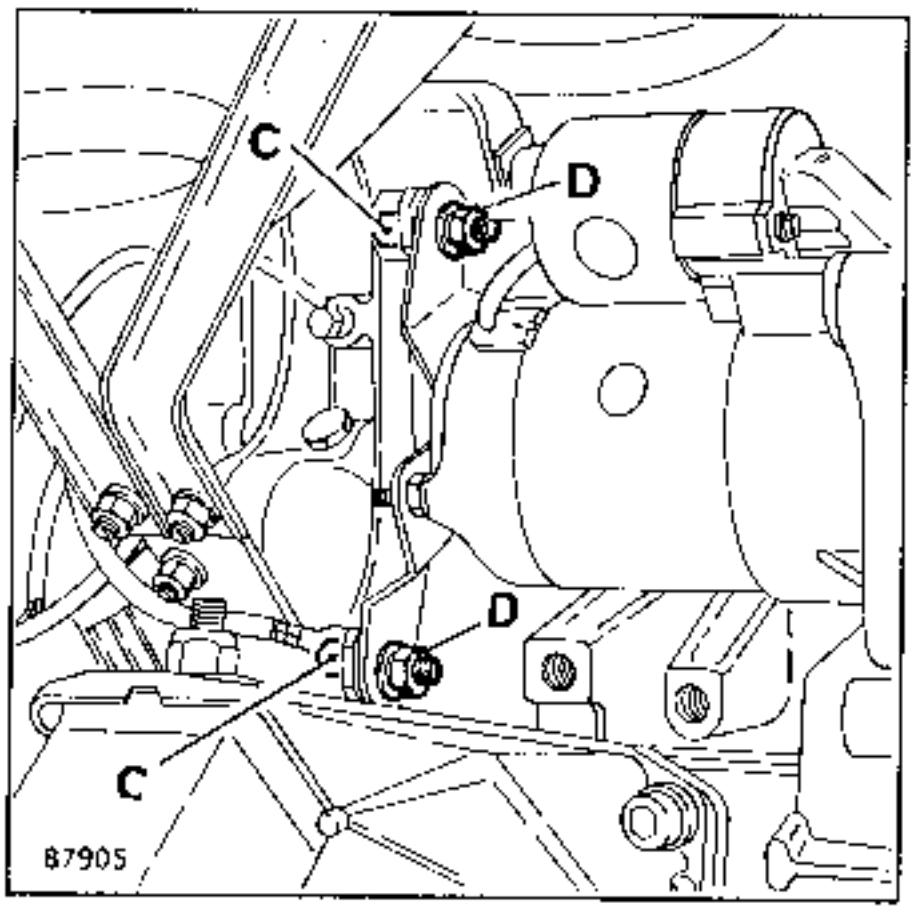
REMOVING

Disconnect the battery.

Disconnect the wires.

Remove:

- the two rear securing bolts (D),
- the two bolts (C) securing the unit to the cylinder block,
- the three bolts securing the unit to the clutch housing,
- the starter.



REFITTING

Special Points:

Fit and tighten the three bolts on the clutch housing.

Screw up the rear securing bolts on the starter and those on the cylinder block, finger tight.

Tighten the two bolts (C).

Tighten the two bolts (D).

REDUCTION GEAR TYPE STARTER

Disconnect the battery.

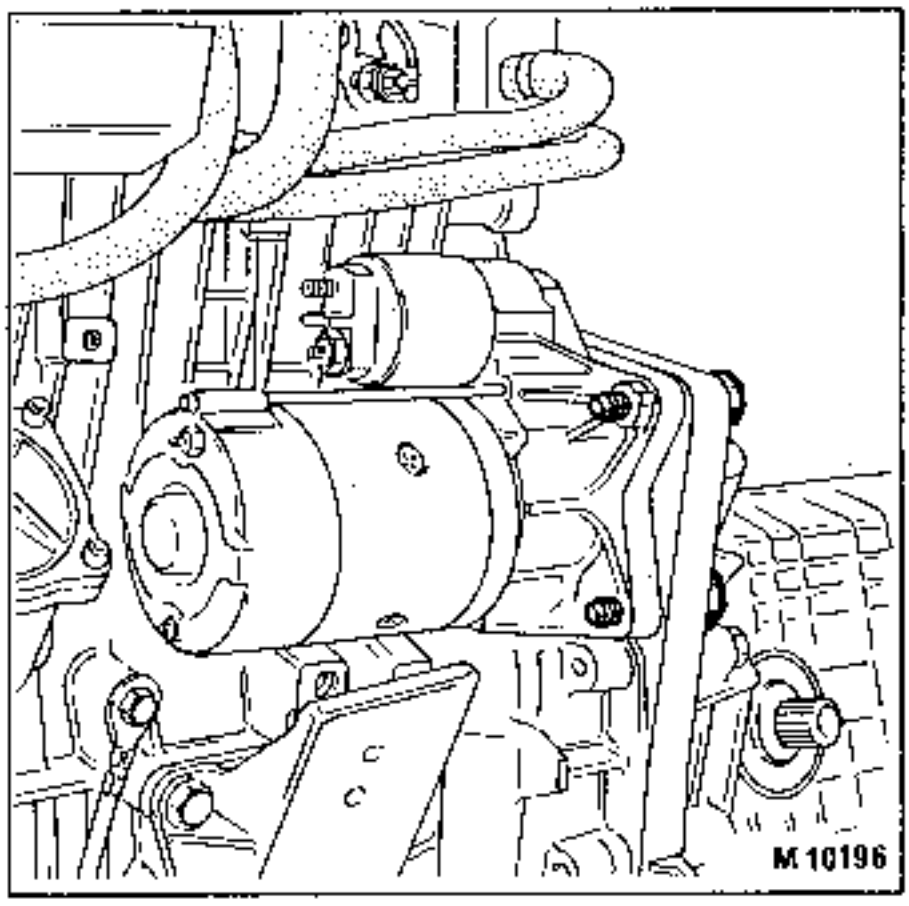
Remove the engine protection panel.

Disconnect the wires.

Remove:

- the 3 bolts securing the unit to the clutch housing,

- the starter.

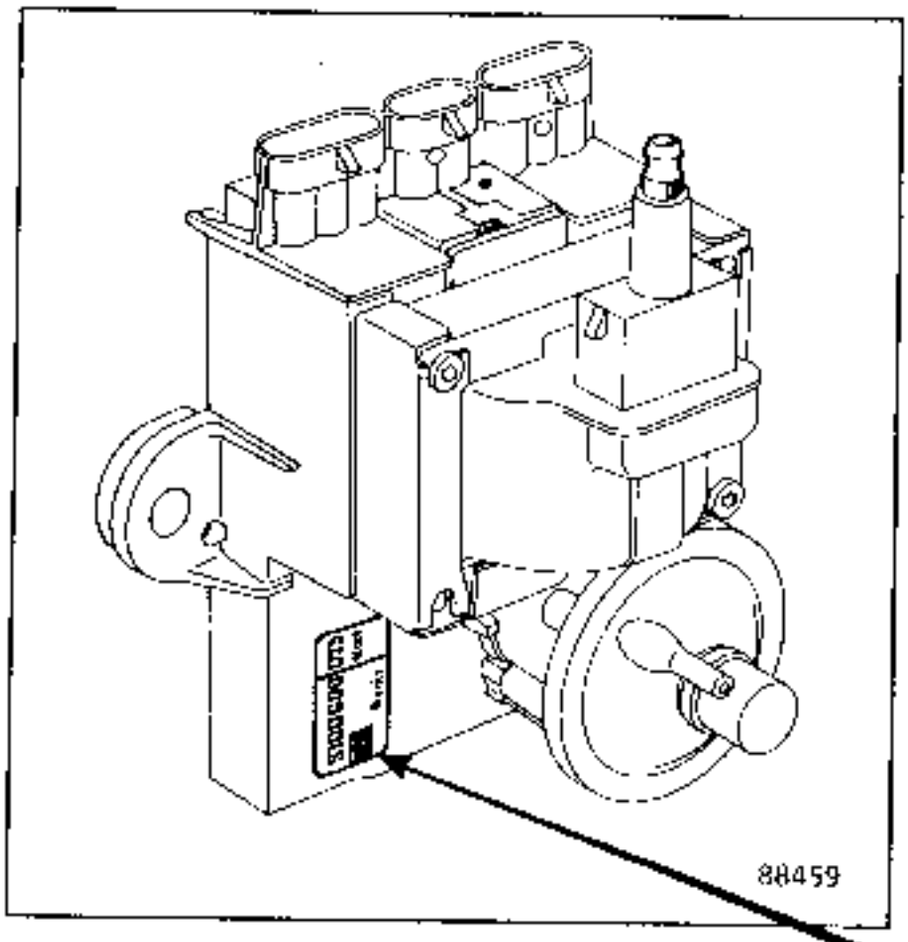


REFITTING

Carry out the removing operations in reverse.

Vehicle	Engine	Curves
X 481	F2N 712 F2N 716	RE 234
X 482	F2N 710	RE 232
X 482	F2N 754	RE 282
L 489	J6R 758 J6R 759	RE 001
L 48 D B 48 D	C2J 770	RE 278
X 48 J	F2R 702	RE 232
L 48 M K 48 M	F2N 750	RE 258
L 48 N K 48 N	F2N 752	RE 259

TYPE F IGNITION UNIT



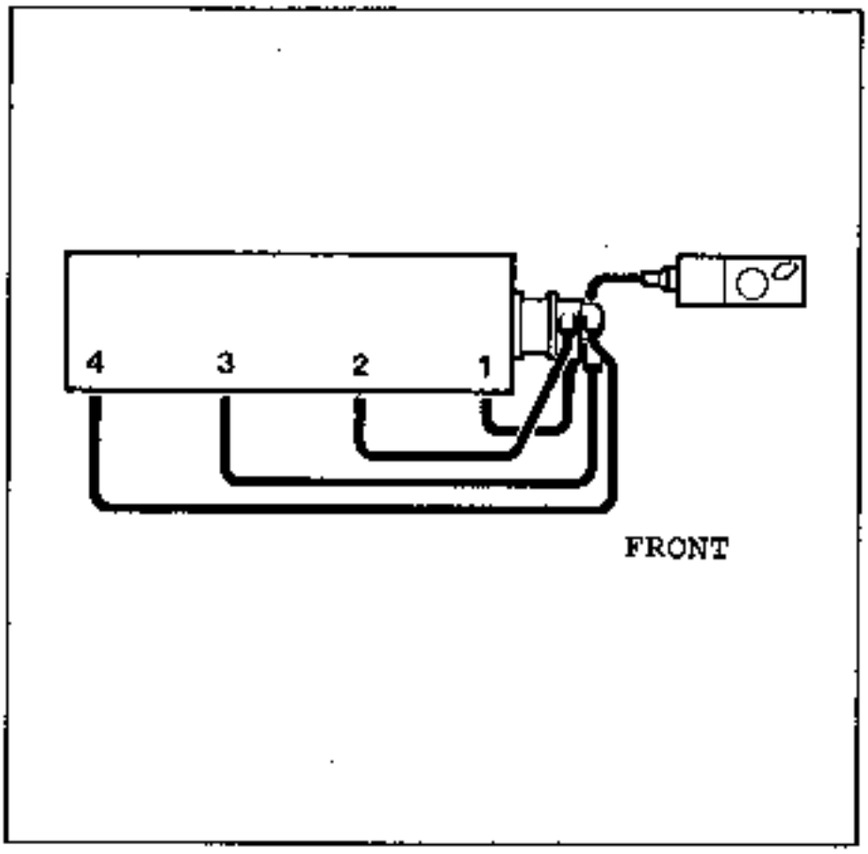
CURVE IDENTIFICATION

The curves are identified by a label stuck to the body of the electronic computer.

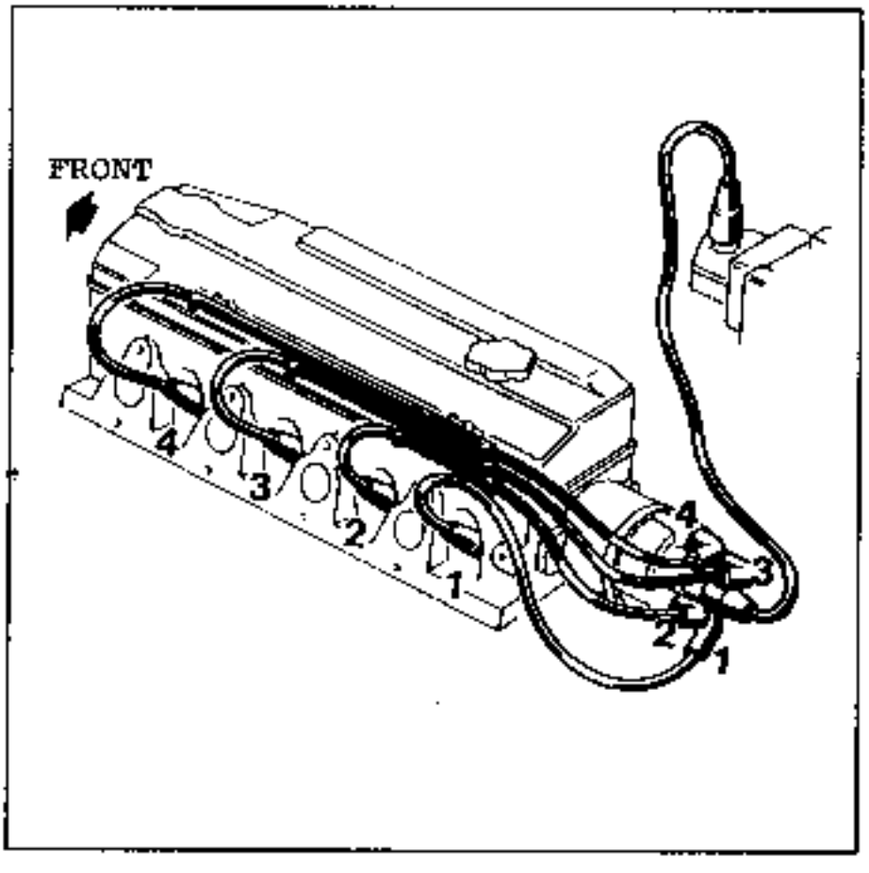


PLUG LEAD CONNECTIONS:

1-3-4-2



TYPE F ENGINE



TYPE J ENGINE

Special Features of the Electronic Units used on type F Engines

Certain integral electronic ignition system units have an additional ignition advance correction take-off, which is connected to socket (Z) by a "packard" 3 way connector.

Two wires are connected to channels A and C of this connector or only one wire to channel A (depending on the type of system).

Each wire has its own correction function

ELECTRONIC IGNITION SYSTEMS RE232 and RE234.

Two temperature switches are used. They are earthed to bring them into operation.

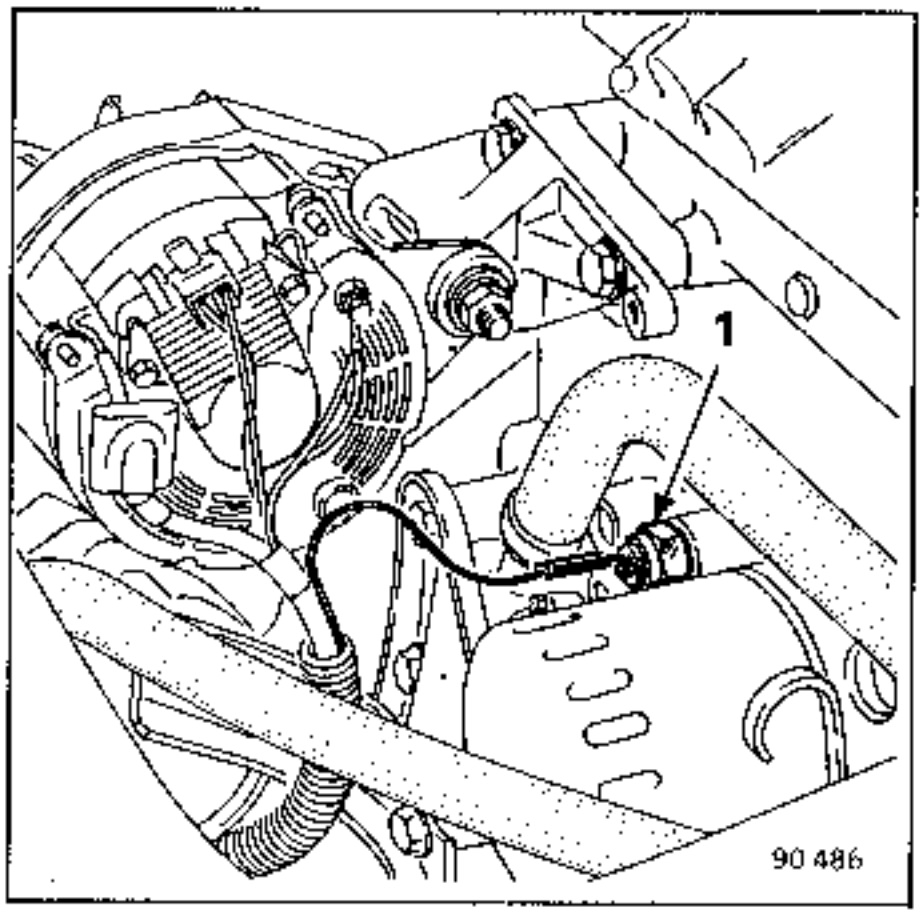
On channel (A) the wire is connected to the electric fan coolant temperature switch mounted on the radiator. It operates as follows:

	Temperature (°C)	
	Below 90	Above 90
Advance correction between 1200 rpm and 4700 rpm at a vacuum of 0 to 270 mb.	0	-4 ± 2

This correction prevents pinking.

On channel (C), the wire is connected to the oil temperature switch (1) on the cylinder block. This operates as follows:

	Temperature (°C)		
	Below 15	From 15 to 70	Above 70
Advance correction between 1200 & 2500 rpm at a vacuum of 380 to 920 mb.	+10° ± 2	0	+10° ± 2



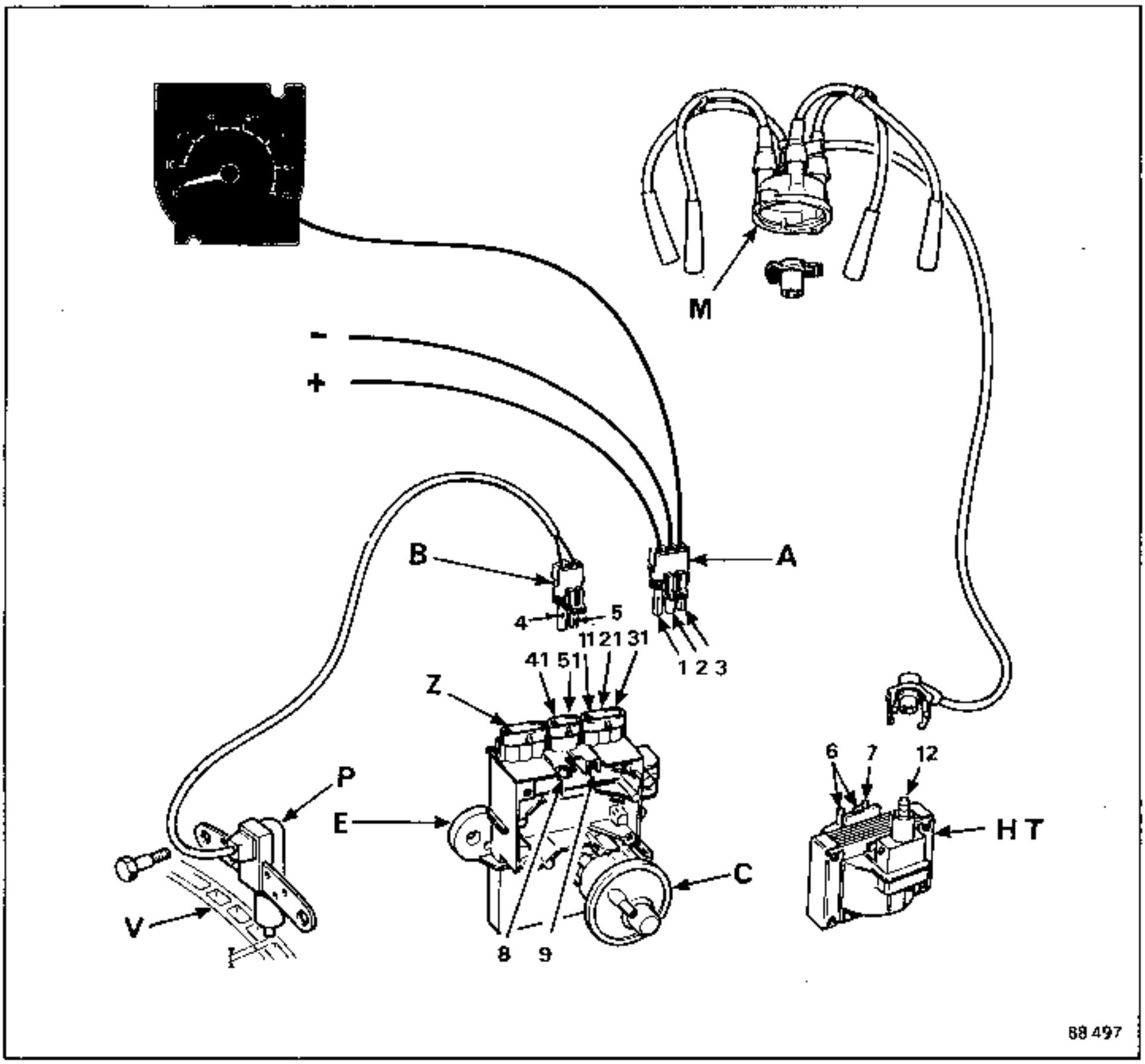
AEI RE282

Only the coolant temperature switch is used.

The oil temperature switch is replaced by the oil pressure warning light pressure switch, which was formerly at the back of the cylinder block near the engine intermediate shaft.

	Temperature (°C)	
	Below 90	Above 90
Advance correction between 1200 rpm and 4700 rpm at a vacuum of 0 to 270 mb.	0	-3 ± 2

This correction prevent pinking.



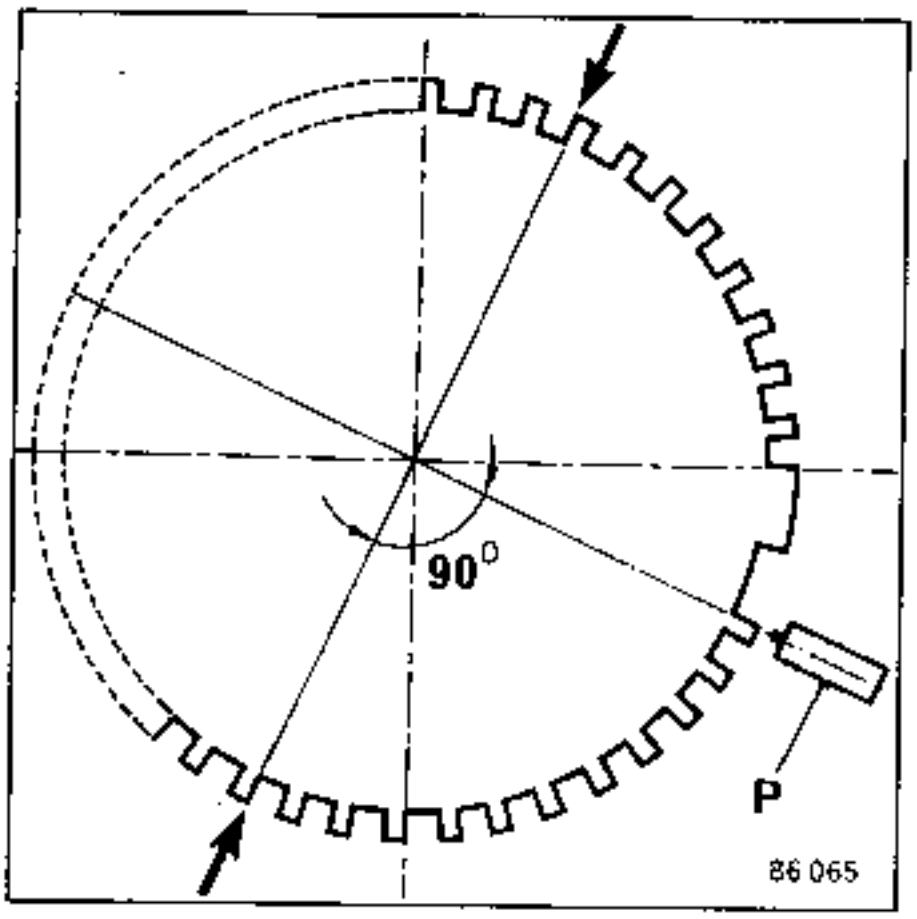
Item	Description
1	+ supply
2	Earth
3	Tachometer
4	Sensor coil
5	Sensor coil
6	Coil + terminal and interference suppression capacitor terminal
7	Coil - terminal
8	Coil + contact
9	Coil - contact
11	Module + "input"
12	Secondary contact stud
21	Module earth
31	Tachometer "output"

Item	Description
41	Sensor signal
51	Sensor signal
M	Distributor cap
HT	Ignition coil
C	Vacuum capsule
E	Electronic computer
P	Magnetic position sensor
V	Flywheel
A	Supply connector
B	Position sensor connector
Z	See special features on page 4

NOTE: Terminals 8 and 11 are directly interconnected inside the housing.

1 - FLYWHEEL

This has 44 evenly spaced teeth on it, of which two are removed each half turn to form an absolute precision index 90° before top and bottom dead centres. In reality, therefore, there are only 40 teeth.



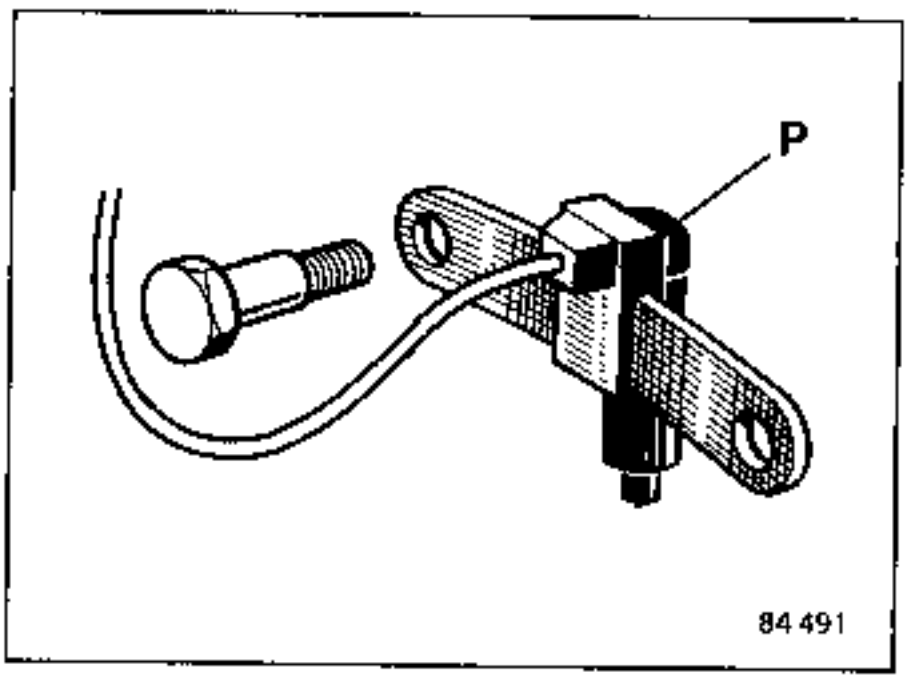
2 - POSITION SENSOR (P)

This detects:

- the positions of top and bottom dead centre,
- the engine speed.

It cannot be adjusted (it is pre-adjusted on its securing bar).

It must be secured to the clutch housing with shouldered bolts.

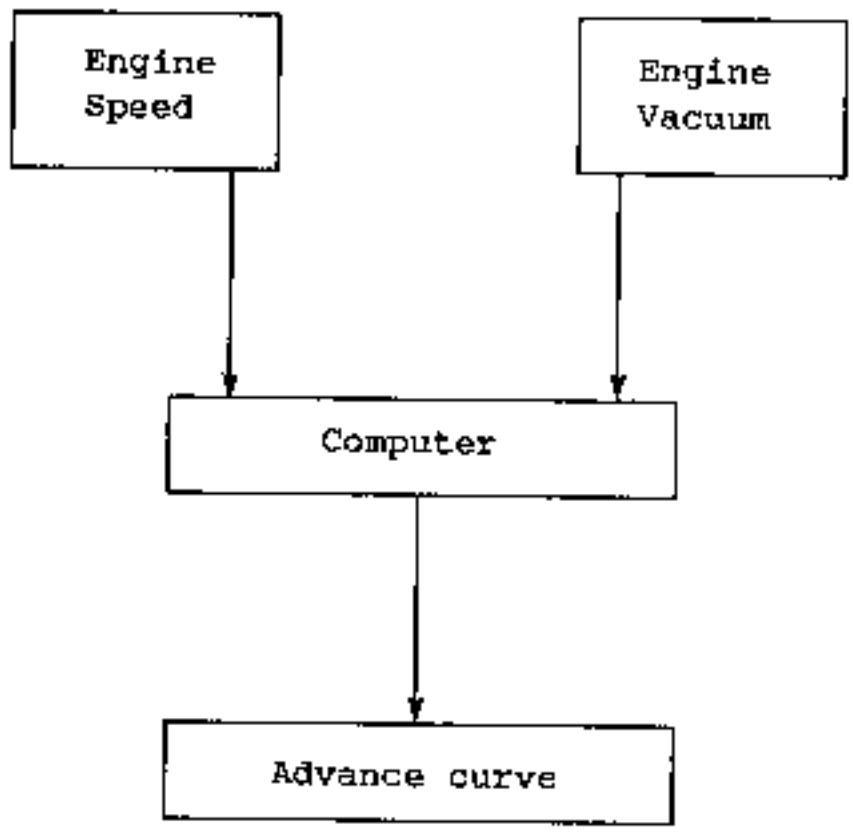


3 - VACUUM SENSOR

The external appearance of this vacuum capsule is identical to that on a conventional ignition system, but internally it is different.

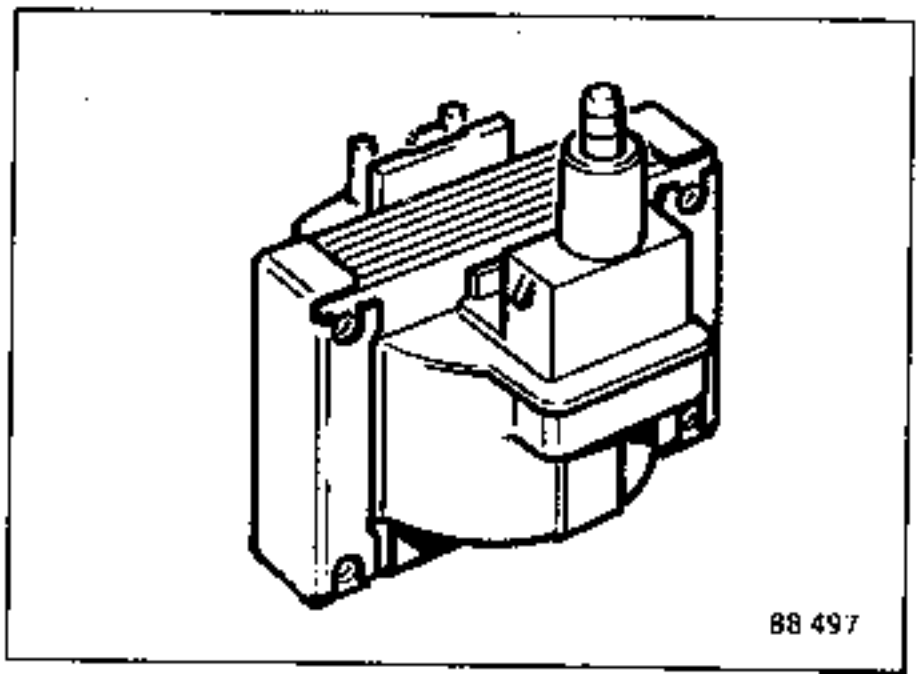
4 - THE COMPUTER

This is an electronic system which defines the timing curve to suit the engine speed and vacuum.



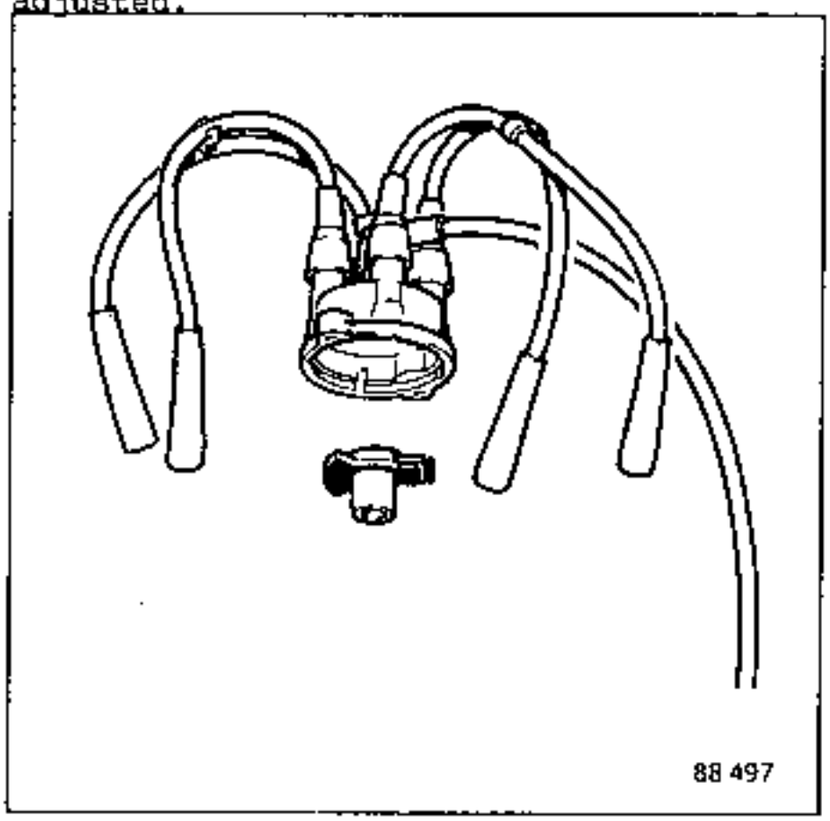
5 - THE COIL

This is separate from the computer and can therefore be replaced separately.



6 - THE DISTRIBUTOR CAP

This is a distributor the sole function of which is to distribute the high tension current to the spark plugs in the correct firing order. It cannot be adjusted.



CHECKING

The centrifugal and vacuum advance curves can be checked, but they cannot be adjusted (only a visual check on the ignition advance variation can be carried out).

TEST EQUIPMENT

Identical to that used on the other vehicles in our range:

voltmeter)
ohmmeter) of the specified type
strobe light
diagnostic bay (the connections being identical to those for vehicles which do not have a diagnostic plug and with the "electronic" key depressed).

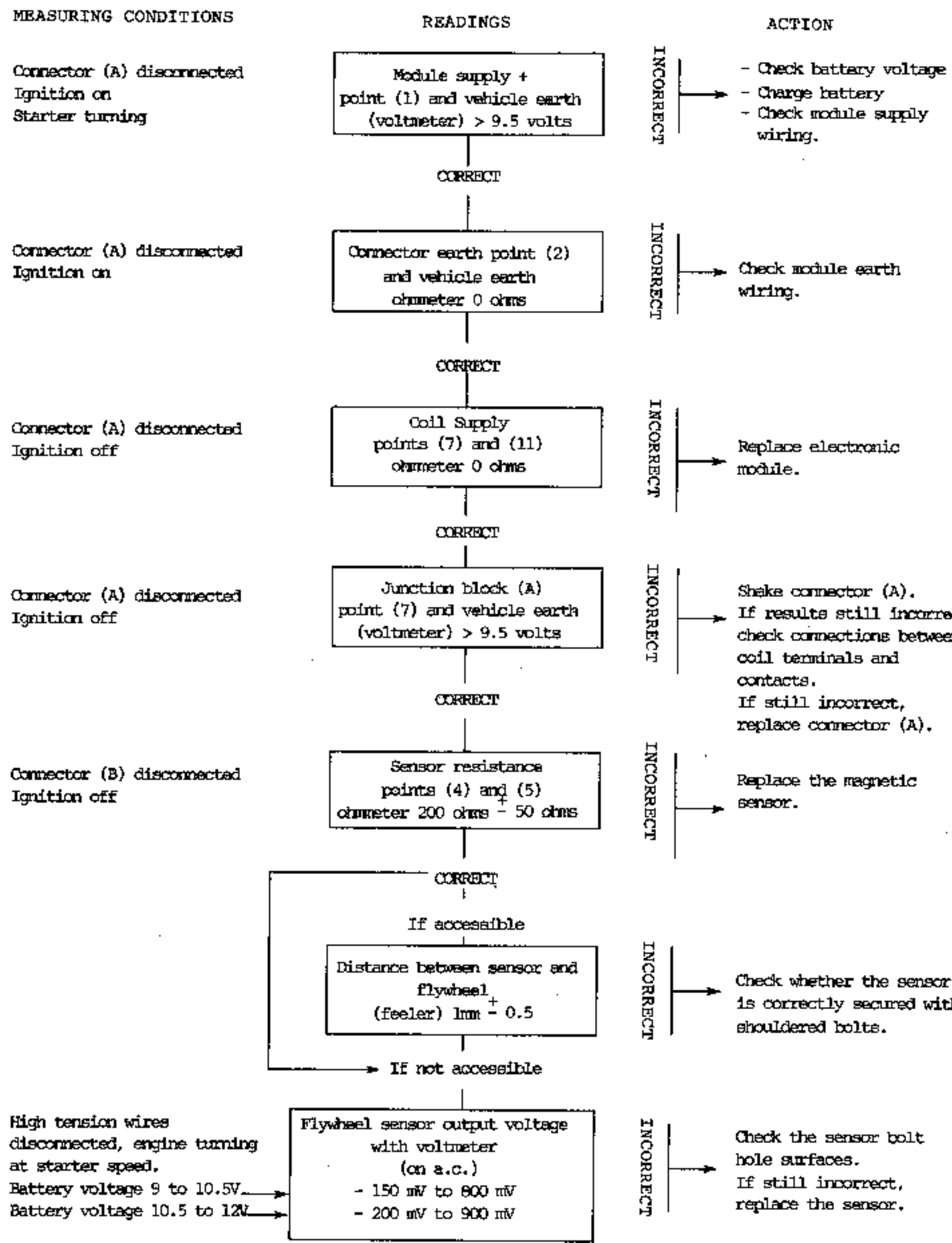
IMPORTANT

Precautions to be taken:

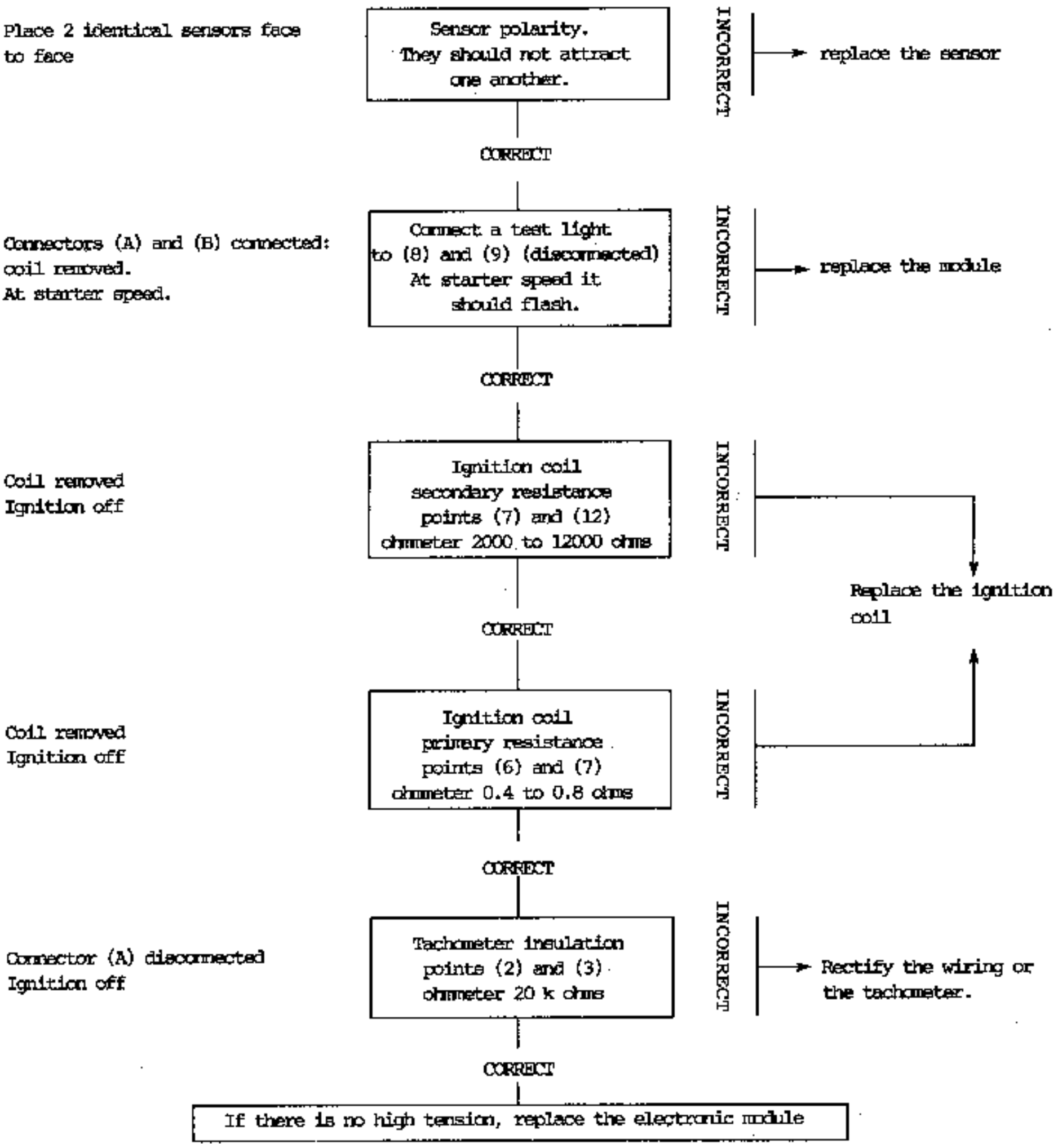
- do not strike a high tension spark on the electronic computer,

- do not earth the coil primary or secondary currents.

FAULT FINDING (cont'd)



FAULT FINDING (continued)



FAULT FINDING (continued)

STARTING DIFFICULT, BUT NO TROUBLE WHEN THE ENGINE IS RUNNING

Check, visually or with checking equipment:

- the spark plugs,
- the plug leads,
- the distributor cap,
- the coil high tension lead.

Check the high tension at starter speed:

- disconnect the high tension lead at the distributor cap end,
- place the lead 2 cm from the cylinder block.

NOTE: NEVER BRING HIGH TENSION CURRENT INTO CONTACT WITH THE ELECTRONIC MODULE

Operate the starter.

READING

The high tension spark is even.

INCORRECT → ACTION: Check module supply: > 9.5 volts. Check battery charge. Charge battery

CORRECT

Check the carburation, mechanical condition of engine and initial timing

CORRECT

Measure sensor resistance points (4) and (5) ohmmeter: 200 ± 50 ohms. If incorrect, replace

CORRECT

If accessible

Check distance between sensor and flywheel (feeler) 1mm ± 0.5. If incorrect, replace

If not accessible

Check that flywheel sensor output voltage is higher than 150 mV (in a.c. position). Replace if incorrect

CORRECT

Check flywheel sensor polarity (2 identical sensors should not attract one another). If incorrect, replace sensor

CORRECT

Clean sensitive face of sensor

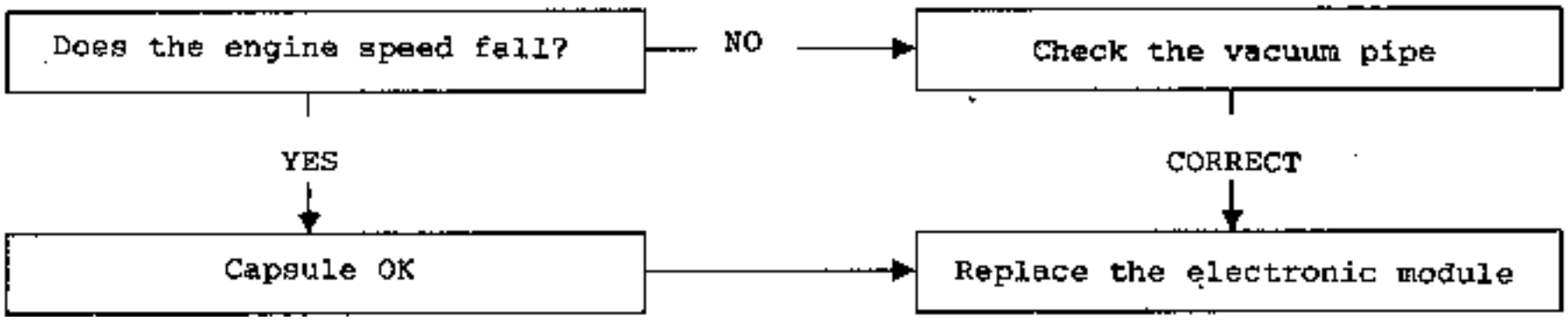
CORRECT

Replace sensor

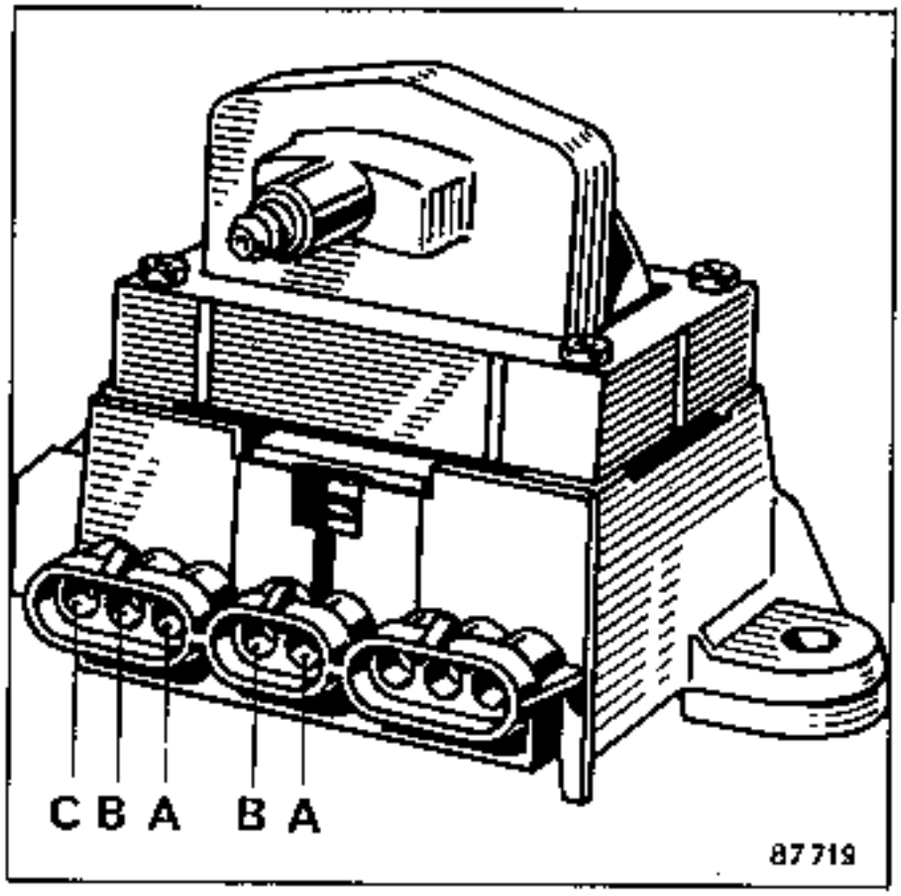
FAULT FINDING (continued)

CHECK THE MECHANICAL CONDITION OF THE VACUUM CAPSULE

- Stabilize the engine speed at 3000 rpm.
- Disconnect the vacuum pipe from the capsule.



The RENAULT injection unit is programmed with the ignition advance curves and sends a control signal (5 volts) to the ignition power module.



3 way connector

A Battery +
B Earth
C Tachometer

2 way connector

A Control signal earth
B Control signal

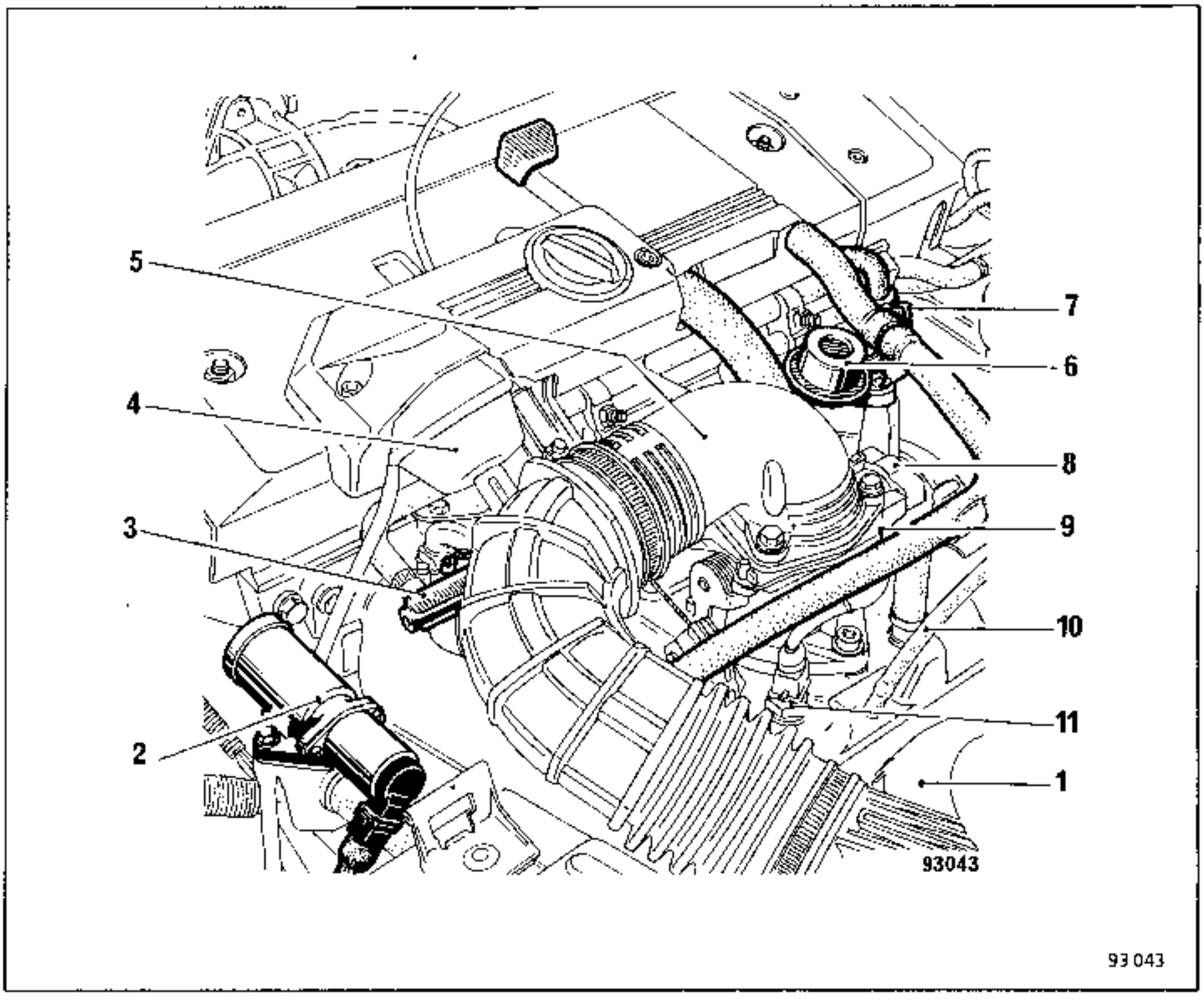
SPARK PLUGS

Type	ENGINE	AC	CHAMPION	EYQUEM RENAULT	SPARK GAP ± 0.5(mm)
L481 K481 S481 B481	F2N	C41CXLS	N279YC	C82LS	0,8
L482 K482 S482	F2N 710	C41CXLS	N279YC	C82LS	0,8
B482 L482 S482 K482	F2N 754	-	-	C82LS	0,8
L483 K483 B483	J7R		S6YC	C82LJS	0,9
L485	J7R 752			803LJSP	0,6
L489	J6R	C42CLTS	S279YC		0,8
L48D B48D	C2J		N281YC		0,8
L48E K48E B48E	F3N 722	C41CXLS	N6YC	C82LS	0,8
L48F K48F B48F	F3N 726		RN9YC		0,8
L48J K48J B48J	F2R 702	C41CXLS	N279YC	C82LS	0,8
L48K K48K B48K	J7T 754 J7T 755	C41CLTS	S7YC		0,8
L48M K48M	F2N 750	C41CXLS	N279YC	C82LS	0,8
L48N K48N	F2N 752	C41CXLS	N279YC	C82LS	0,8
L48Q/L48Y B48Q/B48Y	J7R 754	-	-	FC62LS3	1,2

WARNING: Fit only the make and type of spark plugs epecified. The thermal index is not the only factor in the selection of spark plugs.

On the following pages we have covered the special features of 12 valve (X48Q or X48Y) vehicles. For other fuel injection types, consult manuals MR INJ R(E) and INJ single point.

Special Features of the J7R 754 Engine



1. Air filter
2. Regulator valve (HITACHI)
3. Fuel injection gallery
4. Speed regulator capsule
5. Air intake ducting
6. Pulse damper
7. Fuel pressure regulator
8. Load potentiometer
9. Throttle unit
10. Pressure sensor pipe with 1.5mm jet
11. Air temperature sensor

The J7R-754 engine differs from the others at its cylinder head (12 valves):

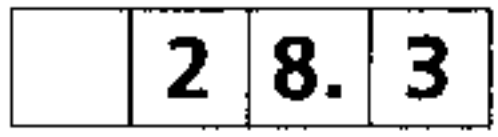
- the spark plugs are on the exhaust side,

- the inlet manifold is special, as is the fuel injection gallery, which is fitted with a pulse damper and a pressure regulator which is integral with the gallery.

- the idling speed regulator valve (HITACHI) is mounted directly on the inlet manifold. It is fitted with a 2 wire connector (one + after the ignition switch and one - leading to computer terminal 24).

The fault finding sequences and the method of using test XR 25 are described in manual MR INJ R(E) Section 17.

Identification number reading on the XR 25 central display

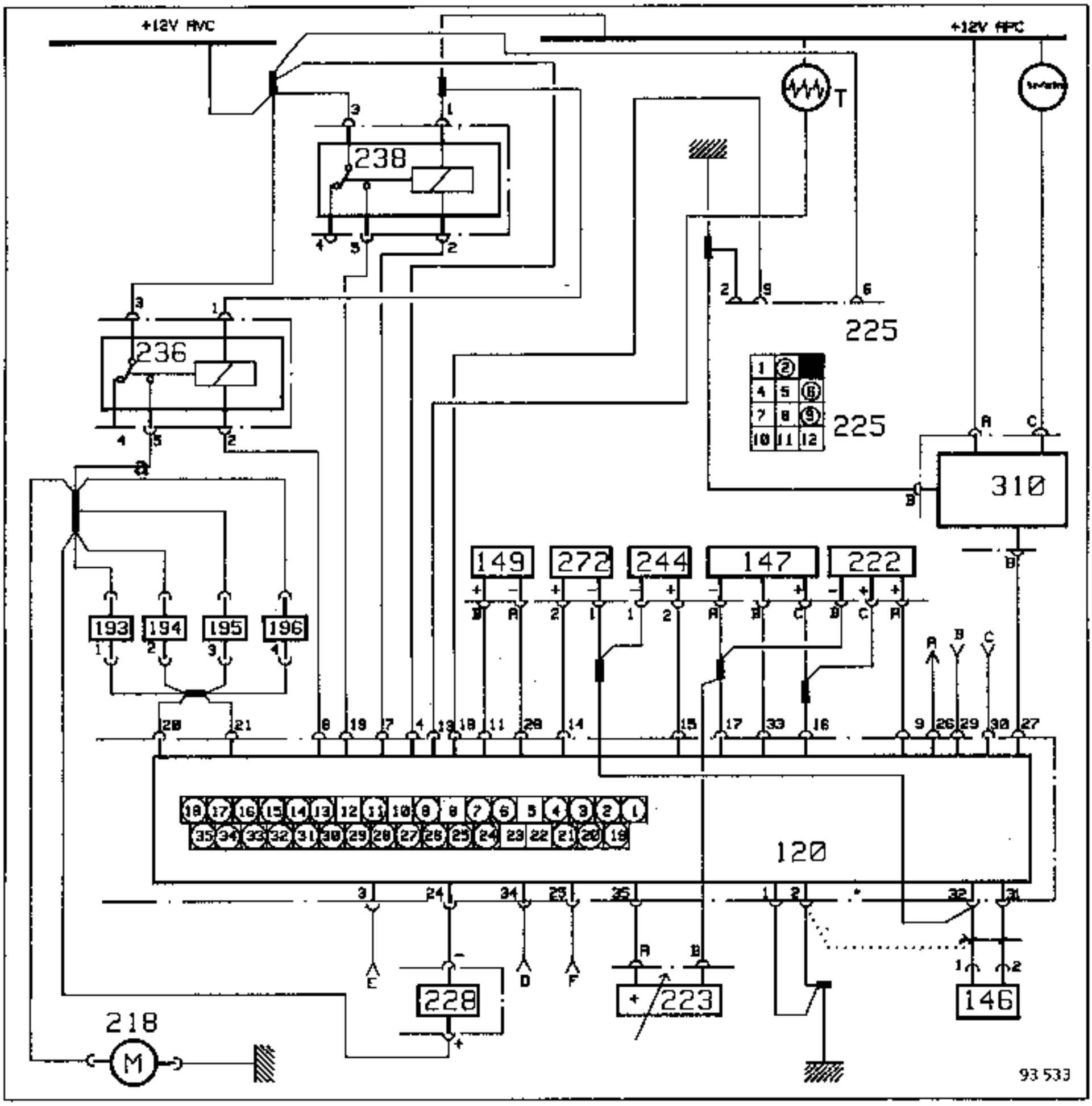


TESTS CARRIED OUT (on the basis of the number displayed by the XR 25)	Keys	28	
Pressure sensor	01	x	Millibars
Coolant temperature	02	x	Degrees
Air temperature	03	x	Degrees
Supply voltage	04	x	Volts
CO Potentiometer	05	x	Ohms
Sensor 02	05		Millivolts
Engine speed	06	x	rpm
Turbo pressure RCO	11		Milliseconds
Idling regulator valve RCO	12	x	Milliseconds %
Pinking sensor signal	13	x	No units
Engine speed variation	14	x	rpm
Pinking correction	15	x	No units
Atmospheric pressure correction	16	x	Millibars
No load/full load potentiometer reading	17	x	No units
Vehicle speed	18	x	Km/h
Turbo pressure correction	20		Milliseconds

NOTE: The tests and data checks described on the following pages are to be carried out with the XR 25 fitted with cassette no. 7 or subsequent cassettes and using test data sheet no. 87A.

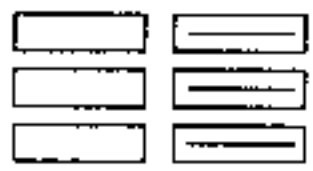
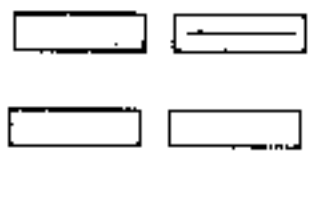
The computer is of the type which memorizes transitory defects. The diagnosis output is permanent and the diagnostic warning light on the instrument panel operates.

INJECTION CIRCUIT DIAGRAM

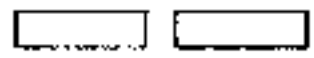
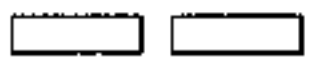


120	Computer
146	Pinking sensor
147	Pressure sensor
149	Flywheel sensor
193 - 196	Injectors
218	Fuel pump (engine)
222	Throttle unit potentiometer
223	Adjusting potentiometer
225	Diagnostic socket (plan view)
228	Idling regulator solenoid valve
236	Pump relay
238	Supply relay
244	Coolant temperature sensor
272	Air temperature sensor
310	Ignition power module (M.P.A.)
	Connectors
T	Diagnostic warning light
A	To flow sensor
B	Starter signal
C	Air conditioning - on/off signal
D	Air conditioning thermostat signal
E	Vehicle speed signal
F	Power steering pressure switch signal

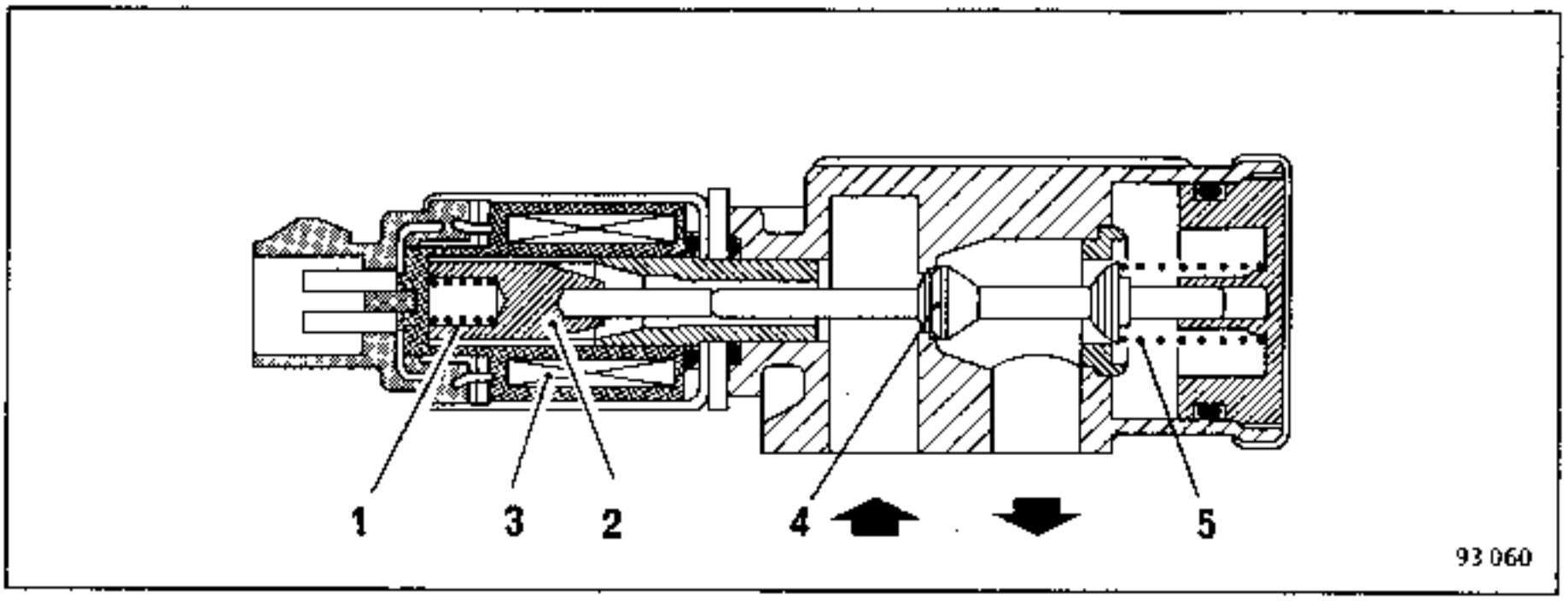
CHECKING THE SPECIFICATIONS

Function to be Checked	Conditions	Selection on Tester	Bar Graph Line No.	Bar Graph Display	Digital Display Remarks
Injection diagnostic position	Engine stopped Ignition on	D03	L1 L8 L10	 L1 : presence code L8 : TDC code L10 : no throttle position	XXXX 28.3 3 = injection diagnostic
Throttle potentiometer check	Engine stopped Ignition on, - no throttle, - accelerator slightly depressed - accelerator fully depressed	# 17	L10 L10 L10		XXXX 4 to 10 min 225
Check on absolute pressure sensor	Engine stopped, ignition on	# 01			XXXX at local barometric pressure
Coolant temperature sensor check	Engine cold - stopped - ignition on	# 02			XXX Ambient temperature ± 5°C
Air temperature sensor check	Engine cold - stopped - ignition on	# 03			XXX Ambient temperature ± 5°C
Battery voltage	Engine warm - running at idling	# 04			Reading XXX 13.2 to 14.4
Coolant temperature sensor check	Engine warm - at idling - after electric fan has cut in once If tester returns to 0	# 02 D03 # 02			XXX 80°C to 110°C

CHECKING THE SPECIFICATIONS

Function to be Checked	Conditions	Selection on Tester	Bar Graph Line No.	Bar Graph Display	Digital Display Remarks
Idling speed regulation and CO percentage check	Engine warm running at idling No current consumer operating such as: - electric fan - power steering (steering lock	# 06 # 12			XXXX Idling speed: 850 + 75 rpm C.O. = 1.8 ± 0.2 % R.C.O. = 30 35 %
Check on idling speed with air conditioning running	Engine warm running at idling - air conditioning control on - compressor engaged	# 06 # 06	L14 L14	 	Check speed XXX 900 to 1000rpm Check speed XXX 900 to 1000rpm
Check on pinking detection system Noise measurement	Engine warm, running off load at: 3600 +200 rpm -0	# 13	L12		Take min and max readings over approx. 10 secs. XXX The reading should be more than zero and variable
Vehicle speed	Vehicle moving	# 18	L15		XXX The reading should be the same as the actual vehicle speed.

"HITACHI" REGULATOR VALVE



PRINCIPLE OF OPERATION

The HITACHI regulator valve has a single winding (2 wires on the connector).

In the "off" position

The air circuit is closed, the spool (4) is pushed back towards the coil (3) by the spring (5). The core (2) is held against the spool by the small spring (1).

With the ignition switched on and the engine stopped

(period during which the fuel pump is running). The coil is supplied with current. The magnetic field pushes over the core (2), the spool (4) moves and opens the valve:

R.C.O. 0% = valve closed
R.C.O. 100% = valve open

With the ignition on and the engine running at idling speed

The computer maintains a cycling rate (R.C.O.) which will maintain the air delivery that keeps the idling speed at the figure programmed on the computer (for example, 850 rpm when the engine is warm).

TESTING BY MEANS OF THE XR 25

Special features:

The total sequence time for the HITACHI valve is approximately 6 m.s.

Example of XR 25 readings

	Diag. output 12	Voltmeter output connector G.O.
Valve closed	0 %	6 m.s
Valve open	100 %	0.3 m.s
Engine warm Idling regulation	37 %	3.9 m.s

FAULT FINDING

If there is something wrong with the idling regulation system, the engine will stall when the foot is removed from the accelerator.

Check:

The coil resistance (9 to 30 ohms).

That the + supply, after the ignition switch, is present at the connector supply wire (current present, with the engine stopped, for approximately 1 second after the ignition is switched on)

Check the continuity of the circuit between:

- channel 24 on computer connector (computer disconnected and replaced by junction block M.S.1048) and channel 5 on the pump relay connector (236). See circuit diagram.

ANTI-FREEZE QUANTITIES AND GRADES

Cooling System Engine Types	Capacities, in litres for the various versions				Specific Requirements
	Phase I	Phase II	C.A.	Aut. Trans.	
C2J	5,5	5,5	-	-	
F2N	5,2	6,4	6,4	6,4	
F2R	7	7	7	-	Glaceol AL (type C)
F3N single point	4,7	6	-	-	
F3N multipoint	4,7	6	6	6,4	Add only demineralized
F8Q	-	7	-	-	water
J6R	6,8	6,8	6,8	7,2	
J7R	6,8	6,8	7	7,2	Protection down to -23°C
J7R Turbo	6,2	6,2	6,2	-	for temperate, hot and cold
J7R 12 valve	-	7,1	7,1	-	climates
J7T	5,7	5,7	7	7,2	Protection down to -40°C
J8S	7,1	-	-	-	for very cold climates.
J8S Turbo	7,2	7,2	7,2	-	
J8S +	7	7	-	-	

THERMOSTAT

Engine Type	Starts to open (in °C)	Fully open (in °C)	Travel (in mm)
C2J	89	101	7,5
F2N F3N	89	101	8
F2R	78	90	7,5
F8Q	82	94	7,5
J6R J7R J7T	89	101	7,5
J8S	81	93	7,5

ANTI-FREEZE CONCENTRATION

Refractometer

Supplier:
CEPAC
33 rue Julles Auffret-
BP55
93130 NOISY LE SEC

OR

S.G. Meter

Supplier:
FACOM
6 and 8, rue Gustave
Eiffel-BP99
91423 MORANGIS

Take coolant from the expansion chamber.

Read the protection provided with the refractometer.

Hot, temperate and cold climates:

Protection -23°C (35% anti-freeze solution)

Very cold countries

Protection -40°C (50% anti-freeze solution)

If the anti-freeze concentration exceeds 60%, the protection is reduced.

The protection levels shown in these charts are valid for coolant at a temperature of 40°C.

Using the Chart

If a vehicle with an anti-freeze capacity of 6 litres shows a protection reading of -15°C.

To take the protection down to -23°C, one must replace 0.7 litres of the mixture in the system by 0.7 litres of pure anti-freeze.

To take the protection down to -40°C, one must replace 1.9 litres of the mixture in the system by 1.9 litres of pure anti-freeze.

PURE ANTI-FREEZE TO BE ADDED

-23°C
Hot, temperate and cold climates

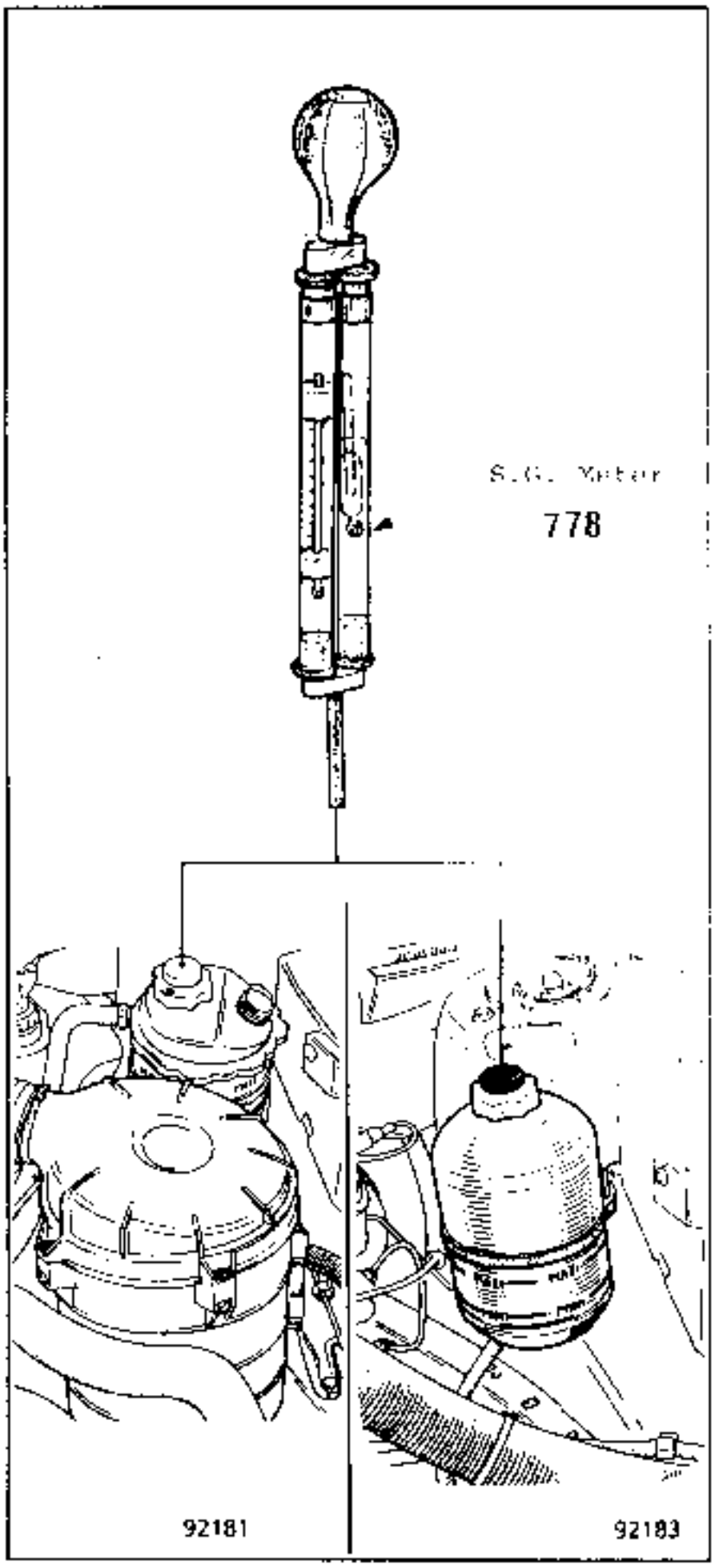
Protection noted at a coolant temp. of 40°C	Volume of coolant to be replaced by Glacelf AL TYPE C anti-freeze to obtain protection down to -23°C	System capacity (litres) 5	6	7	8	9
- 5°C		1,3	1,6	1,8	2,1	2,4
- 10°C		1	1,1	1,3	1,5	1,7
- 15°C		0,6	0,7	0,9	1	1,1
- 20°C		0,2	0,2	0,2	0,3	0,3

-40°C
Very Cold Climates

Protection noted at a coolant temp. of 40°C	Volume of coolant to be replaced by Glacelf AL TYPE C anti-freeze to obtain protection down to -40°C	System Capacity (litres) 5	6	7	8	9
- 5°C		2,2	2,6	3,1	3,5	3,6
- 10°C		1,9	2,3	2,7	3	3,4
- 15°C		1,6	1,9	2,2	2,6	3
- 20°C		1,3	1,6	1,8	2	2,3
- 25°C		1	1,2	1,4	1,7	1,9
- 30°C		0,9	1	1,2	1,4	1,5
-35°C		0,5	0,5	0,6	0,7	0,8

SPECIFIC GRAVITY METER

Draw in coolant until it surrounds the base of the thermometer and freely lifts the float.



Check that the float:

Is not making contact with the upper end of the tube (too much coolant).

Is not sticking to the sides of the tube. If necessary, tap it gently to free it.

Read:

The coolant temperature.

The specific gravity of the coolant.

Consult this correction table to determine the actual frost protection provided by the coolant.

	READING ON S.G. METER						
	3	5	10	15	20	30	40
10	0	0	5	8	11	14	18
20	1	2	6	10	14	18	24
30	2	3	8	12	17	24	33
40	3	5	10	15	20	30	40
50	4	7	12	18	24	35	
60	6	9	15	22	28	40	
70	8	12	18	25	32		
80	10	14	22	32	37		

CORRECTED PROTECTION IN DEGREES

EXAMPLE { Thermometer reading 60 / S.G. meter reading: 10 } PROTECTION DOWN TO MINUS 15°C

ALUMINIUM MATRIX RADIATORS

Certain vehicles are equipped with radiators, the cooling matrix of which is made from aluminium.

Flushing Out

Never flush out these radiators, or the cooling system, with caustic soda or alkaline products (they can corrode light alloy components and cause leakage)

Storage

A radiator can be stored, after removal, for a maximum of 48 hours without taking any particular precautions.

For longer than this, however, particles of the brazing flux used in the radiator during manufacture and the dichlorides in the coolant that the radiator contained, cause, when they make contact with the air, oxydization of the aluminium components of the radiator, resulting in leakage.

One must therefore carry out the following on a radiator which is to remain off the vehicle for more than 48 hours:

- Either THOROUGHLY FLUSH IT OUT with water, BLOW THROUGH IT with compressed air, then PLUG all the orifices.

- Or keep it filled with coolant, if possible.

Anti-Freeze

The correct type of anti-freeze must be used in an aluminium radiator.

The AL type C anti-freeze marketed by the RENAULT network fulfils the specifications laid down by our Design Office, in particular in that:

- it does not attack the various aluminium and cast iron components,

- it has an alkaline content which is specifically adapted to the special requirements of light alloy systems,

- it contains special additives providing effective protection against the acid products of combustion found in both high speed diesel and petrol engines,

- the premixed coolant solutions provide for correct frost protection and efficient running at all temperatures.

ESSENTIAL SPECIAL TOOLS	
M.S. 554-03	Cooling system leak test equipment
M.S. 554-01	Adaptor for M.S.554-03
M.S. 554-04	Adaptor for M.S.554-03

1 - Checking the System for Leaks

Replace the valve on the expansion bottle by adaptor M.S.554-01.

Connect tool M.S.554-03 to it.

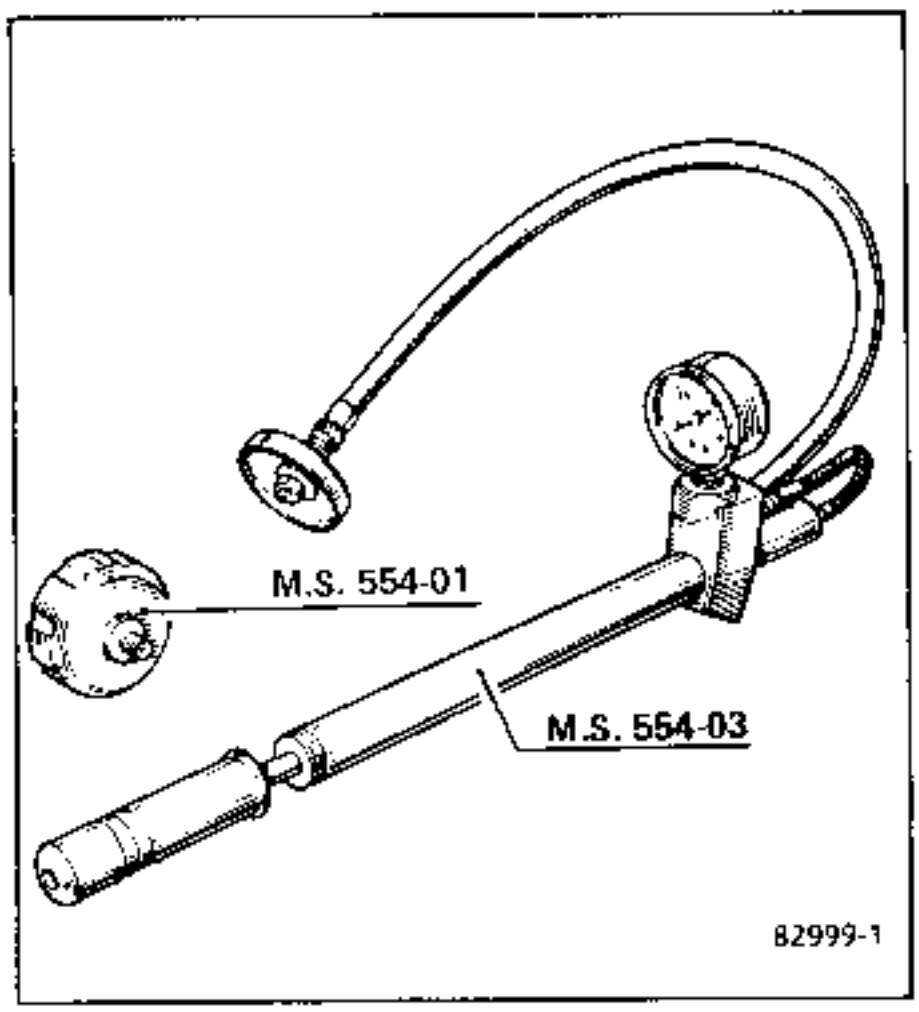
Warm up the engine and stop it.

Pump the equipment to pressurize the system.

Stop pumping at 0.1 bars below the figure at which the valve opens.

The pressure should not drop. If it does, find the leak.

Slowly unscrew the union on tool M.S.554-03 to release the pressure from the cooling system, then remove tool M.S.554-01 and refit the expansion bottle valve using a new seal.



2 - Checking the Valve Setting

If coolant has passed through the expansion bottle valve, the valve must be replaced by a new one.

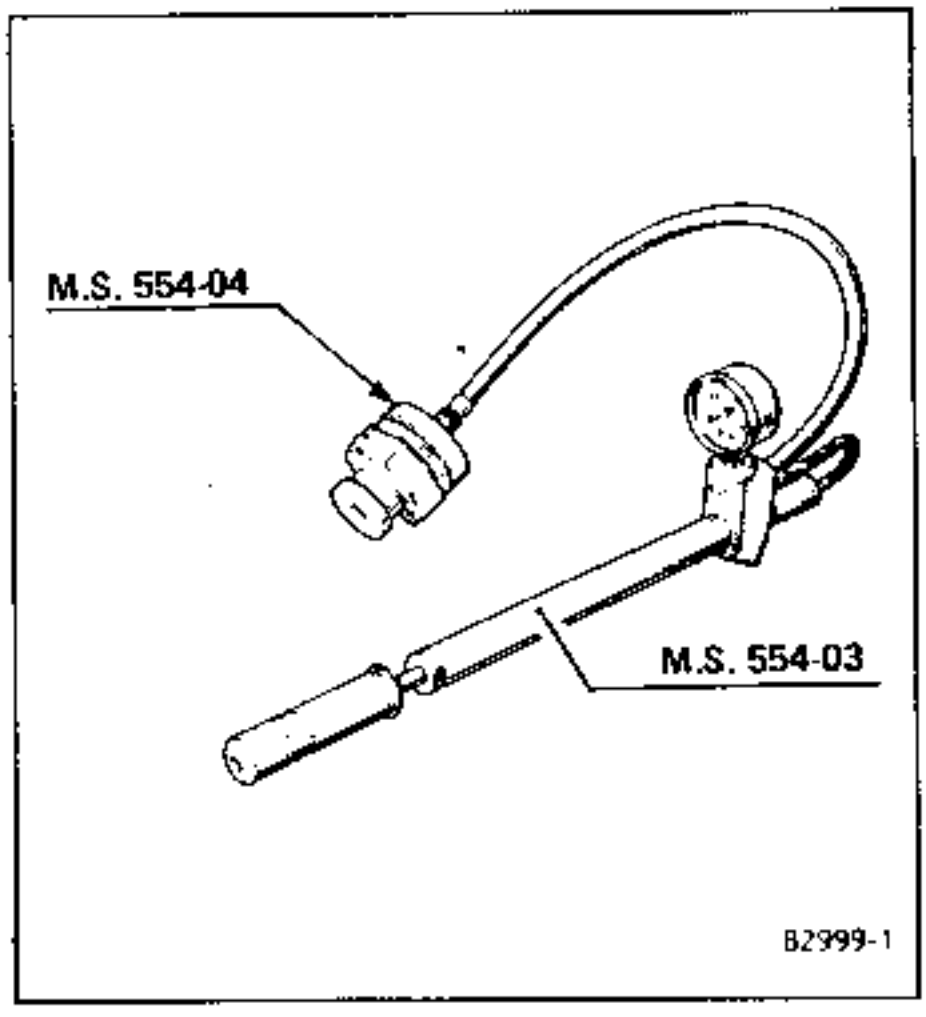
Fit tool M.S.554-04 to pump M.S.554-03 and fit the valve under test to the tool.

Raise the pressure. It should stabilize at the valve opening pressure to within a test tolerance of $\pm$ 0.1 bars.

Valve Setting Pressure

Brown plastic valve 1.2 bars.

Blue plastic valve 1.6 bars.



EXPANSION BOTTLES THAT ARE NOT AN INTEGRAL PART OF THE RADIATOR

There is no heater hot water valve. There is a continuous flow of water through the heater which contributes towards engine cooling.

FILLING

Check that the drain plug or plugs are fully tightened.

Open the bleed screw or screws.

Fill the system through the expansion bottle.

Close the bleed screws as soon as coolant runs from them in a continuous jet.

Start the engine (run it at 1500 rpm).

Top up the level to overflowing, for approximately 4 minutes.

Close the bottle.

BLEEDING THE SYSTEM

Leave the engine running for approximately 10 minutes at 1500 rpm until the electric fan or fans cut in (time required for the automatic degassing of the system.)

Check that the coolant level is near the "Max" mark.

DO NOT OPEN THE BLEED SCREW OR SCREWS WITH THE ENGINE RUNNING.

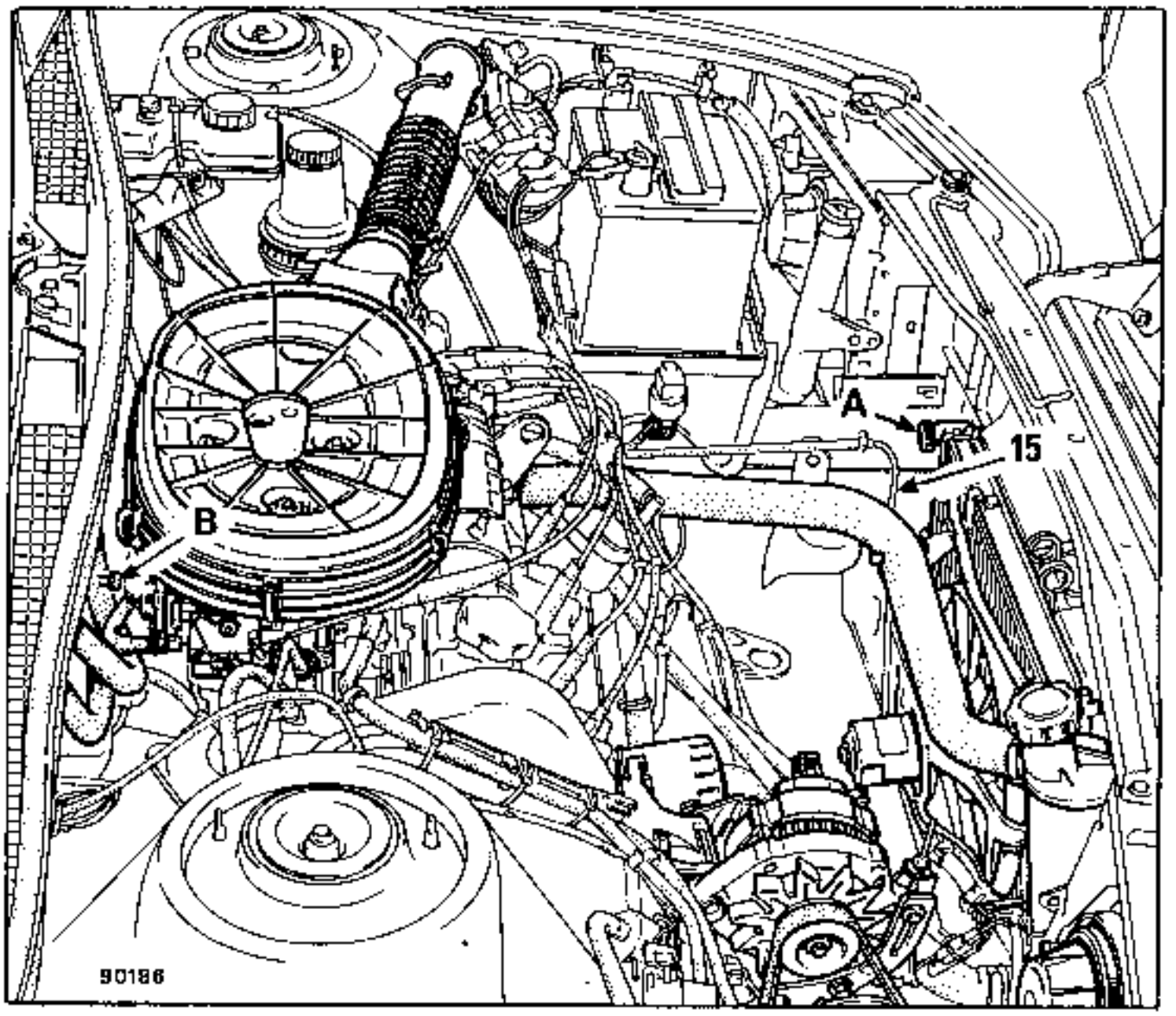
TIGHTEN THE EXPANSION BOTTLE CAP WHEN THE ENGINE IS WARM.

EXPANSION CHAMBER WHICH FORMS PART OF THE RADIATOR

There is no heater hot water valve.

The coolant flow through the heater is continuous and contributes to cooling the engine.

FILLING



Open the bleed screw (A) on the radiator.

Open the bleed screw (B) on the heater hose.

Disconnect the syphon pipe from the radiator and lay it flat (15).

Gradually fill the system through the expansion chamber.

Close the bleed screws (A) and (B) as soon as there is a continuous flow of coolant from them.

Start the engine (1500 rpm).

Depress the accelerator 3 or 4 times (3 to 4000 rpm), then top up the level until it overflows the expansion chamber for approximately 4 minutes.

Close the expansion chamber. Return the syphon pipe to its original position.

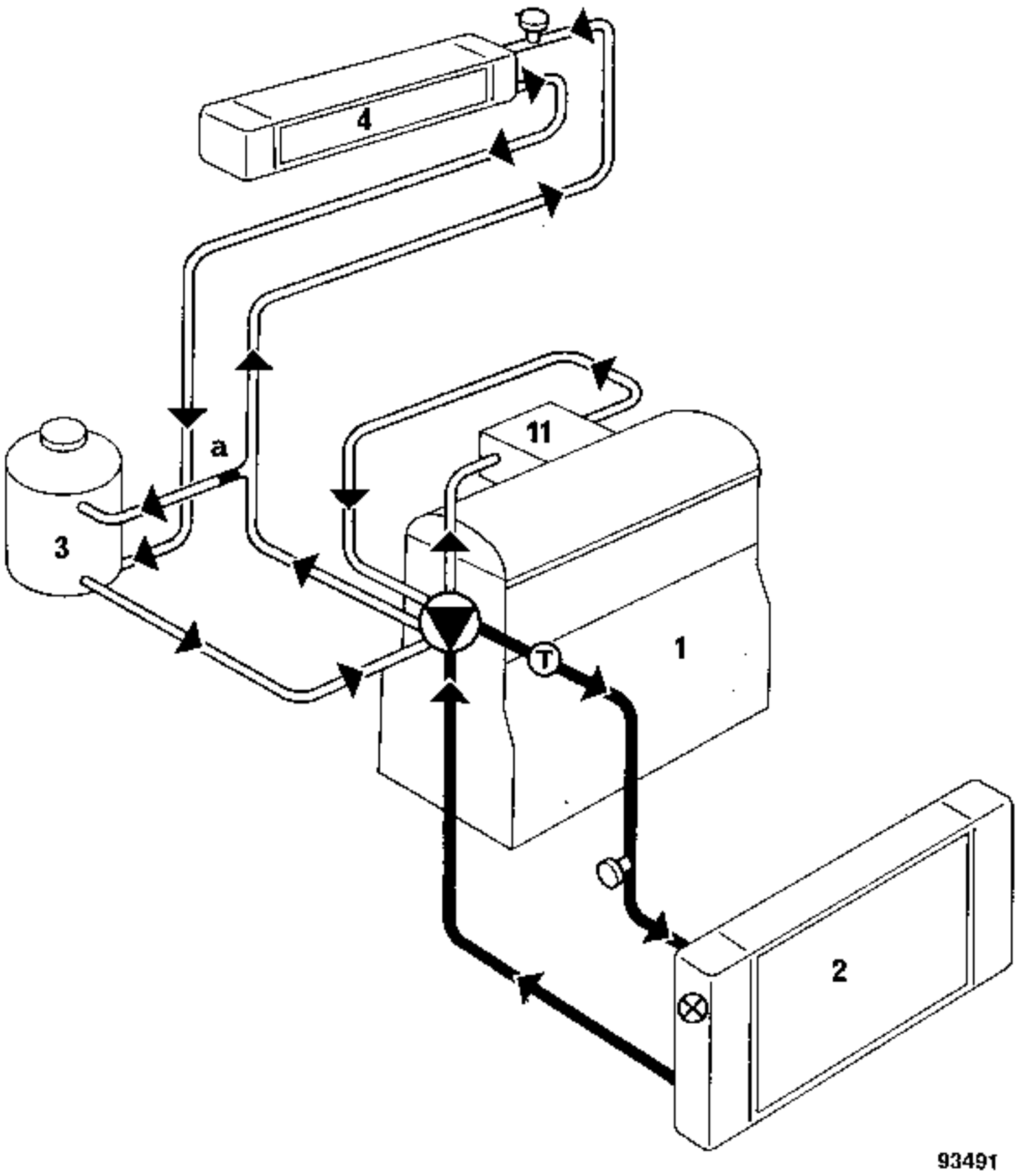
Allow the engine to run for 10 minutes at 1500 rpm until the electric fan cuts in at least three times:
(this is necessary to degas the system automatically).

Check that the coolant level is around the "max" mark (it is acceptable for it to be higher than this).

DO NOT OPEN THE BLEED SCREW OR SCREWS WHILST THE ENGINE IS RUNNING.

RETIGHTEN THE EXPANSION CHAMBER CAP WHEN THE ENGINE IS WARM.

Phases I and II



1. Engine
2. Radiator
3. Expansion bottle
4. Heater
11. Carburettor base heater
a. 3mm Ø jet

Coolant pump

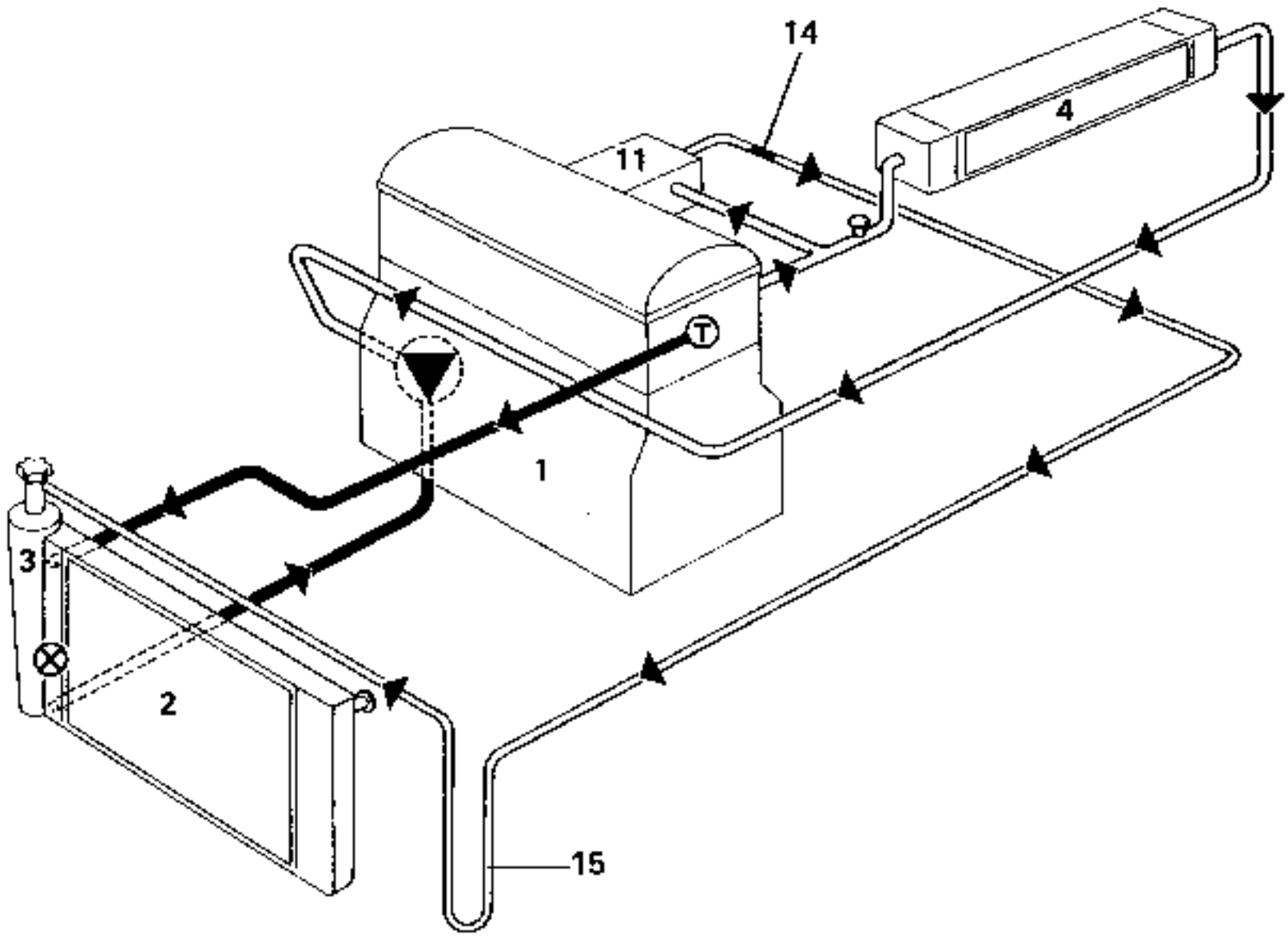
T Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.2 bars

Phase I



90162

1. Engine
2. Radiator
3. Hot bottle with permanent degassing
4. Heater
11. Carburettor base heater
14. 3.5mm Ø jet
15. Siphon

Coolant pump

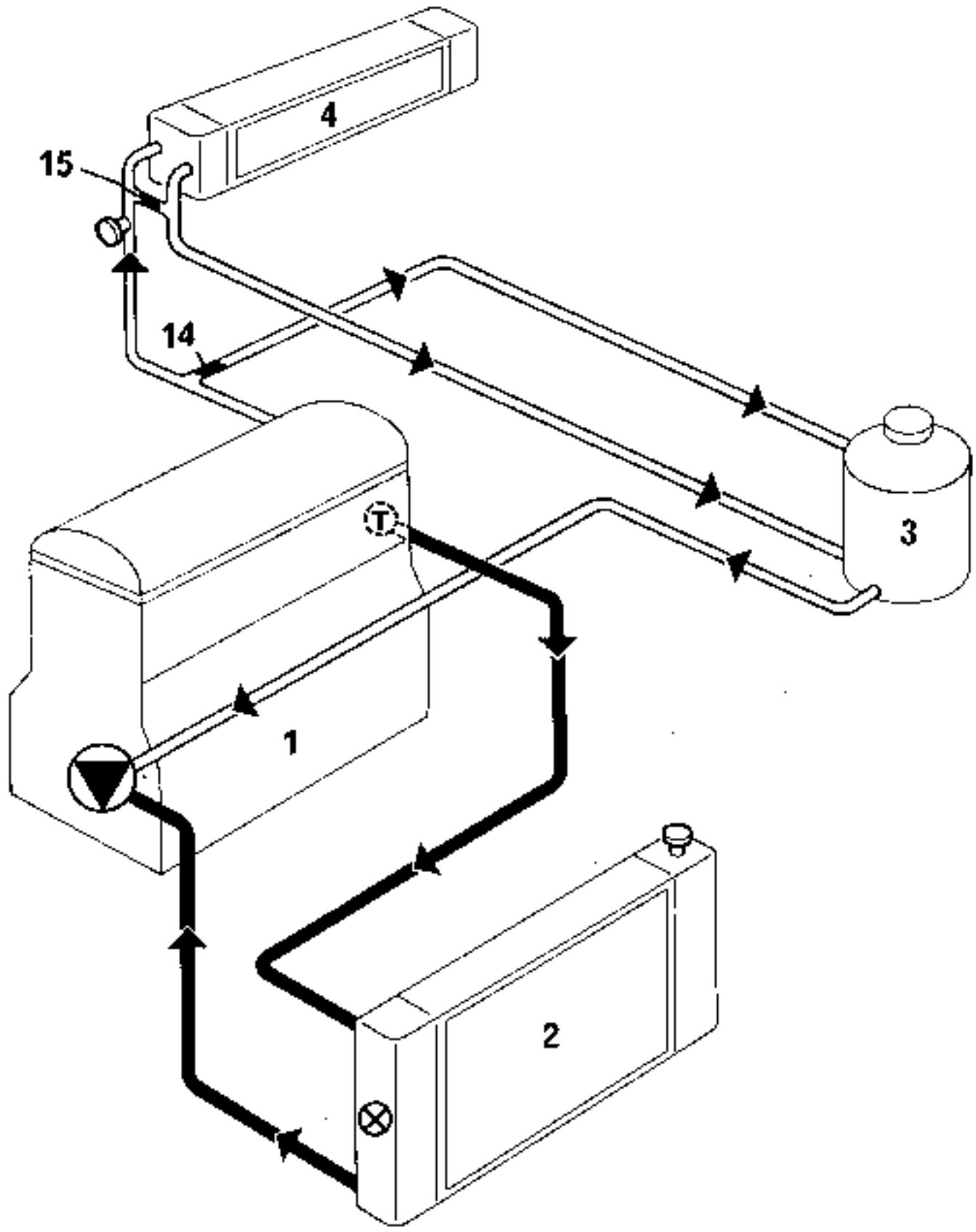
Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.2 bars

Phase II
- temperate climate 76HP
- emission control 75HP



93485

1. Engine
2. Radiator
3. Hot bottle with permanent degassing
4. Heater
14. 3mm Ø jet
15. 8mm Ø bypass jet

Coolant pump

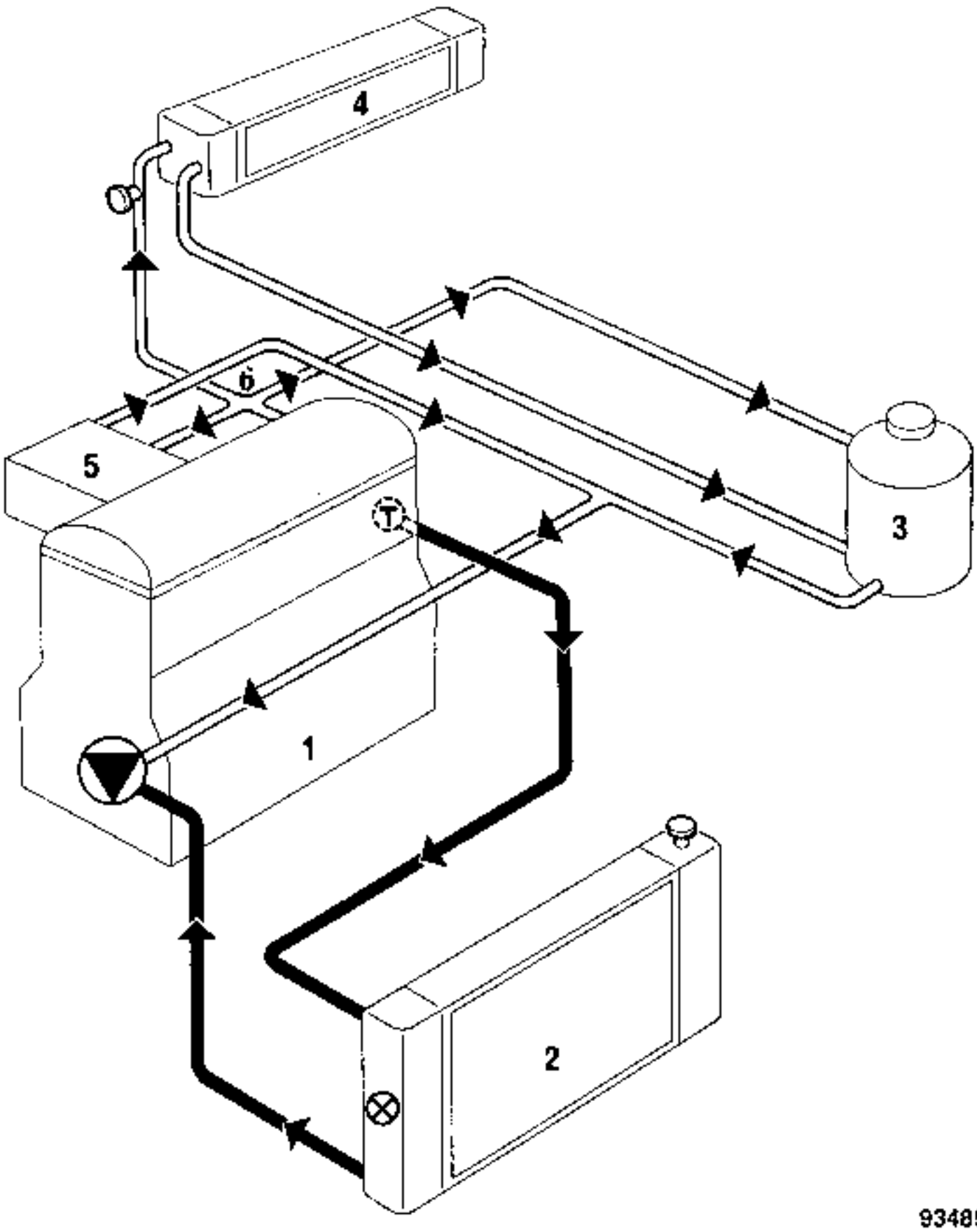
Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.2 bars

Phase II
- emission control 90HP



93485. 1

1. Engine
2. Radiator
3. Hot bottle with permanent degassing
4. Heater
5. Manifold
6. 4 way union
   Jets Ø 16/10/10/3mm

Coolant pump

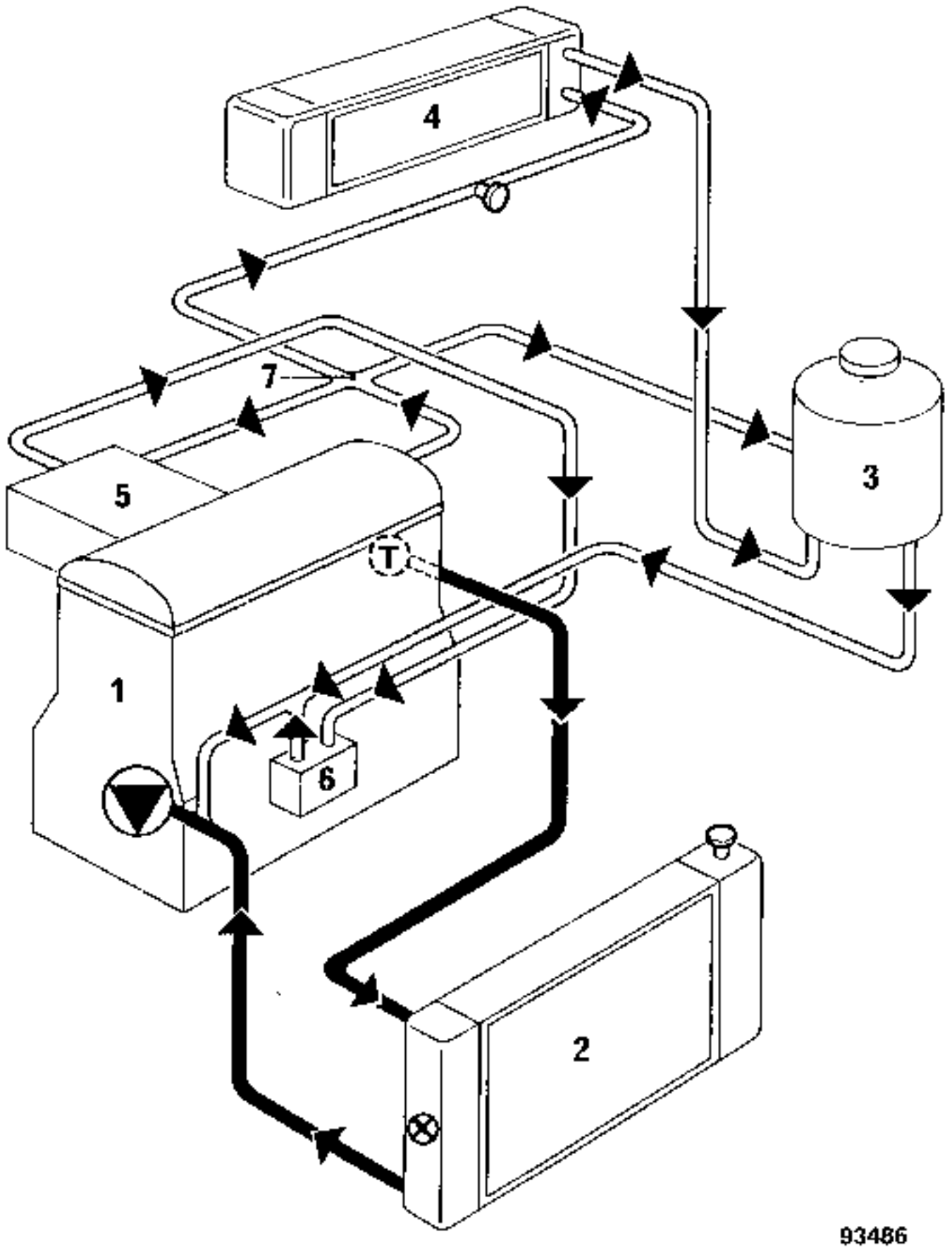
Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.6 bars

Phase II
- hot climates, without air conditioning



93486

1. Engine
2. Radiator
3. "Hot" bottle
4. Heater
5. Manifold
6. Modine (oil cooler)
7. 4 way union
   Jets Ø 16/10/10/3mm

Coolant pump

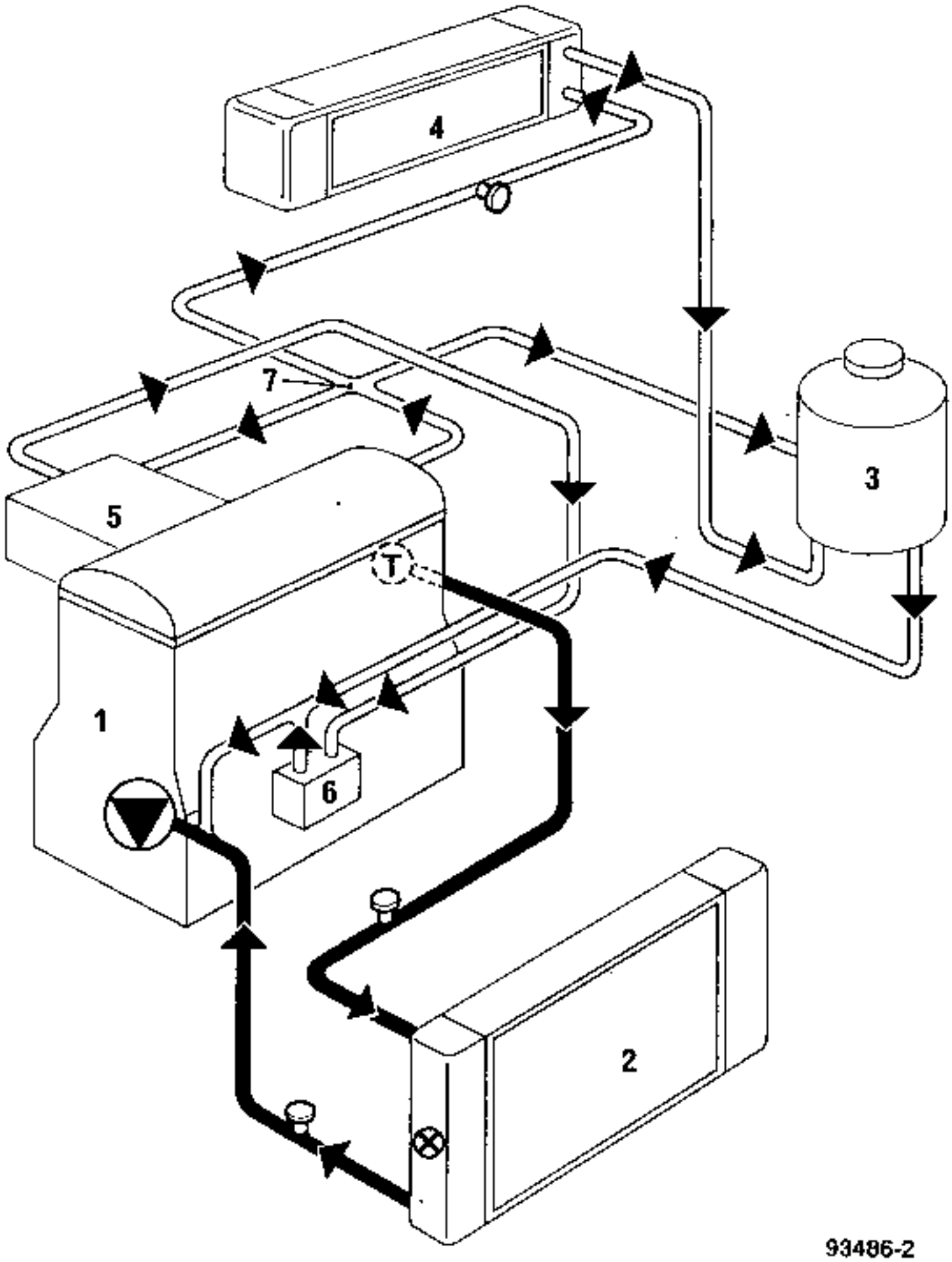
Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1,6 bars

Phase II
- hot climates, with air conditioning



93486-2

1. Engine
2. Radiator
3. "Hot" bottle
4. Heater
5. Manifold
6. Modine (oil cooler)
7. 4 way union
   Jets Ø 16/10/10/3mm

Coolant pump

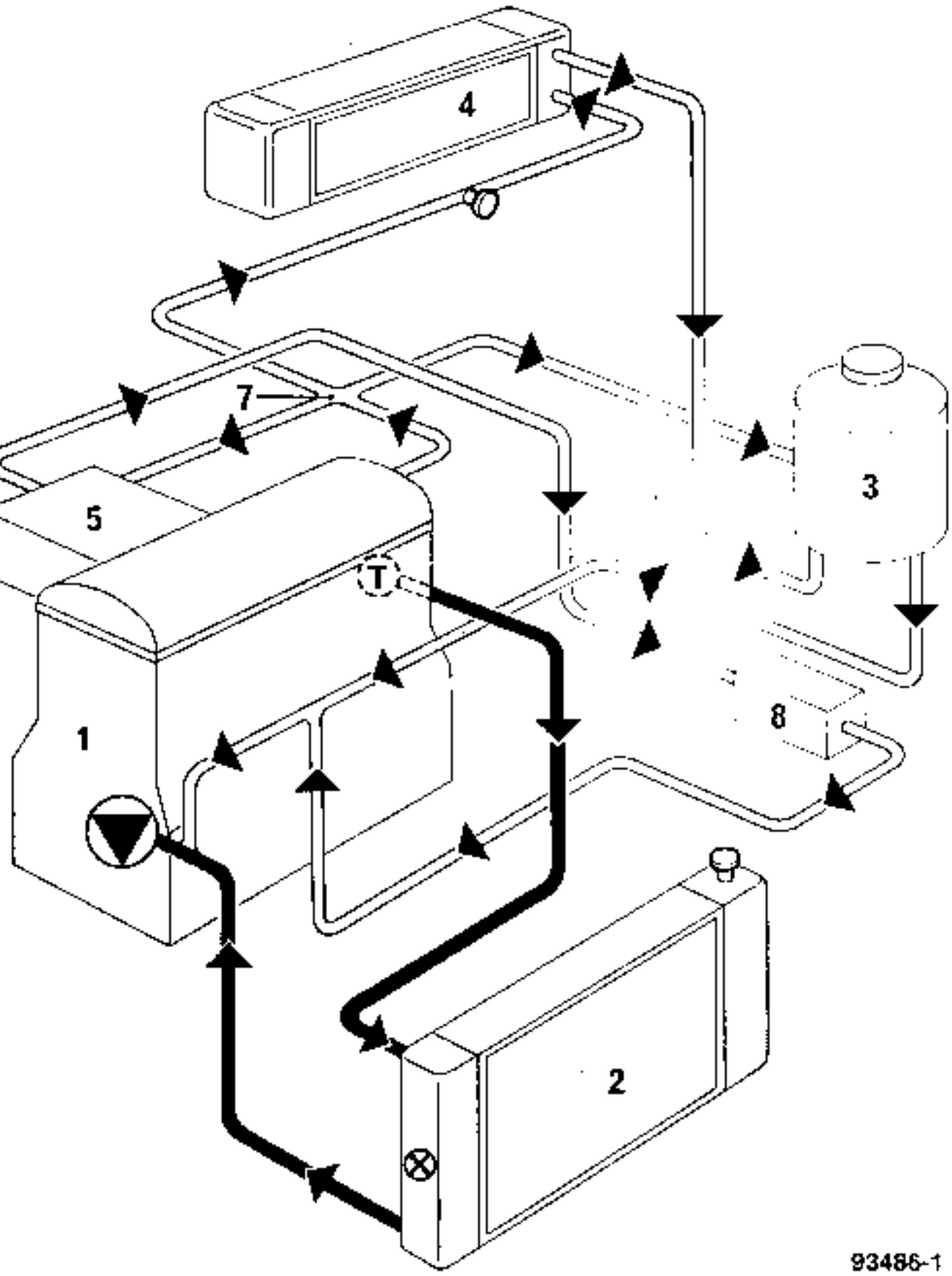
T Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.6 bars

Phase II
- Automatic transmission, temperate climates



1. Engine
2. Radiator
3. "Hot" bottle
4. Heater
5. Manifold
7. 4 way union
   Jets Ø 16/10/10/3mm
8. Aut. trans. oil cooler

Coolant pump

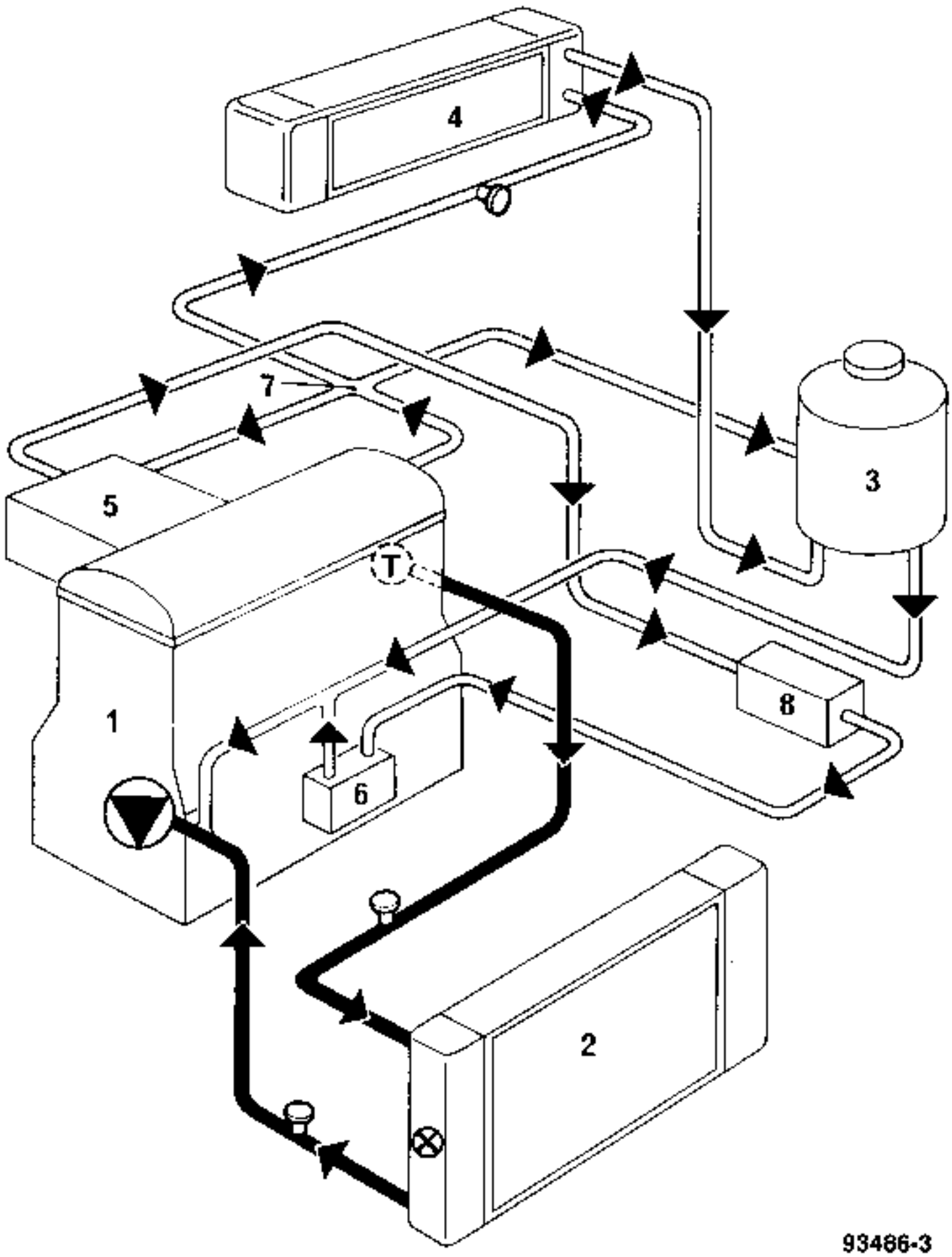
T Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.2 bars

Phase II
- automatic transmission, hot climates



1. Engine
2. Radiator
3. "Hot" bottle
4. Heater
5. Manifold
6. Modine (oil cooler)
7. 4 way union
   Jets Ø 16/10/10/3mm
8. Aut. trans. oil cooler

Coolant pump

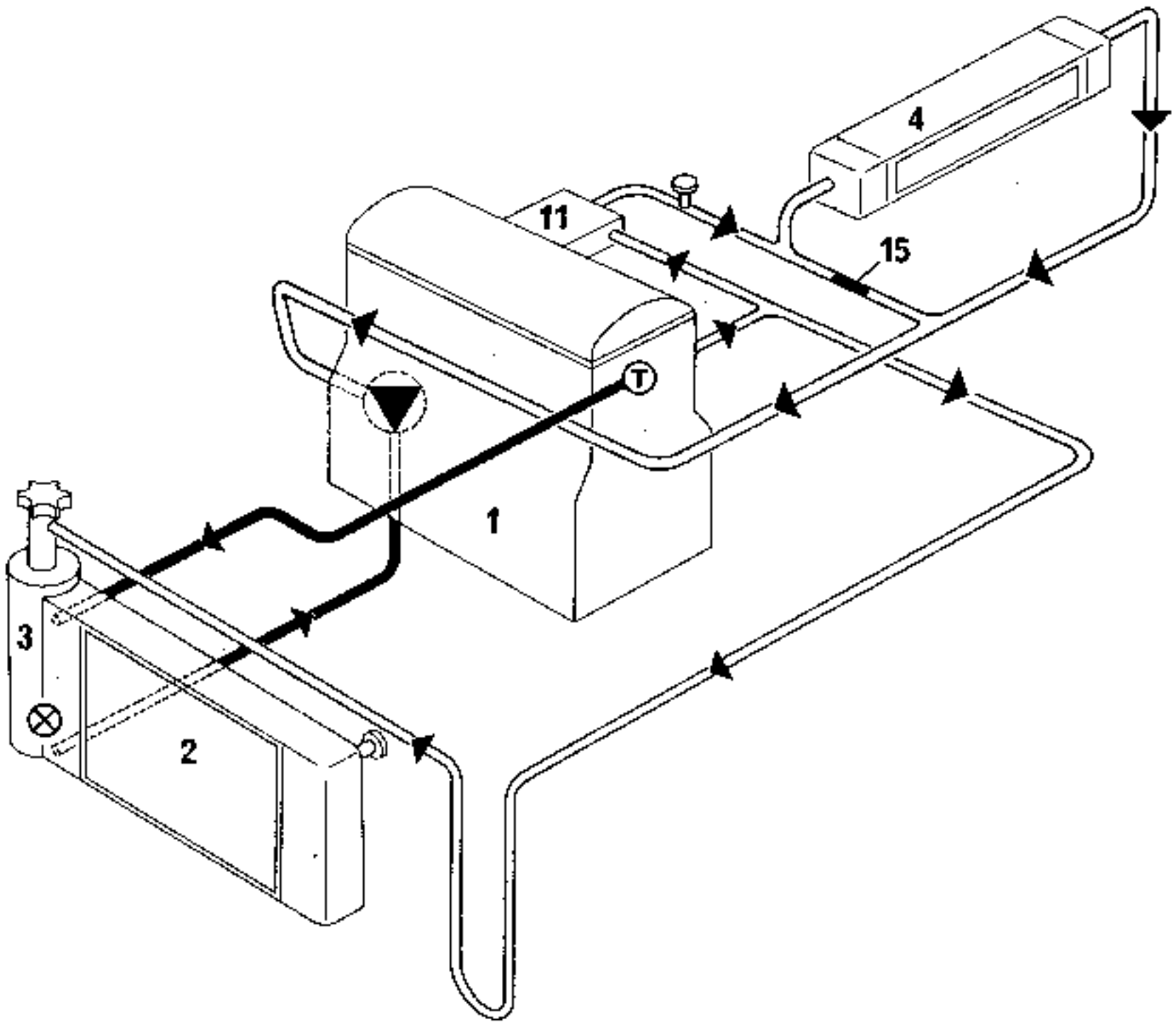
Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.6 bars

Phases I and II
- without air conditioning



93559

1. Engine
2. Radiator
3. "Hot" bottle with permanent degassing
4. Heater
11. Carburettor base heater
15. Bypass

Coolant pump

Thermostat

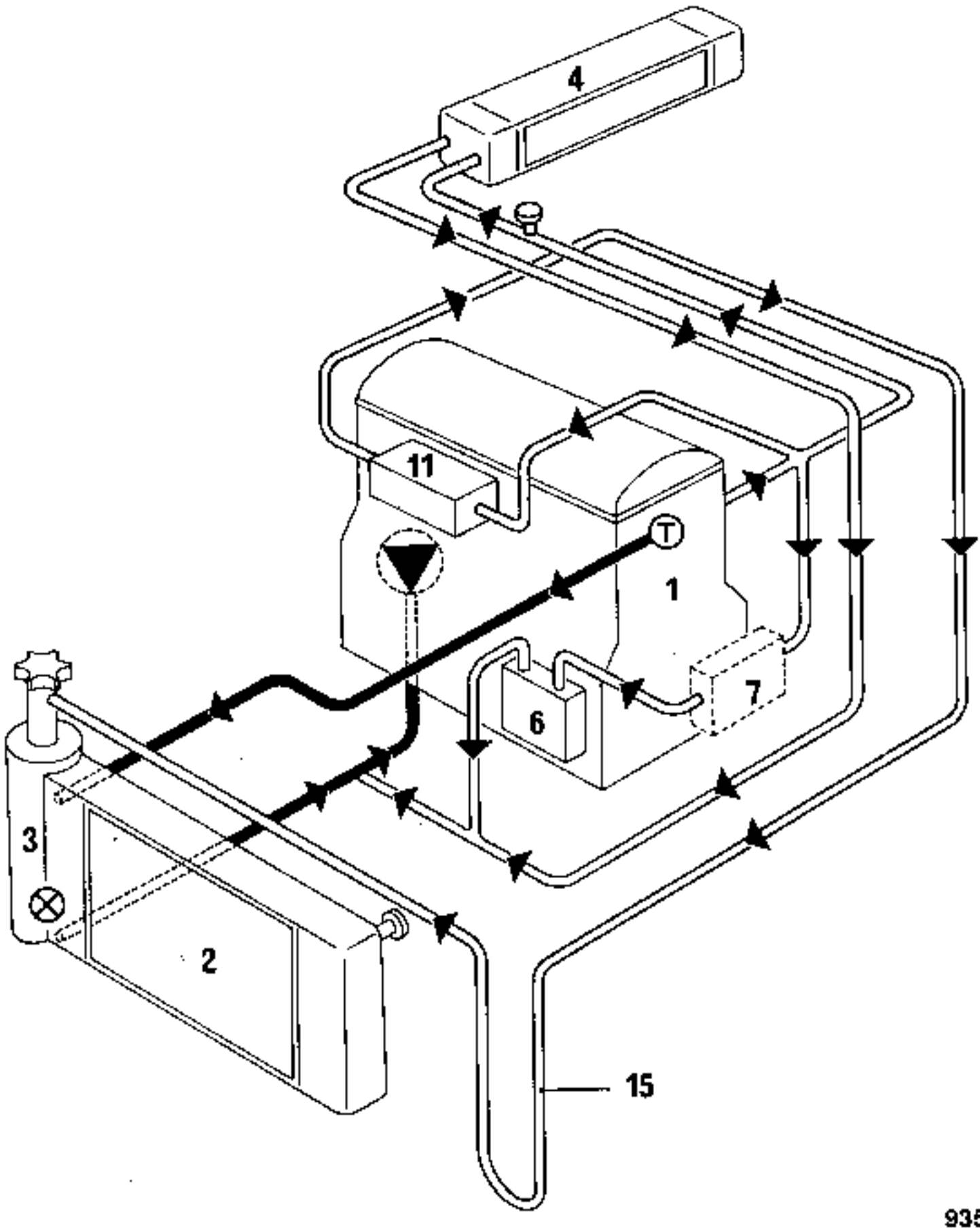
Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.2 bars

Phases I and II
- with and without air conditioning

Phase II
- automatic transmission without air conditioning, in dotted lines



1. Engine
2. Radiator
3. "Hot" bottle with permanent degassing
4. Heater
6. Modine (oil cooler)
7. Aut. trans. oil cooler
11. Throttle unit
15. Siphon

Coolant pump

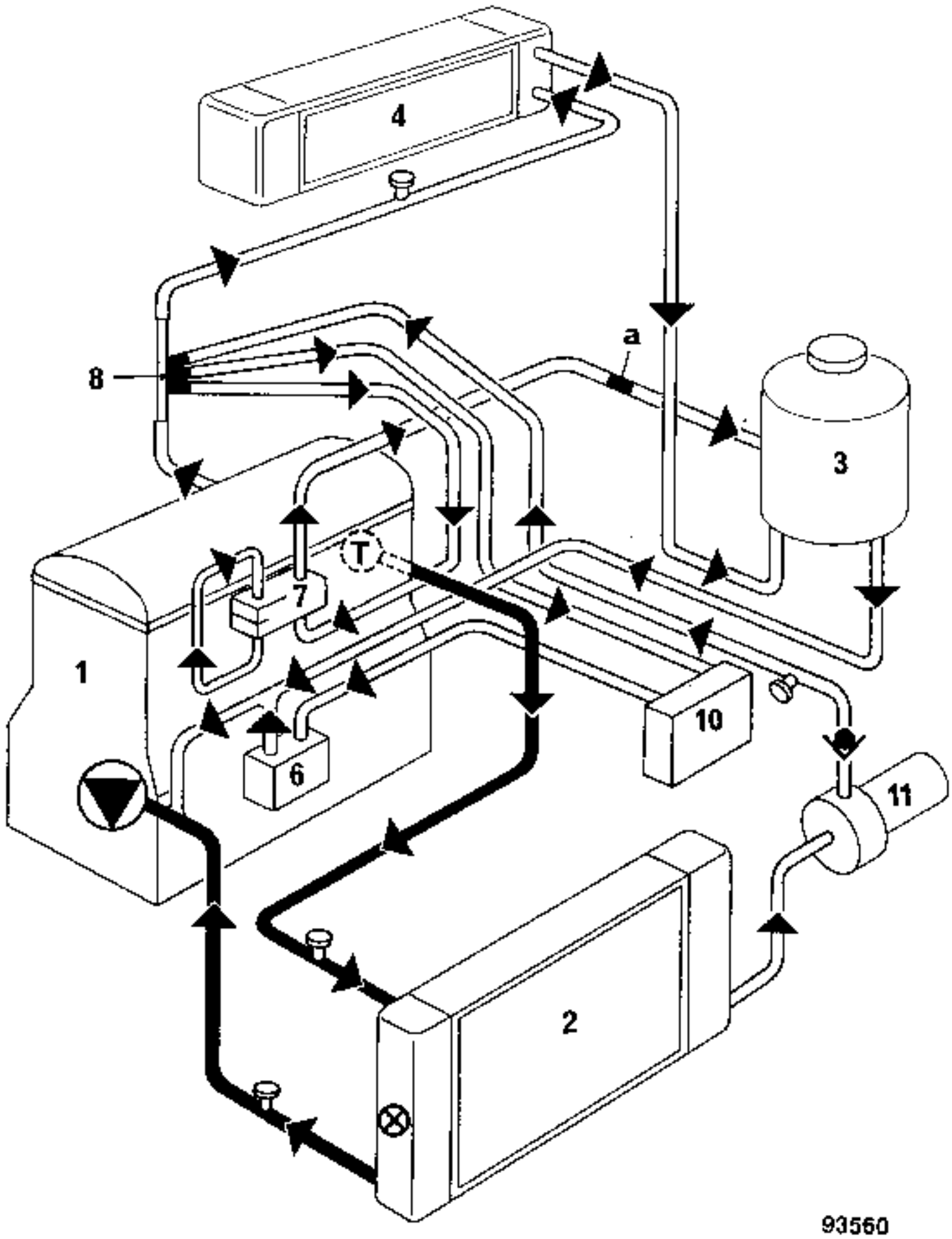
T Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.2 bars

Phase II
- automatic transmission, without air conditioning



1. Engine
2. Radiator
3. "Hot" bottle
4. Heater
6. Modine (oil cooler)
7. Throttle unit
8. 5 way union
   Jets Ø 16/10/10/6/5.5mm
10. Aut. trans. oil cooler
11. Electric pump
a. 5.5mm Ø jet

Coolant pump

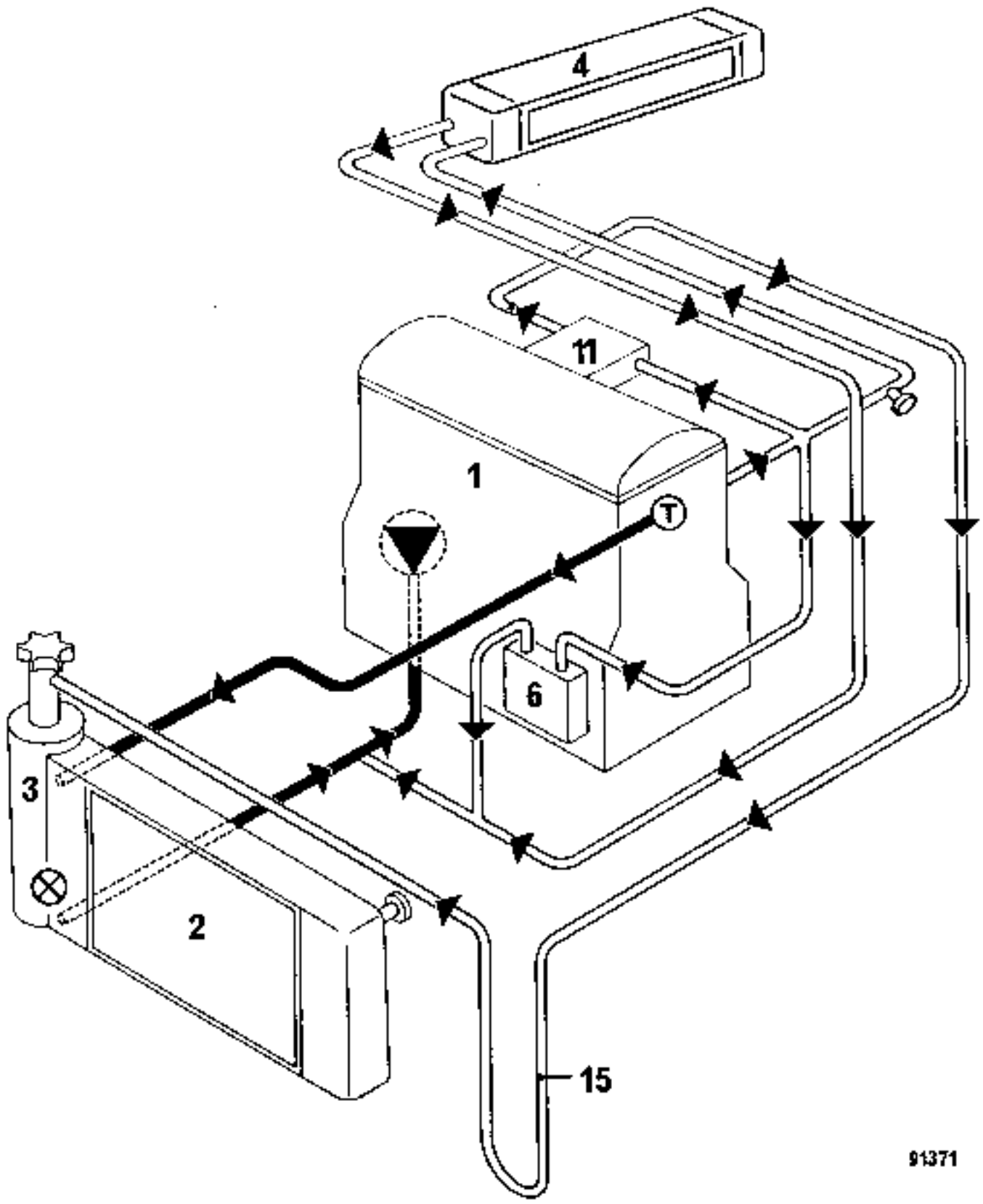
T Thermostat

Bleed screw (4)

Temperature switch

The valve on the expansion bottle is set at 1.2 bars

Phase I
- without air conditioning



1. Engine
2. Radiator
3. "Hot" bottle with permanent degassing
4. Heater
6. Modine (oil cooler)
11. Carburettor base heater
15. Siphon

Coolant pump

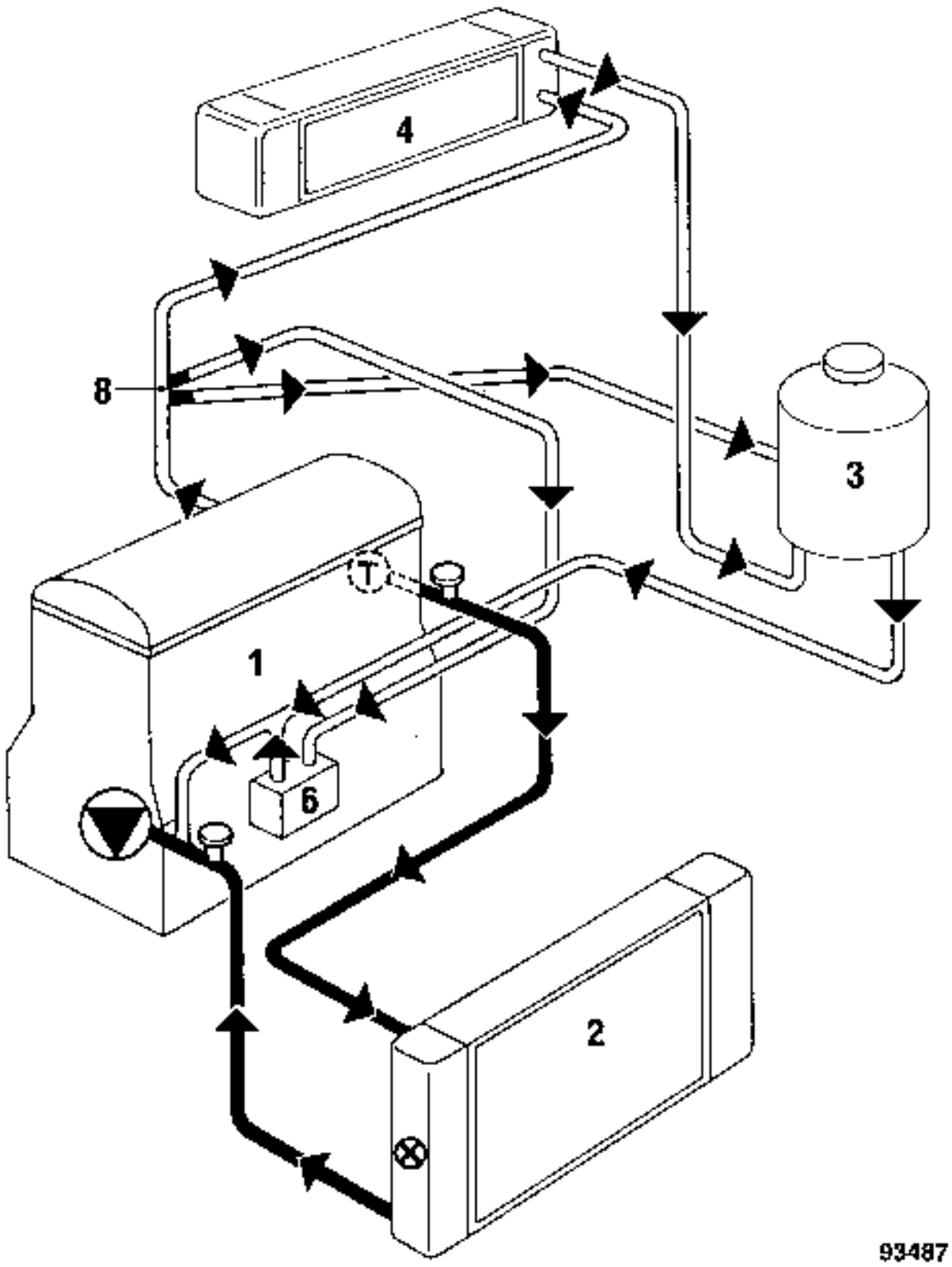
T Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.2 bars

Phase I
- with air conditioning



1. Engine
2. Radiator
3. "Hot" bottle
4. Heater
5. Modine (oil cooler)
8. 4 way union
   Jets Ø 16/10/10/3mm

Coolant pump

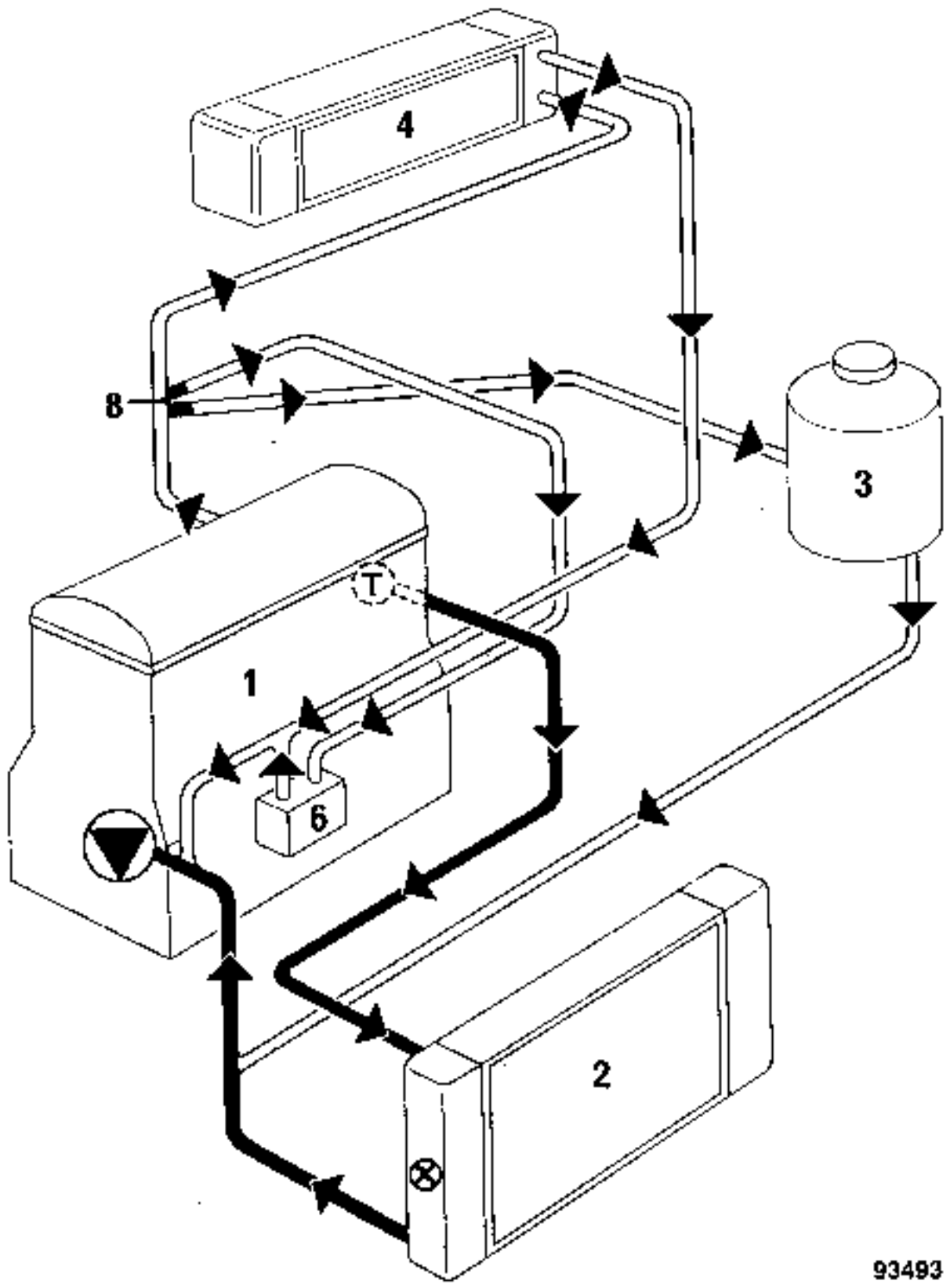
Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.2 bars

Phase II



1. Engine
2. Radiator
3. "Hot" bottle
4. Heater
6. Modine (oil cooler)
8. 4 way union
   Jets Ø 16/10/10/3mm

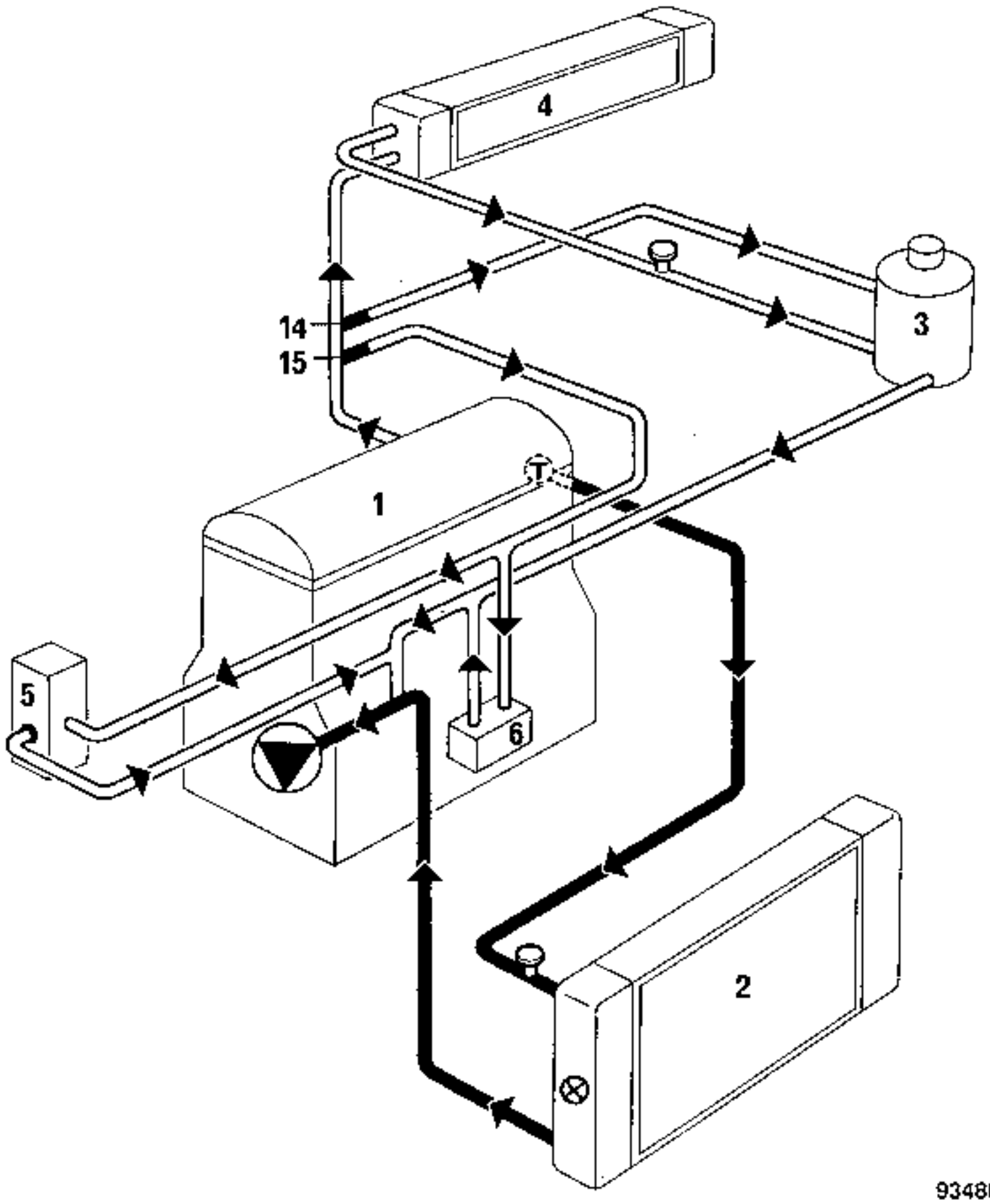
Coolant pump

Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.2 bars



1. Engine
2. Radiator
3. "Hot" bottle with permanent degassing
4. Heater
5. Fuel heater
6. Modine (oil cooler)
14. 3mm Ø jet
15. 8mm Ø jet

Coolant pump

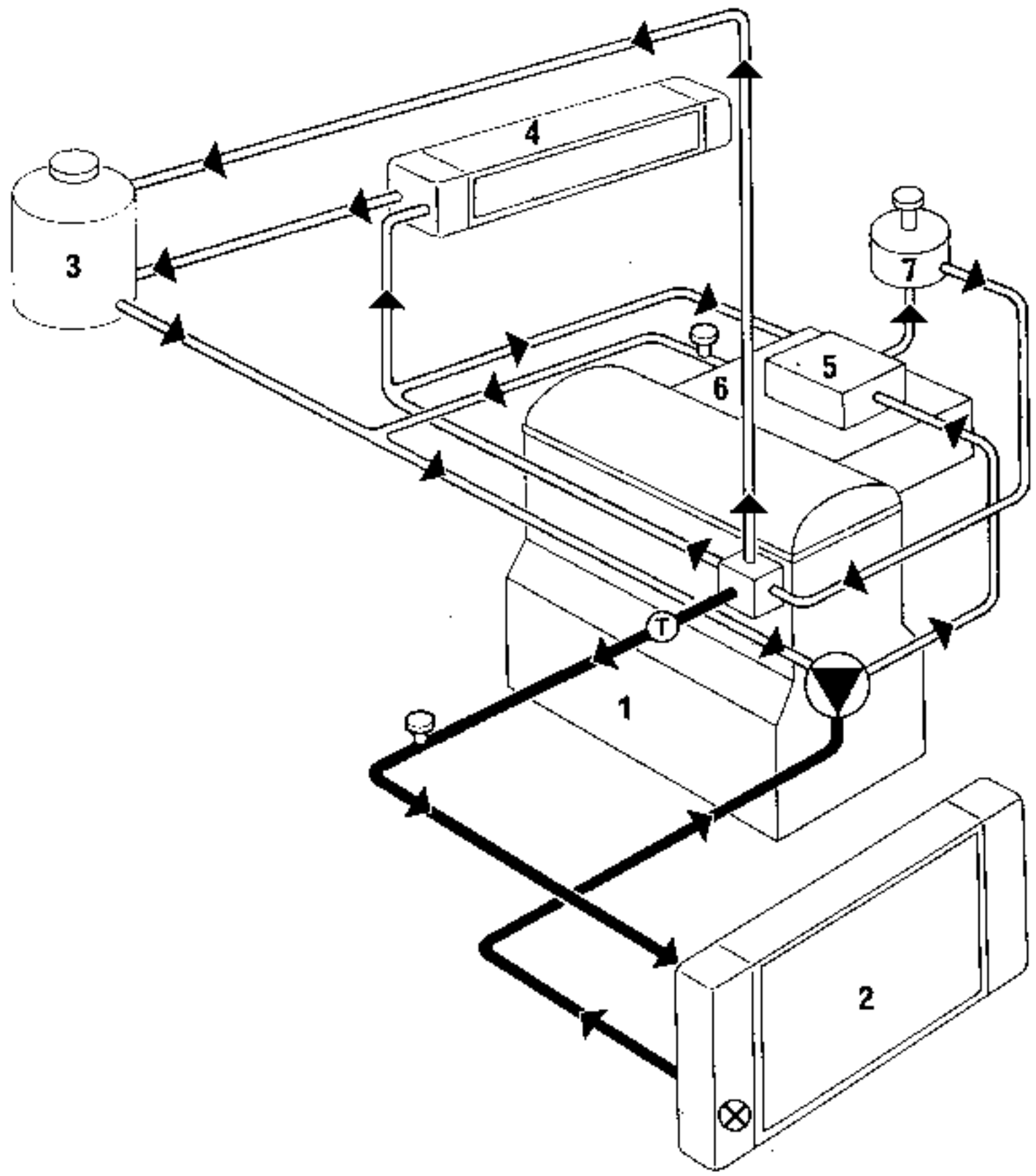
Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.2 bars

Phases I and II
- with and without air conditioning



93492

1. Engine
2. Radiator
3. "Hot" bottle with permanent degassing
4. Heater
5. Carburettor base heater
6. Manifold heater
7. Choke

Coolant pump

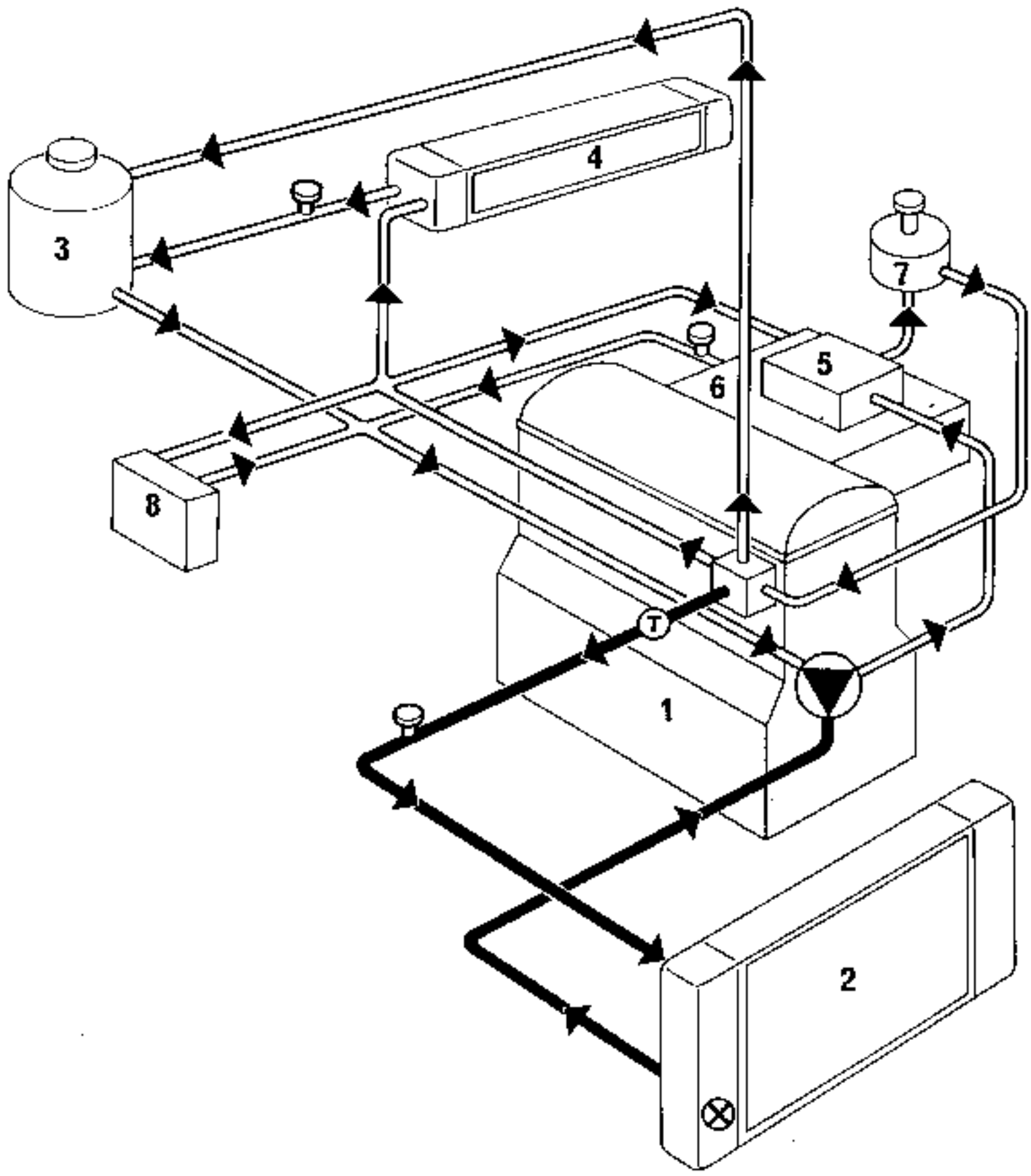
Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.2 bars

Phases I and II
- automatic transmission



93525

1. Engine
2. Radiator
3. "Hot" bottle with permanent degassing
4. Heater
5. Carburettor base heater
6. Manifold heater
7. Choke
8. Aut. trans. oil cooler

Coolant pump

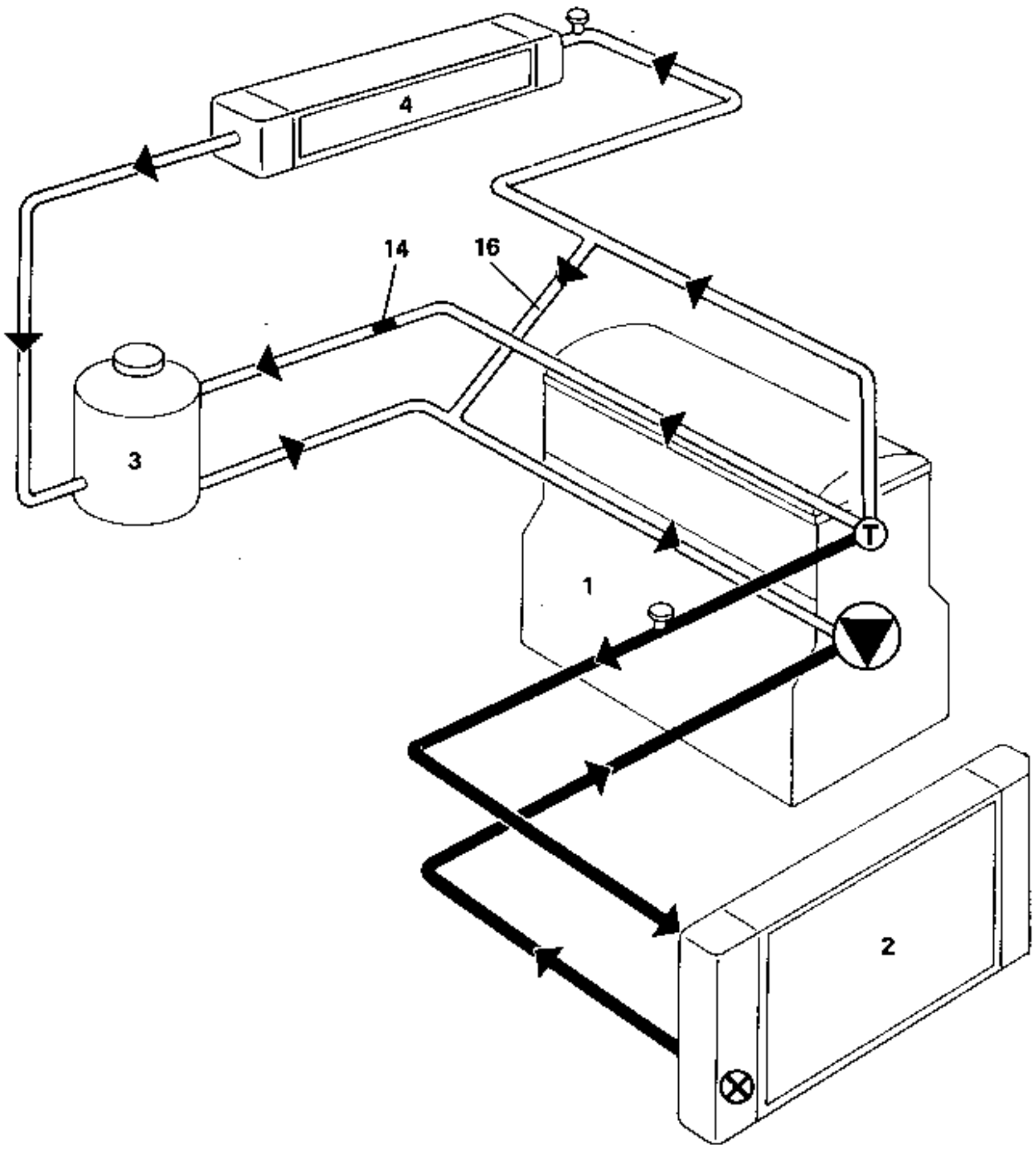
Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.2 bars

Phases I and **II**
- J7R engine with air conditioning
- J7T engine without air conditioning



1. Engine
2. Radiator
3. "Hot" bottle with permanent degassing
4. Heater
14. 3mm Ø jet
16. Bypass

Coolant pump

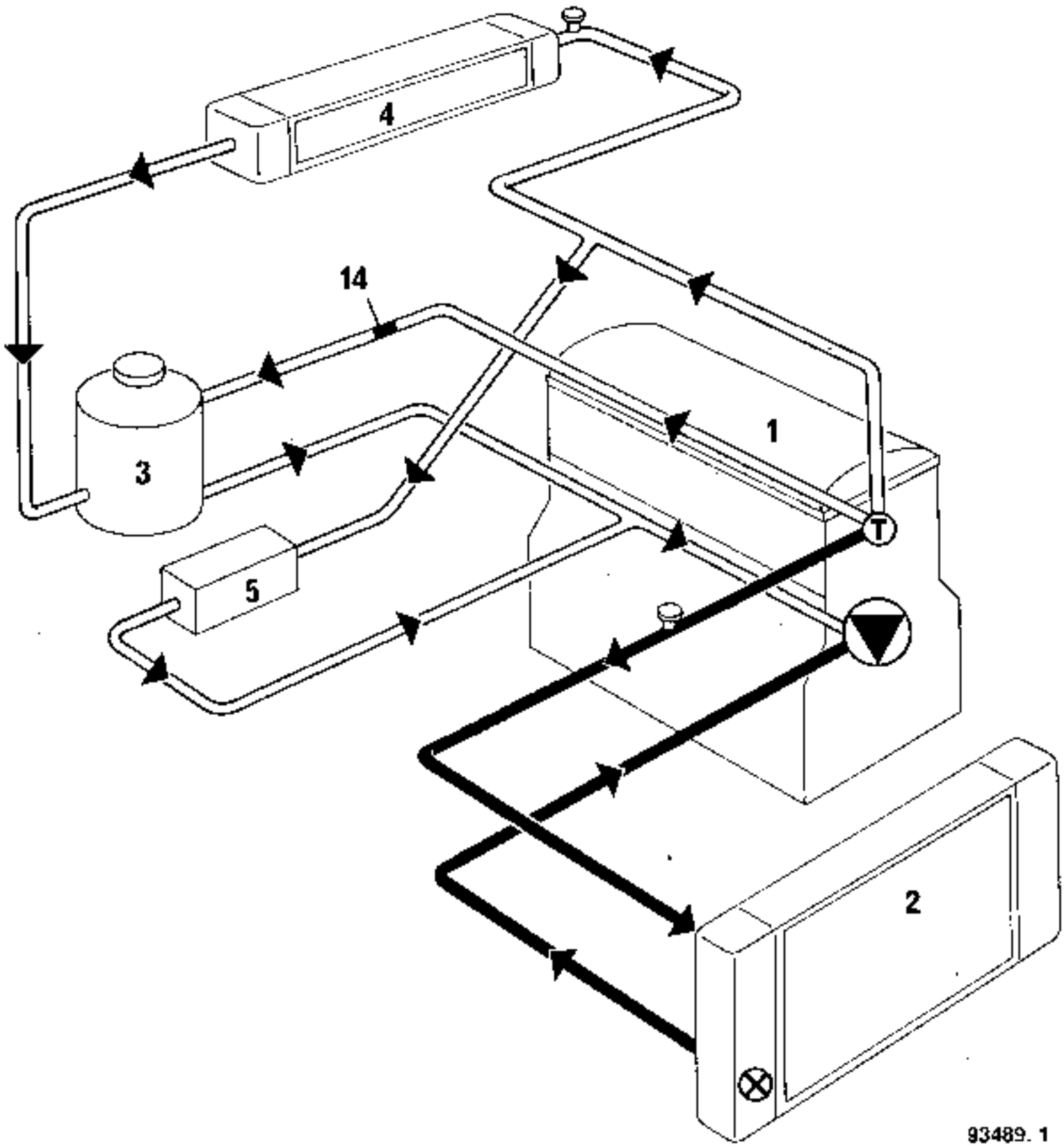
Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.2 bars

Phase II
- J7R engine, aut. trans. with air conditioning
- J7T engine, aut. trans. without air conditioning



1. Engine
2. Radiator
3. "Hot" bottle with permanent degassing
4. Heater
5. Aut. trans. oil cooler
14. 3mm Ø jet

Coolant pump

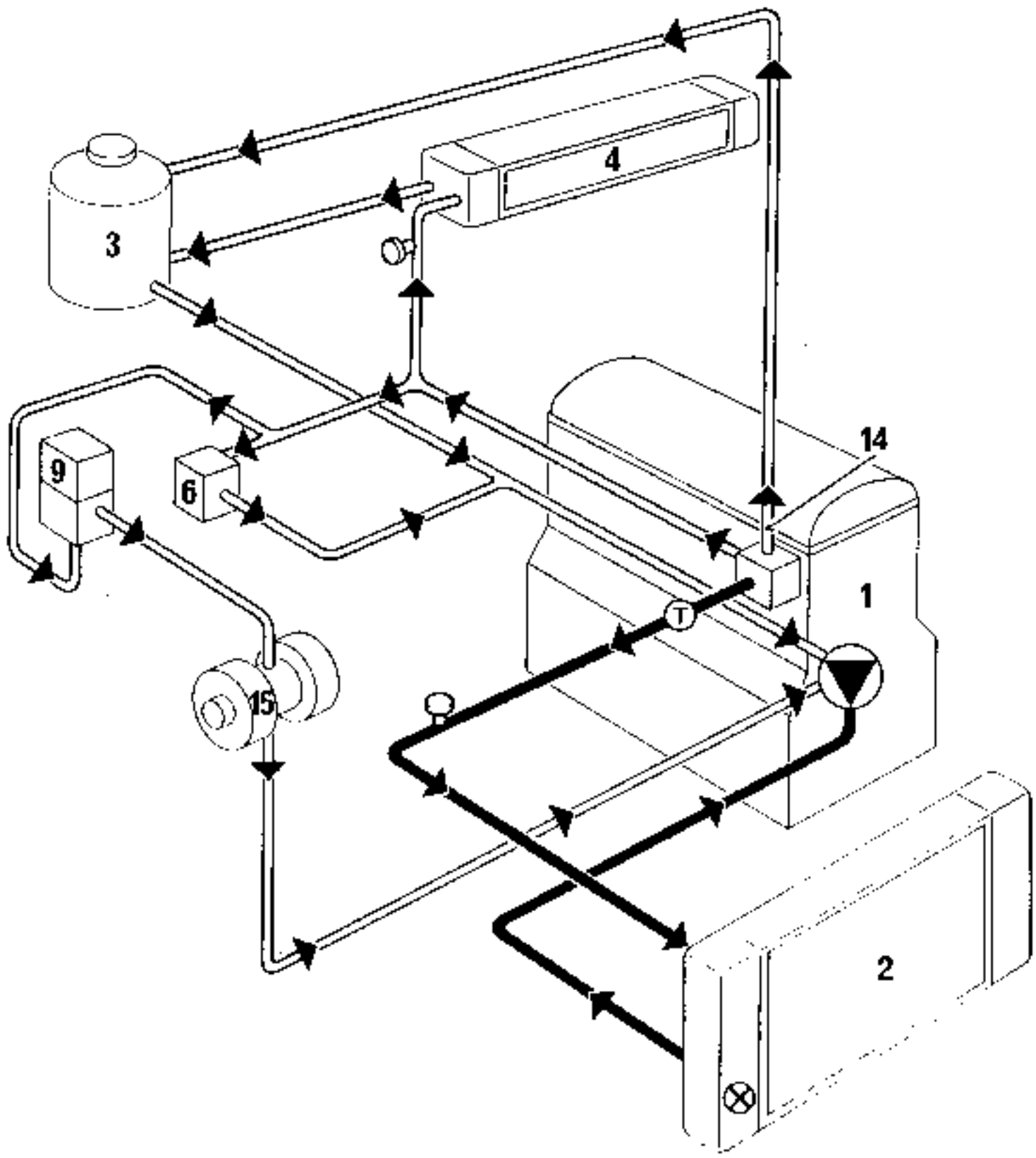
T Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.2 bars

Phases I and II



1. Engine
2. Radiator
3. "Hot" bottle with permanent degassing
4. Heater
6. Modine (oil cooler)
9. Electric coolant pump
14. 3mm Ø jet
15. Turbocharger

Coolant pump

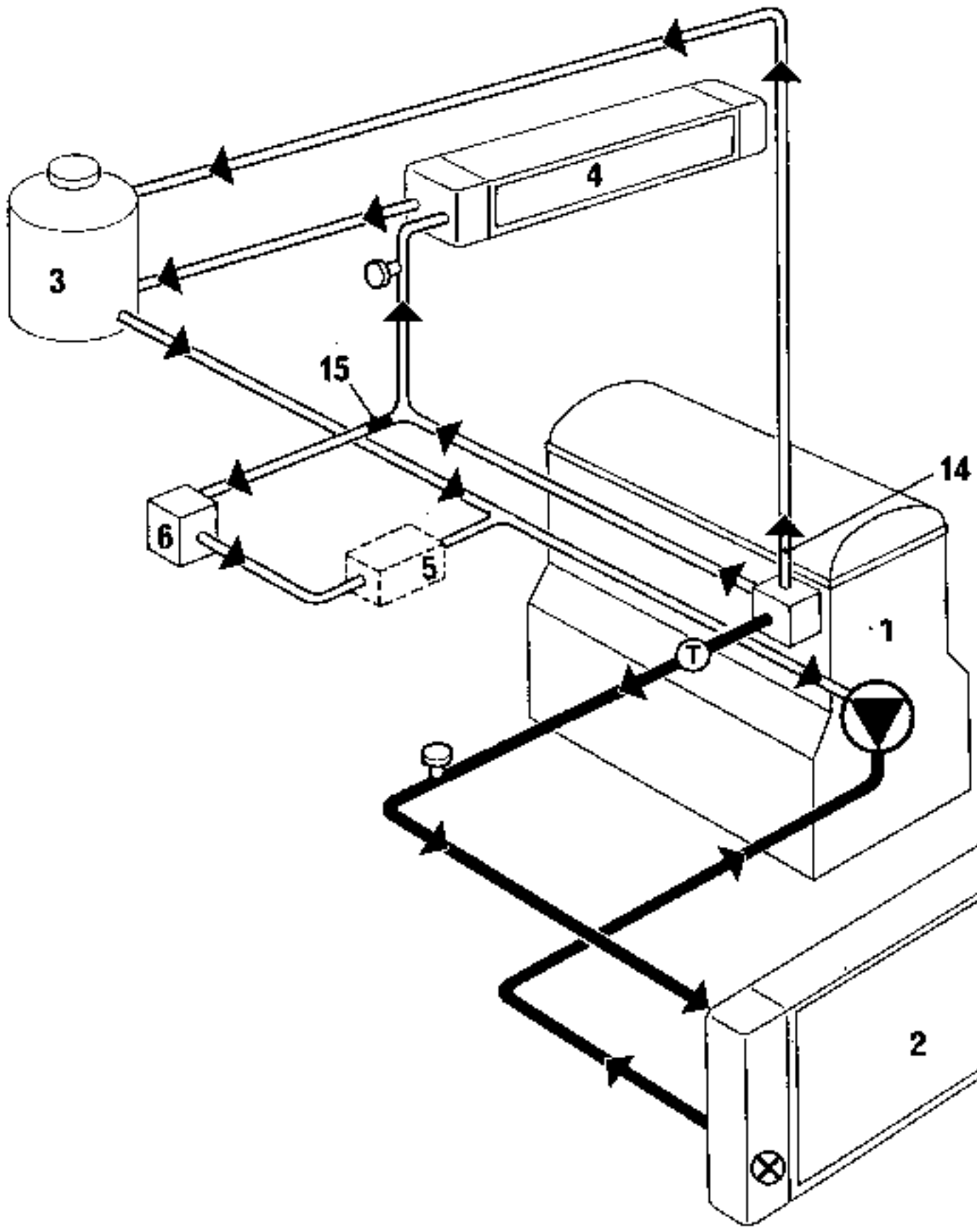
T Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.6 bars

Without air conditioning
Automatic transmission shown in dotted lines



1. Engine
2. Radiator
3. "Hot" bottle with permanent degassing
4. Heater
5. Aut. trans. oil cooler
6. Modine (oil cooler)
14. 3mm Ø jet
15. 8mm Ø jet

Coolant pump

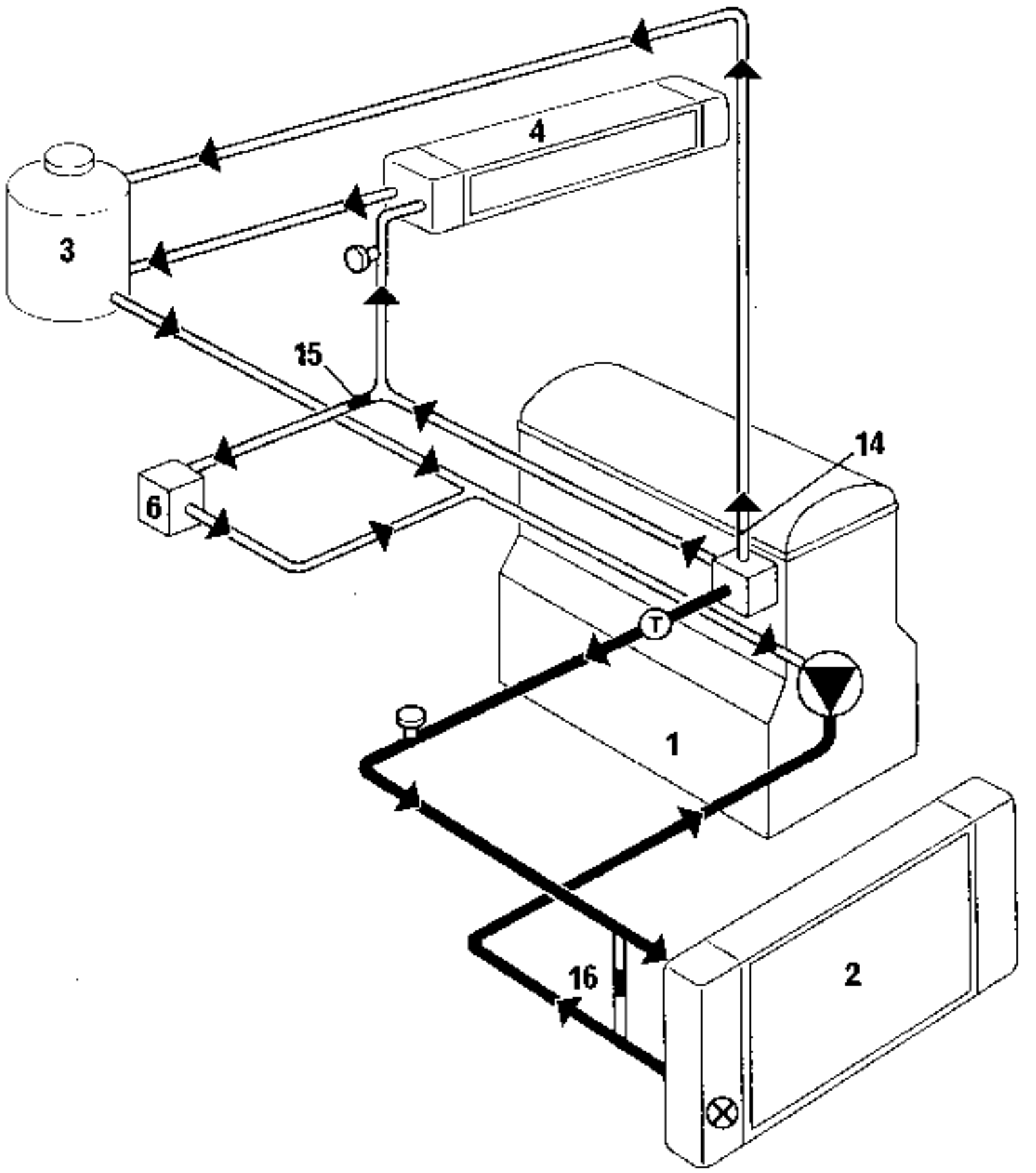
T Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.6 bars

With air conditioning



93490. 1

1. Engine
2. Radiator
3. "Hot" bottle with permanent degassing
4. Heater
6. Modine (oil cooler)
14. 3mm Ø jet
15. 8mm Ø jet
16. 10mm Ø bypass

Coolant pump

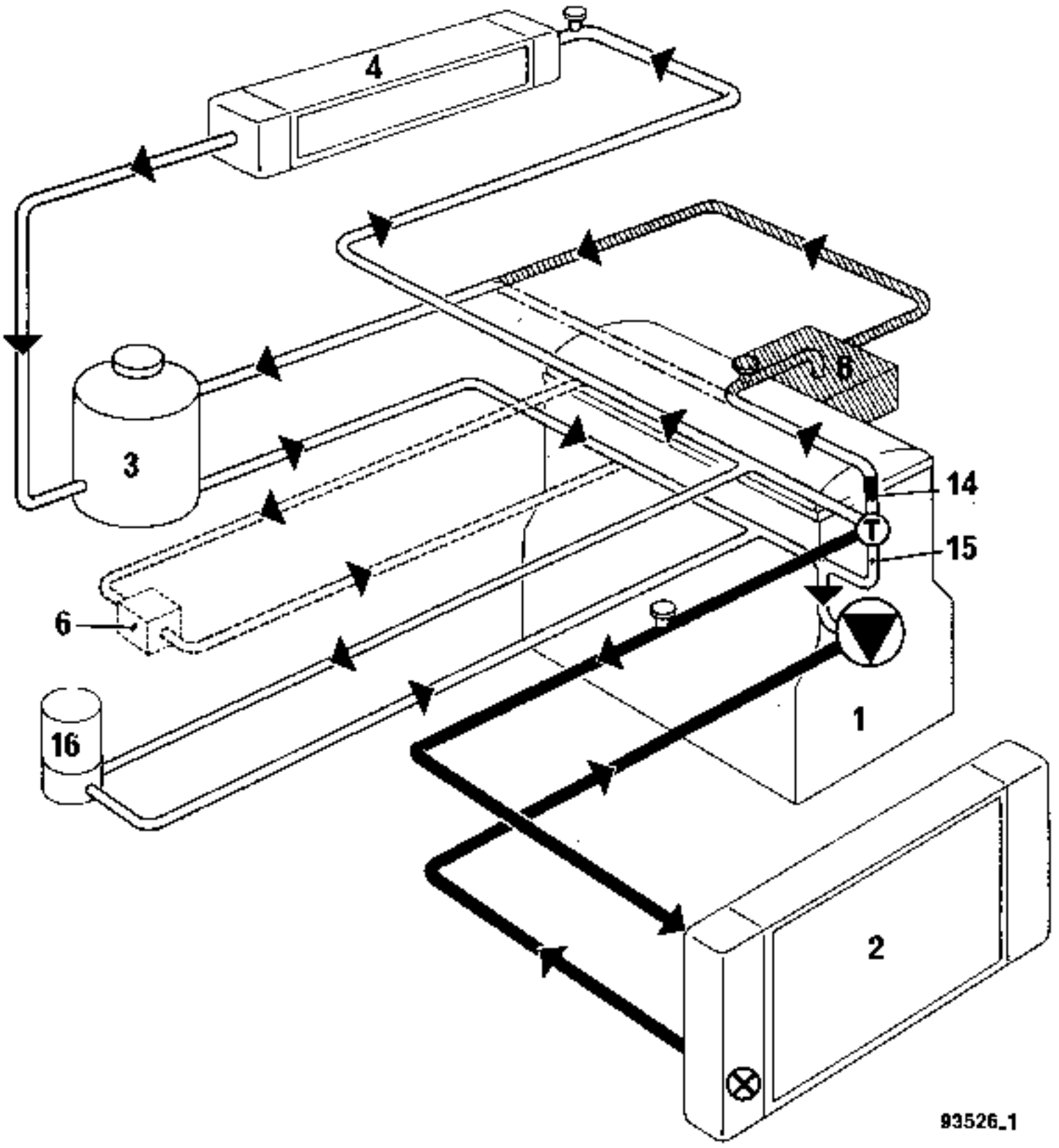
Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.6 bars

Phase I
- with and without air conditioning



Flow through oil cooler, coolant pump (AC)

Flow through Bosch cold starting system

Flow with Roto-Diesel pump

1. Engine
2. Radiator
3. "Hot" bottle with permanent degassing
4. Heater
6. Oil cooler for diesel turbo engines
8. Bosch cold starting system
14. 3.5mm Ø jet
15. Circuit P (see operation of thermostat)
16. Fuel heater

Coolant pump

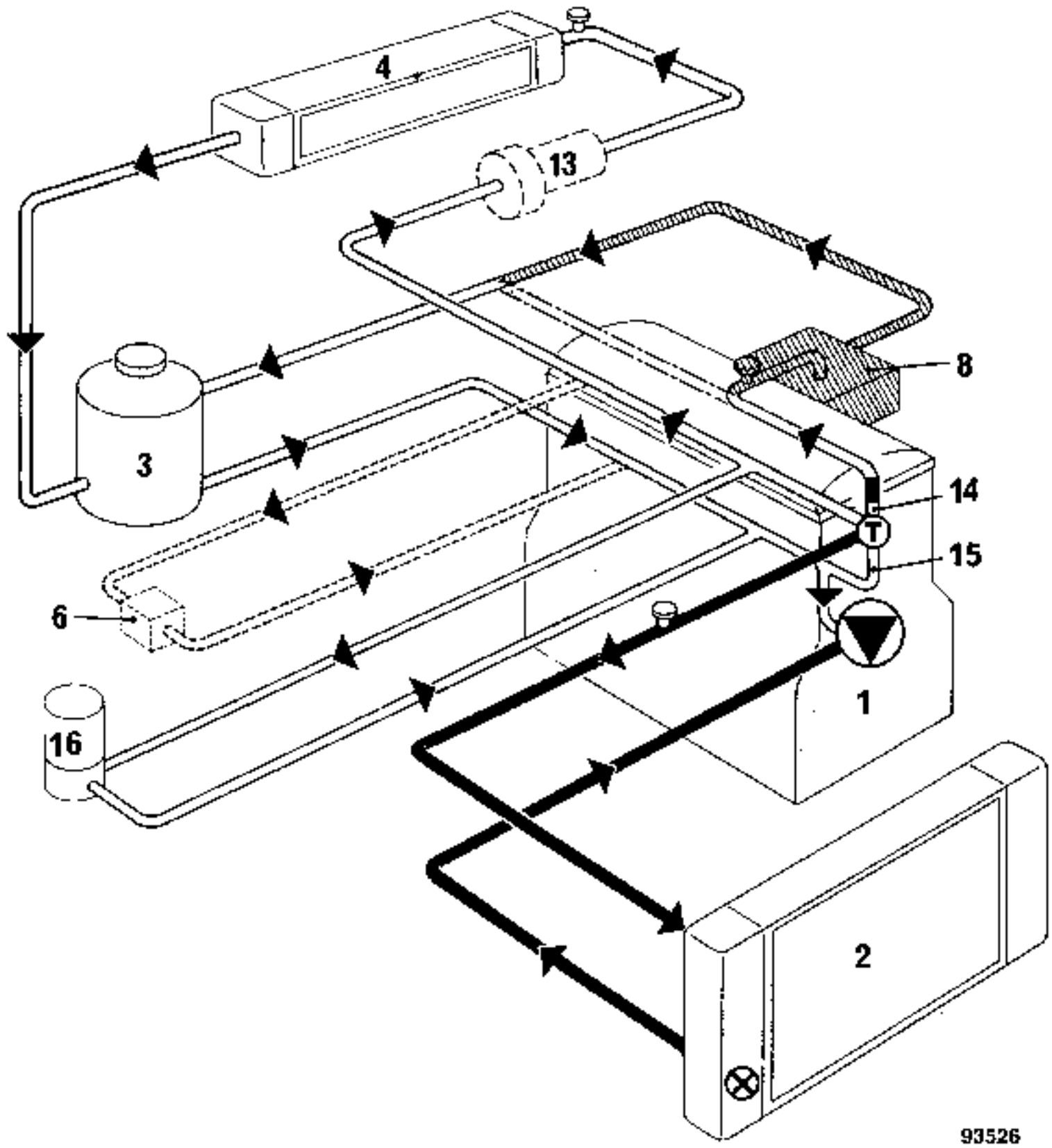
Double acting thermostat

Bleed screws of which there are: 2 (Roto diesel pump)
3 (Bosch pump)

Temperature switch

The valve on the expansion bottle is set at 1.2 bars

Phase II
- without air conditioning



Flow through oil cooler

Flow through Bosch cold starting system

Flow with Roto-diesel pump

1. Engine
2. Radiator
3. "Hot" bottle with permanent degassing
4. Heater
5. Aut. trans. oil cooler
6. Oil cooler for diesel turbo engines
13. Electric pump (air conditioned versions)
14. 3.5mm Ø jet
15. Circuit P (see operation of thermostat)
16. Fuel heater

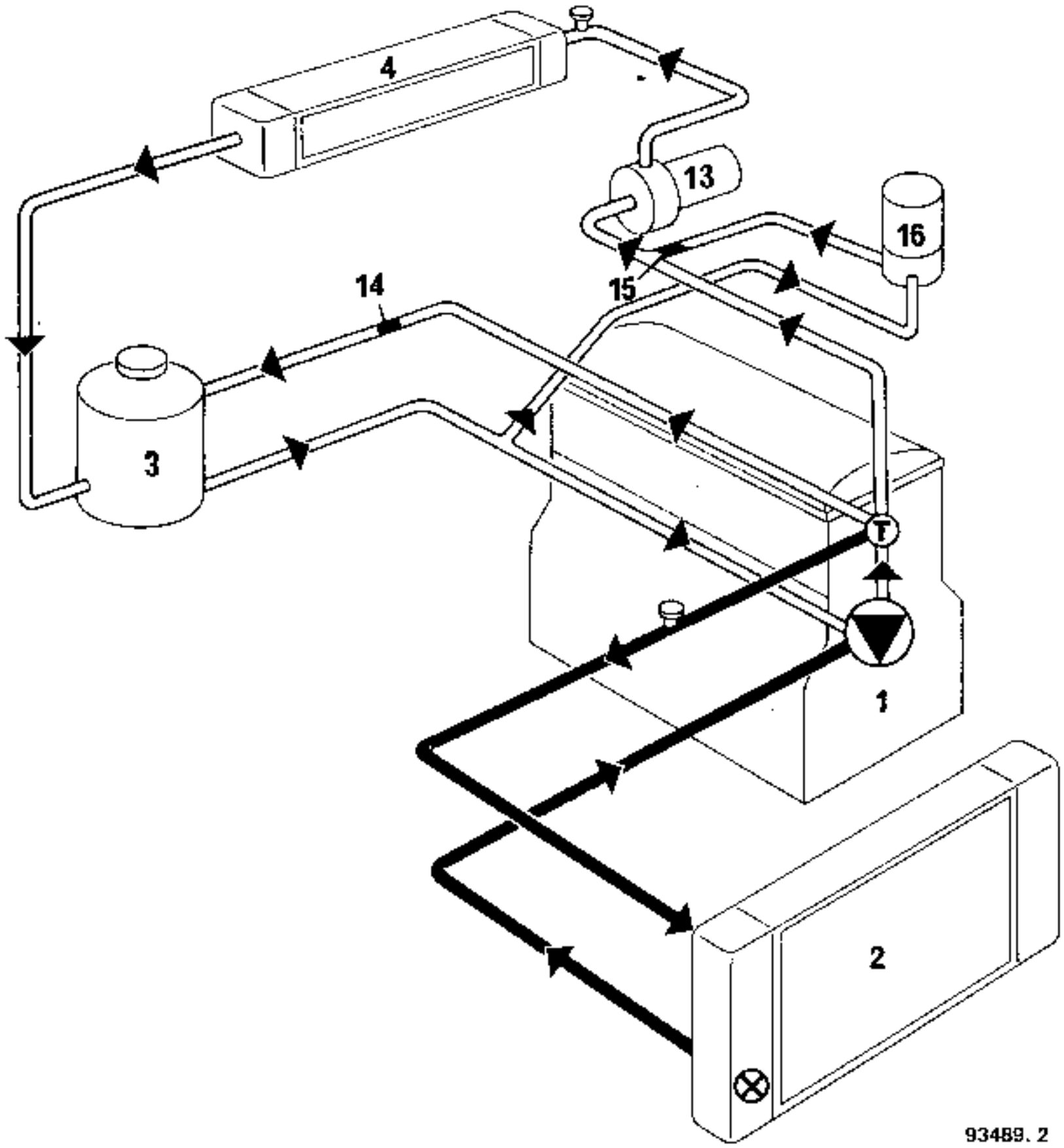
Coolant pump

Double acting thermostat

Bleed screws of which there are: 2 (Roto diesel pump)
2 (Bosch pump)

Temperature switch

The valve on the expansion bottle is set at 1.2 bars



1. Engine
2. Radiator
3. "Hot" bottle with permanent degassing
4. Heater
13. Electric coolant pump
14. 3mm Ø jet
15. 8mm Ø jet
16. Fuel heater

Coolant pump

T Thermostat

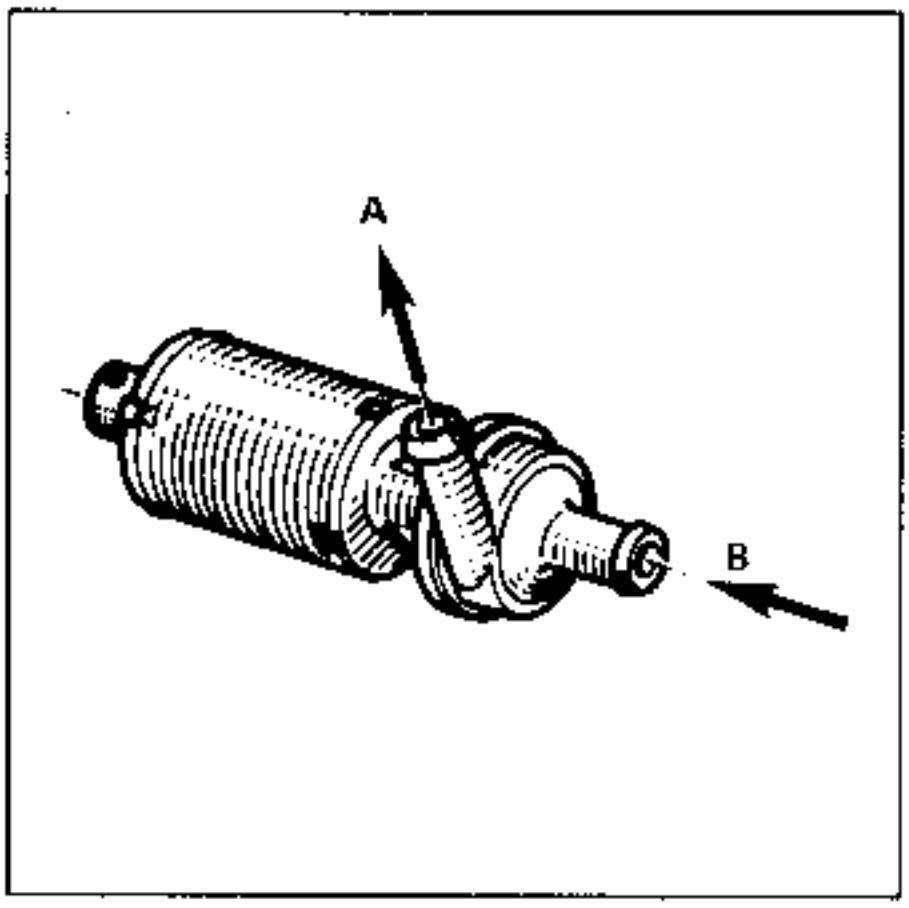
Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.2 bars

The electric coolant pump is mounted on the side of the front right hand shock absorber turret (centrifugal type).

The pump suction connection is the hole on the centre line of the pump-motor assembly and the pressure output is perpendicular to this centre line.

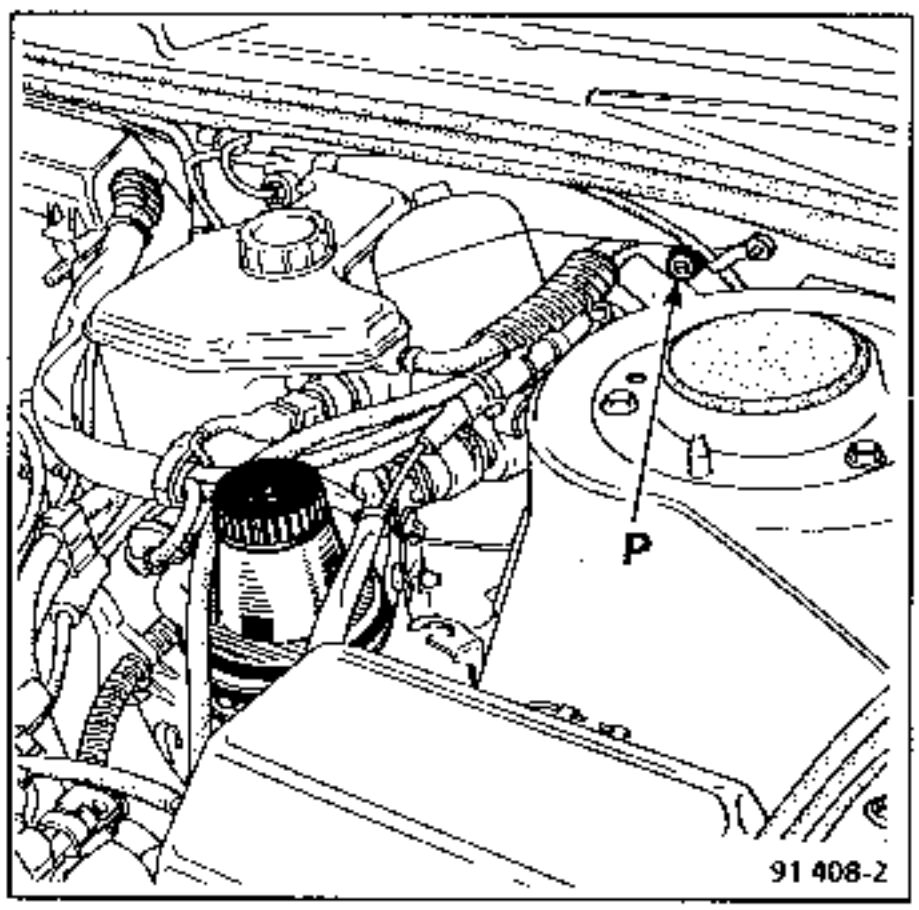


A Pressure output

B Suction input

WARNING:

Bleed screw (P) is not part of the coolant system. It is used to bleed the clutch hydraulic control system.

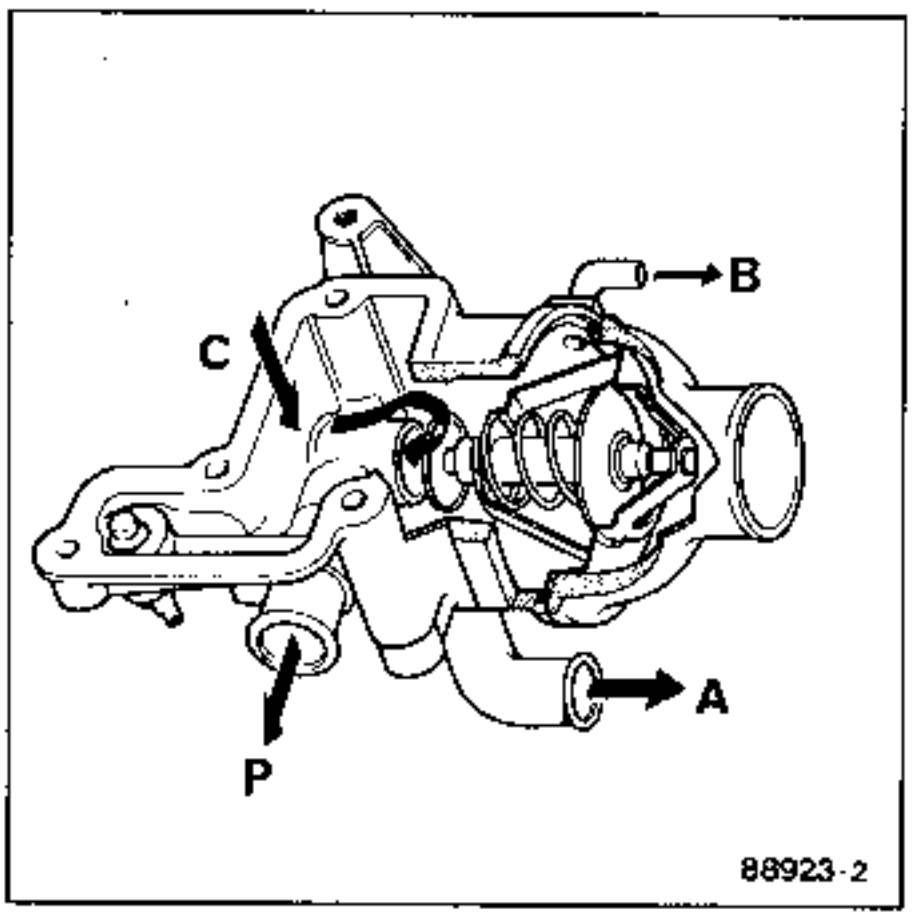


The coolant pump passes coolant into the cylinder block.

WHEN THE ENGINE IS COLD

The coolant flows through the cylinder block, the cylinder head, the cold starting system (Bosch pump only), the heater and the "hot" expansion bottle.

Figure 1

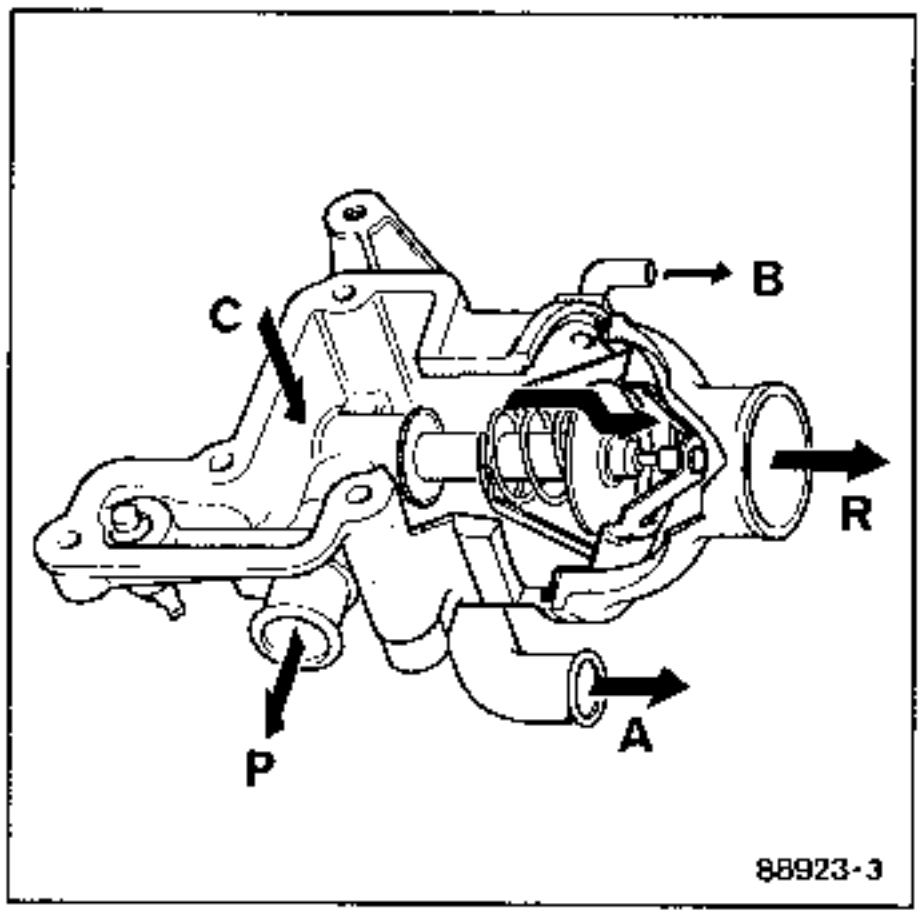


The thermostat (Figure 1) is closed and the coolant from the cylinder head (circuit C) is passed back to the coolant pump through circuit P, the heater through circuit A and the cold starting system (Bosch pump) followed by the "hot" expansion bottle through circuit (B).

WHEN THE ENGINE IS HOT

The coolant flows through the cylinder block, the cylinder head, the radiator, the cold starting system (Bosch pump only), the heater and the "hot" expansion chamber.

Figure 2



The thermostat (figure 2) is "open". It allows the coolant from the cylinder head (circuit C) to pass to the radiator (circuit R) and closes off circuit P, which formerly connected the cylinder head (circuit C) to the coolant pump.

Coolant still flows through connections (A) and (B).

REPLACING

The repair methods refer to diagrams which identify, immediately, the individual points.

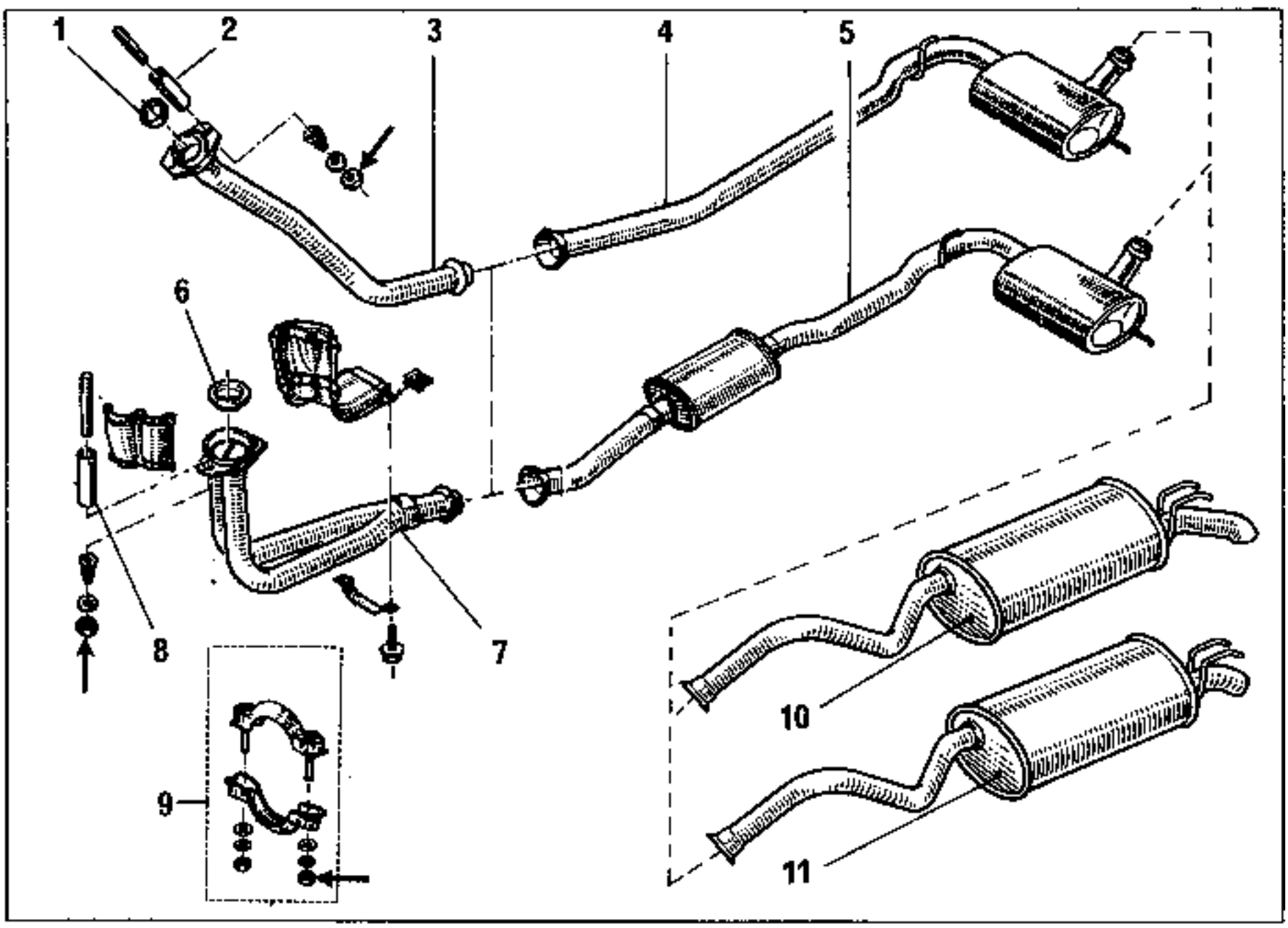
To avoid these becoming unnecessarily complicated, we have used symbols to show the details of the operations to be carried out.

→ Fully unscrew to remove.

⊘ Cut:
- either with a flame torch,
- or with a pipe cutter.

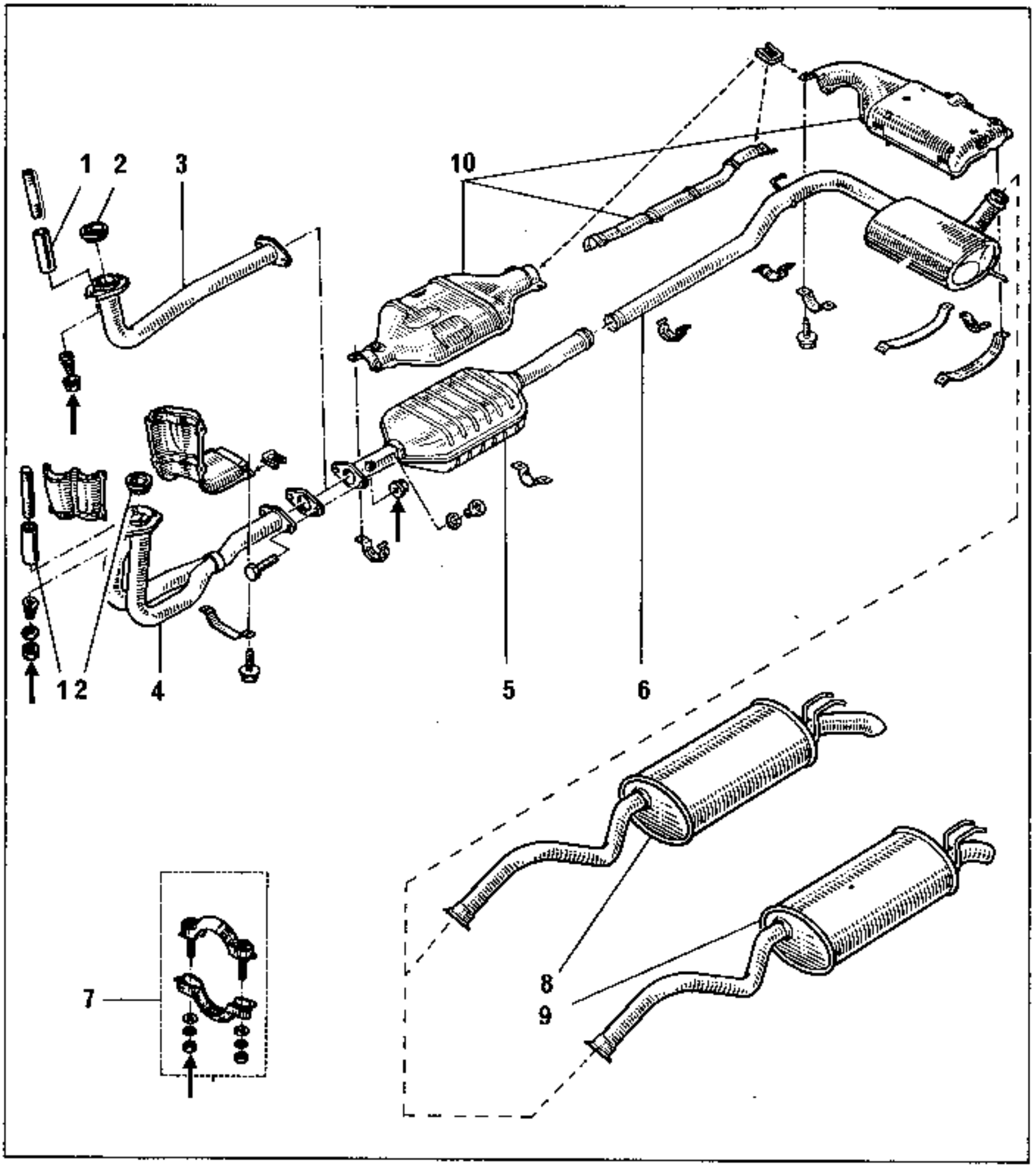


Cut only with a flame torch:
- the clamp,
- the outside tube of a sleeved joint.



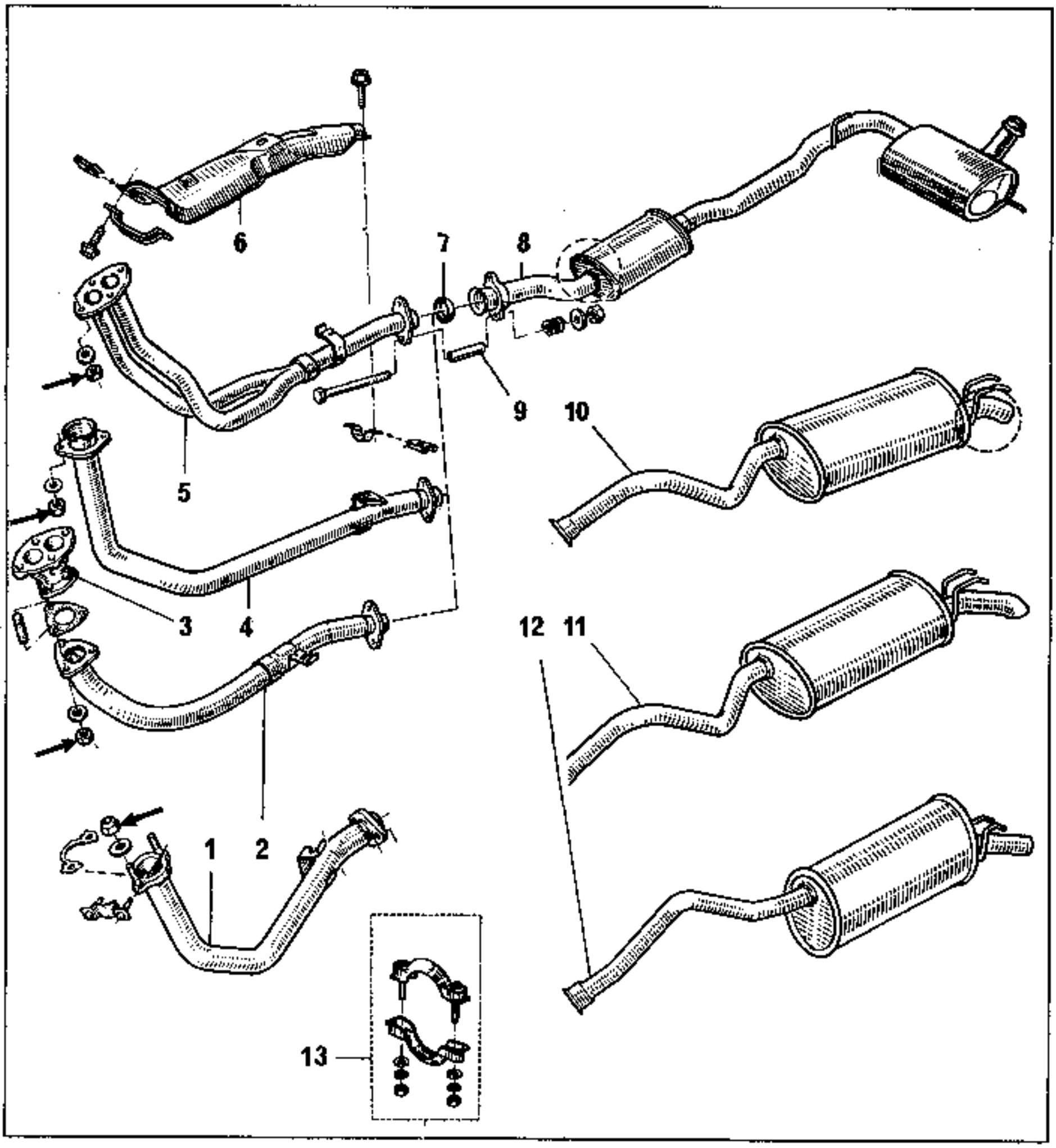
1. Metex ring from (89-05)
2. Torque limiting spacer
3. Down pipe engines C and F8Q
4. Intermediate pipe to (89-04)
5. Intermediate pipe from (89-05)
6. Metex ring engine type F2N...
7. Down pipe engine type F2N...
8. Torque limiting spacer
9. Set of securing clamps
10. Silencer from (89-05)
11. Silencer up to (89-04)

EMISSION CONTROL TYPE VEHICLES (WITH CATALYZER)



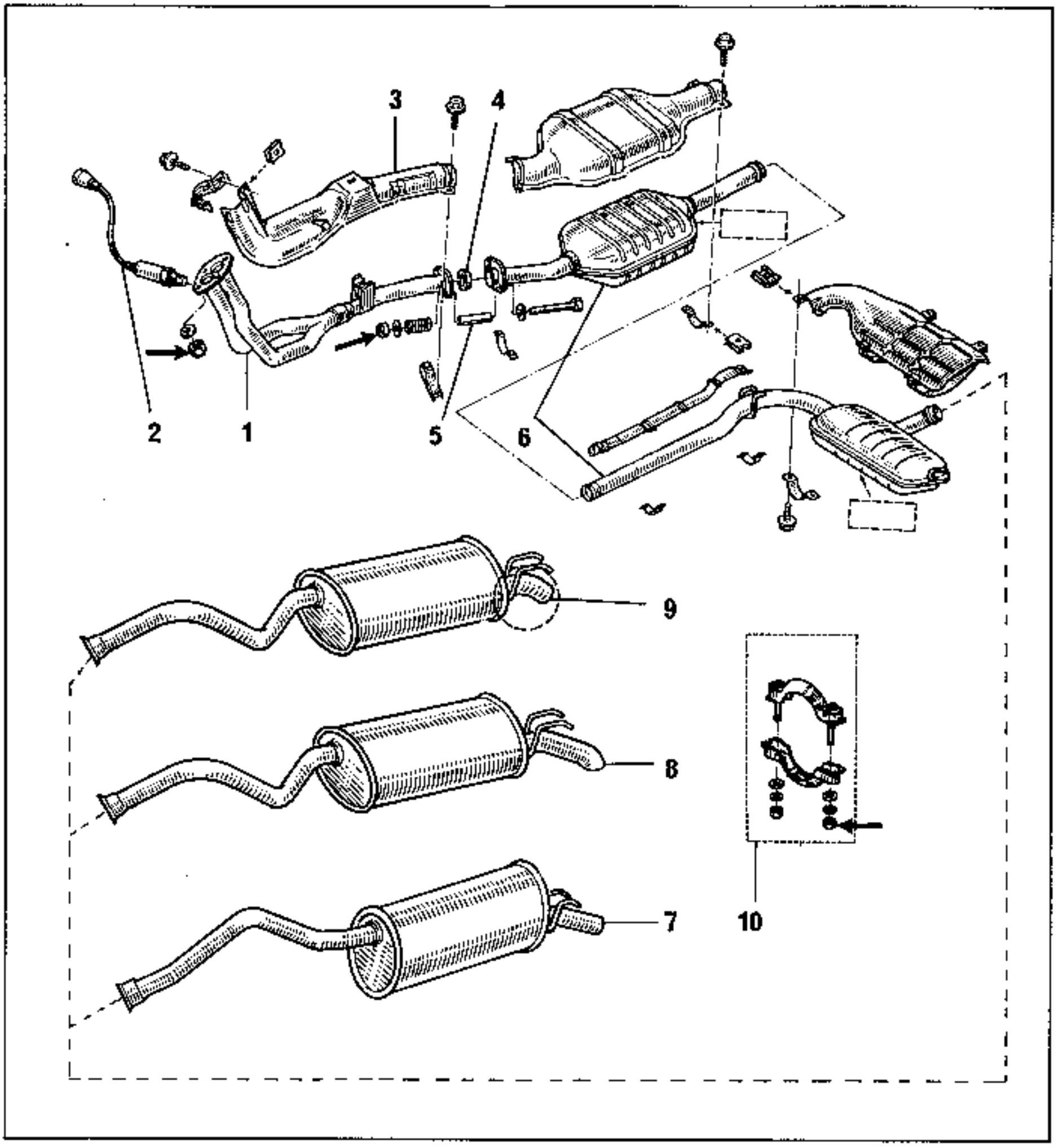
1. Torque limiting spacer
2. Metex friction ring
3. Single flow down pipe
4. Twin flow down pipe
5. Catalytic converter
6. Intermediate pipe
7. Set of securing clamps
8. Silencer from (89-05)
9. Silencer up to (89-04)
10. Heat shields

EXHAUST
Complete exhaust system



1. Down pipe X 485
2. Down pipe X 483 Aut. Trans. AR4
3. Intermediate clamp X 483 aut. trans. AR4
4. Down pipe J8S engine
5. Down pipe X483 X489
6. Heat shield
7. Metex friction ring
8. Intermediate expansion pipe
9. Torque limiting spacer
10. Silencer up to (89-04)
11. Silencer from (89-05)
12. Silencer for (4x4) vehicles
13. Set of securing clamps

EMISSION CONTROL TYPE VEHICLES WITH CATALYZERS



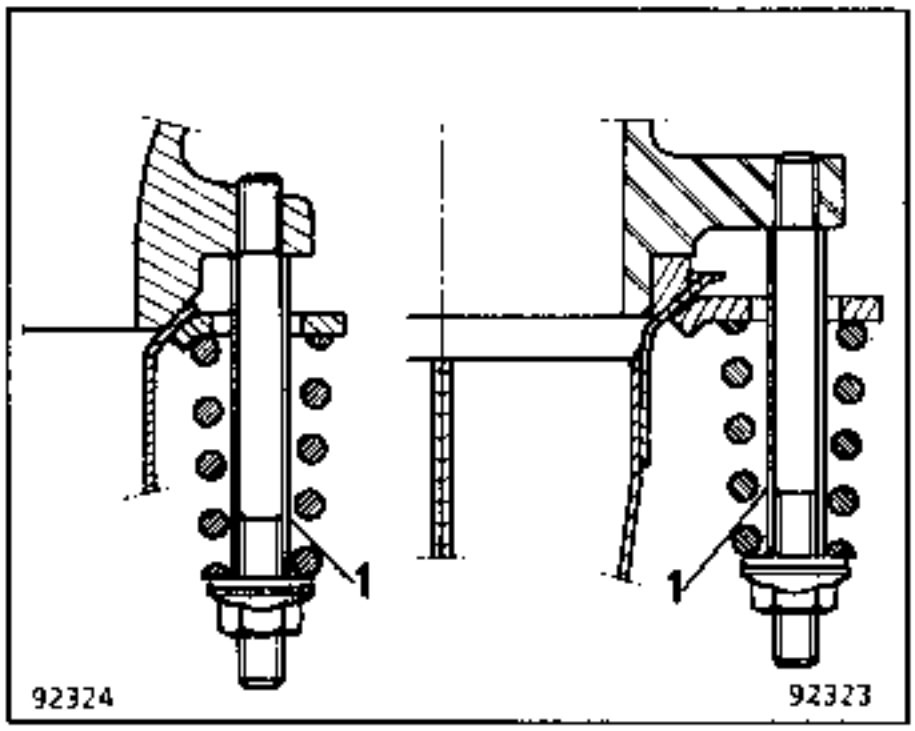
1. Down pipe
2. Oxygen sensor (Lambda)
3. Heat shields
4. Metex friction ring
5. Torque limiting spacer
6. Catalytic converter
7. Silencer for (4x4) vehicles
8. Silencer from (89-05)
9. Silencer up to (89-04)
10. Set of securing clamps

For the exhaust system to be correctly aligned and the clamps to be correctly tightened:

- Tighten the various joints one after the other, starting from the exhaust manifold and ending at the silencer.

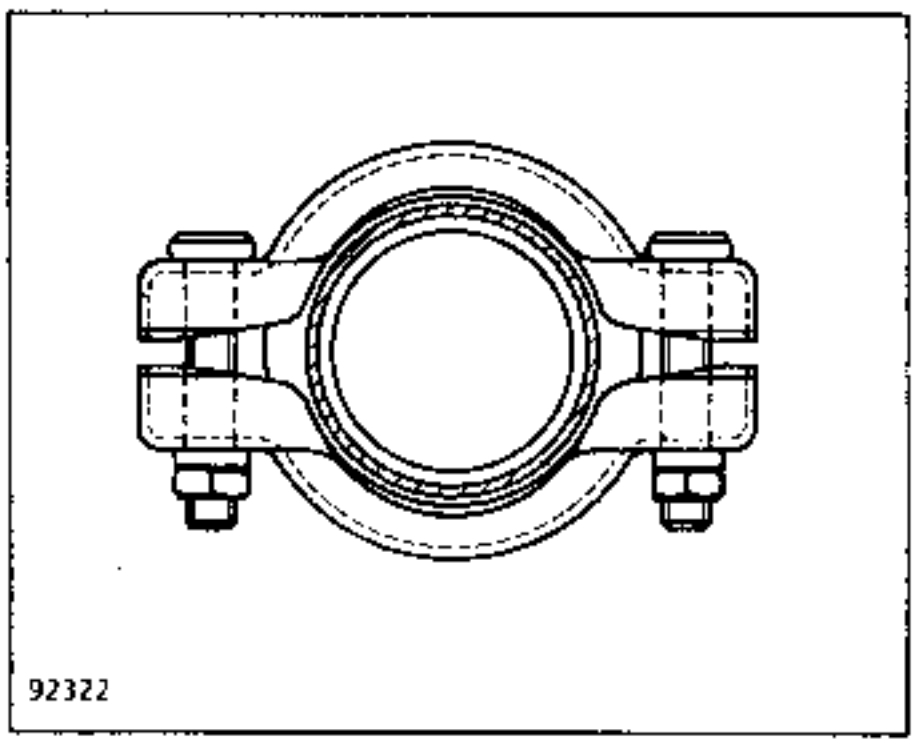
Arrangements:

Type C and F8Q Engines Type F Engine



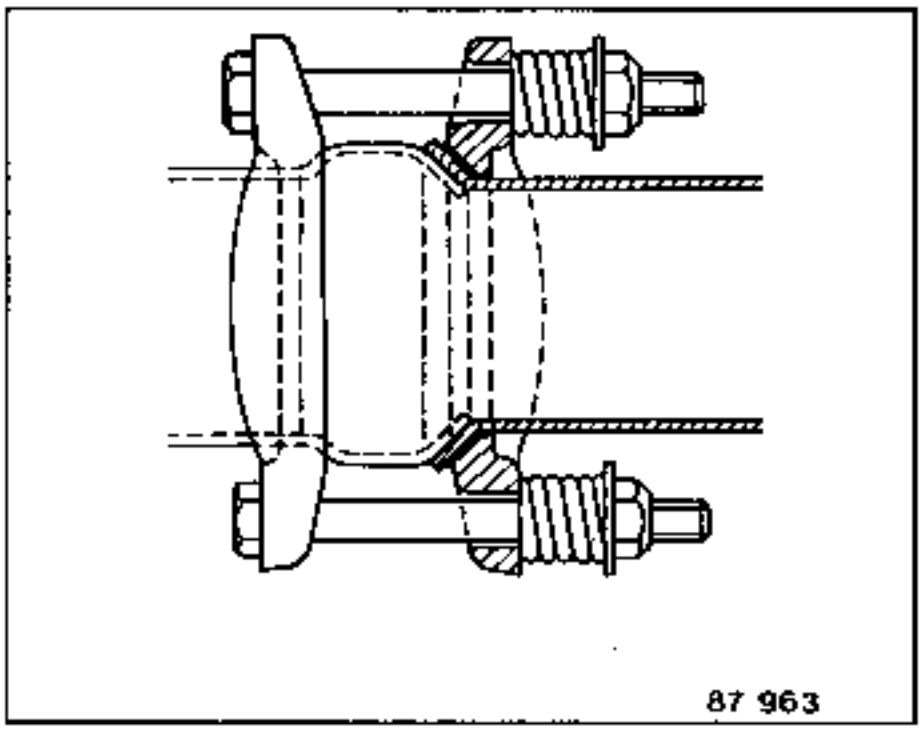
NOTE: the exhaust down pipes are fitted with spacers (1) which determine the spring pressure. Tighten until making contact with the spacers.

- Place the clamps so that their tightening areas bear evenly on both pipes to be clamped.



- Tighten the clamp bolts to the specified torque: 8mm Ø bolts: 2 daN.m to avoid distorting the pipes and clamps which could cause leakage.

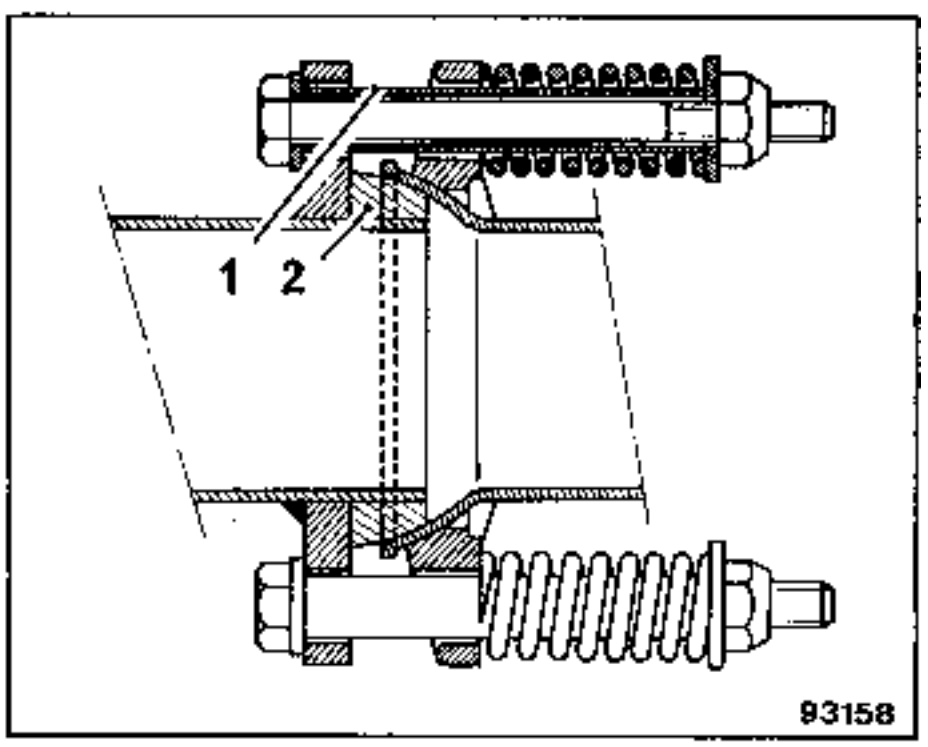
Type J... engine: arrangement with springs and thermoplastic seal.



ESSENTIAL: Replace the thermoplastic seal each time the joint is disconnected by an anti-rattle ring, reference 60 25 071 196. The joint is tight enough as soon as the seal between the two pipes is complete.

Spherical joints with METEX rings

Note: A spacer (1) determines the spring pressure. Tighten the nuts until contact is made with the spacers.



1. Spacer
2. Metex friction ring

ITS OBJECT

The function of an oxydization type catalytic pot, or catalyzer, is to process the main polluting agents contained in exhaust gases.

PRINCIPLE OF OPERATION

The catalyzer is operating under optimum conditions when the fuel-air mixture is around richness proportions 1.

Precious metals such as platinum and palladium are used for the manufacture of catalyzers.

Catalyzation is a process that facilitates a chemical reaction without taking part in it or being consumed.

PRECAUTIONS TO BE TAKEN

Catalyzers are destroyed by certain materials, and this is why fuels completely free of lead additives must be used in vehicles fitted with them. A small quantity of lead will not necessarily destroy the catalyzer, but it will cause it to overheat. This often reaches proportions such as the cell structure of the catalyzer is broken down, thus allowing exhaust pollutants to pass through.

TO PREVENT SUCH OVERHEATING

- The engine must be in good condition (in particular the fuel system and ignition system must be perfectly adjusted) to avoid the catalyzer operating under abnormal conditions.

- The vehicle must be stopped, immediately, if the engine misfires, if there is a defect in the fuel system, if the engine loses power or any other symptom (such as engine overheating) occurs, especially if it happens several times or if the engine backfires.

- The catalyzer can also be overheated by turning the engine for too long a period on the starter or trying to start it by towing it. Under these circumstances, the engine receives an excessively rich mixture for a long period (more than a minute), which occasionally fires.

REMOVING-REFITTING

If the car has been run on leaded fuel, the exhaust pipe on the input side of the catalyzer must be replaced with a new one (when the down pipe and catalyzer are in two parts).

Before replacing any part of the exhaust system, the fuel in the vehicle fuel system must be absolutely free of lead additives.

To obtain this result, either flush out the system with unleaded fuel, or run the vehicle for several tanks full of unleaded fuel.

NOTE: whenever carrying out work on the vehicle exhaust system, ensure that it is entirely free of leaks from the exhaust manifold gasket to the catalyzer, including the catalyzer.

Any seal removed must be REPLACED BY A NEW ONE.

SPECIAL FEATURES

Never park the vehicle or run the engine in a position where combustible materials such as grass or leaves may make contact with the hot exhaust system. Under certain wind and climatic conditions, these materials or substances may catch fire on contact with a hot exhaust.

CHECKING THE CATALYZER:

Ensure, before any inspection of the catalyzer (or the oxygen sensor), that is has not been contaminated by fuel containing lead:

- carry out a test for lead at the vehicle exhaust, using the appropriate test equipment.

Connect an exhaust gas analyzer to the rear of the vehicle.
With the engine cold:

- note the pollutant emission readings,
- warm up the engine (until the electric fan has cut in twice),
- check the pollutant readings at idling speed and at a speed of between 2500 and 3000 rpm,
  - if the CO percentage is higher than 0.2%, disconnect the oxygen sensor,
  - if there is no variation in the CO percentage with the sensor connected and then disconnected, replace the oxygen sensor. (Warning: this may have been contaminated by the lead contained in the fuel. Check this by carrying out a test for the presence of lead on the oxygen sensor. Ensure, also, that it is operating correctly, using test XR25. Its condition is shown by the bar graphs on line 13 and by the variation in the readings no. 05 at idling speed and at a constant speed of between 2500 and 3000 rpm,
  - if, with a new oxygen sensor in place, the CO reading is still higher than 0.2%, check:
    - the catalyzer, by shaking it to see if it makes a noise (confirm this by driving the vehicle)

Remove the catalyzer and check:

- that there is no visible damage.
- that no suspect noises are produced by shaking the catalyzer.
- that nothing is partially or totally blocking the catalyzer.

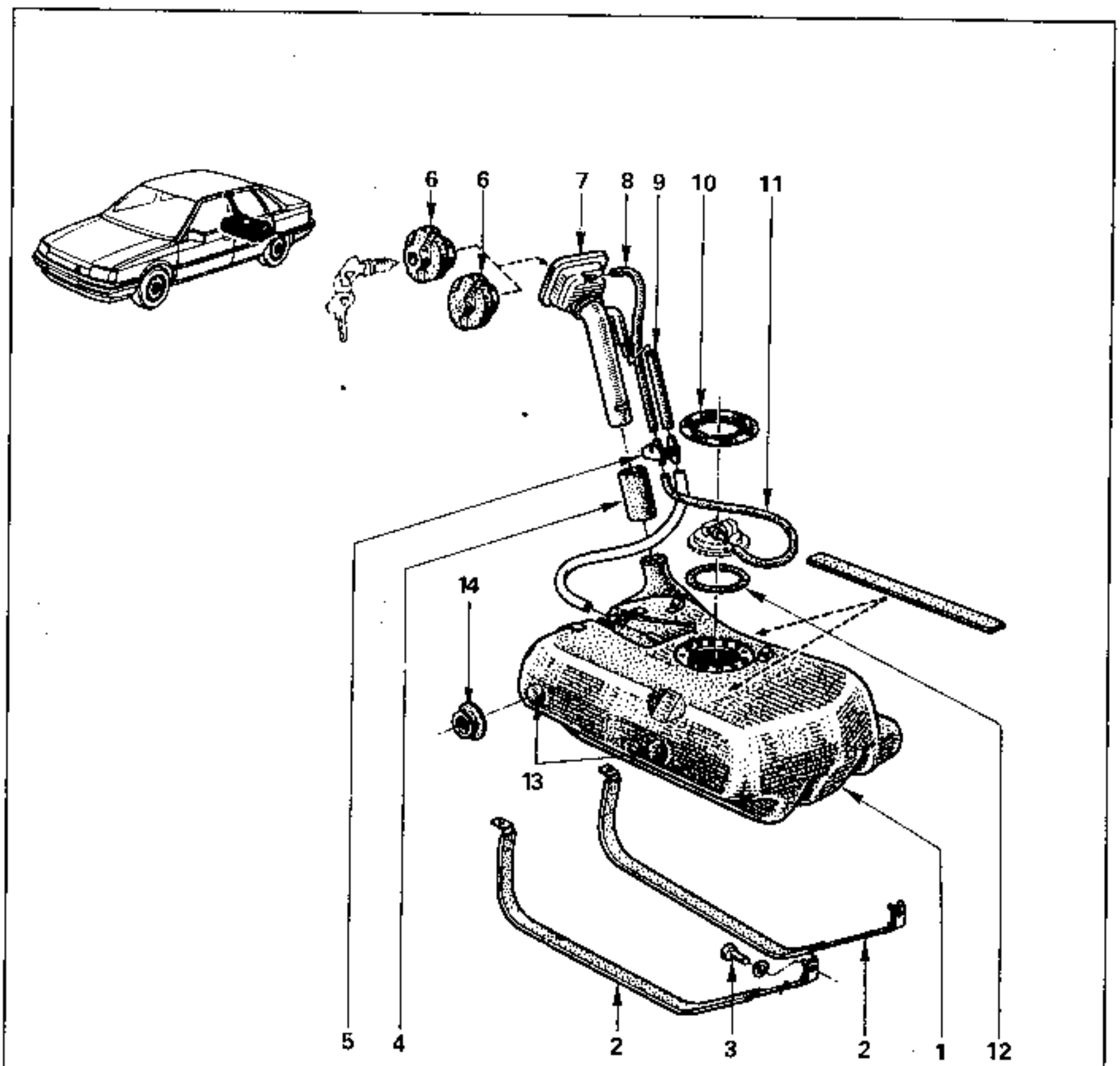
WARNING

Before replacing the catalyzer, check:

- that the vehicle is in perfect running condition:
  Fuel system, ignition, battery charge, mixture regulation by the oxygen sensor all correct (testing with XR 25 and a lead test).
- the vehicle performance by means of a road test.
- that no local noises are produced by the catalyzer during the road test.
- that the exhaust system is entirely free of leaks.
- that there is no lead in the exhaust system, by the appropriate tests.
- the pollutant readings obtained:
  - the engine temperature,
  - take the readings at idling speed and at a speed of between 2500 and 3000 rpm.

NOTE: Variations in the different pollutant levels will not be immediate. They may be transitory and irregular because the reading will vary with the exhaust gas analyzer characteristics (sensitivity, response time, condensation in the systems, the condition of the filters, the lengths of the pipe, etc...).

- Ensure that the instrument is accurately zeroed after the necessary warmup time.



1. Fuel tank
2. Securing straps
3. Securing bolts
4. Sleeve
5. Double connector
6. Filler cap (non ventilated type)
7. Filler pipe
8. Tank vent pipe
9. Tank vent pipe
10. Locking ring
11. Tank vent pipe
12. Tank unit gasket
13. Dowel locating the tank on the vehicle body
14. Spacer

NOTE: on vehicles for certain markets, the tank vent passes through a "CANISTER"

Before removing the fuel gauge tank unit, ensure that the following precautions are observed.

Do not smoke.

Do not bring a naked flame or red hot parts near the working area (welding etc...).

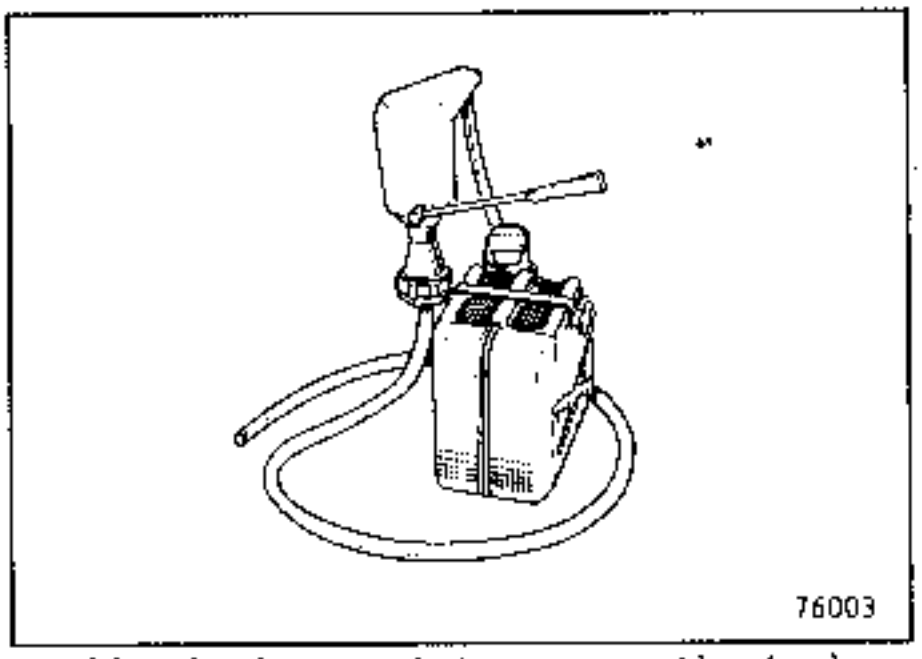
After draining off the fuel, firmly close the container.

REMOVING

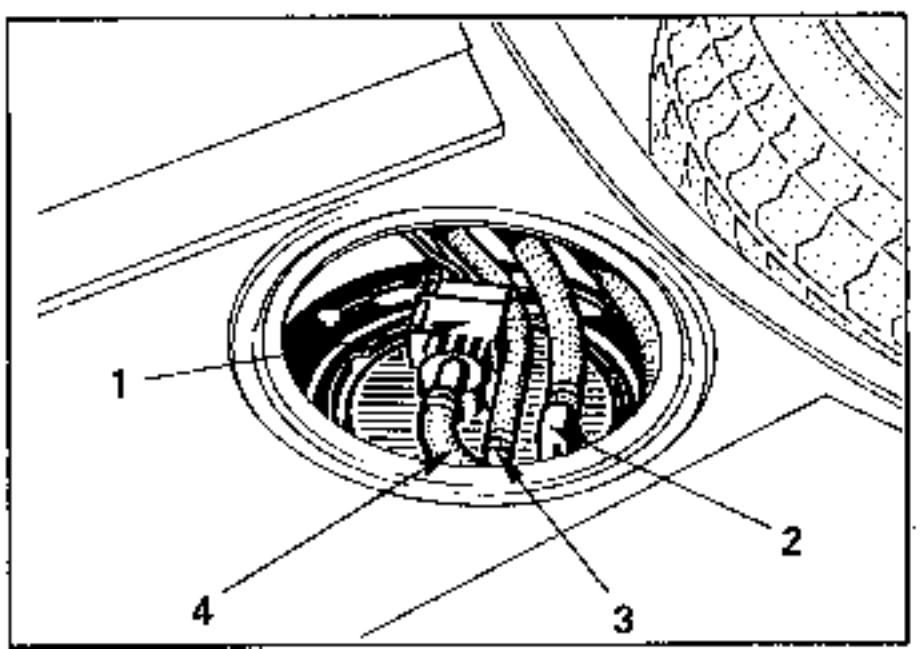
- Place the vehicle on a lift.

Before raising the vehicle:
- Disconnect the battery.
- Drain off the fuel from the tank using, for example, a "piston pump 3000" as supplied by:

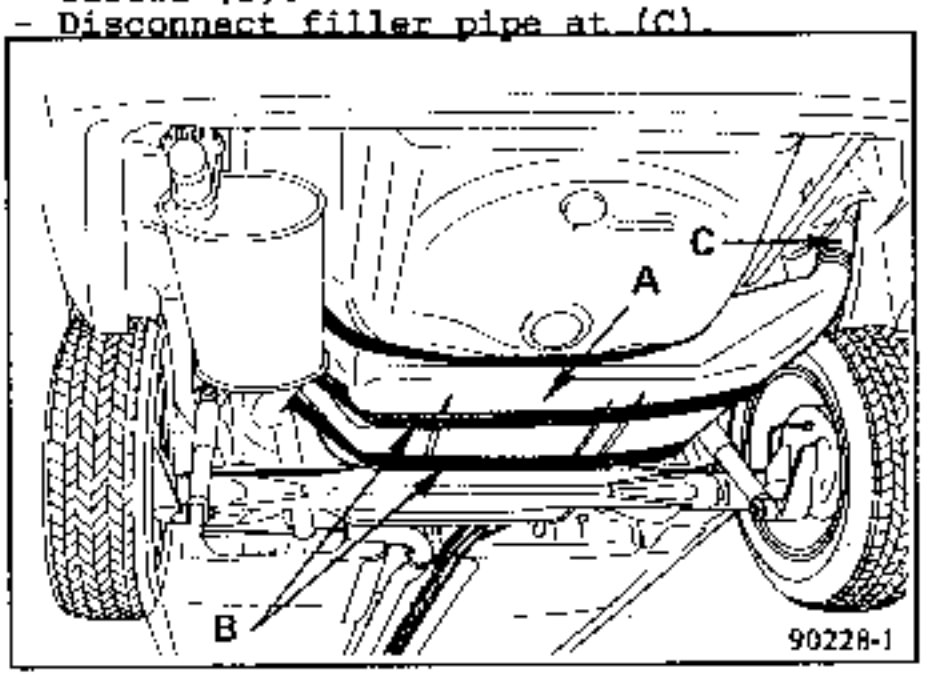
La Compagnie des Pompes et Distributeurs
7, rue J. Macé - 92150 Suresnes
Tél. : 45.06.23.95



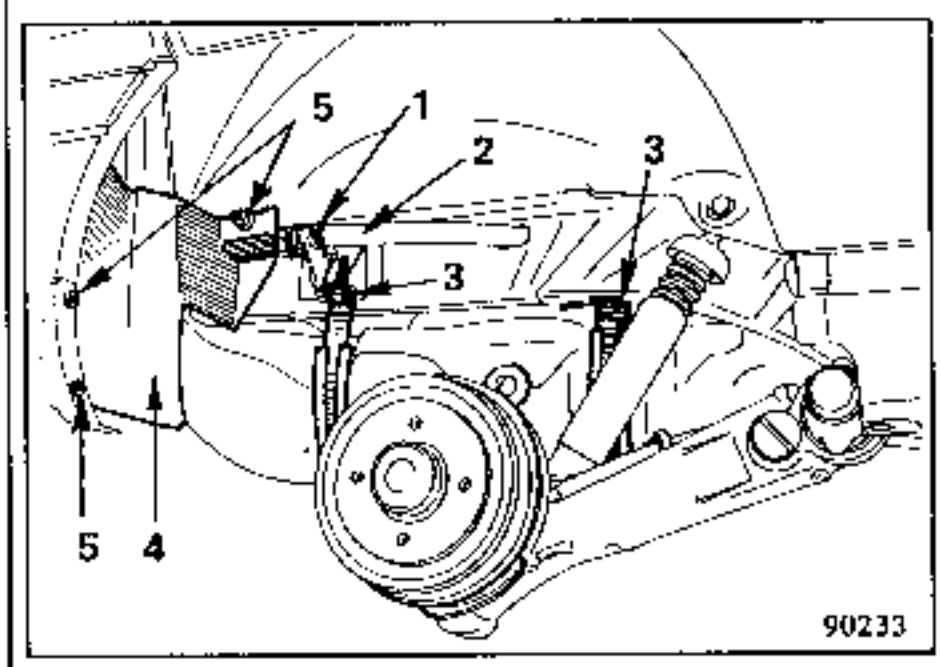
- Lift the boot mat to remove the tank unit connector access panel.
- Disconnect the connector from the tank unit (1).
- Disconnect the output pipe (2), return pipe(3) and vent (4) in the tank unit well.



- Remove the rear right hand wheel.
- Disconnect the two vent pipes from the double connector (1).
- Remove the protector (4) by taking out screws (5).
- Disconnect filler pipe at (C).



A - Tank
B - Securing strap
C - Connection between filler pipe and tank



1. Double connector
2. Vent pipes
3. Tank securing bolts
4. Protector
5. Securing bolts

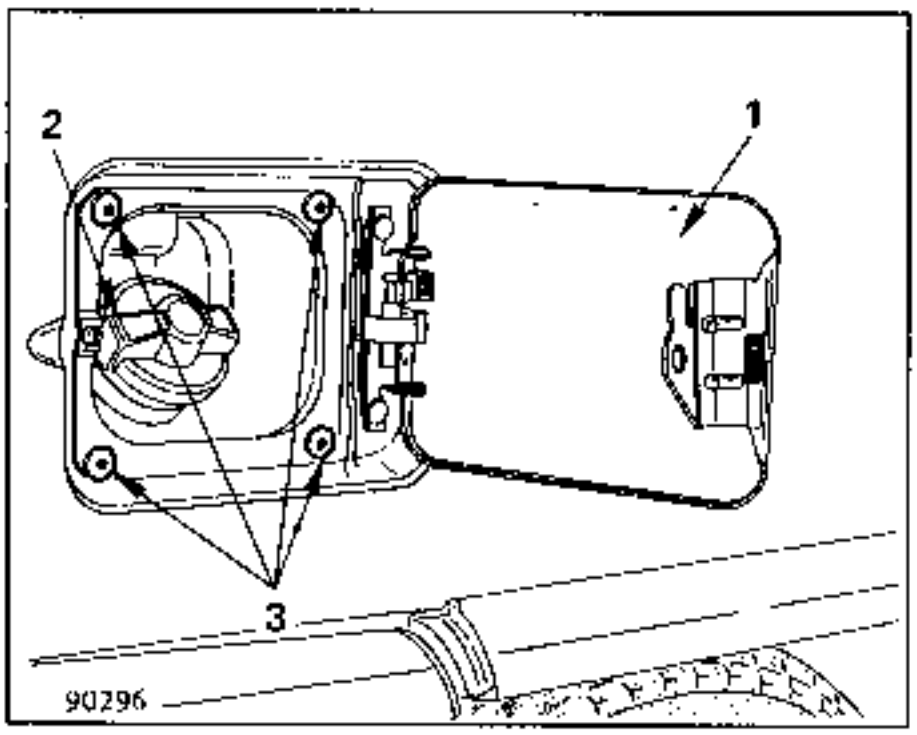
Remove the tank fastenings (3) and, using a Desvil V 710 stand (for example) placing a sheet of rubber between the stand and the tank, slowly lower the tank.

Refitting the Tank:

Take care, when refitting the tank, not to trap the pipes.
Locate the tank dowels in the corresponding recesses on the body.

Removing

The upper part of the filler pipe (cap end) is riveted to the bodywork.
To remove this part, one must drill out the rivets to free the pipe from the vehicle body.

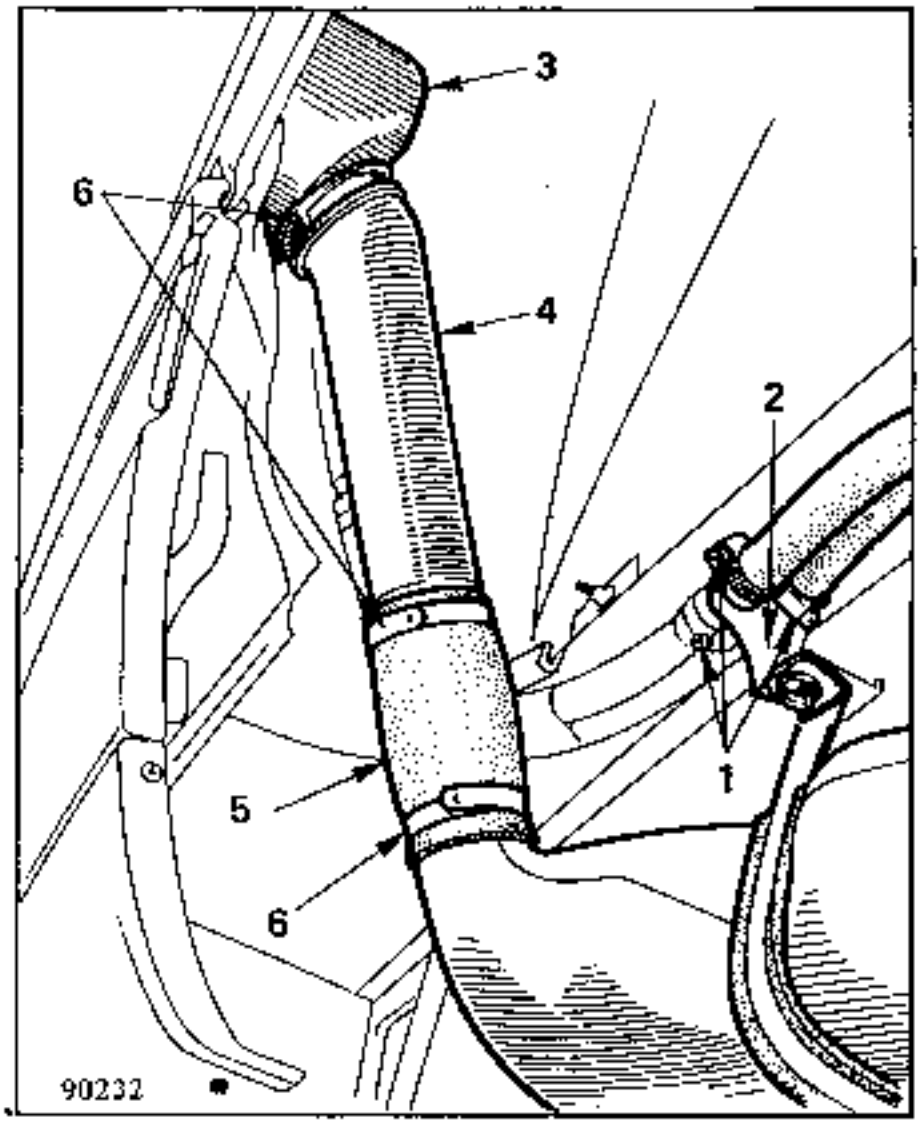


1. Flap
2. Filler cap
3. Securing rivets

- Disconnect the vent pipes from the double connector (2), on the filler pipe side.
- Disconnect the hose connecting the filler pipe to the tank (5) and (6).
- Remove the assembly.

Refitting

IMPORTANT: Take care, when refitting, not to trap the pipes.
Fit new aluminium rivets.
Ø = 4.8mm
L = 12mm
Head Ø = 12mm



1. Vent pipes
2. Double connector
3. Filler pipe
4. Sleeve
5. Connecting hose
6. Hose clips

FILLING THE TANK

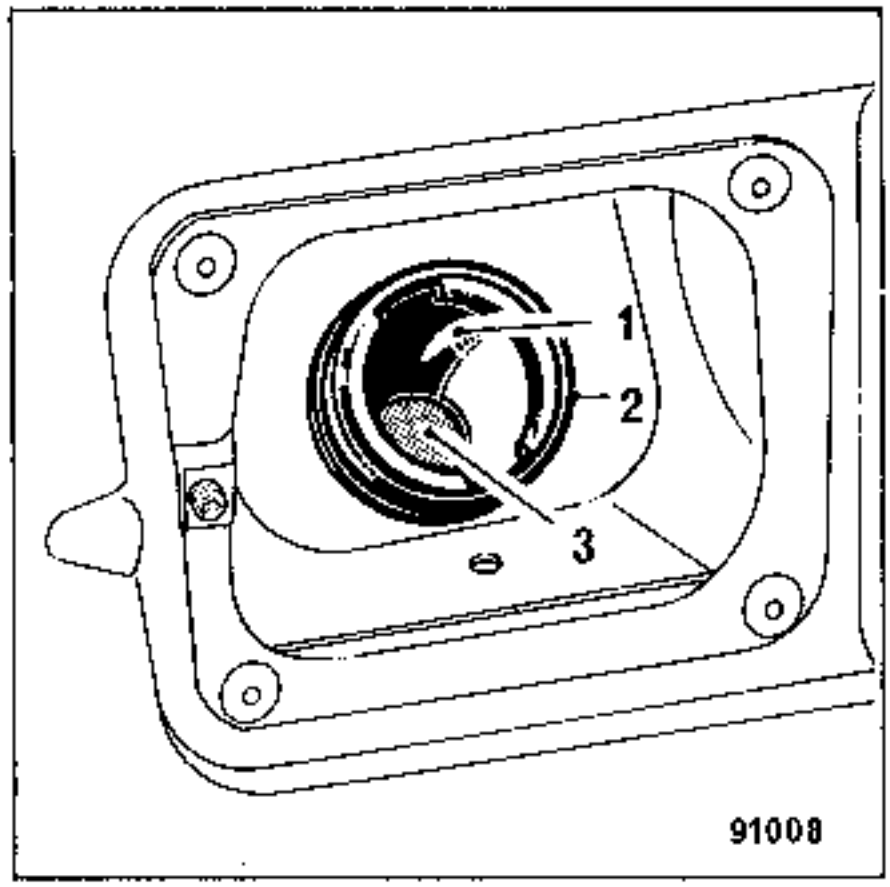
The tank has a useable capacity of
66 litres $^{+}_{-}$ 1 litre or 62 litres
$^{+}_{-}$ 1 litre on 4x4 vehicles.

- Insert the fuel filler nozzle as far as it will go and release the automatic filler system.
- After the automatic filler system has cut out for the first time, when the tank is almost full, one can add a maximum of a further 2 litres.
- The system is designed to retain an expansion volume, and this must not be filled.
- We therefore strongly recommend against filling the tank until it overflows.

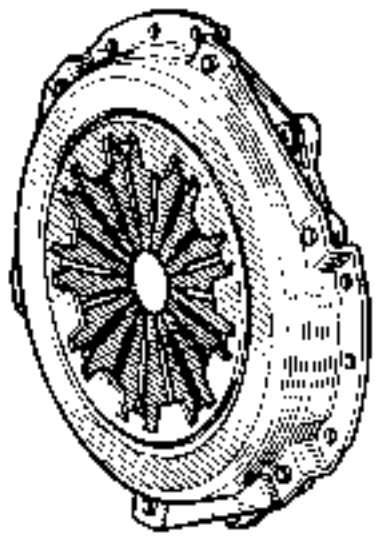
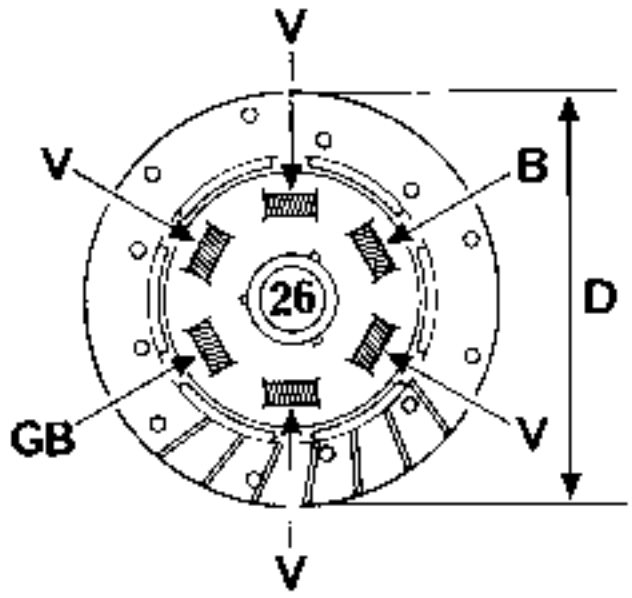
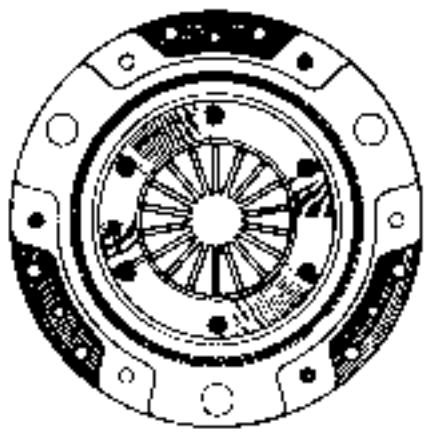
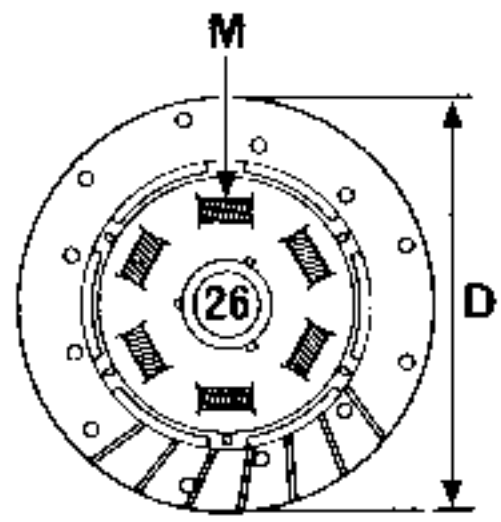
FILLING TANK WITH UNLEADED FUEL

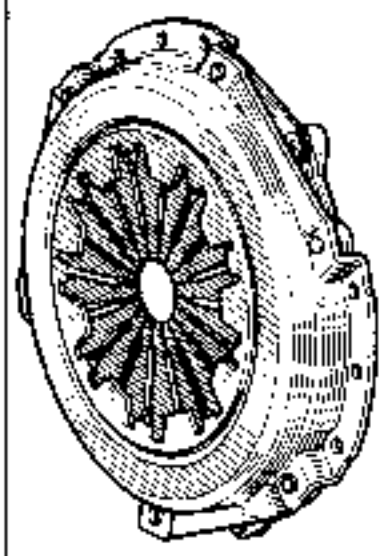
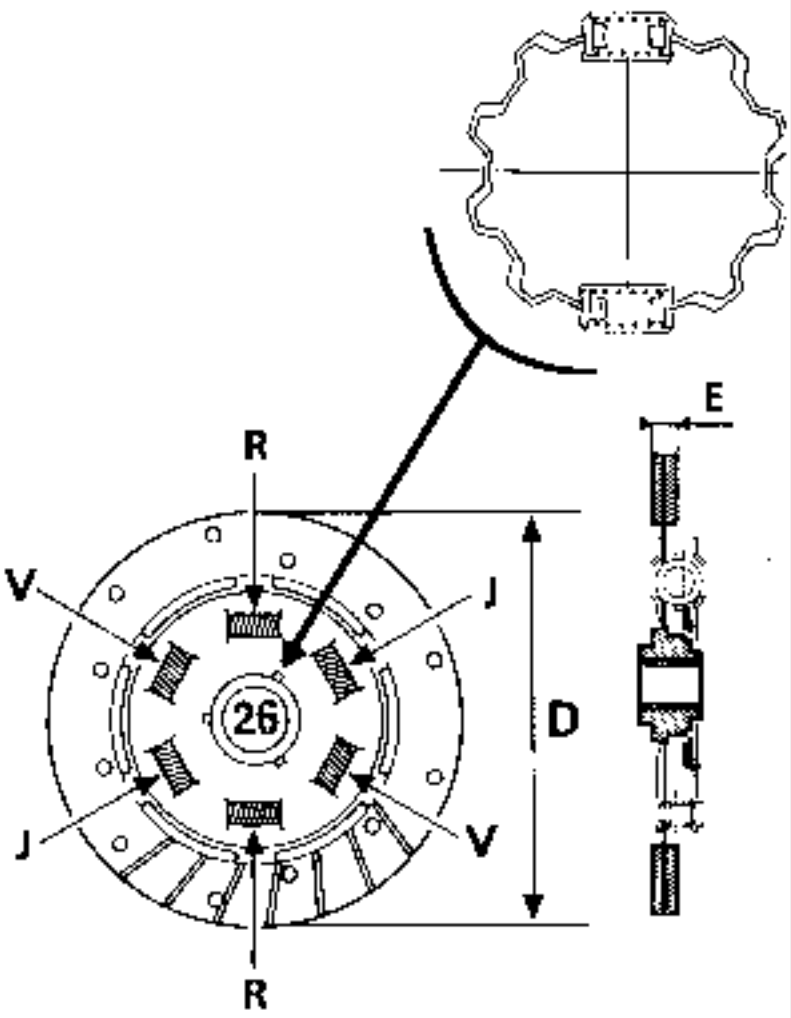
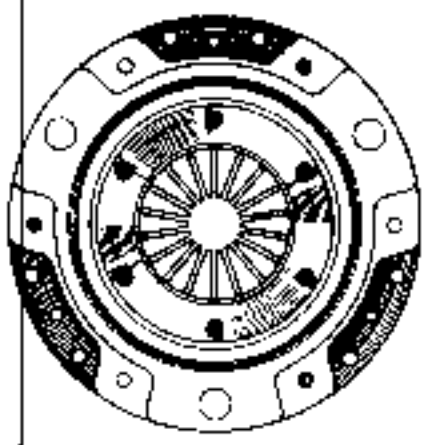
If the vehicle is to be used on unleaded fuel, the filler pipe will be fitted:

- with a smaller diameter filler hole into which a filler nozzle on a leaded fuel pump will not fit,
- a valve blocking off the filler pipe.



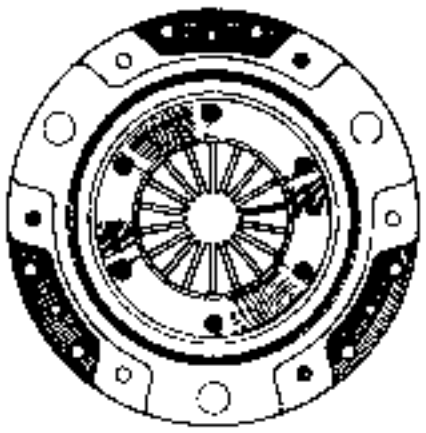
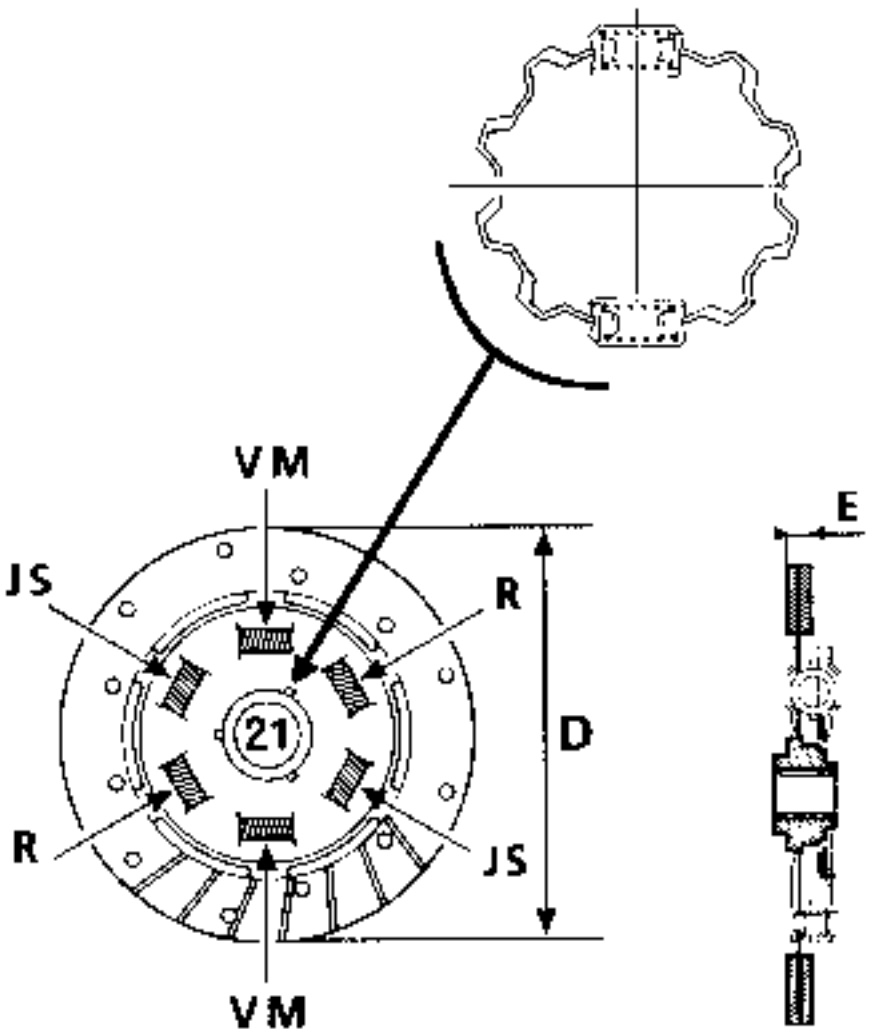
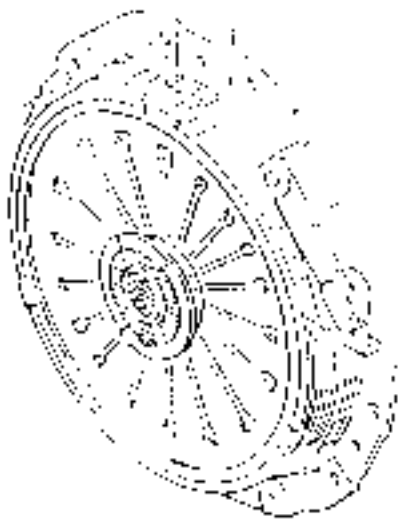
1. Reduced diameter
2. Filler hole
3. Valve

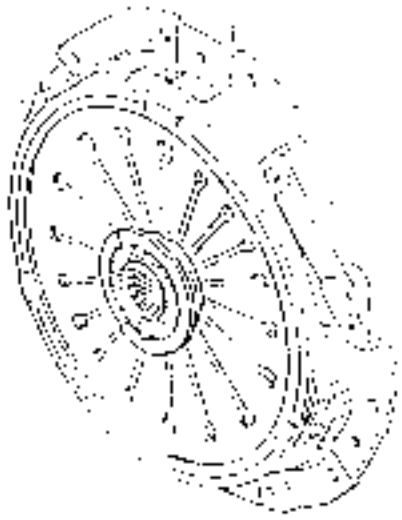
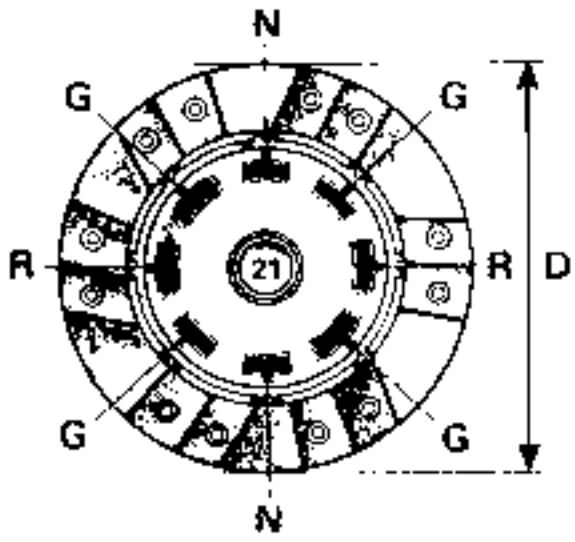
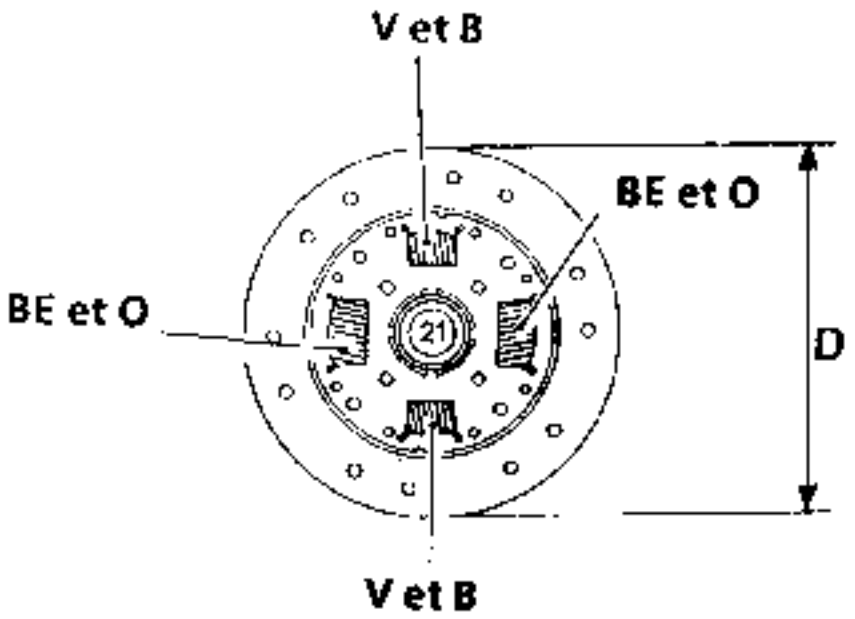
VEHICLE TYPE	MECHANISM	DISC
B-L-K 48D	 858735 **180 CP 3300**	 906938  769068 **26 splines** E = 7.7 mm D = 181.5 mm B = White GB = Blue grey V = Green
B-L-K-S 481 B-L-K-S 482 B-L-K 48E B-L-K 48F B-L-K 48J L-K 48M L-K 48N	 769075 **200 CP 425** **or** **200 CP 4000**	  76906R 90693R1 **26 splines** M = 6 light pink springs E = 7.7 mm D = 200 mm

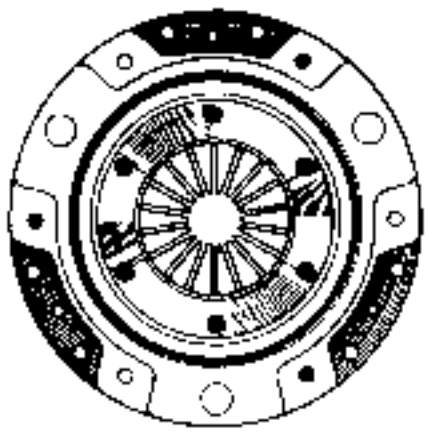
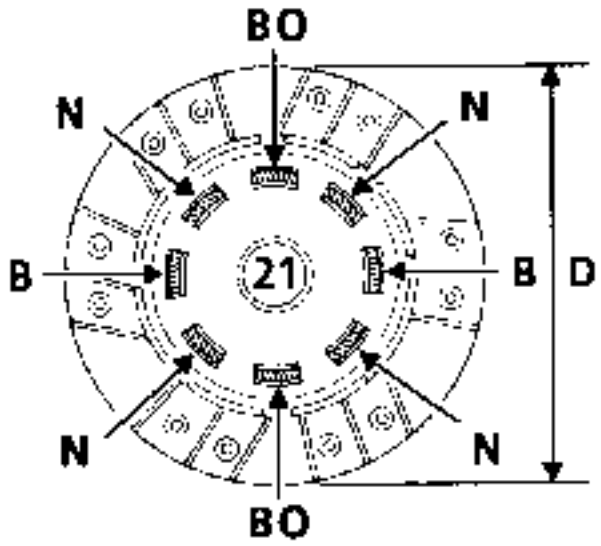
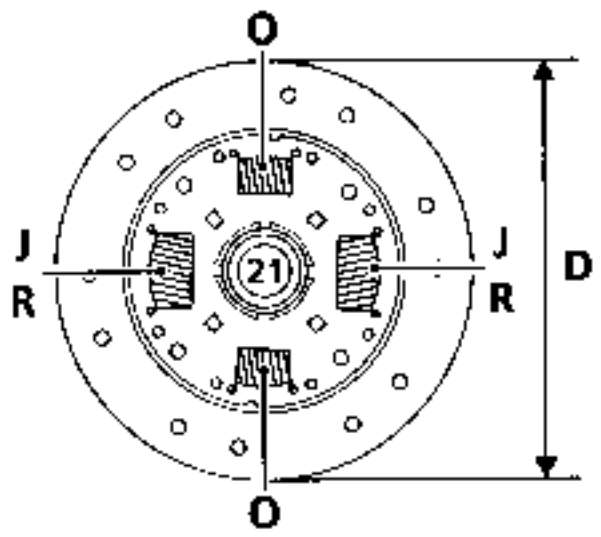
VEHICLE TYPE	ENGINE TYPE	FLYWHEEL PROFILE	MECHANISM	DISC
B-L-K-S 48H	F8Q	 937275	 858735 **200 CP 4000**	**Special note:** 2 additional springs on hub  90693G1 76906R
		 937285	 769075 **200 CPV 3500**	**26 splines** **E** = 7.7 mm **D** = 200 mm **R** = Red **J** = Yellow **V** = Green

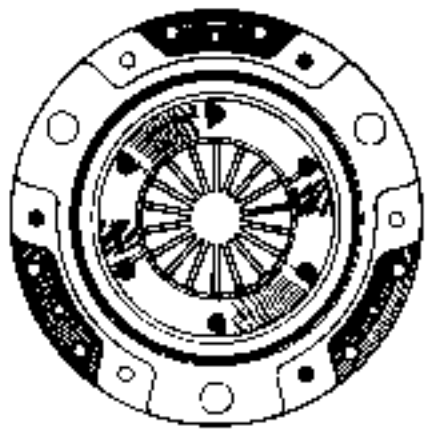
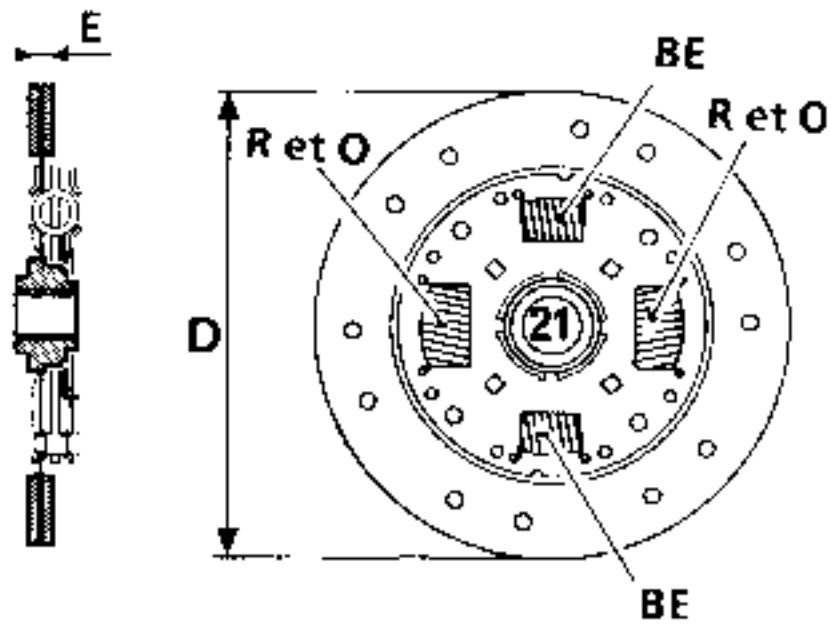
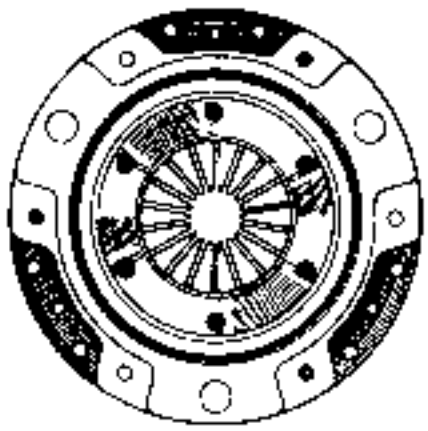
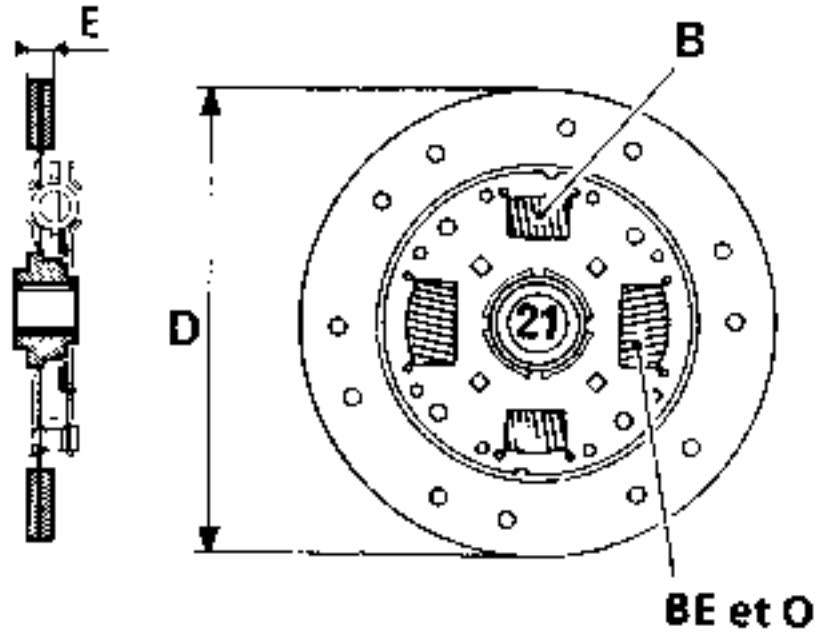
IMPORTANT

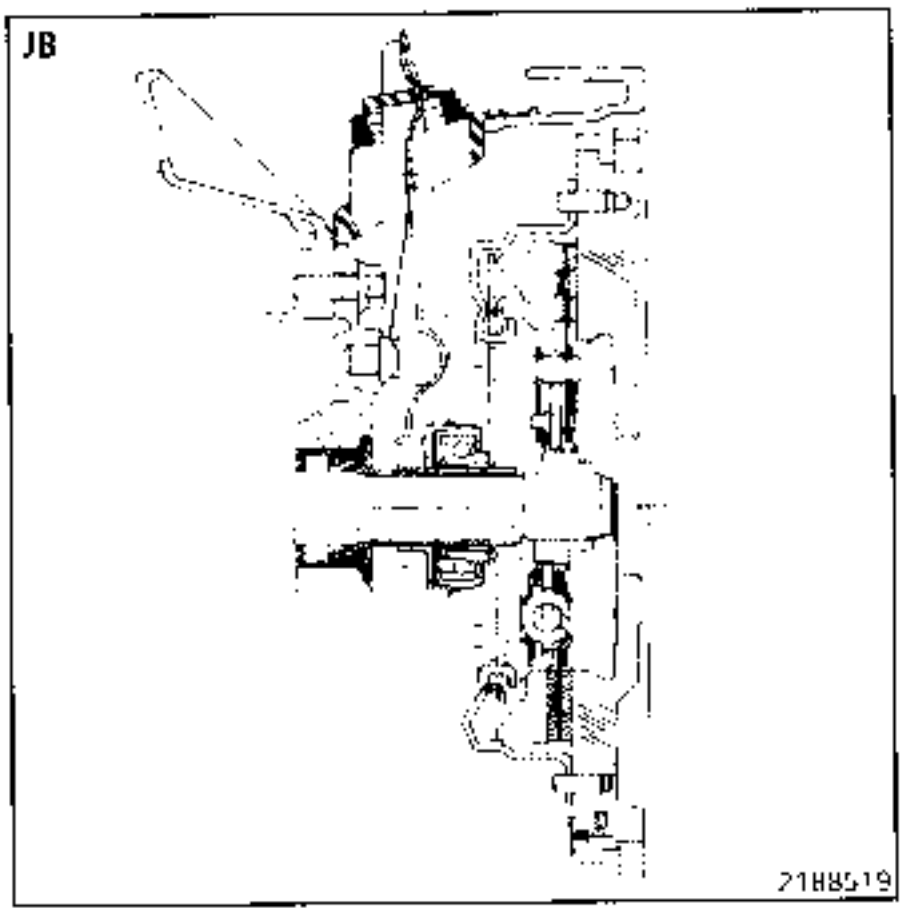
Special features of "diesel" clutch discs :
These are fitted with a damping pre-hub, the efficiency of which is best when its internal components operate dry.
If there is an excess of grease on the hub and this penetrates into the damper pre-hub it will render the hub less efficient and gearbox noise will occur.

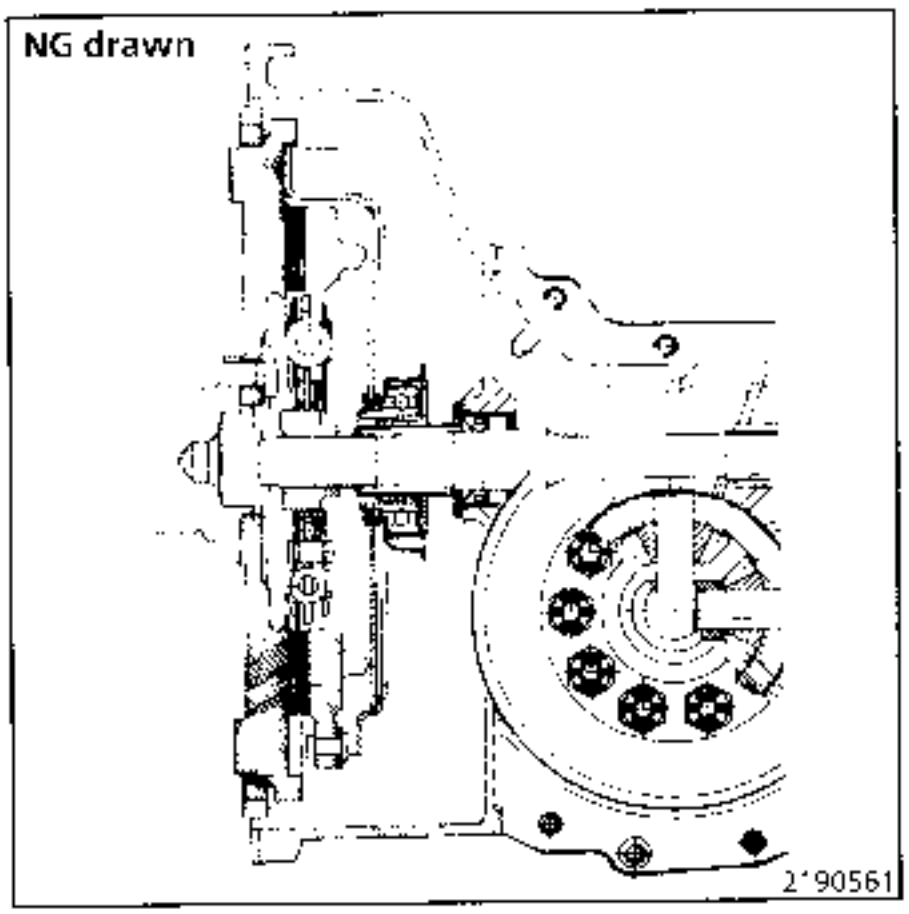
VEHICLE TYPE	MECHANISM	DISC
B-L-K 486 B-L-K-S 48V	 769075 **200 CP 375** **200 CP 3500**	 90693G2 76906R **21 splines** **E** = 7.7 mm **D** = 200 mm **JS** = Sand yellow **VM** = Moss green **R** = Red
B-L-K 488 B L K 48W	 21203 **215 DT 4900**	 76906R **21 splines** **E** = 6.8 mm **D** = 215 mm **BC** = Light blue **GB** = Blue grey **J** = Yellow

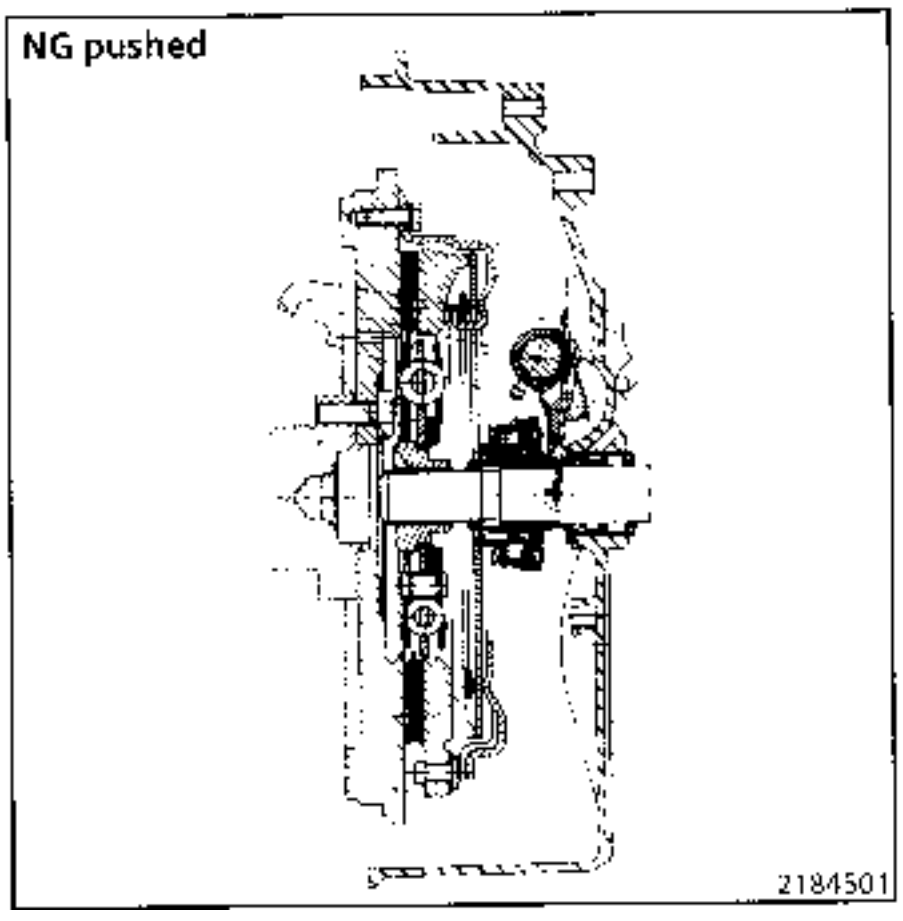
VEHICLE TYPE	MECHANISM	DISC
4 × 2 B-L-K 48K B-L 48Q B-L 48R B-L 48Y B-K-L 483 L 489	 21203 **215 DT 475** **or** **215 DT 4900**	**1st assembly**  2182168 1  **21 splines** E = 6.8 mm D = 215 mm G = Grey N = Black R = Red **2nd assembly** 76906R  2190693-1 **21 splines** E = 6.8 mm D = 215 mm V = Green B = Blue BE = Beige O = Orange

VEHICLE TYPE	MECHANISM	DISC
4 × 2 L 485	 76907S **235 CP 6250**	**1st assembly**   90693 1R5 **21 splines** **E** = 7.7 mm **D** = 228.6 mm **BO** = Olive brown **N** = Black **B** = Blue **2nd assembly** 76906R  90693-2R5 **21 splines** E = 7.7 mm D = 228.6 mm J = Yellow R = Red O = Orange

VEHICLE TYPE	MECHANISM	DISC
4 x 4 B-L 48R B-L 48Y	 769075 **215 CP 4500**	 76906R 2190693-4 **21 splines** **E** = 6.8 mm **D** = 215 mm **BE** = Beige **O** = Orange **R** = Red
4 x 4 L 485	 769075 **235 CP 6250**	 76906R 2190693-5 **21 splines** **E** = 7.7 mm **D** = 228.6 mm **B** = Blue **BE** = Beige **O** = Orange







Single disc, cable controlled disc, operating dry.

Clutch plate with diaphragm.

Clutch disc with resilient hub.

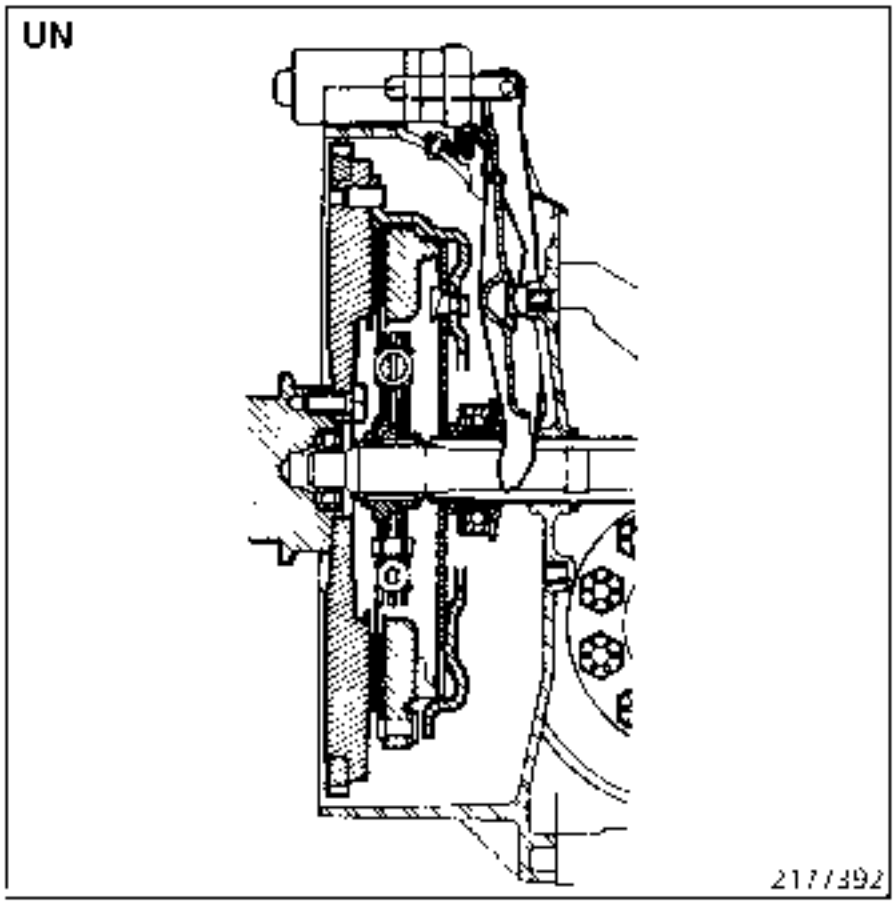
"**Pushed**" type clutch:

Self-centring guided ball bearing type thrust pad in constant contact.

"**Drawn**" type clutch:

Ball bearing type thrust pad integral with diaphragm.

Automatic wear take-up.



Single disc clutch operating dry.

Clutch plate with diaphragm.

Clutch disc with resilient hub.

Self-centring guided ball bearing type thrust pad in constant contact.

Mechanically assisted clutch control.

Hydraulic control:

- The principle of this control is the same as for a brake control.

- The clutch pedal acts on a master cylinder which causes the slave cylinder piston to move and act on the fork.

Clearance can not be adjusted at the pedal.

BENDIX control :

- The hydraulic circuit is supplied with the fluid contained in the brake fluid reservoir.

"Automotive Products" control:

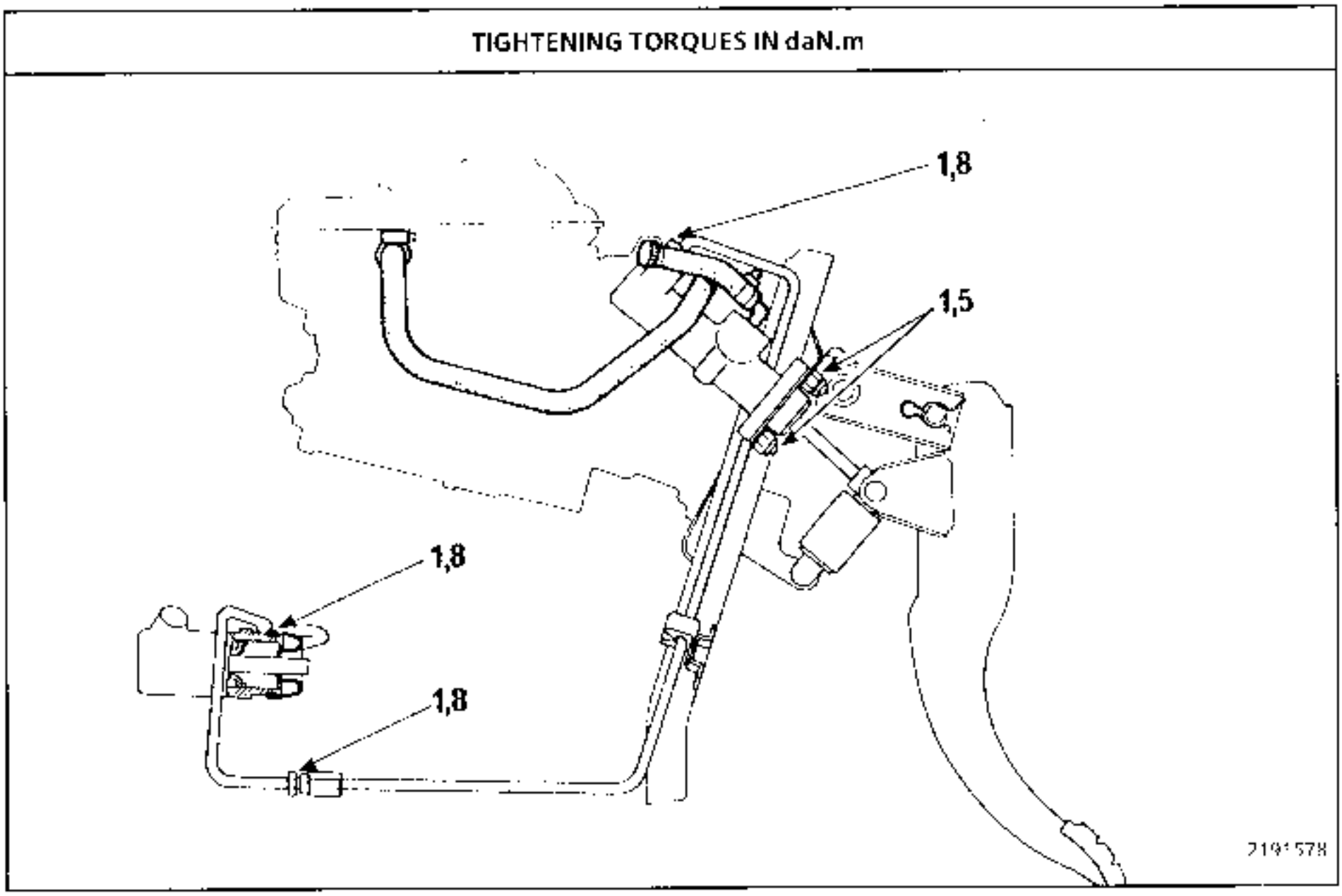
- The fluid reservoir is integral with the master cylinder.

- This equipment is supplied ready filled and bled.

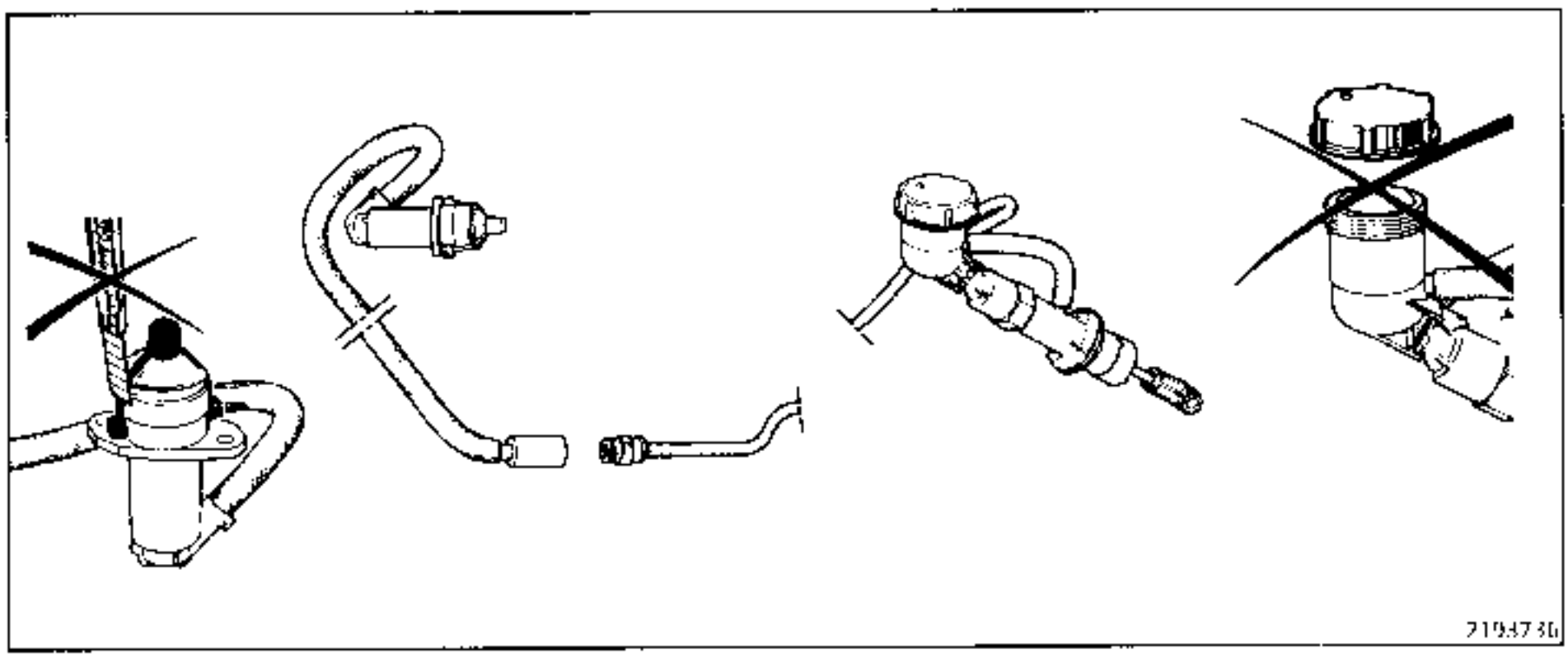
Hydraulic clutch controls

BENDIX

TIGHTENING TORQUES IN daN.m



AUTOMOTIVE PRODUCTS

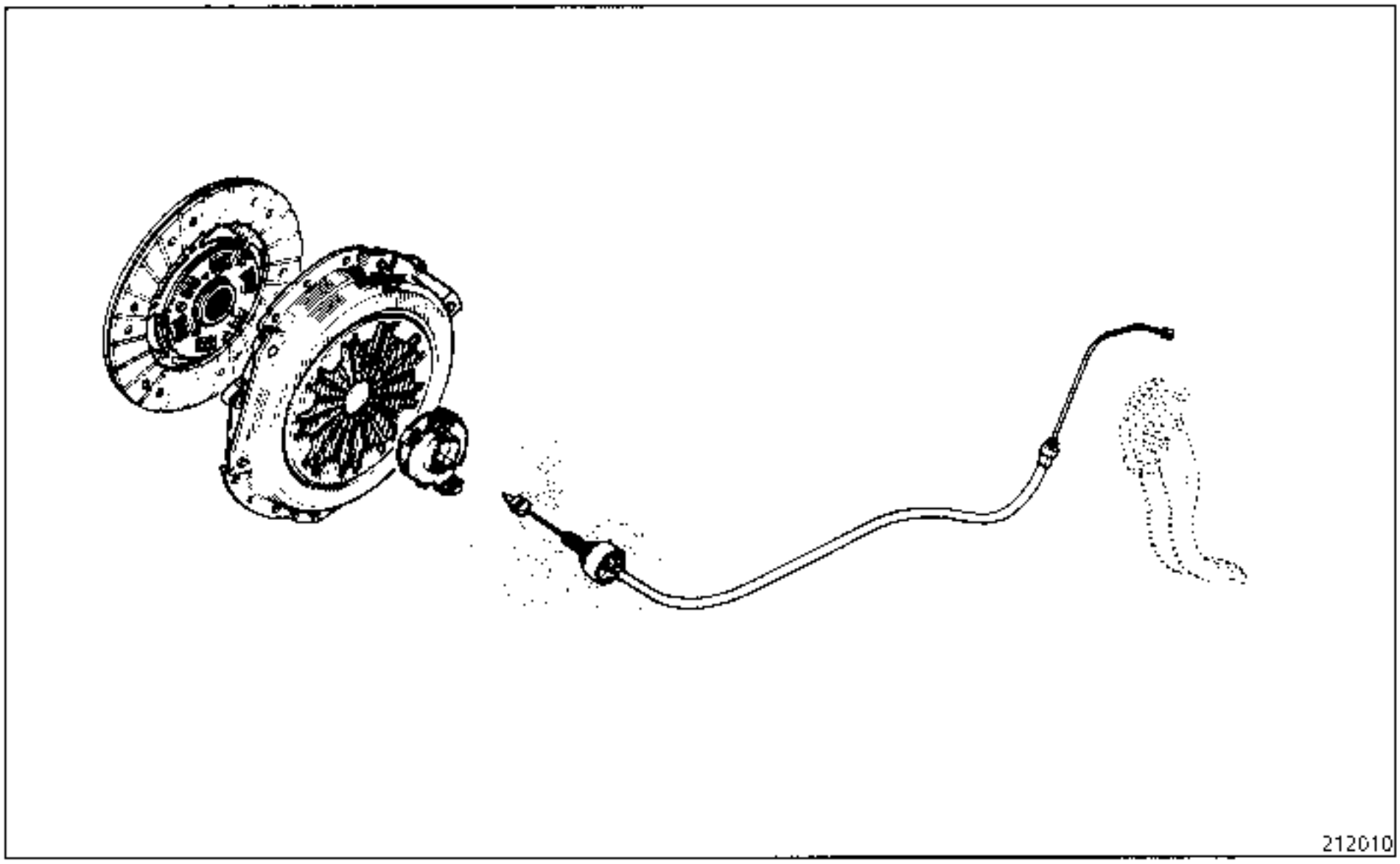


AP control - Special notes: This equipment is supplied ready filled and bled.

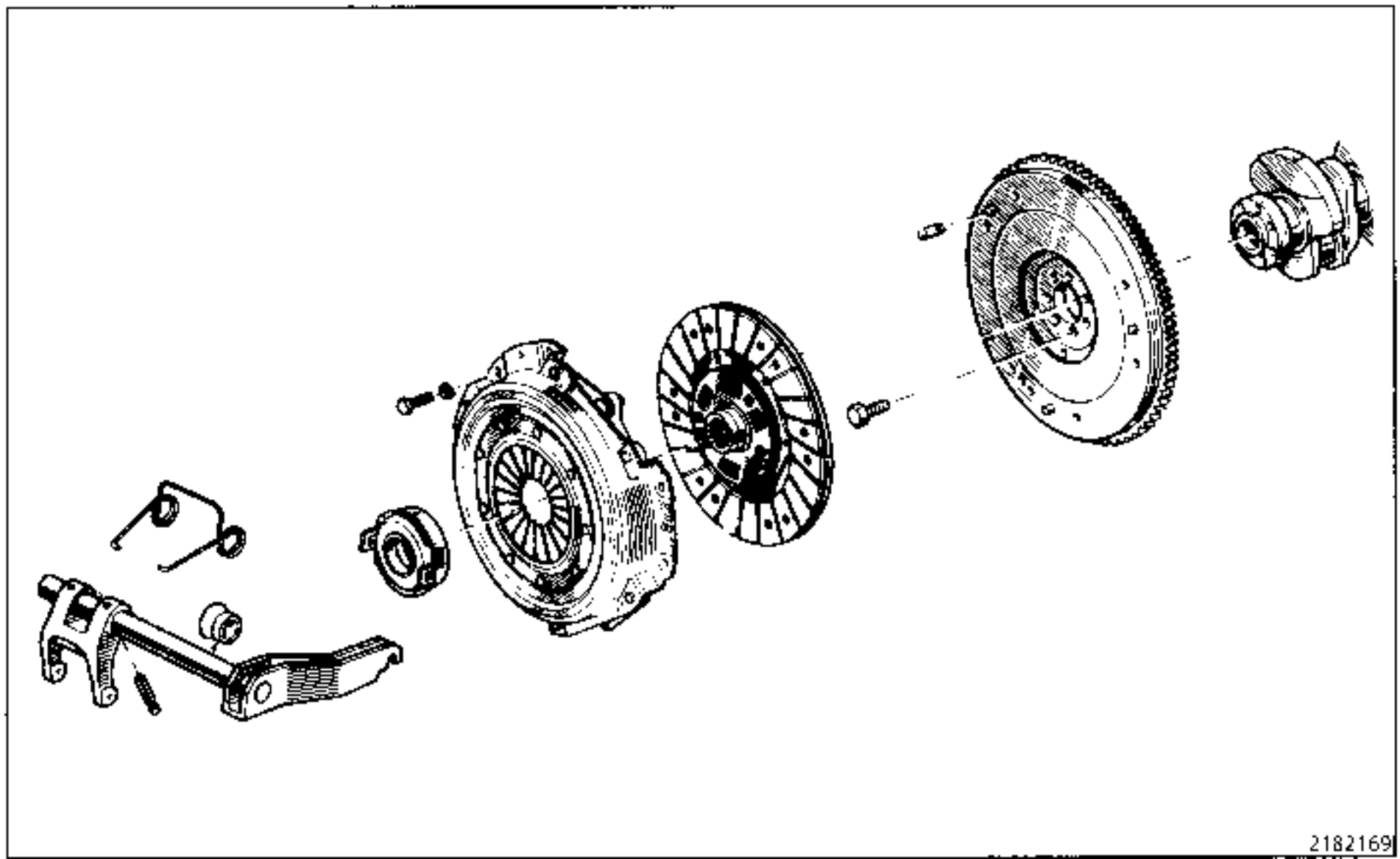
- The master cylinder is mounted using a bayonet type mounting.
- The slave cylinder push rod is held in its initial position by two tabs which divide the first time the pedal is pressed.

Refer to **section 37**.

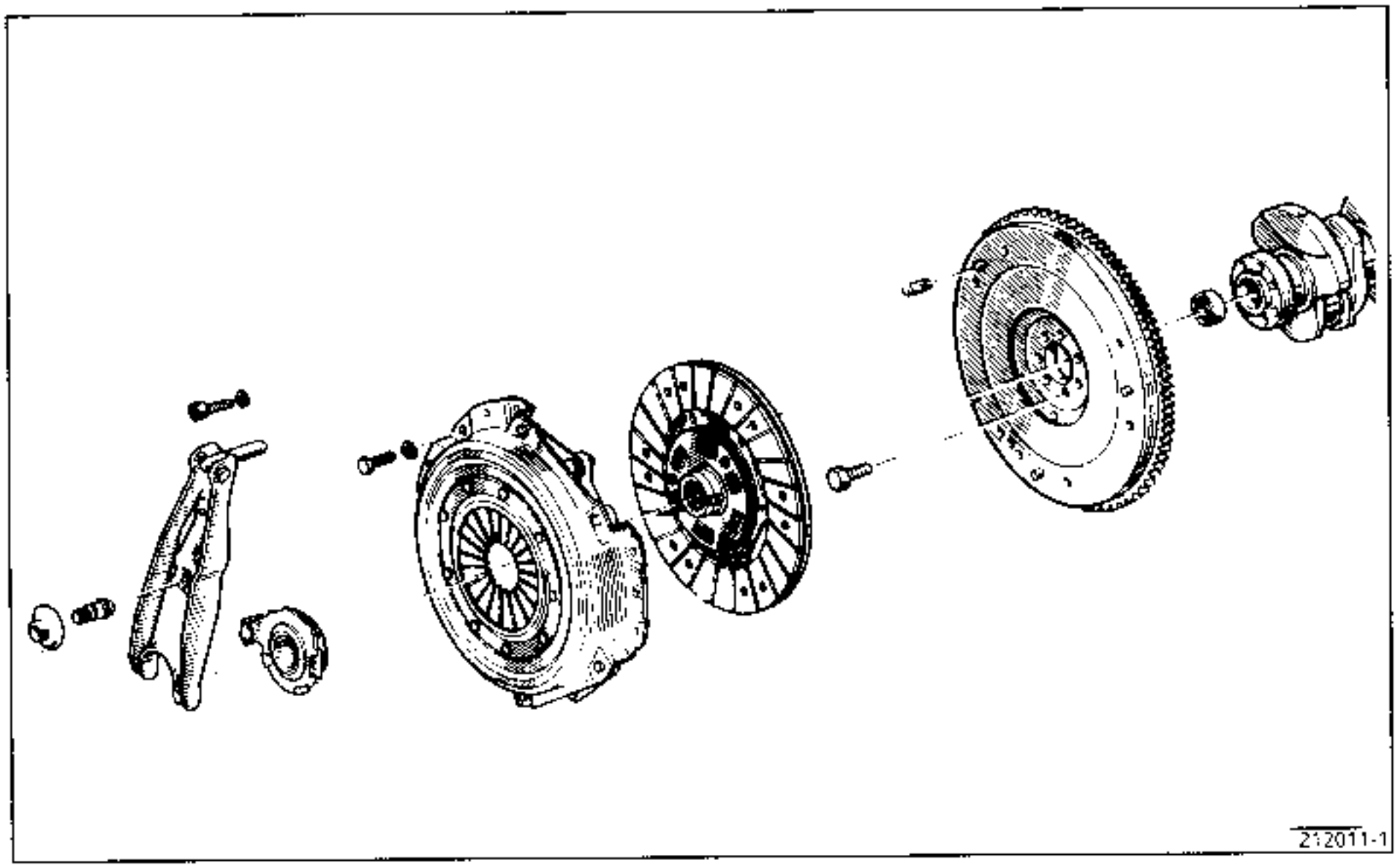
"PUSHED" TYPE CLUTCH (JB gearbox)



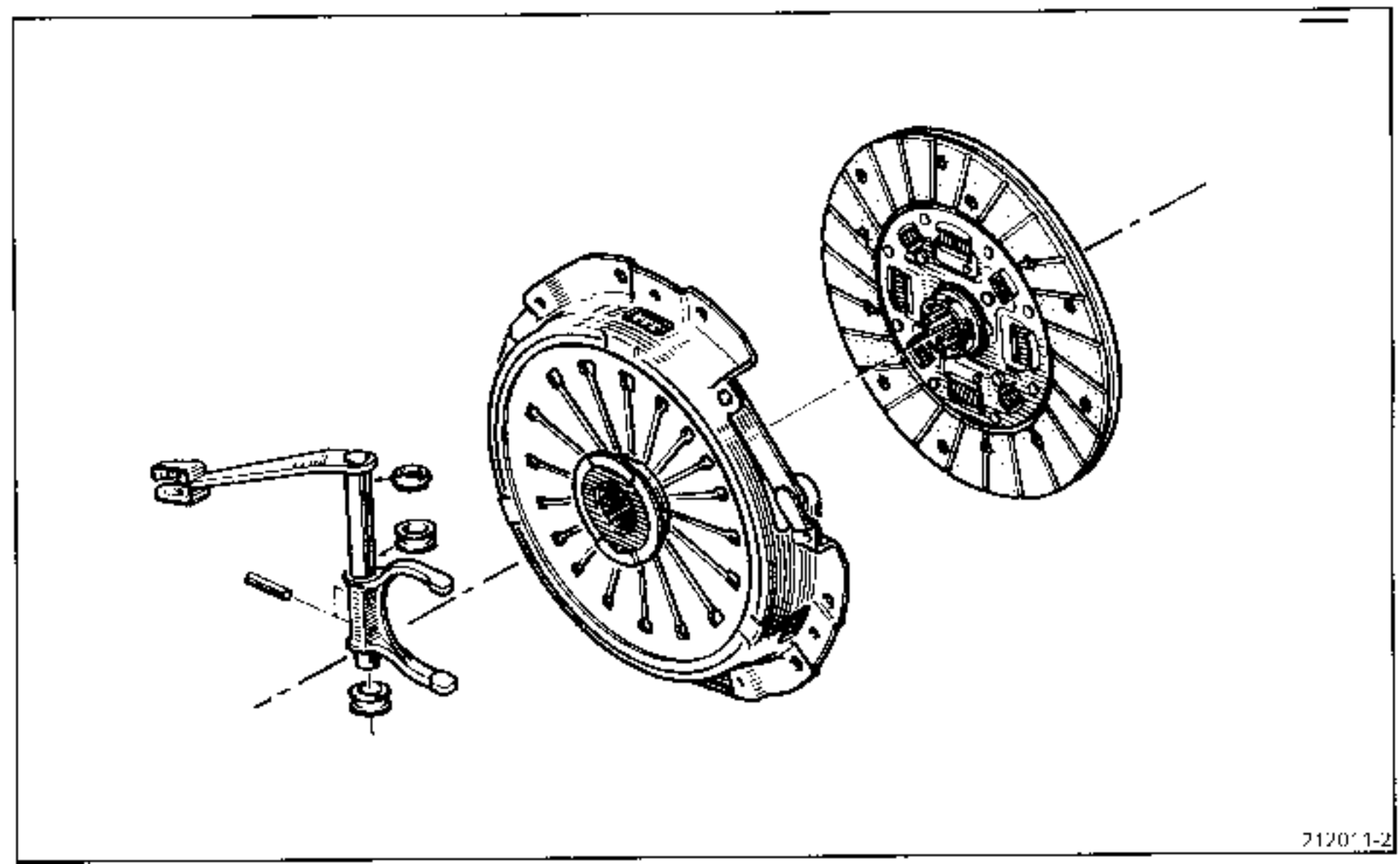
"PUSHED" TYPE CLUTCH (NG gearbox)



"PUSHED" TYPE CLUTCH (UN gearbox)



"DRAWN" TYPE CLUTCH (NG gearbox)



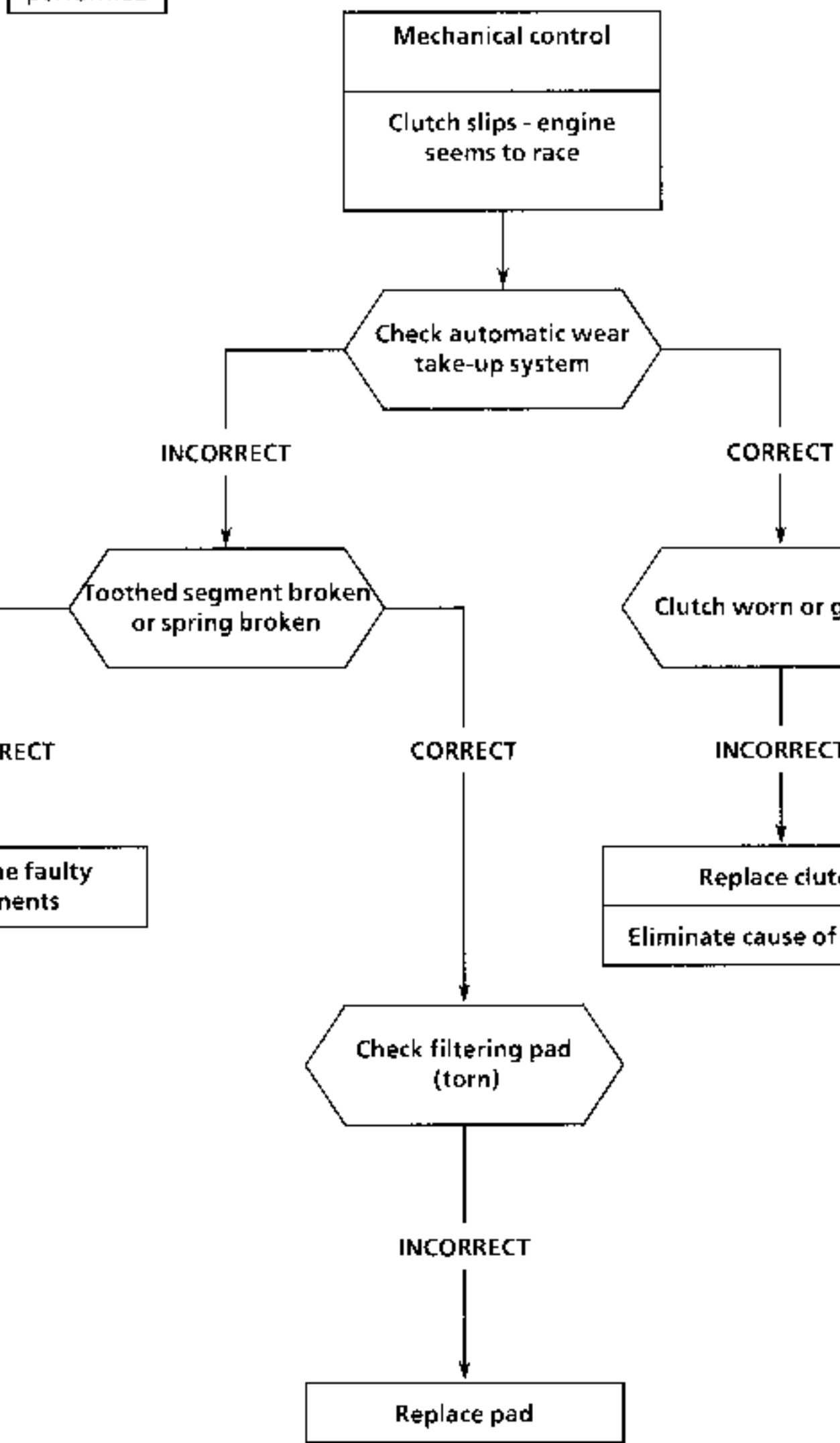
Type	Packaging	Part Number	Component
MOLYKOTE BR2	1 g sachet	77 01 421 145	Sunwheel splines Fork pivot Thrust pad guide Fork pads } Clutch
RHODORSEAL 5661	100 g tube	77 01 404 452	Ends of driveshaft roll pins
LOCTITE 518	24 ml syringe	77 01 421 162	Housing assembly faces

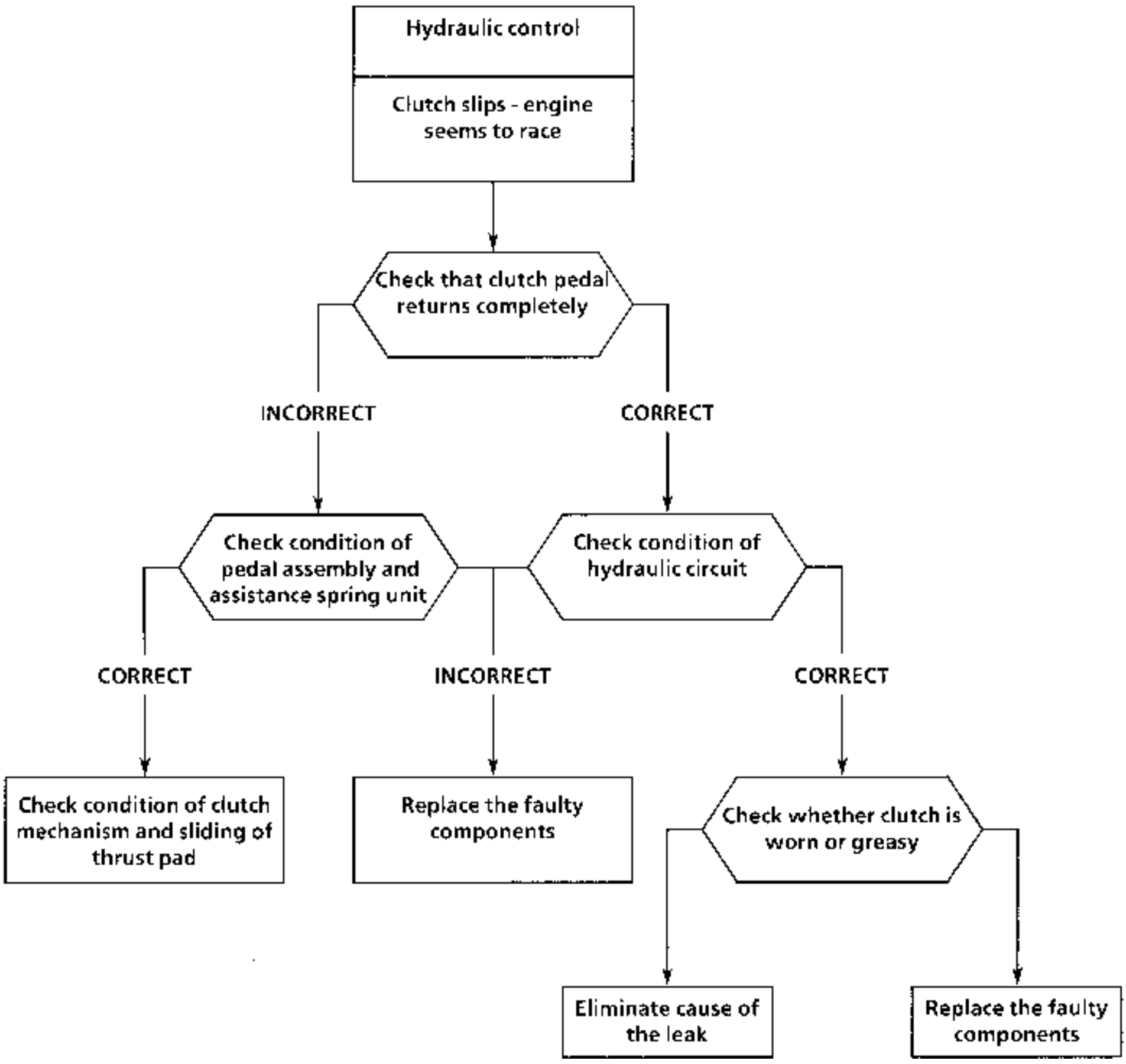
Key

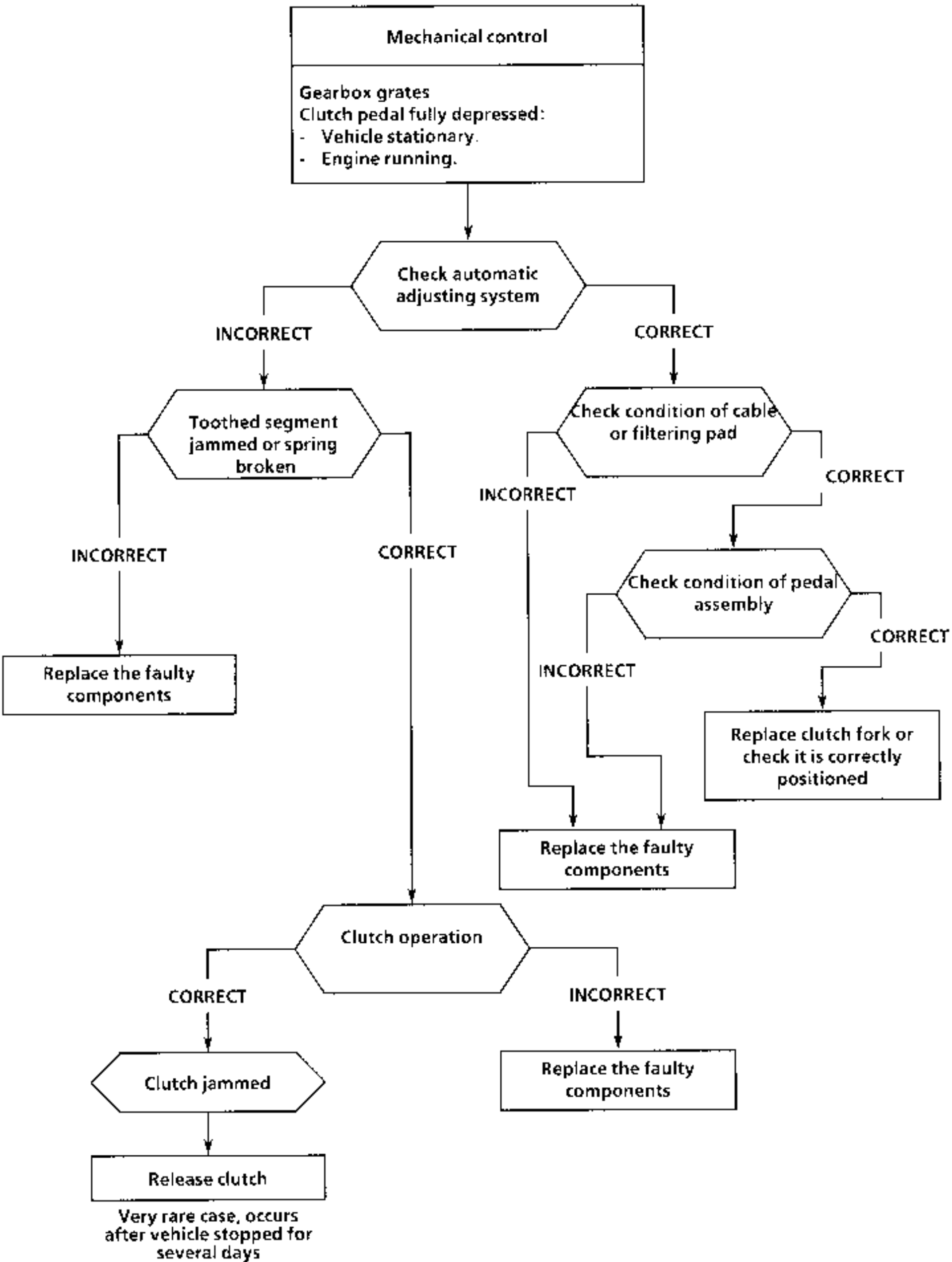
Fault notes

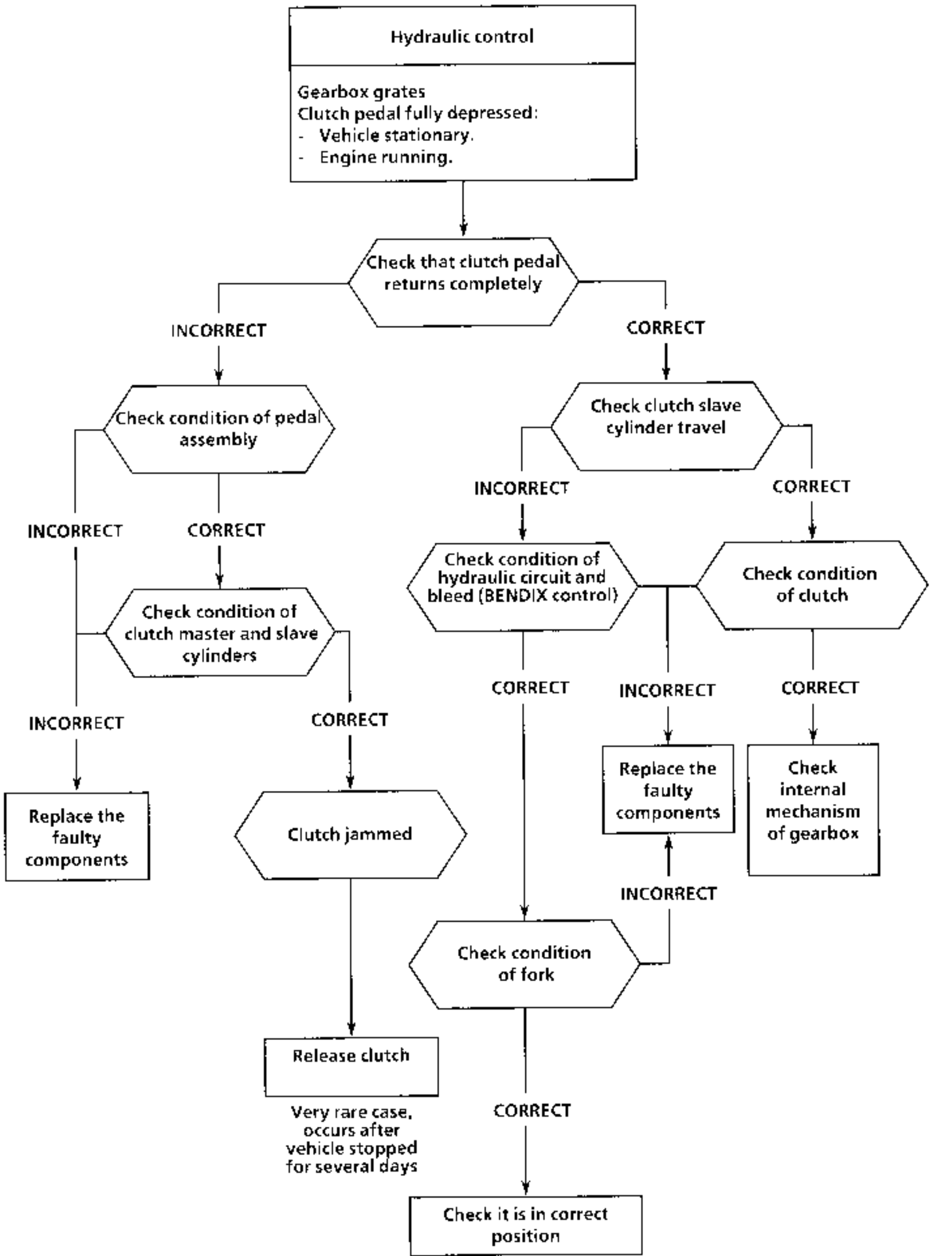
Check

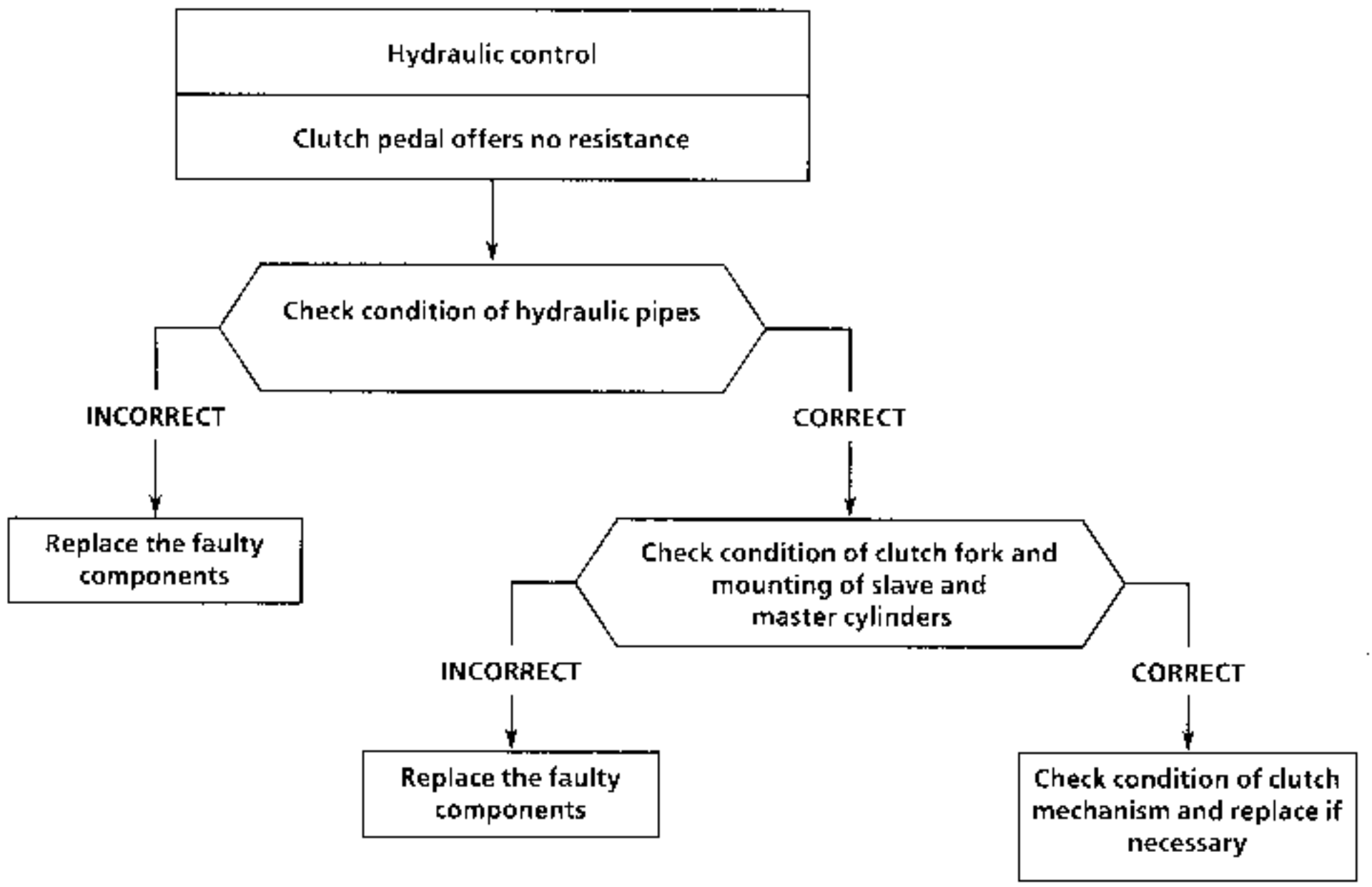
Operation to be performed

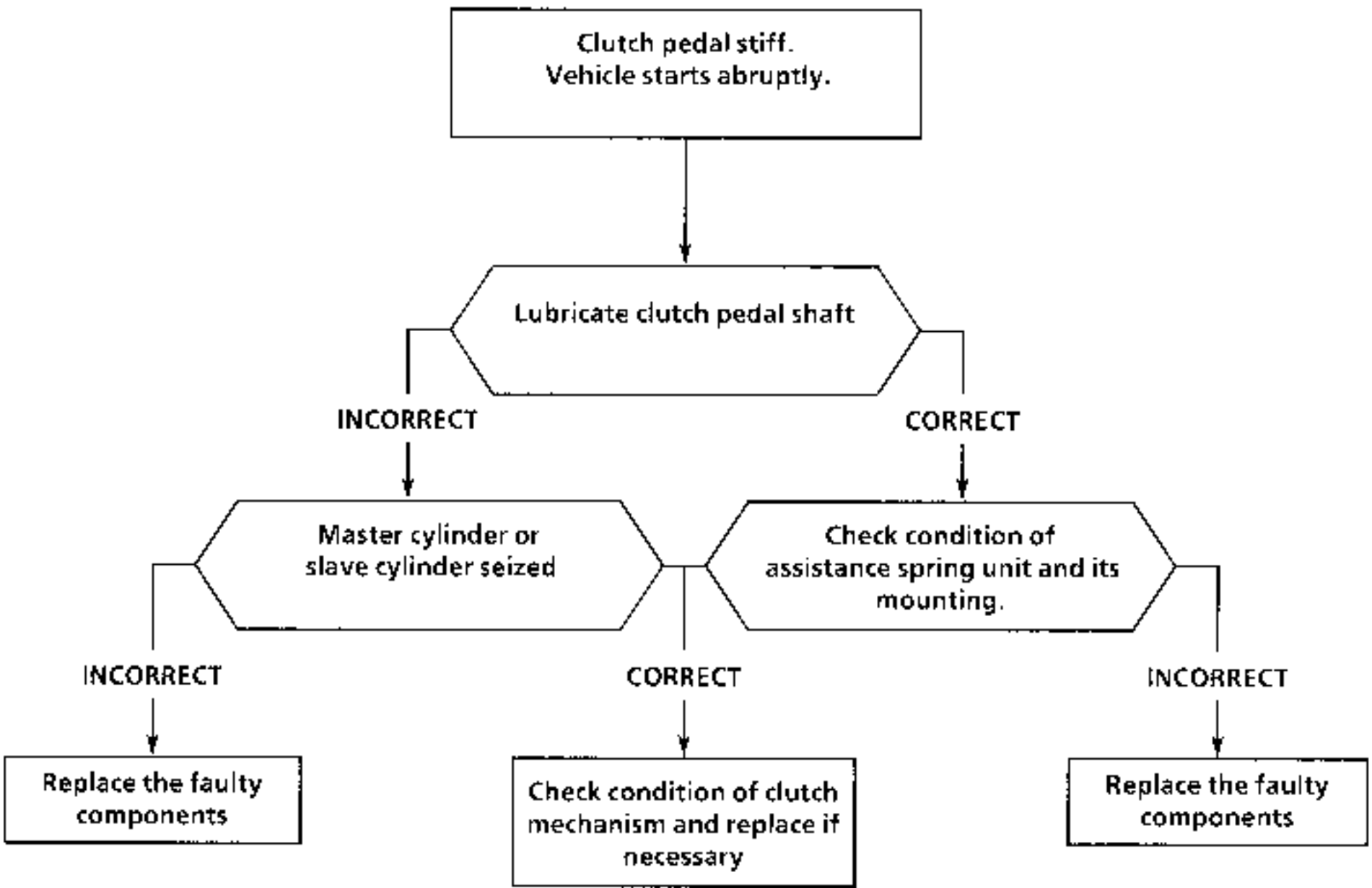


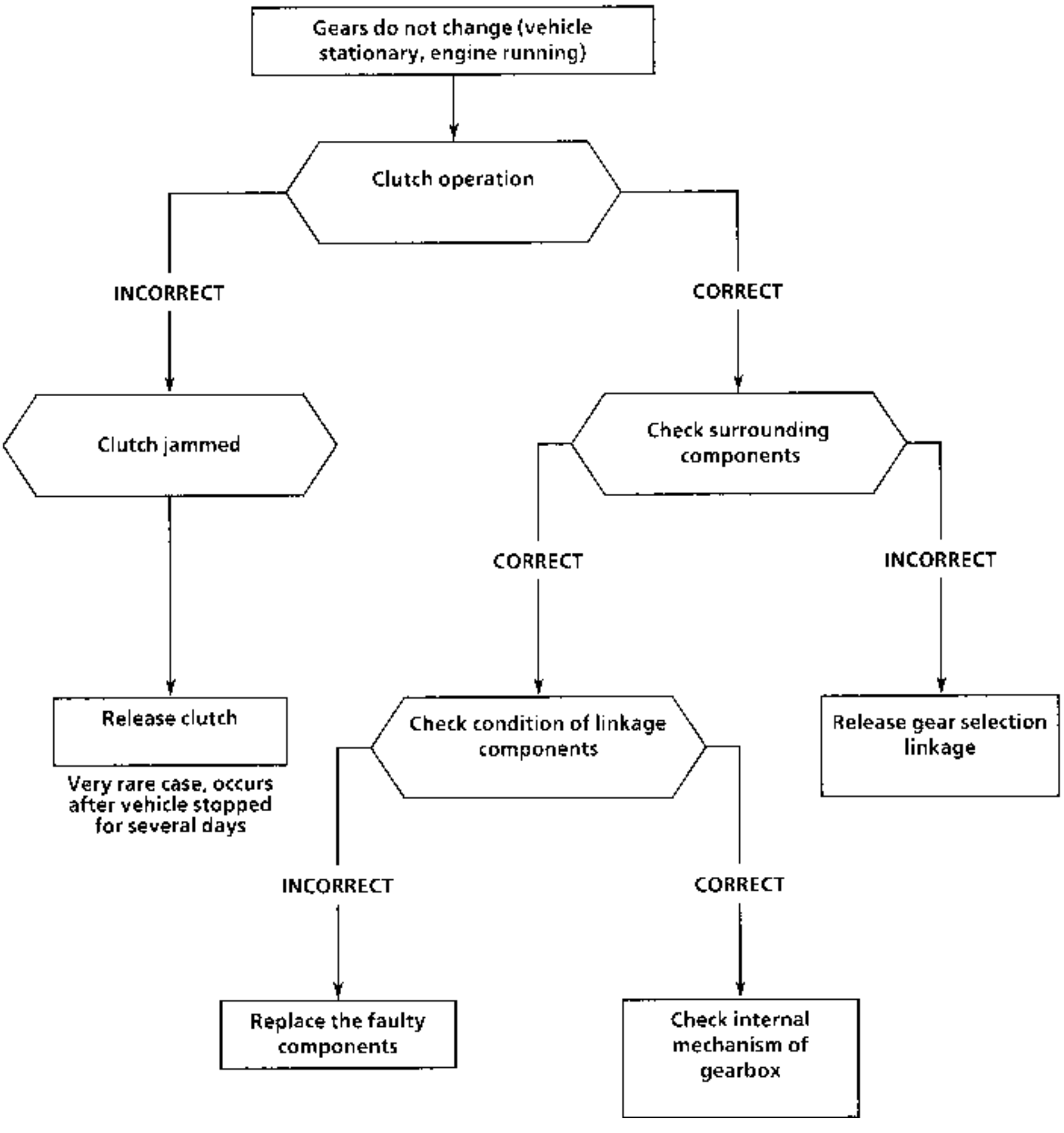

Hydraulic control
Clutch slips - engine seems to race
Check that clutch pedal returns completely
INCORRECT
CORRECT
Check condition of pedal assembly and assistance spring unit
Check condition of hydraulic circuit
CORRECT
INCORRECT
CORRECT
Check condition of clutch mechanism and sliding of thrust pad
Replace the faulty components
Check whether clutch is worn or greasy
Eliminate cause of the leak
Replace the faulty components


Mechanical control
Gearbox grates
Clutch pedal fully depressed:
- Vehicle stationary.
- Engine running.
Check automatic adjusting system
INCORRECT
CORRECT
Toothed segment jammed or spring broken
Check condition of cable or filtering pad
INCORRECT
CORRECT
INCORRECT
CORRECT
Replace the faulty components
Check condition of pedal assembly
INCORRECT
CORRECT
Replace clutch fork or check it is correctly positioned
Replace the faulty components
Clutch operation
CORRECT
INCORRECT
Clutch jammed
Replace the faulty components
Release clutch
Very rare case, occurs after vehicle stopped for several days


Hydraulic control
Gearbox grates
Clutch pedal fully depressed:
- Vehicle stationary.
- Engine running.
Check that clutch pedal returns completely
INCORRECT
CORRECT
Check condition of pedal assembly
Check clutch slave cylinder travel
INCORRECT
CORRECT
INCORRECT
CORRECT
Check condition of clutch master and slave cylinders
Check condition of hydraulic circuit and bleed (BENDIX control)
Check condition of clutch
CORRECT
INCORRECT
CORRECT
INCORRECT
CORRECT
Replace the faulty components
Clutch jammed
Replace the faulty components
Check internal mechanism of gearbox
INCORRECT
Check condition of fork
Release clutch
Very rare case, occurs after vehicle stopped for several days
CORRECT
Check it is in correct position


Hydraulic control
Clutch pedal offers no resistance
Check condition of hydraulic pipes
INCORRECT
CORRECT
Replace the faulty components
Check condition of clutch fork and mounting of slave and master cylinders
INCORRECT
CORRECT
Replace the faulty components
Check condition of clutch mechanism and replace if necessary


Clutch pedal stiff.
Vehicle starts abruptly.
Lubricate clutch pedal shaft
INCORRECT
CORRECT
Master cylinder or slave cylinder seized
Check condition of assistance spring unit and its mounting.
INCORRECT
CORRECT
INCORRECT
Replace the faulty components
Check condition of clutch mechanism and replace if necessary
Replace the faulty components


Gears do not change (vehicle stationary, engine running)
Clutch operation
INCORRECT
CORRECT
Clutch jammed
Check surrounding components
CORRECT
INCORRECT
Release clutch
Very rare case, occurs after vehicle stopped for several days
Check condition of linkage components
Release gear selection linkage
INCORRECT
CORRECT
Replace the faulty components
Check internal mechanism of gearbox

Whistling when clutch disengaged

Clutch thrust pad seized

Replace thrust pad

Clutch pedal grating

Lubricate clutch pedal and assistance spring unit shafts

INCORRECT

Pedal shaft worn - spring unit faulty

Replace the faulty components

Juddering
(vehicle jolts on starting)

Check condition of gearbox mounting

INCORRECT

Replace the mountings and check tightening of gearbox mountings on engine and engine mountings themselves

CORRECT

Clutch greasy or warped

Replace the faulty components. Eliminate cause of the leak

REPLACEMENT

This operation is carried out when the gearbox has been separated from the engine.

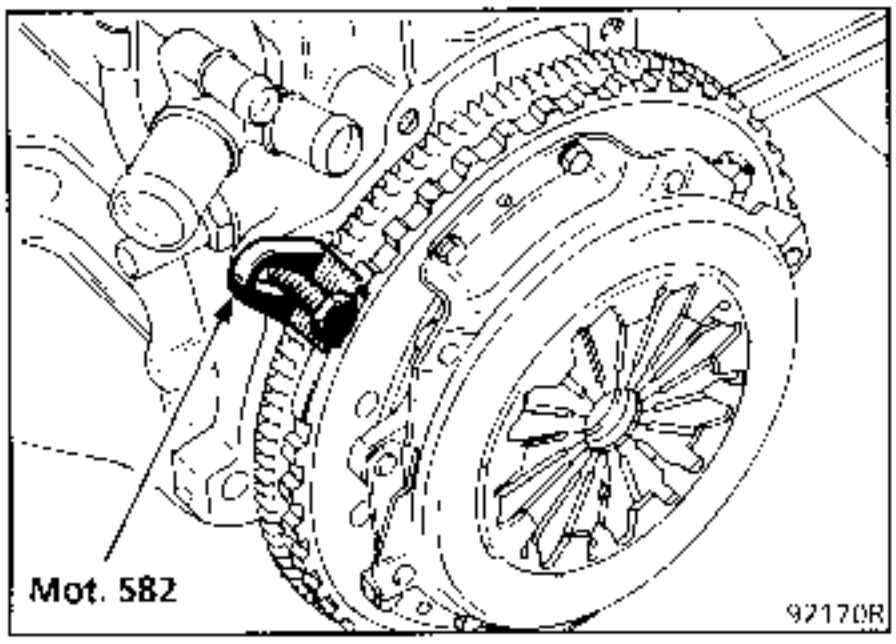
SPECIAL TOOLING REQUIRED		
Mot.	582	Locking tool

TIGHTENING TORQUES (in daN.m)	
7 mm diameter mechanism mounting bolt	2.5
8 mm diameter mechanism mounting bolt	3

REMOVAL

Fit the locking tool **Mot. 582**.

Remove the mounting bolts from the mechanism and remove the mechanism together with the clutch disc.
Check and replace any faulty parts.



REFITTING

ALL TYPES

PRECAUTIONS TO BE TAKEN WHEN REPAIRING THE CLUTCH

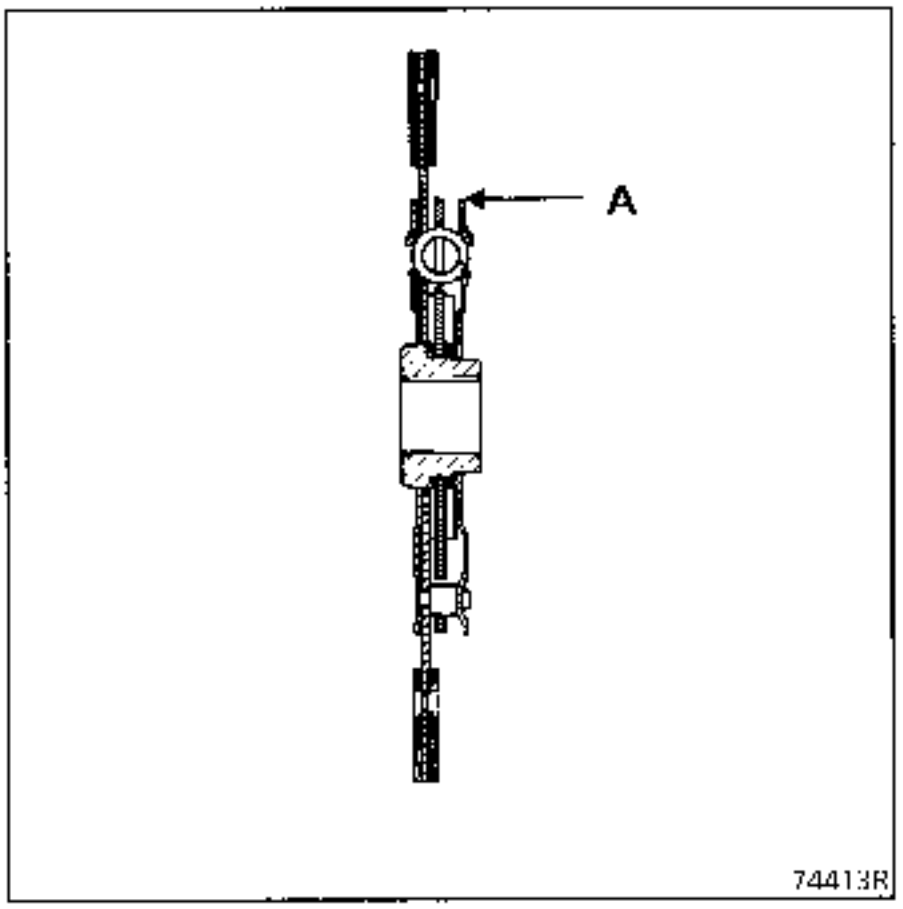
To improve the sliding of clutch discs, the hubs are now nickel coated.

Clean the clutch shaft splines and refit the assembly, **without lubricant**.

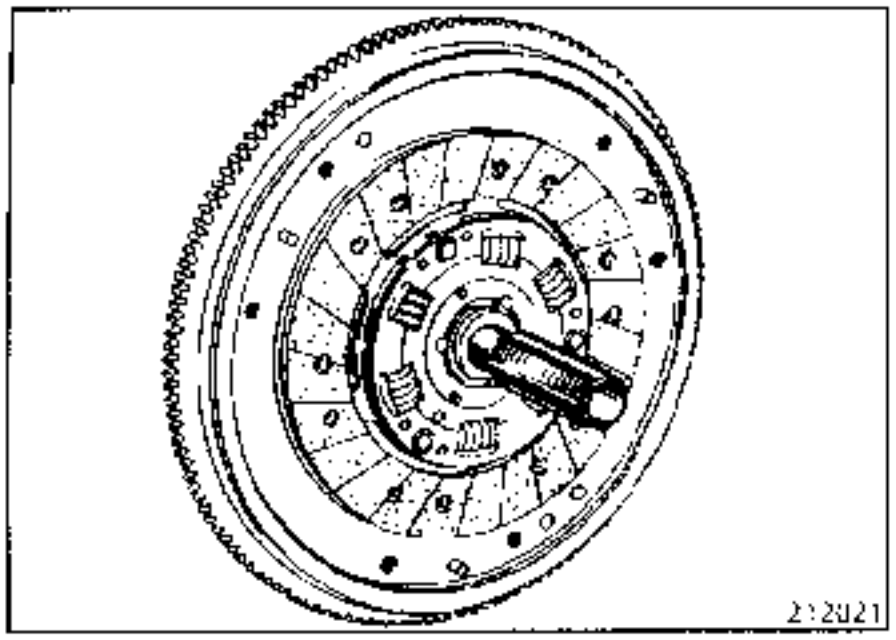
Special notes for diesel engine clutch discs :

These are equipped with a damper pre hub which is most efficient when its internal components are operating dry.

Fit the disc into position: offset **(A)** of the hub should be at the gearbox end.



Use the plastic centring device provided in the kit to fit the disc.



Fit the mechanism.

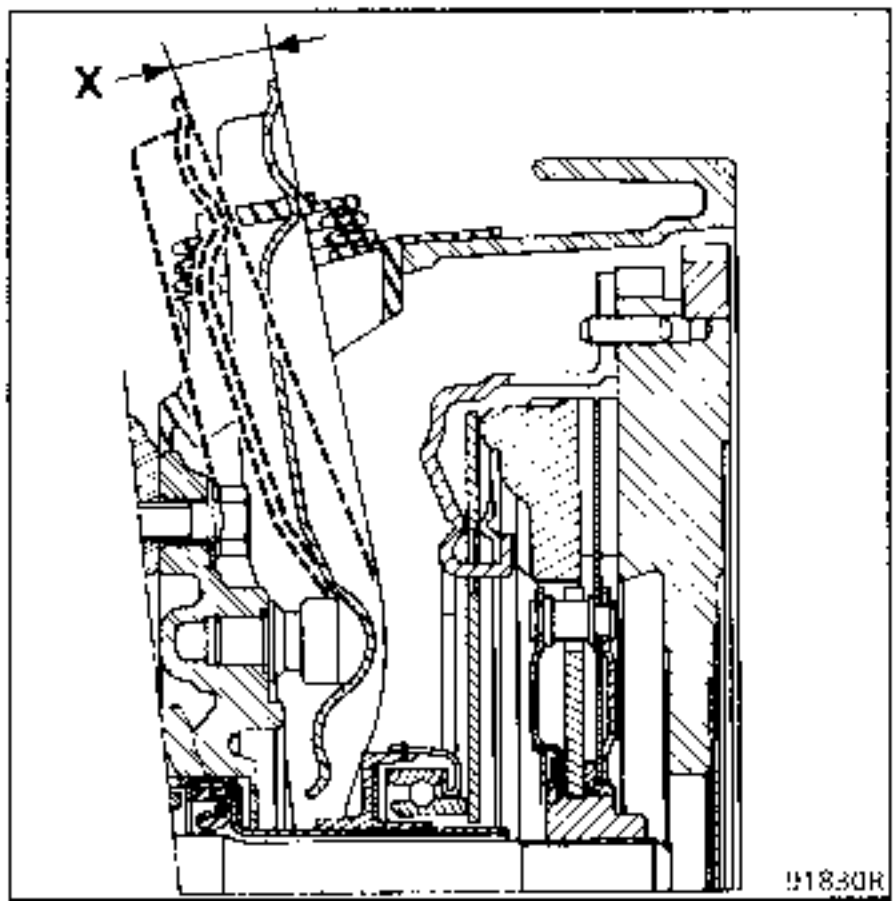
Gradually tighten then torque tighten the mechanism mounting bolts.

Remove the locking tool **Mot. 582**.

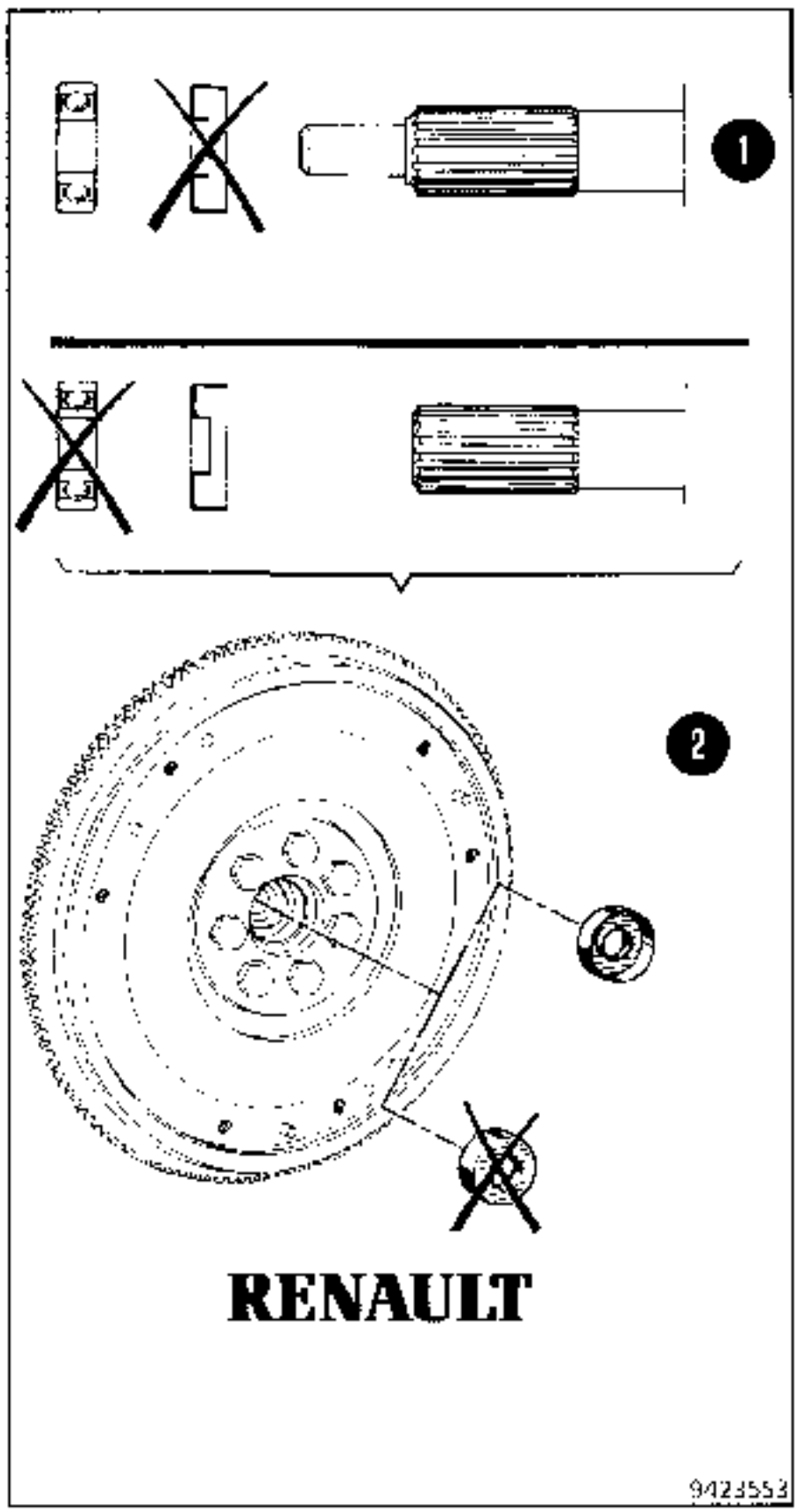
Coat the following components with **MOLYKOTE BR2** :
- thrust pad bore,
- guide tube,
- fork pads,
- pivot.

After refitting the gearbox, reset the toothed segment and check the automatic take-up system operates correctly (depending on version).

Check the fork travel . It should be :
X = 17 to 18 mm



NOTE : to centre the disc on **J** and **F** engines, use the centring rings.



REPLACEMENT

This operation is carried out when the gearbox has been separated from the engine.

REMOVAL

Remove the thrust pad by tilting the fork.

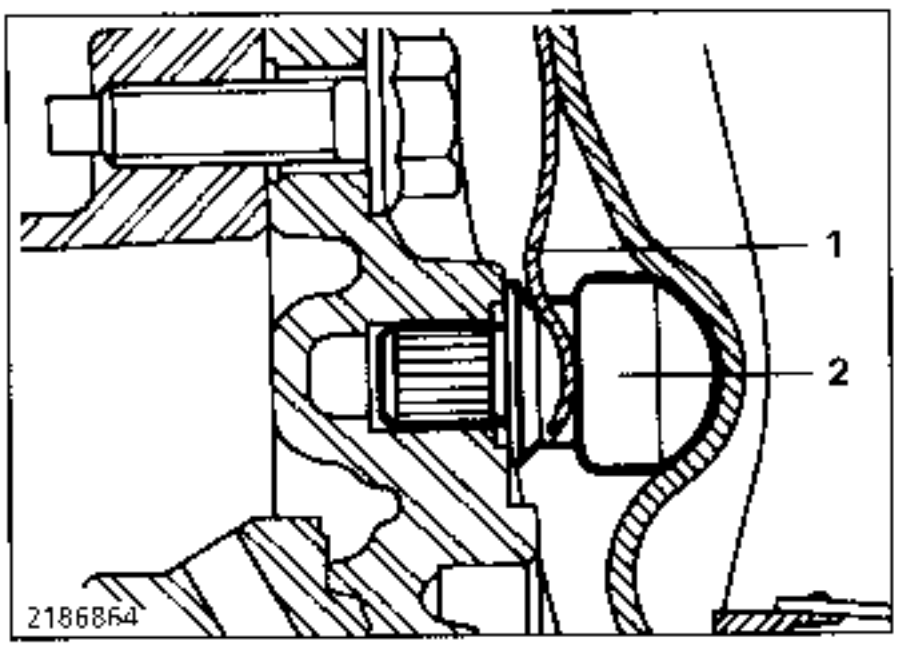
Remove the rubber protector and pull the fork to the interior of the clutch bellhousing.

REFITTING

Coat the walls of the guide tube and the fork pads using **MOLYKOTE BR2**.

1st fitting

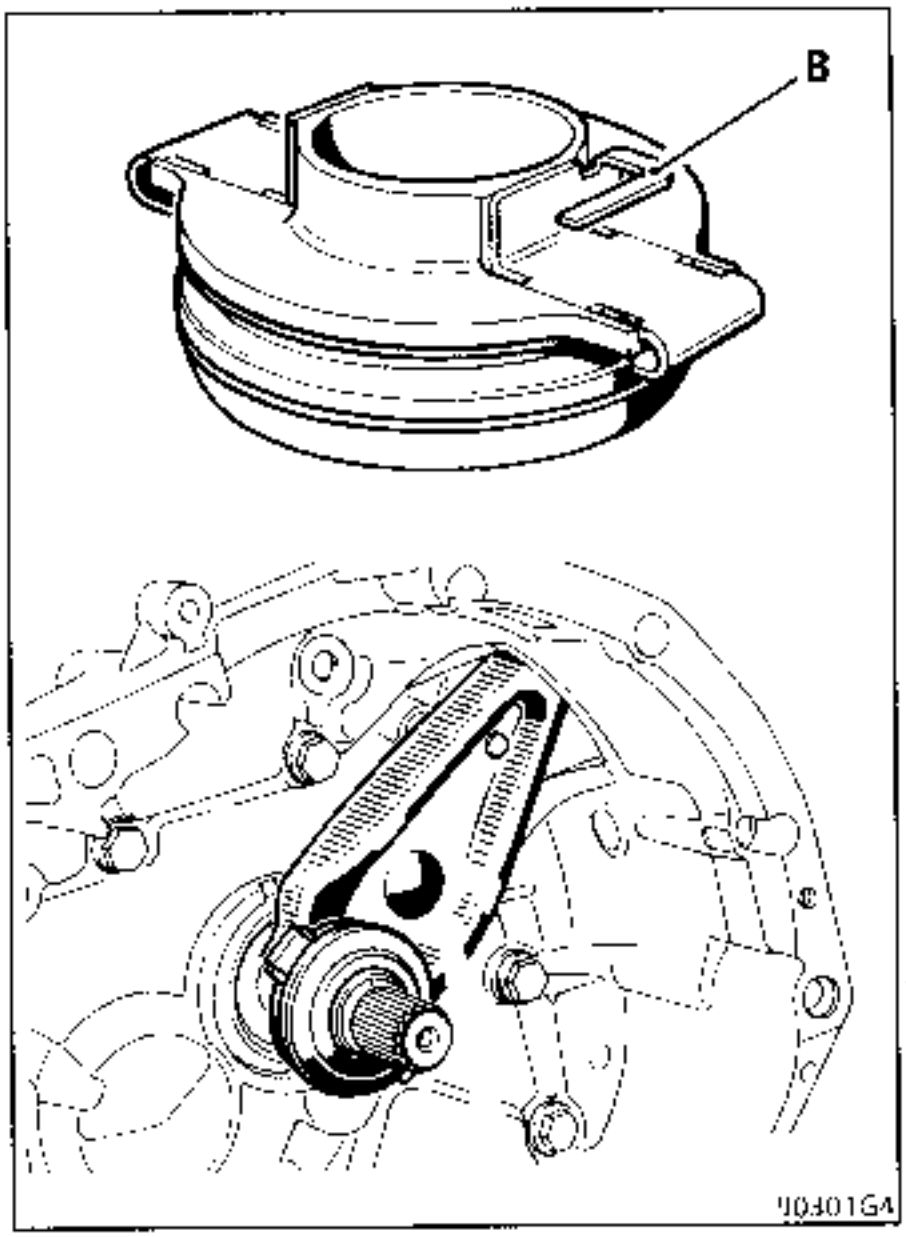
Position the fork by placing the spring (**1**) behind the cup (**2**) on the pivot.



2nd fitting

There is no clutch fork thrust spring (**1**) on the pivot.

Place the thrust pad on the guide tube, placing clip (**B**) in the fork.



Refit the rubber protector.

Ensure the assembly operates correctly.

NOTE : when carrying out operations which do not require the gearbox to be removed or after replacing the gearbox, DO NOT lift the fork as this may release the clip (B) on the thrust pad.

REPLACEMENT

This operation is carried out when the gearbox has been separated from the engine.

THRUST PAD

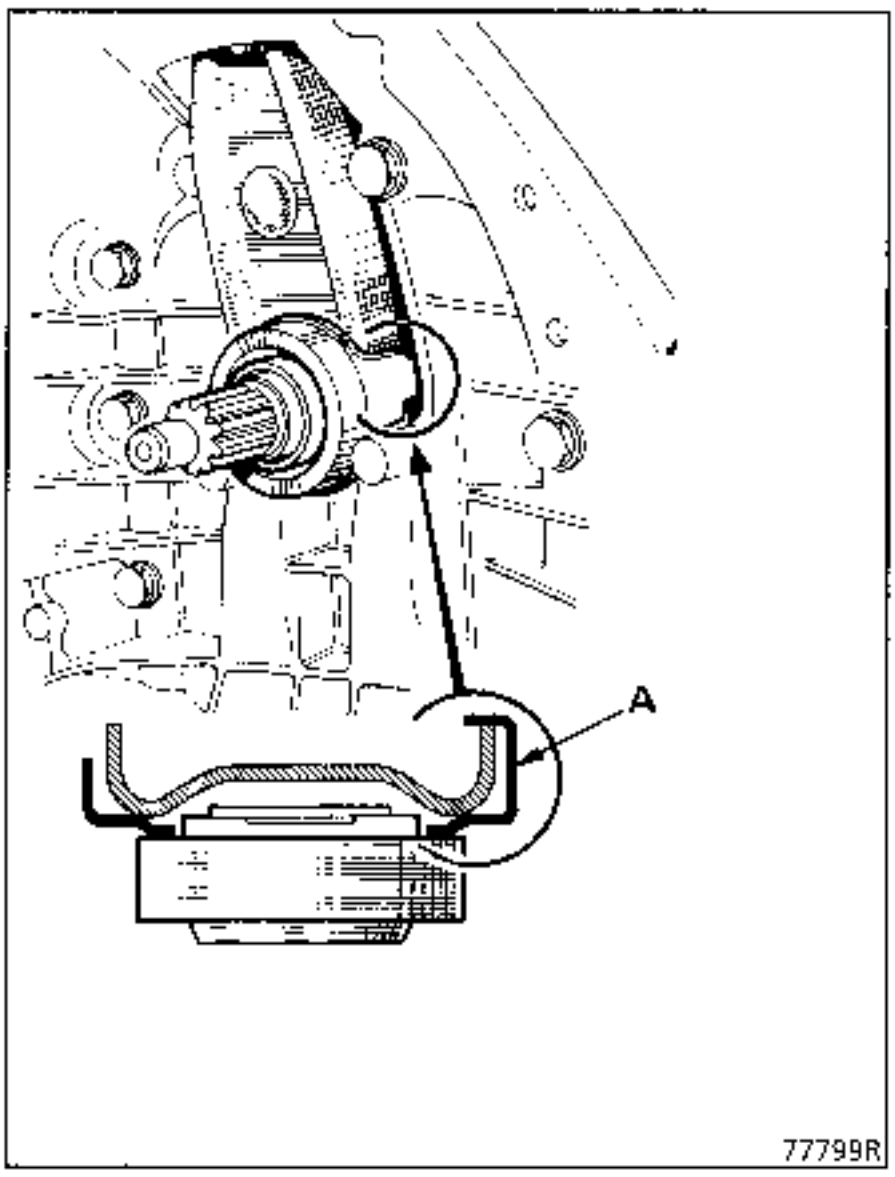
Removal

Tilt the fork to remove the thrust pad.

Refitting

Coat the walls of the guide tube with **MOLYKOTE BR2**.

Fit the thrust pad on the guide tube, inserting clip (**A**) into the fork.



Ensure that it slides correctly.

FORK

Removal

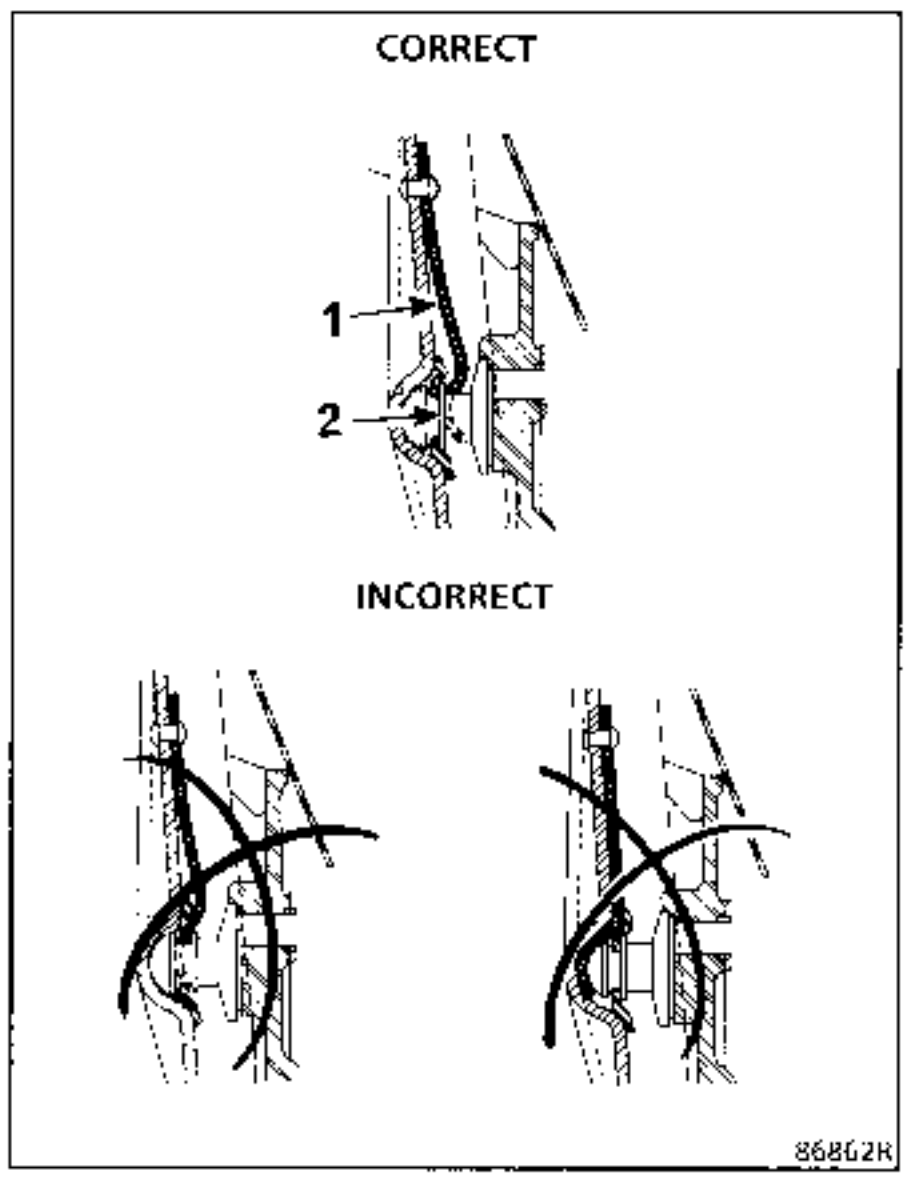
Pull the fork towards the outside of the gearbox to remove it.

Refitting

Lightly coat the fork pivot with "**MOLYKOTE BR2**".

Fit the fork into position, positioning spring (**1**) behind cup (**2**).

Ensure the assembly operates correctly.



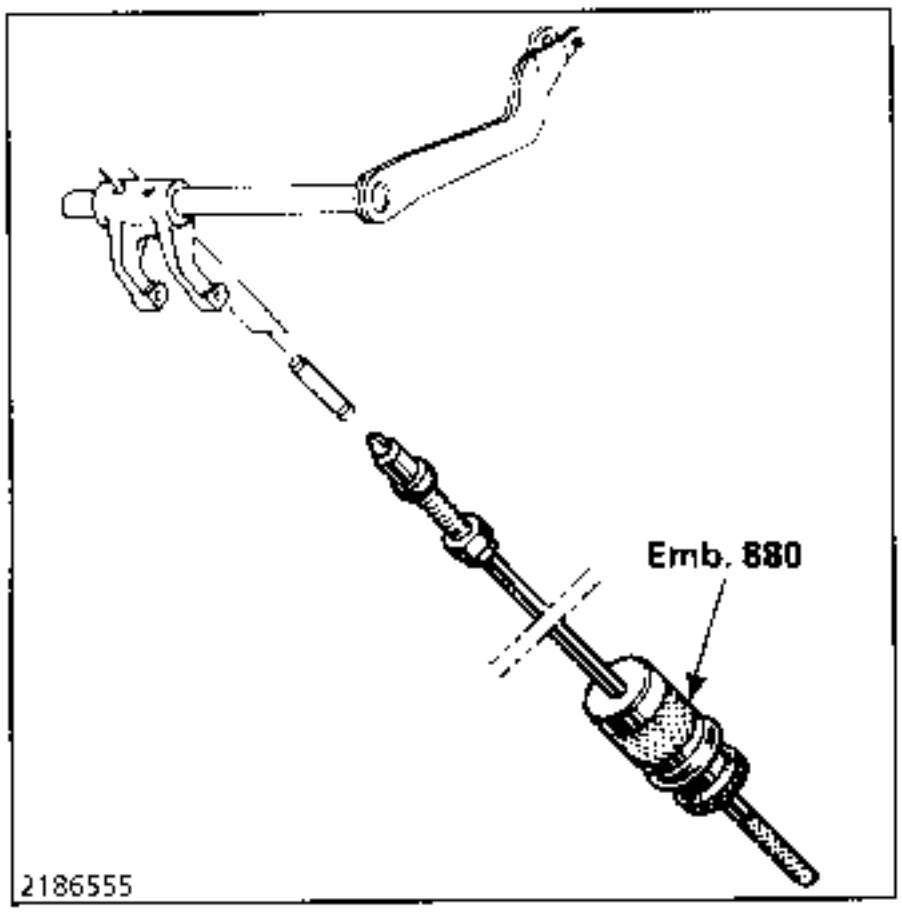
REPLACEMENT

SPECIAL TOOLING REQUIRED		
Emb.	880	Roll pin extractor

This operation is carried out when the gearbox has been separated from the engine.

REMOVAL

Remove the roll pins from the fork using tool **Emb. 880**.

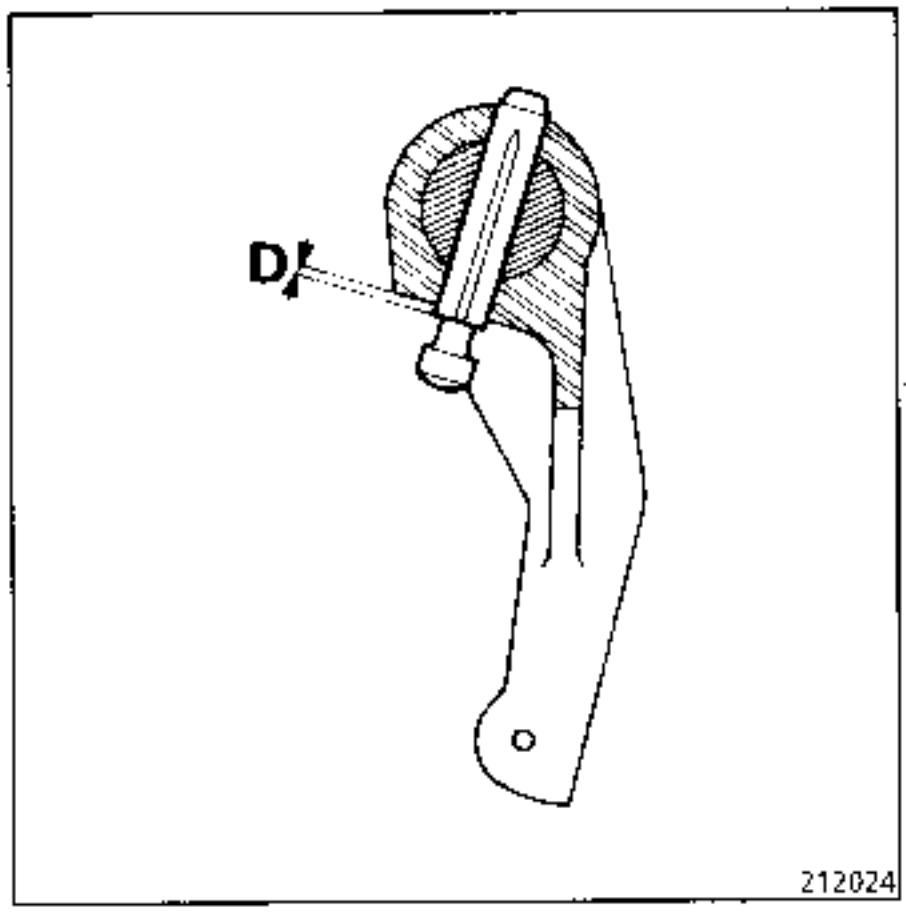


REFITTING - Special notes

Lubricate the fork shaft using **MOLYKOTE BR2**.

Fit the roll pins; ensure that distance **D** in relation to the fork is observed.

D = 1 mm



Lubricate the thrust pad guide and fork pads with **MOLYKOTE BR2**.

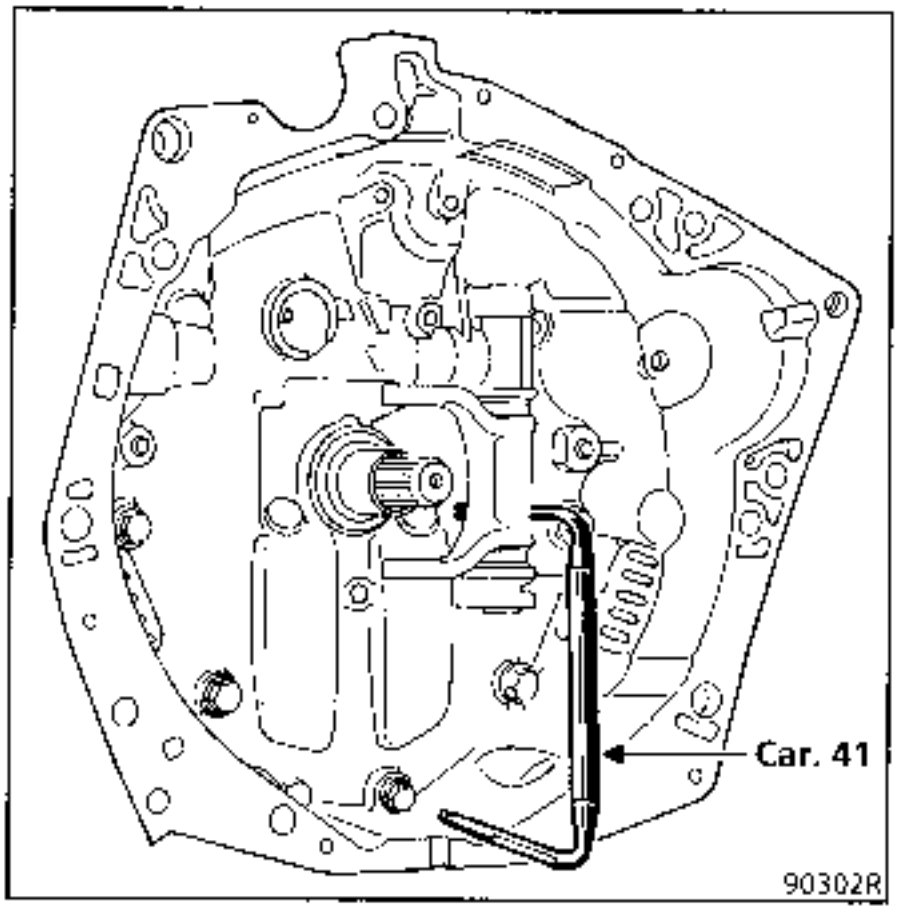
REPLACEMENT

SPECIAL TOOLING REQUIRED		
B.Vi.	606	Set of punches
Car.	41	Angled punch

This operation is carried out when the gearbox has been separated from the engine.

REMOVAL

Knock out the fork retaining roll pins half way using tool **B.Vi. 606** then remove them using tool **Car. 41**.



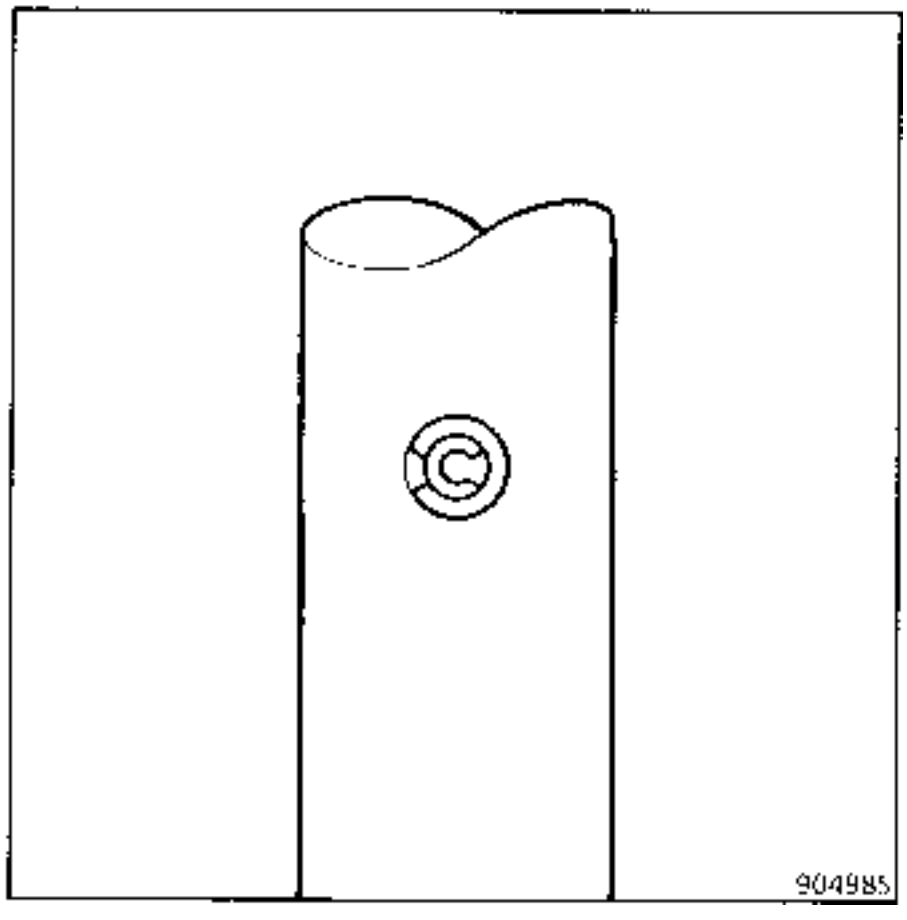
REFITTING

Lightly grease the fork shaft (**MOLYKOTE BR2**).

Engage the shaft (fitted with sealing rubber) and fit the fork and the two plastic spacers. Observe the fitting direction for the fork: boss at the clutch bellhousing end.

Align the holes in the fork with those on the shaft and fit the roll pins.

Make sure that the roll pins are fitted the correct way round. The slots in the roll pins should be perpendicular to the fork shaft and facing in opposite directions.



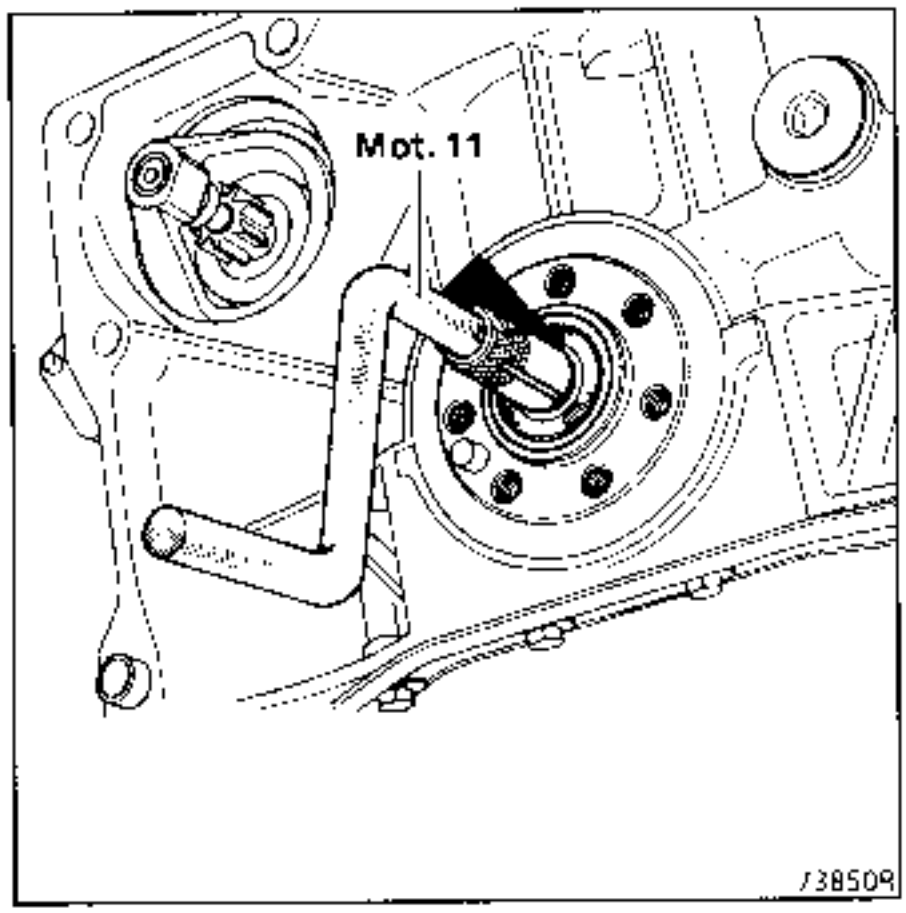
REPLACEMENT

This operation is carried out when the gearbox has been separated from the engine and the clutch removed.

SPECIAL TOOLING REQUIRED
Mot. 11 Hub extractor
Plus tooling for removing the gearbox

REMOVAL

Extract the bearing using tool **Mot. 11**.



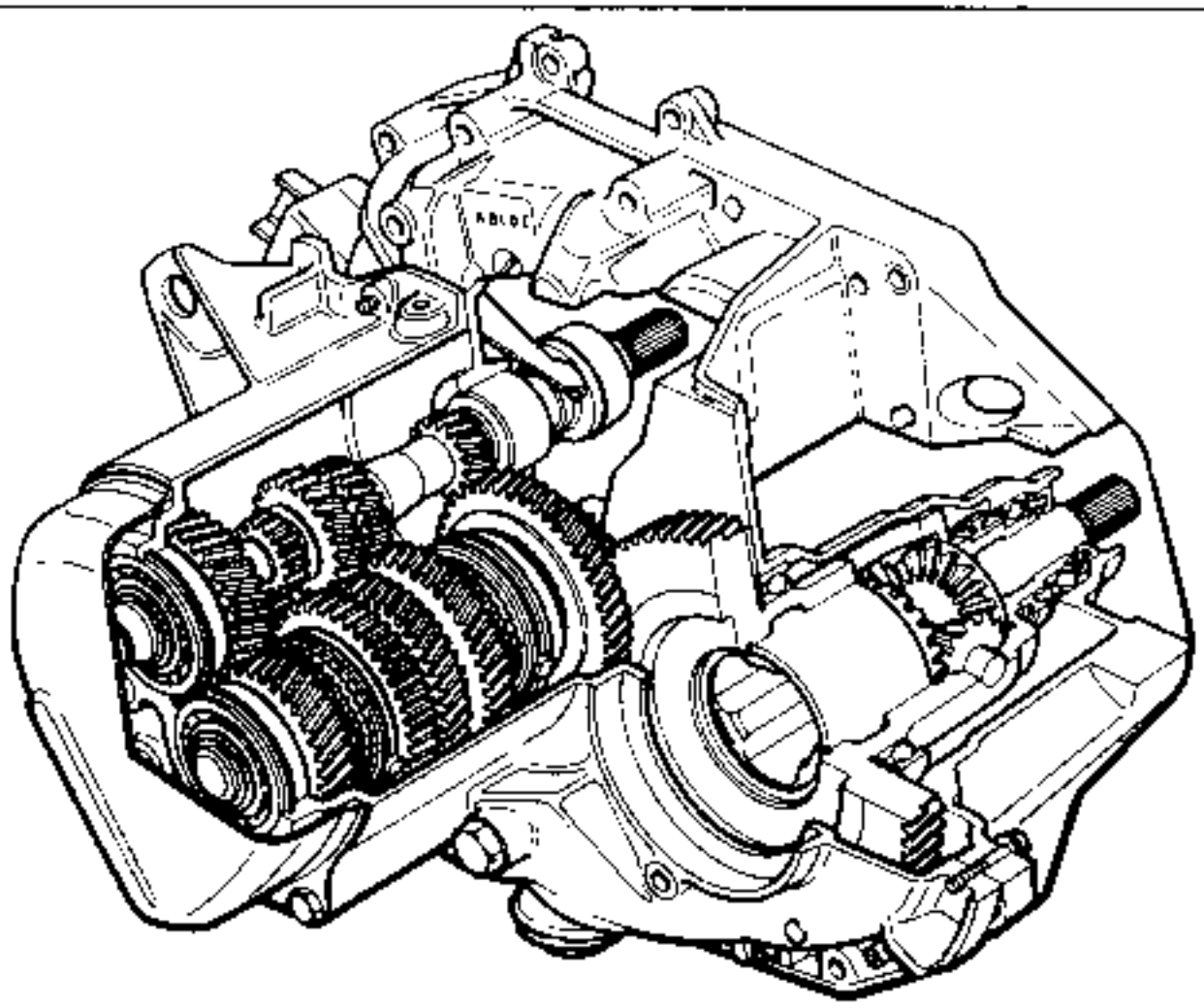
REFITTING

Fit the new bearing: this is supplied greased - only the outer diameter requires cleaning.

Coat the outer diameter of the bearing with **LOCTITE FRENBLOC**.

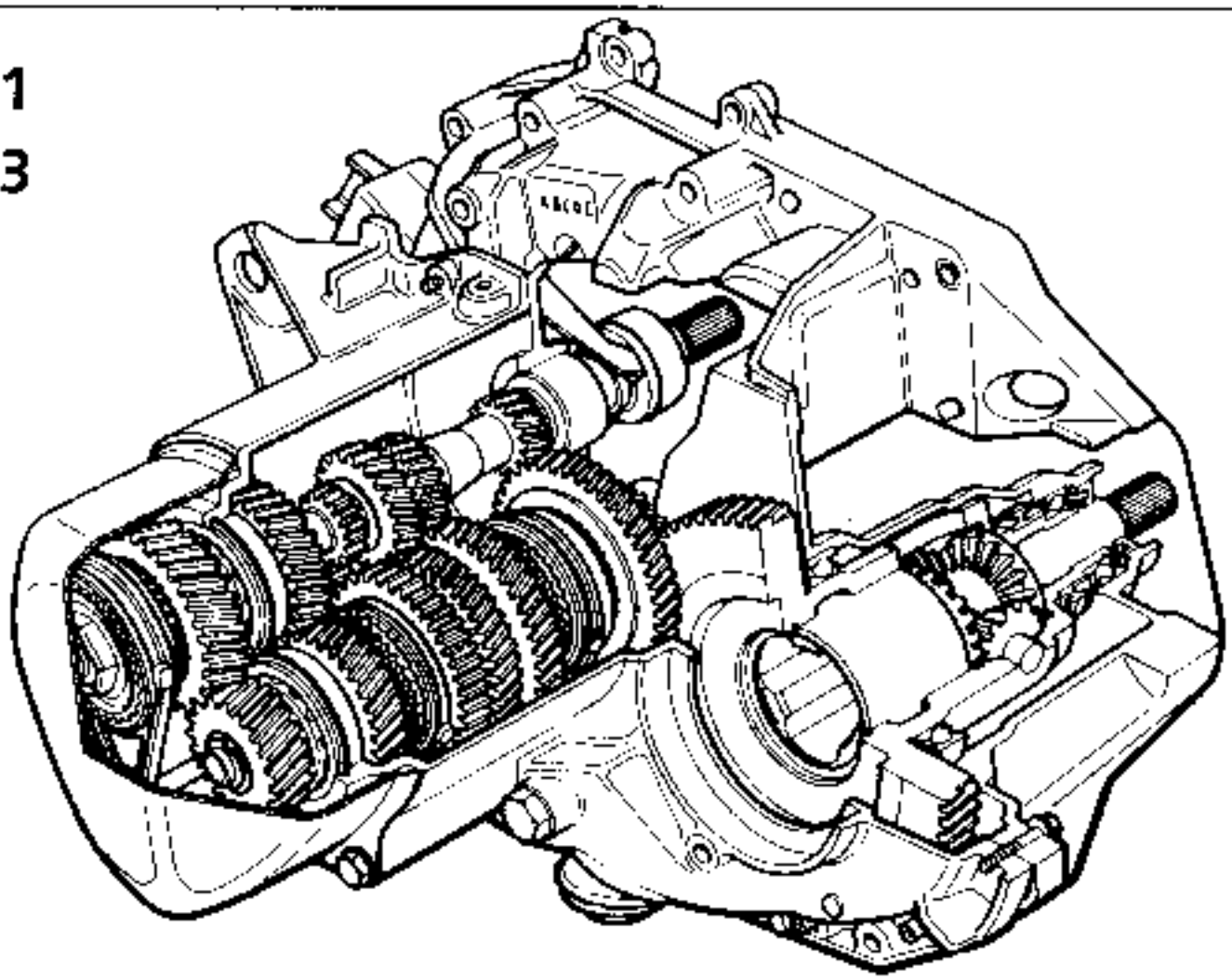
Fit the bearing using a tube, taking the weight on the outer cage.

JB2

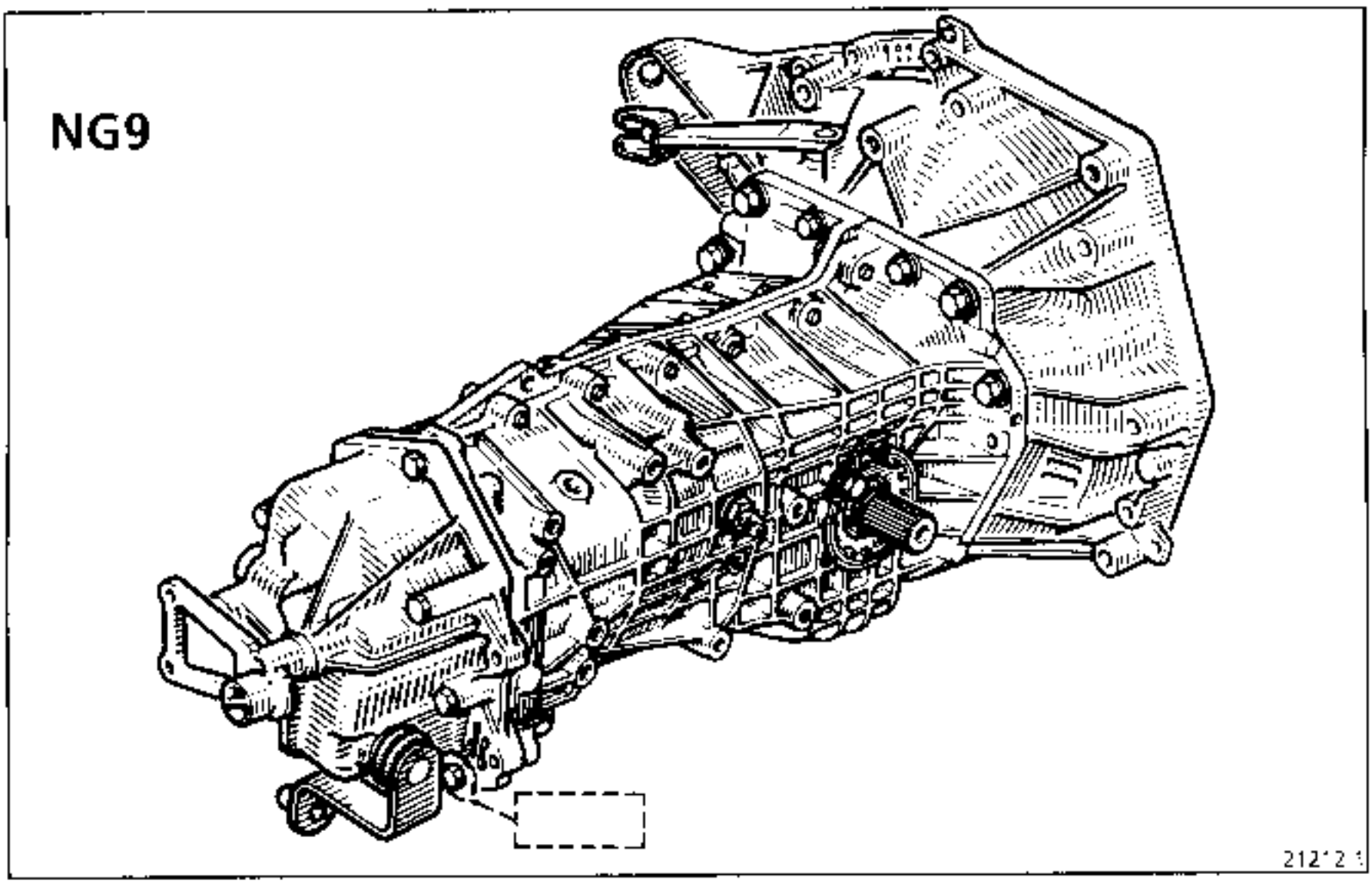


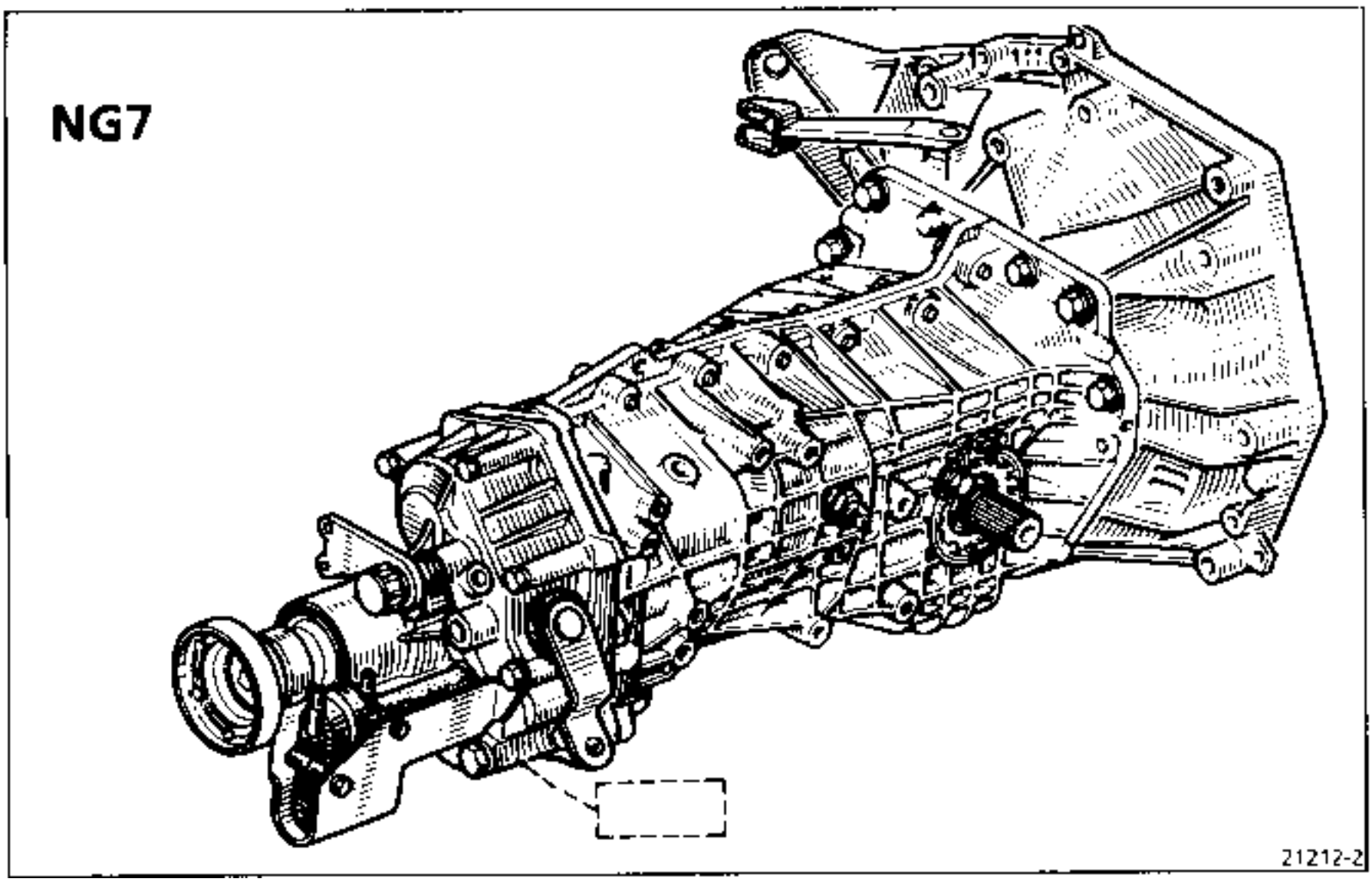
21211-1

JB1
JB3

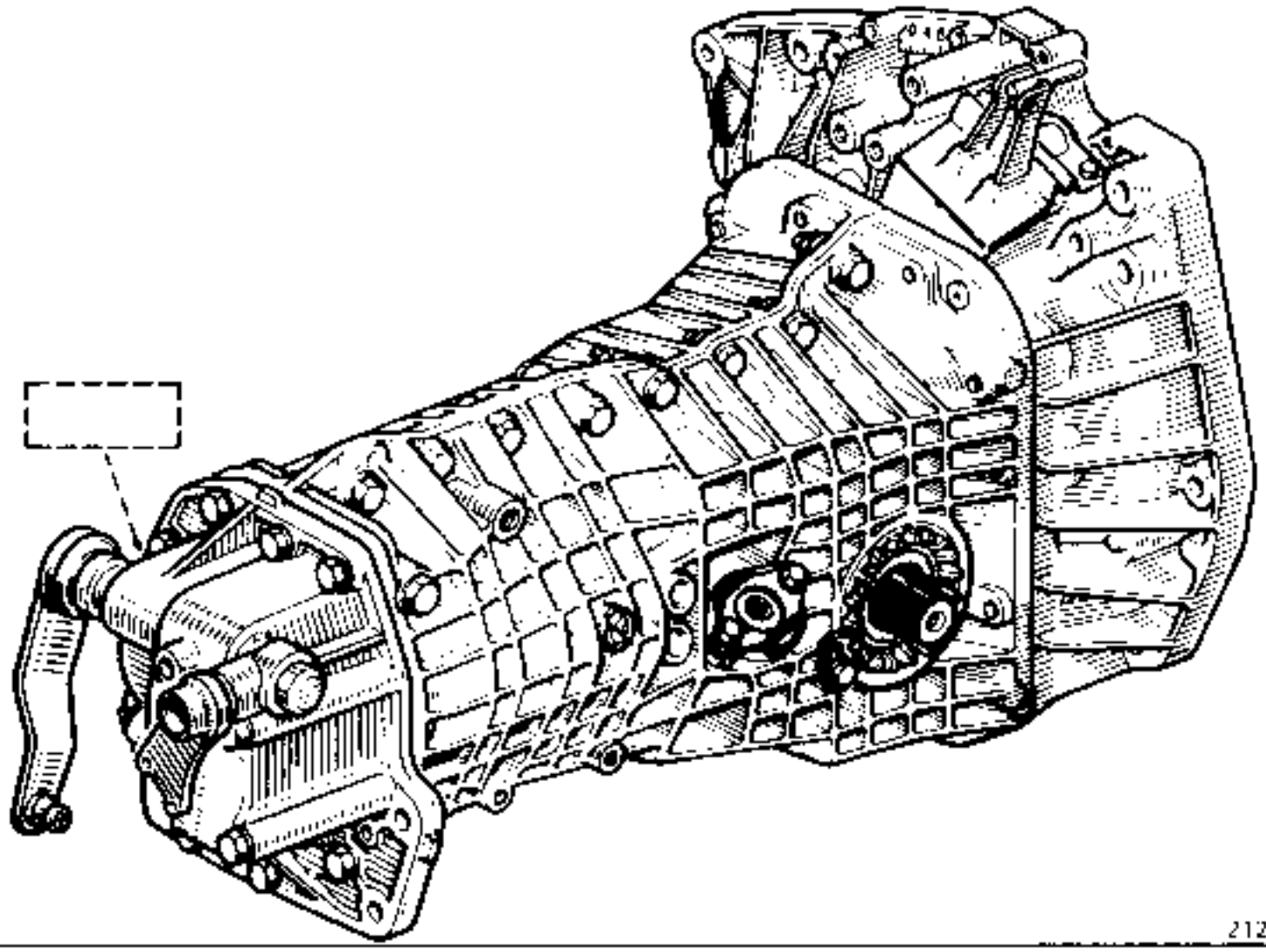


21211-7


NG9
212'2 1

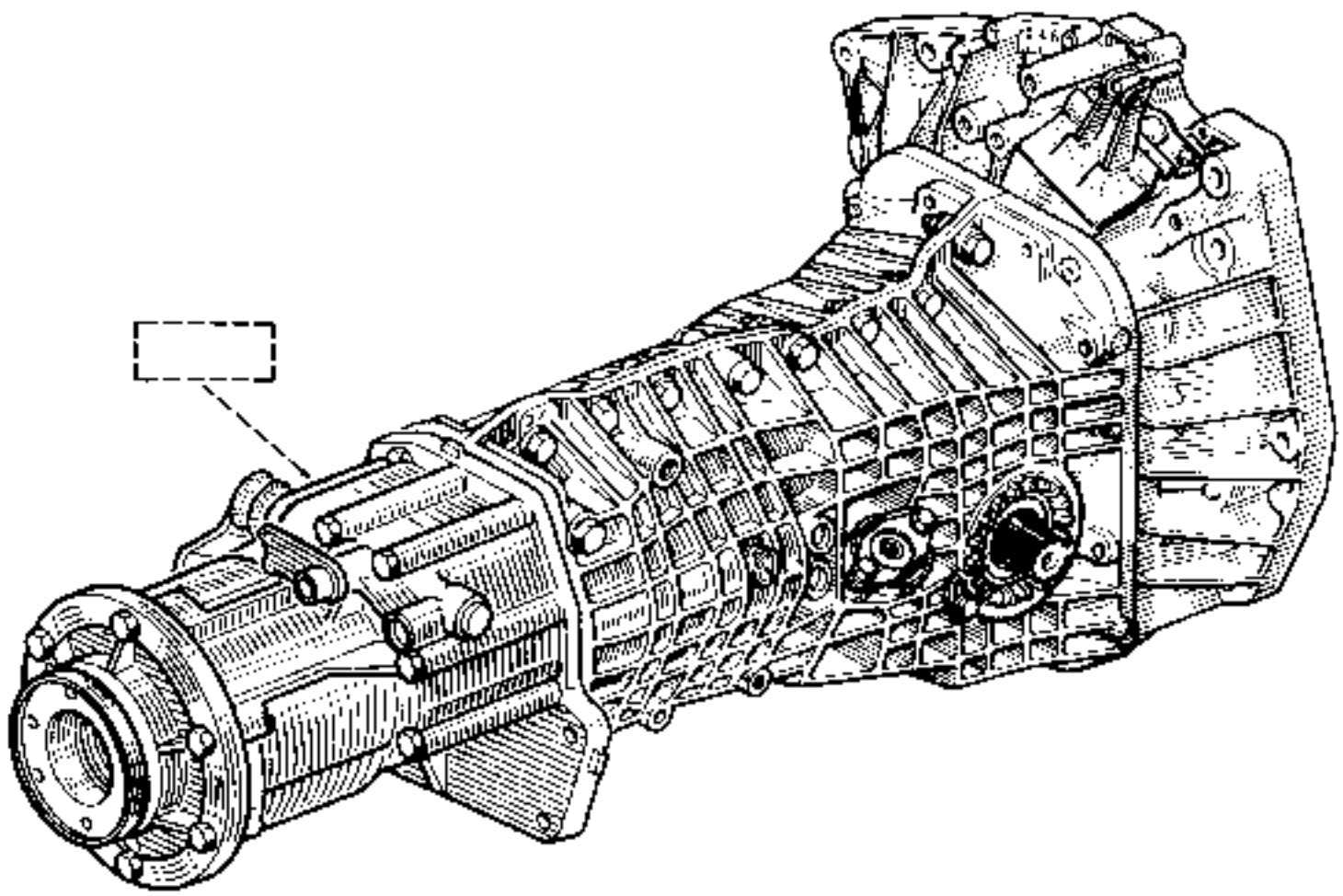

NG7
21212-2

UN1



21214-1

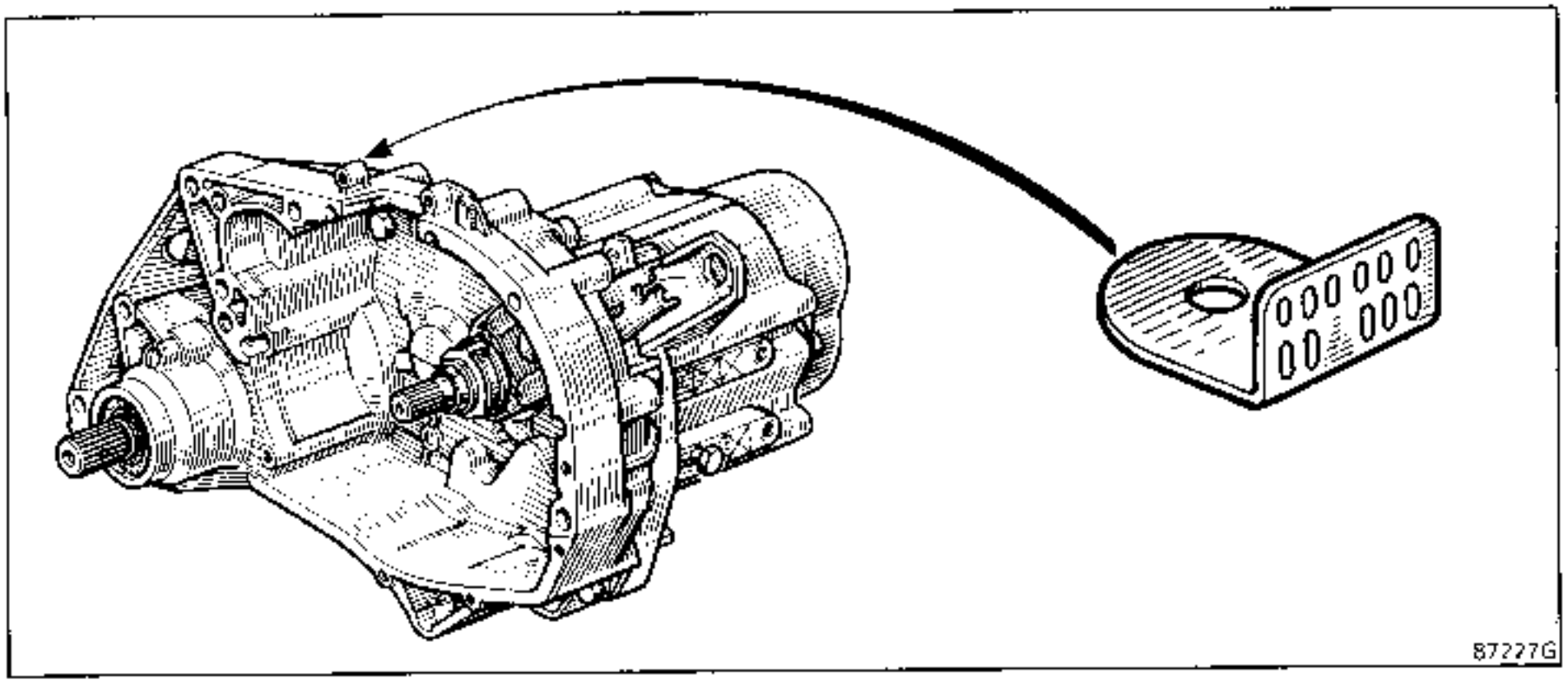
UN7



21213-2

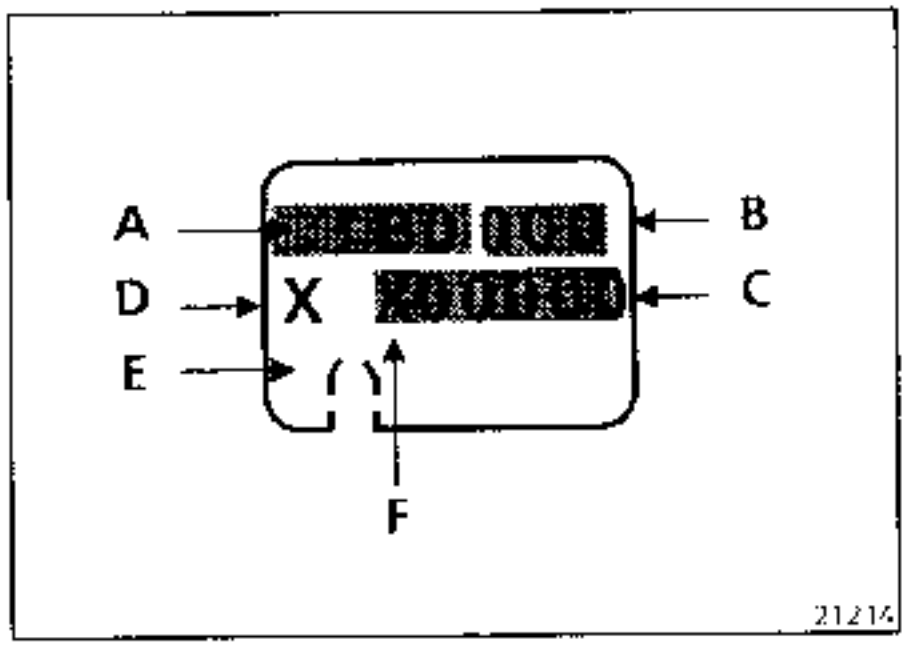
X48 vehicles with "**transverse engines**" are fitted with the **JB** type gearbox.

Workshop Repair Manual "**B.V. JB**" deals with the complete overhaul of this component.



An identification plate on the clutch bellhousing shows:

- at **A** : the gearbox type,
- at **B** : the gearbox suffix,
- at **C** : the fabrication number,
- at **D** : the factory of manufacture,
- at **E** : a notch when the gearbox is assembled with a **C** or **E** type engine,
- at **F** : a letter preceding fabrication numbers greater than **999 999**.



TWO COLOUR MARKING (JB1 - JB2 - JB3)

2/3 of the surface is painted with a colour specific to each gearbox, enabling them to be matched with the driveshafts.

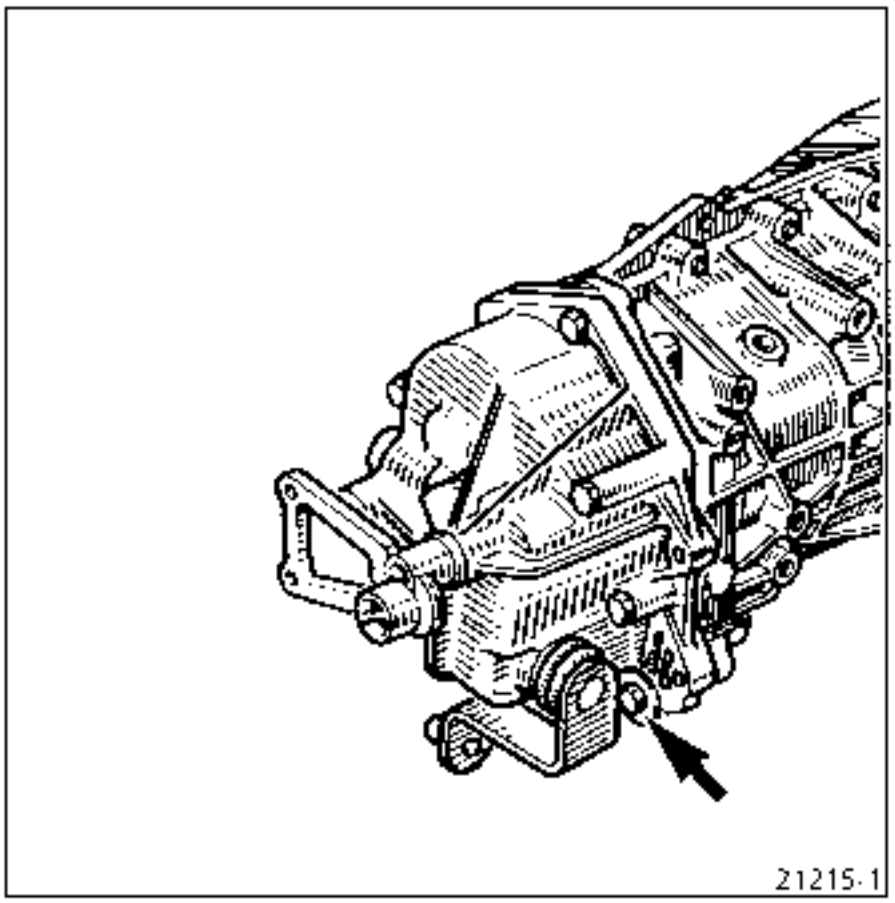
The remaining **1/3** of the surface is painted with a colour specific to the gearbox suffix.

X48 vehicles with "**in line**" engines and **X48** "**4 x 4**" vehicles are fitted with **NG** or **UN** type gearboxes.

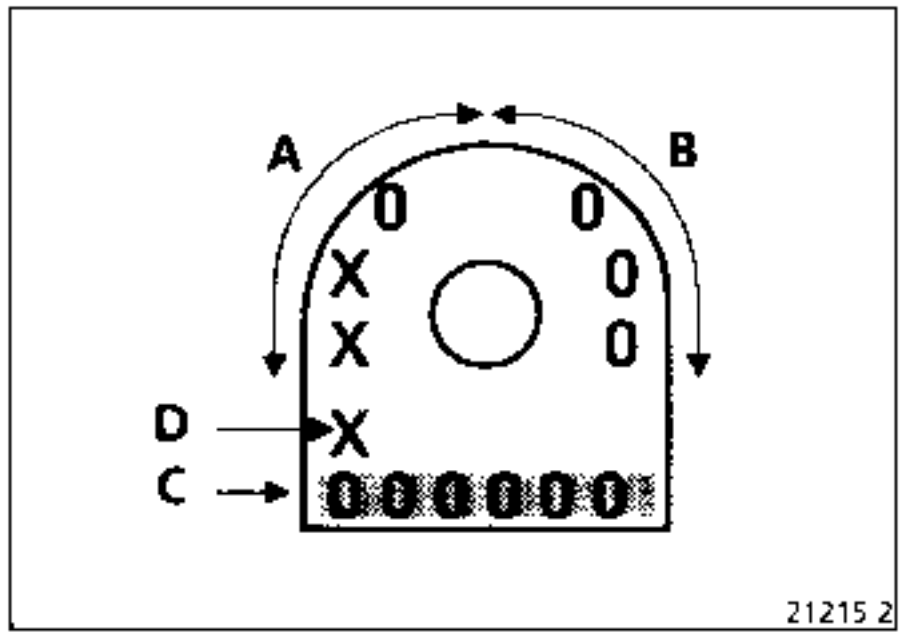
Workshop Repair Manuals "**BV - NG**", "**BV - UN** and **BV - UN7**" deal with the complete overhaul of these components.

A plate mounted on the rear housing shows:

- at **A** : the gearbox type,
- at **B** : the gearbox suffix,
- at **C** : the fabrication number,
- at **D** : the factory of manufacture.



21215-1



21215 2

JB1									
Suffix	Vehicle	Final drive	Speedo drive	1st	2nd	3rd	4th	5th	Reverse
029	B-L-K 48D	15 — 61	21 — 19	11 — 41	21 — 43	28 — 37	30 — 29	39 — 31	21 — 26 39

JB2								
Suffix	Vehicle	Final drive	Speedo drive	1st	2nd	3rd	4th	Reverse
000	L-K-S 481 L-K 48 M	17 — 56	21 — 19	11 — 41	19 — 39	25 — 33	31 — 28	11 — 26 39
002 004	B-L-K-S 481 B-L-K 48M				21 — 43	28 — 37		

JB3									
Suffix	Vehicle	Final drive	Speedo drive	1st	2nd	3rd	4th	5th	Reverse
010	L-K-S 482 L-K 48F L-K 48 M	16 — 57	21 — 19	11 — 41	19 — 39	25 — 33	30 — 29	34 — 27	11 — 26 39
017	L 482 L-K 48J L-K 48N L-K 48E	15 — 61		11 — 34	19 — 35			33 — 25	
022	L-K 482 Spain	15 — 58		11 — 41	19 — 39			34 — 27	
027 059	B-L-K 481 B-L-K 482 B-L-K 48E B-L-K 48J B-L-K 48N	15 — 61		11 — 34	22 — 41	28 — 37		41 — 31	
028 060	B-L-K-S 481 B-L-K 482 B-L-K 48F B-L-K 48H B-L-K 48M	16 — 57		11 — 41	21 — 43			39 — 31	

JB3									
Suffix	Vehicle	Final drive	Speedo drive	1st	2nd	3rd	4th	5th	Reverse
031 061	B-L-K 482 B L K 484	15 — 58	21 — 19	11 — 41	21 — 43	28 — 37	30 — 29	39 — 31	11 — 26 39
038 063	B-L K 48V B 484 L 482	15 — 61							

NG9									
Suffix	Vehicle	Final drive	Speedo drive	1st	2nd	3rd	4th	5th	Reverse
000	B-L-K 48C B-L-K 483 B L-K 489 B-L-K 48K B-L-K 48B	9 — 31	6 — 18				33 — 34	36 — 31	
001	B-L-K 487 B-L-K 488 B-L-K 48W B-L-K 48P	9 — 31	6 — 18				34 — 33	37 — 29	
002	B L-K-S 486 B-L-K-S 48V B-L-K-S 480	9 — 29	8 — 23				33 — 34	36 — 31	
003	L-K 48A	10 — 31	8 — 22	11 — 45	17 — 37	22 — 31	34 — 33	37 — 29	11 — 23 39
005	L-K 483 L 489	9 — 34	6 — 19						
006	L-K 486 Spain	9 — 31	6 — 18				33 — 34	36 — 31	
007	L 489 Arabia	9 — 32	6 — 19						
008	L-K 485 L 48Z	9 — 31	6 — 18						
009	B-L 48Y B-L 48Q B-L 48R	9 — 31	6 — 18			28 — 43	37 — 43	43 — 40	

NG7									
Suffix	Vehicle	Final drive	Speedo drive	1st	2nd	3rd	4th	5th	Reverse
003	K 483 K 48K K 48B	9 — 31	6 — 18	11 — 45	17 — 37	22 — 31	33 — 34	36 — 31	11 — 23 39
004	K 486 K 48V								

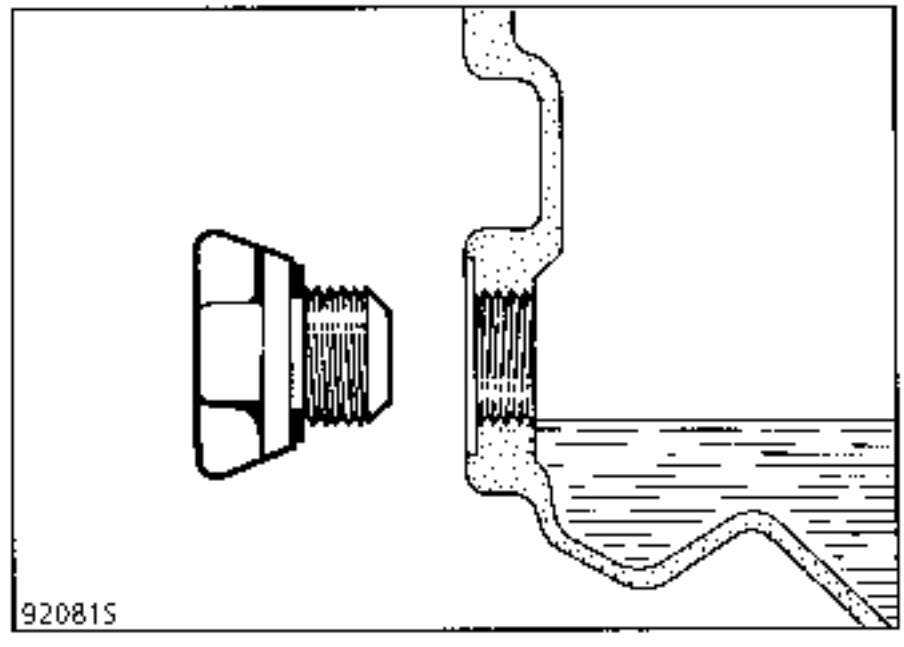
UN1									
Suffix	Vehicle	Final drive	Speedo drive	1st	2nd	3rd	4th	5th	Reverse
013	L 485 L 48L	9 — 31	23 — 20	11 — 37	17 — 35	21 — 29	27 — 28	39 — 32	11 — 25 39

UN7 (4 x 4)									
Suffix	Vehicle	Final drive	Speedo drive	1st	2nd	3rd	4th	5th	Reverse
000	L 485 L 48L	9 — 31	23 — 20	11 — 37	17 — 35	21 — 29	27 — 28	39 — 32	11 — 25 39
001	L-B 48Y L-B 48Q L-B 48R	9 — 37							
002	B-L 483 B-L 48K	9 — 35							

CAPACITY (in litres)

JB2	3.25	TRX 75W 80W
JB1 JB3	3.4	TRX 75W 80W
NG9	2.2	TRX 80W
NG7	2.4	TRX 80W
UN1	3	TRX 80W
UN7	3.35	TRX 80W
OT2	1.3	TRX 80W

CHECKING THE LEVEL



Fill to the level of the aperture.

SPECIAL PRECAUTIONS

TRANSELF TRX oil is a high technology product requiring certain precautions to be taken in order to prevent foreign bodies entering it, which could damage the quality of the oil and make gear changing difficult. The following recommendations should therefore be observed:

Storage of oil cans

Cans must be stored:

- away from inclement weather (rain, snow, splashes),
- in a dry place (avoid locations near to washing equipment),
- hermetically sealed.

Storage of components (gearbox or final drive)

When storing a gearbox or final drive which has not been drained, plug any air inlets.

Store components in a dry location.

Using the oil

Oil cans must be closed after each use.Never decant oil into a larger container as this brings a greater surface into contact with the outside air.

Pressure washing (of the vehicle or a component)

Plug the gearbox and final drive breathers.

If the gearbox or final drive is removed, plug the openings correctly to prevent water from entering.

The following gearboxes:

JB2 4 forward gears
1 reverse gear

JB1 5 forward gears

JB3 1 reverse gear

are fitted with **BORG-WARNER** synchronisers.

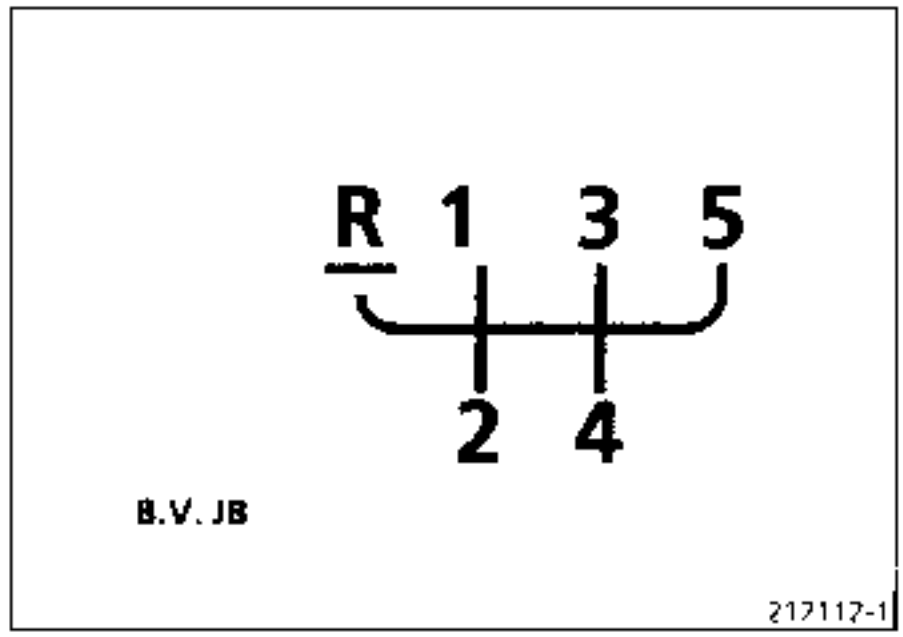
NG and **UN** gearboxes with:

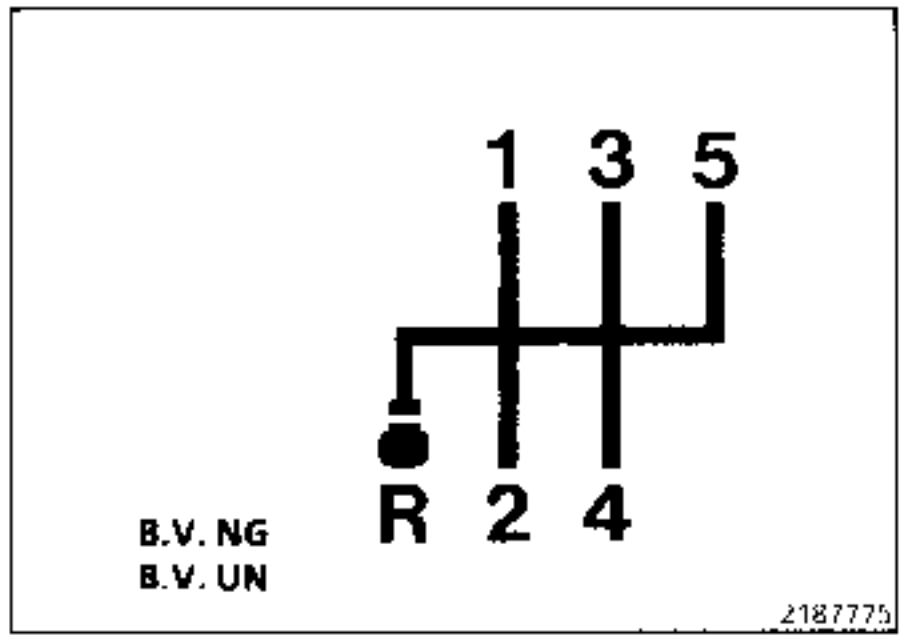
5 forward gears
1 reverse gear

are fitted with :

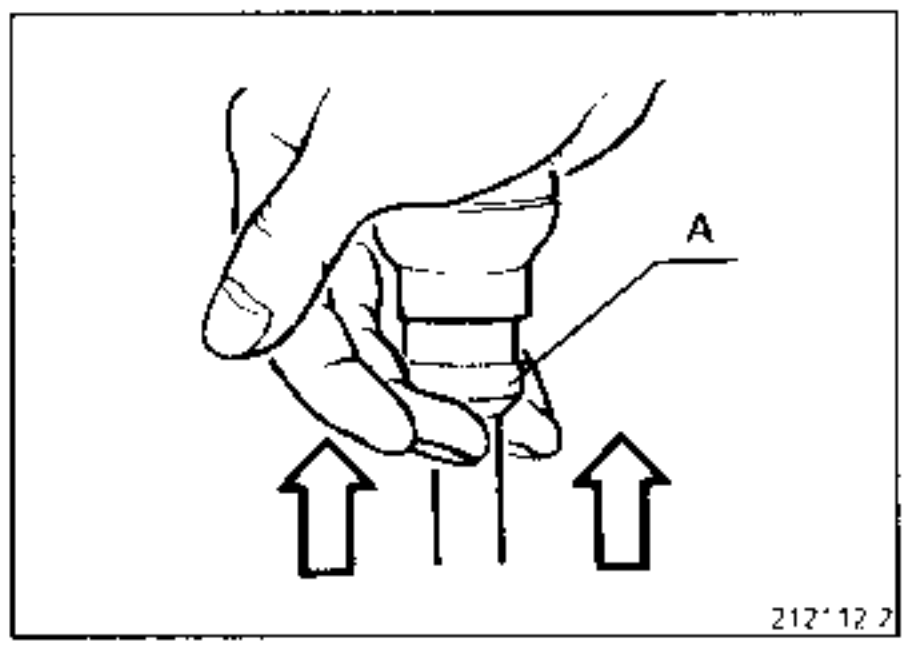
- **RENAULT** synchronisers for 1st and 2nd,
- **BORG-WARNER** synchronisers for 3rd, 4th and 5th.
- **NG7** : prop shaft differential lock control.
- **UN7** : New 1st/2nd synchro, which is smaller and has shorter travel.
- The intermediate housing contains the 5th gear, central differential and visco coupling.

GEAR SELECTOR





To select reverse, lift the locking ring (**A**) and move the lever.



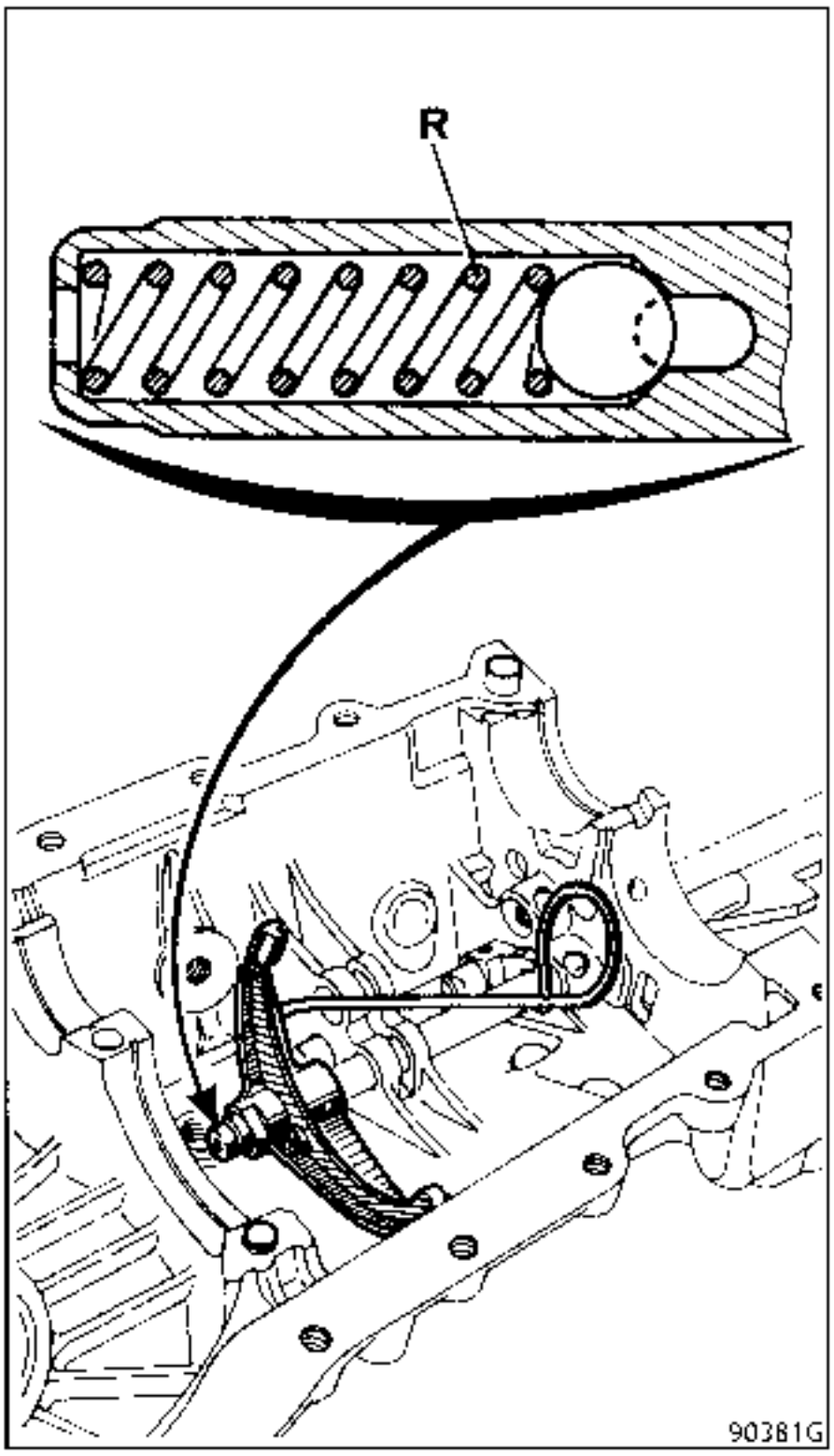
2ND GEAR SYNCHRO ASSISTANCE DEVICE

This device enables 2nd gear to be selected more easily.

Operation

When selecting 2nd gear, some of the force applied to the fork in order to move the sliding gear is absorbed by spring (**R**) located in the shaft (**NG gearbox**) or on the shaft (**UN1 gearbox**) in order to enable the selector lever to move immediately and to retard the complete movement of the fork.

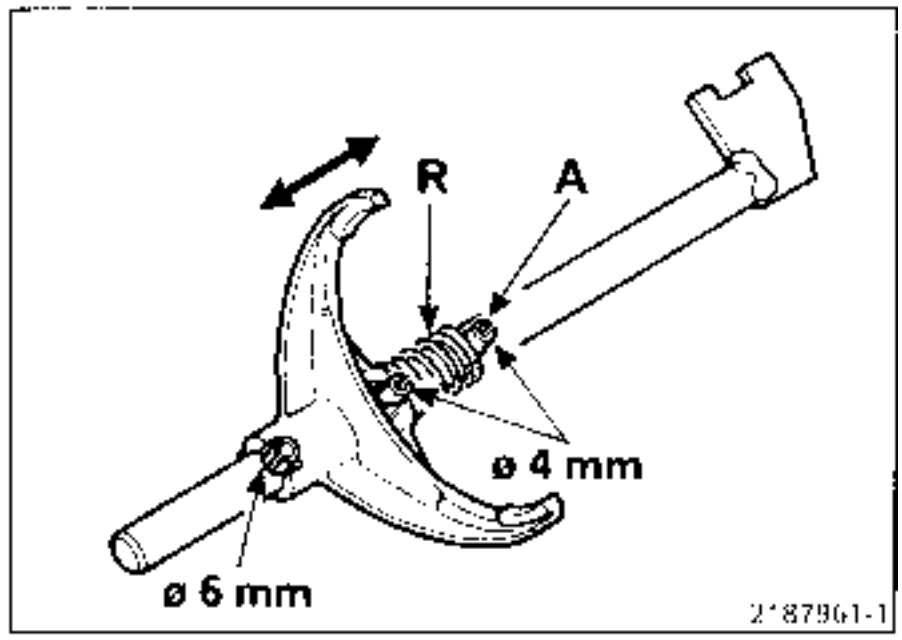
NG gearbox



After fitting the roll pin, ensure that the fork slides on its shaft.

NOTE : with this modification, a 1/2nd locking plunger is fitted instead of a ball.

UN1 gearbox



PRECAUTIONS

When fitting the 1st/2nd fork shaft, the roll pin (**A**) must be fitted correctly to avoid contact with the 1st gear : it should not project beyond the spring coils at the top.

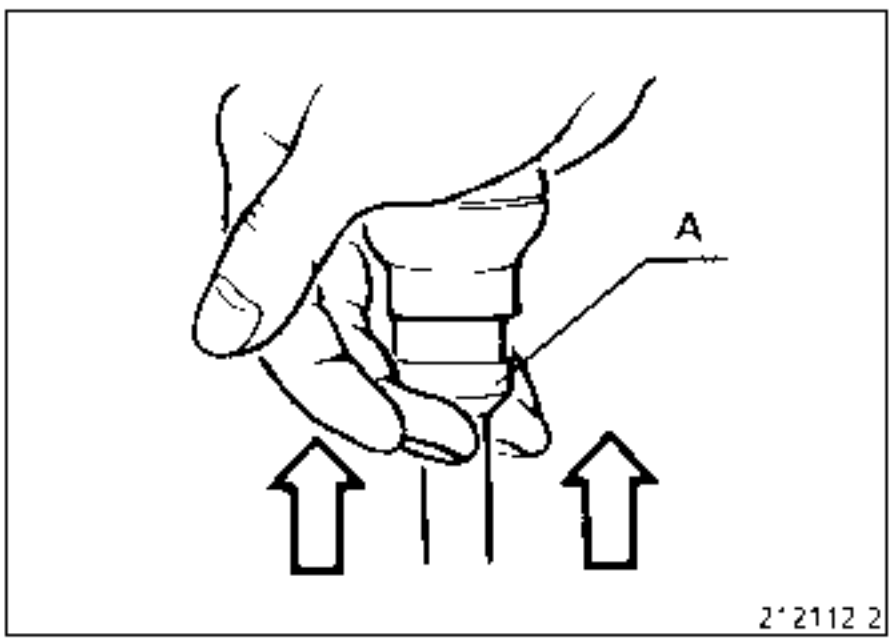
REVERSE GEAR POSITIVE LOCKING

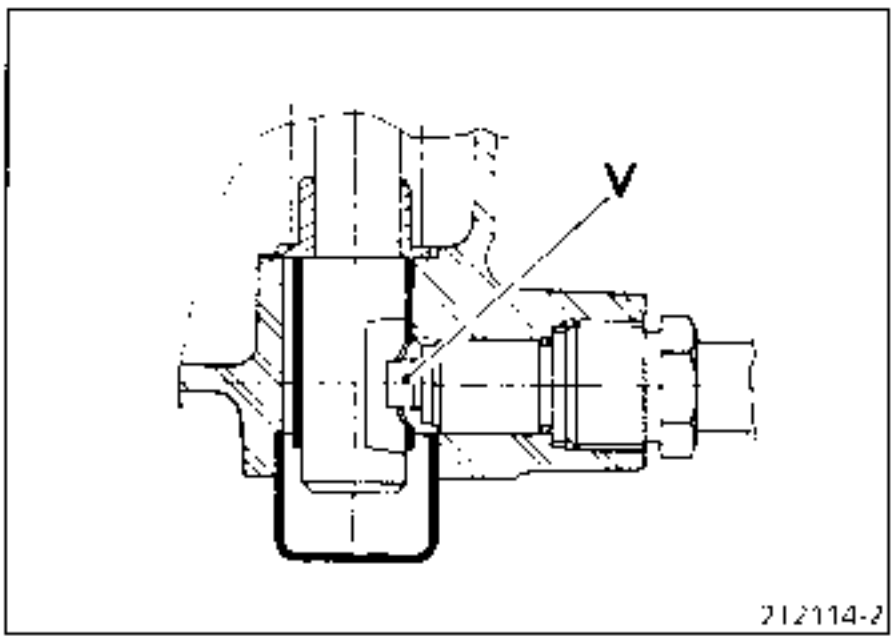
This system prevents reverse being engaged by mistake when the gears are changed quickly from 3rd to 2nd.

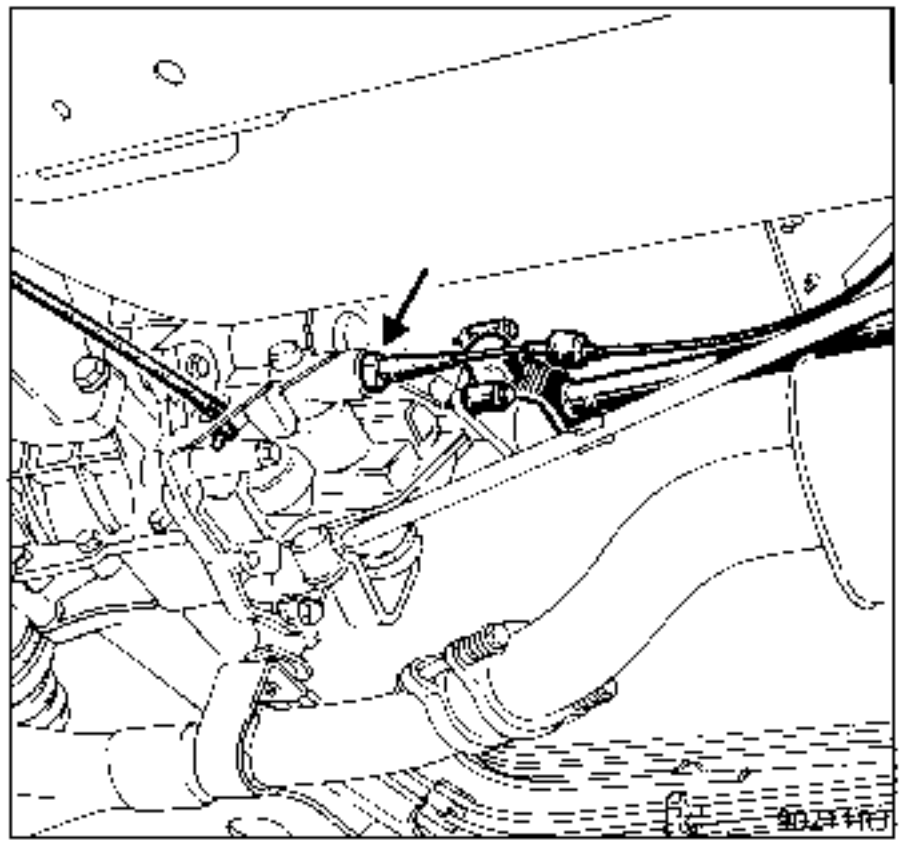
Operation

To select reverse gear, lift the locking ring (A) and move the lever: by means of a cable, the locking ring acts on the finger of a latch (V) mounted on the rear housing of the gearbox.

If this finger moves away, reverse gear is able to be selected.







MATCHED PARTS

- Final drive pinion and crown wheel.
- Synchro hubs and sliding gears.
- Differential cups and bearing cones.

FINAL DRIVE MATCHING (NG and UN gearboxes)

The final drive pinion and crown wheel are ground together during production.

They are therefore inseparable.

If one of the parts has to be replaced, the other must also be replaced.

There is a common marking on the crown wheel and pinion.

The backlash cannot be adjusted.

HUB / SLIDING GEAR MATCHING

In all cases it is advisable to mark the sliding gears in relation to the hubs.

NG7

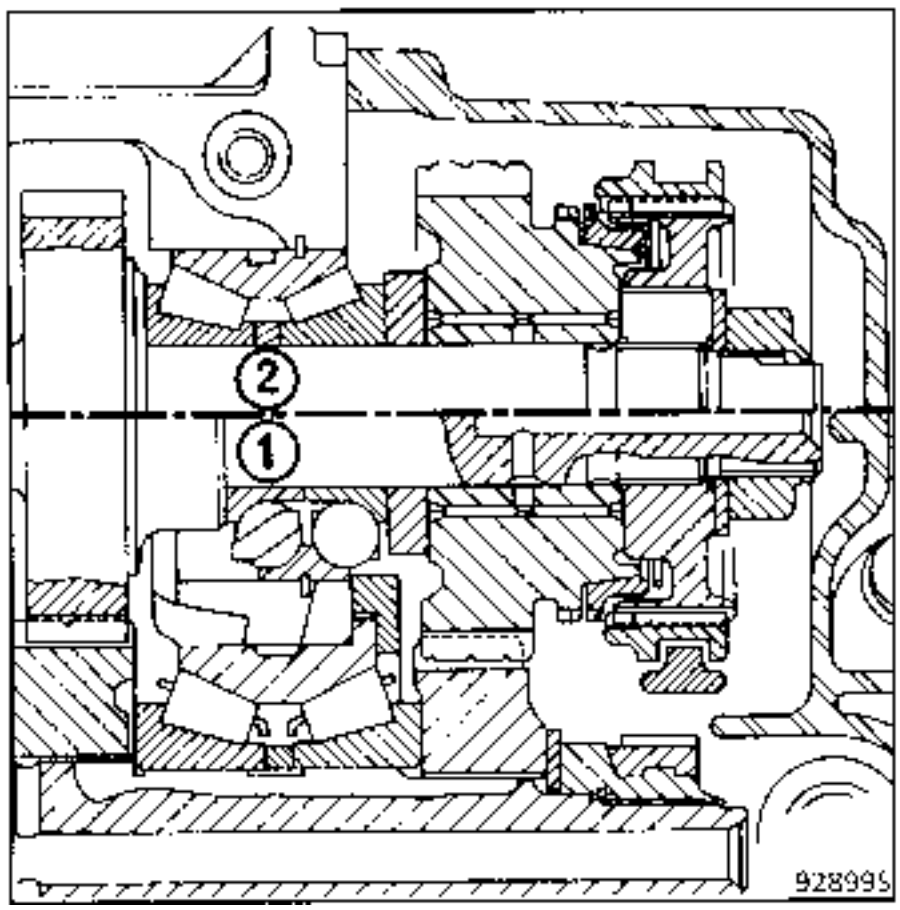
The speedo crown wheel is moulded onto the hub (output shaft), therefore if this crown wheel is damaged, the gearbox output shaft will have to be replaced.

The gearbox output shaft lip seal can only be removed after the rear housing has been removed and the shaft and bearing control shafts have been dismantled.

NG9 009 : Special notes

New "**Small Module**" teeth for 3rd, 4th and 5th.

The primary shaft has been modified and has a dual tapered bearing (2) instead of a bearing (1) with two rows of balls on the rear bearing journal.



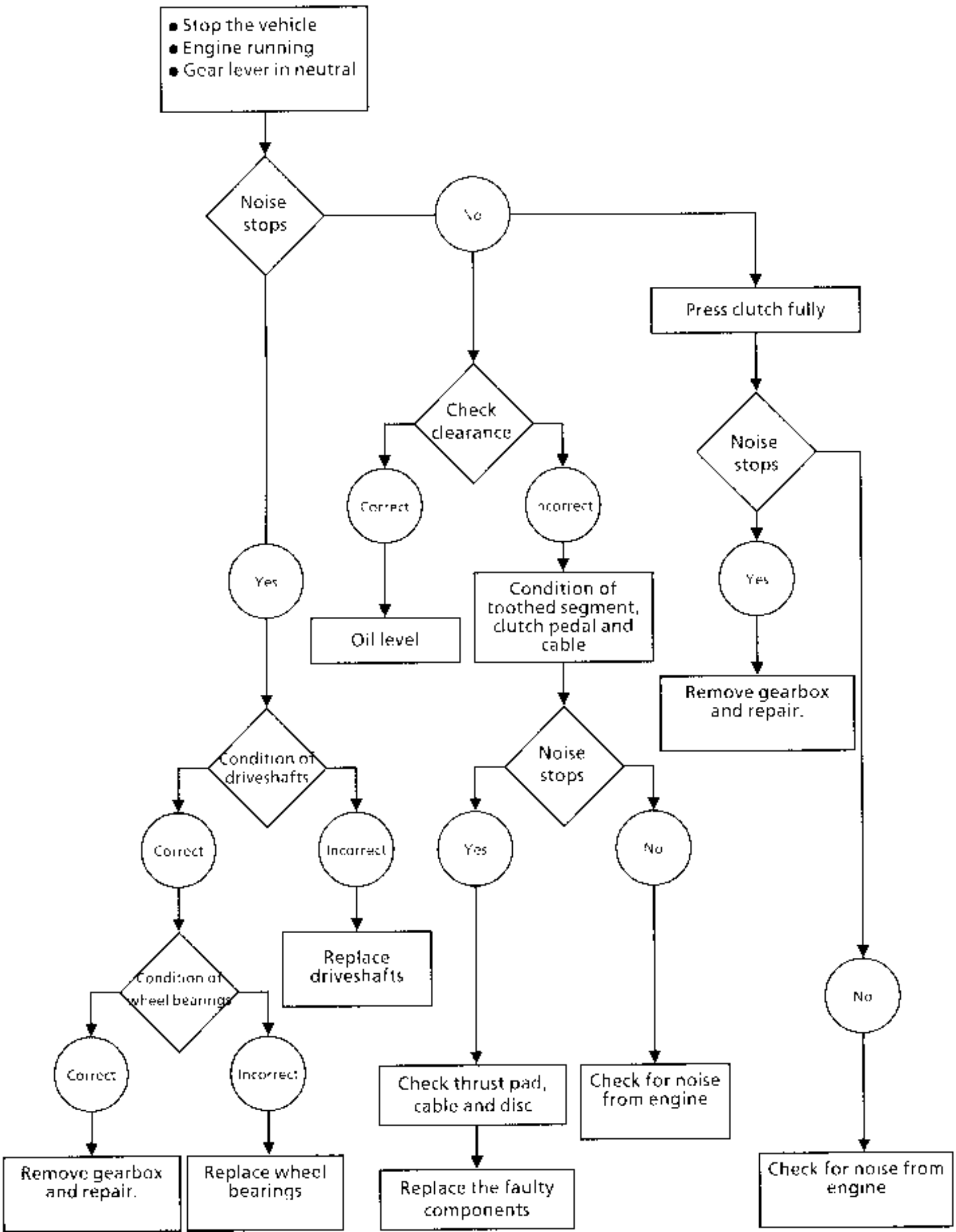
Description	Packaging	Part Number	Use for :
MOLYKOTE BR2	1 g sachet	77 01 421 145	Sunwheel splines Shaft splines Fork pivot Thrust pad guide Fork pads } Clutch
LOCTITE 518	24 ml syringe	77 01 421 162	Housing assembly faces
RHODORSEAL 5661	100 g tube	77 01 404 452	Threaded plugs and switches Locking ball plugs Ends of driveshaft roll pins
LOCTITE FRENBLOC (locking and sealing resin)	24 cc bottle	77 01 394 071	Primary and secondary shaft nuts 5th gear hub and fixed gear Differential lock drive
LOCTITE SCELBLOC (locking and sealing resin)	24 cc bottle	77 01 394 072	Final drive nut (UN7) 5th gear 5th gear hub } (depending on assembly) Notched nut (UN7)
PERFECT SEAL "LOWAC" (fluid coating for seals)	100 g tube	77 01 417 404	Paper seals for rear housing and clutch bellhousing (depending on assembly)

Parts to be replaced systematically

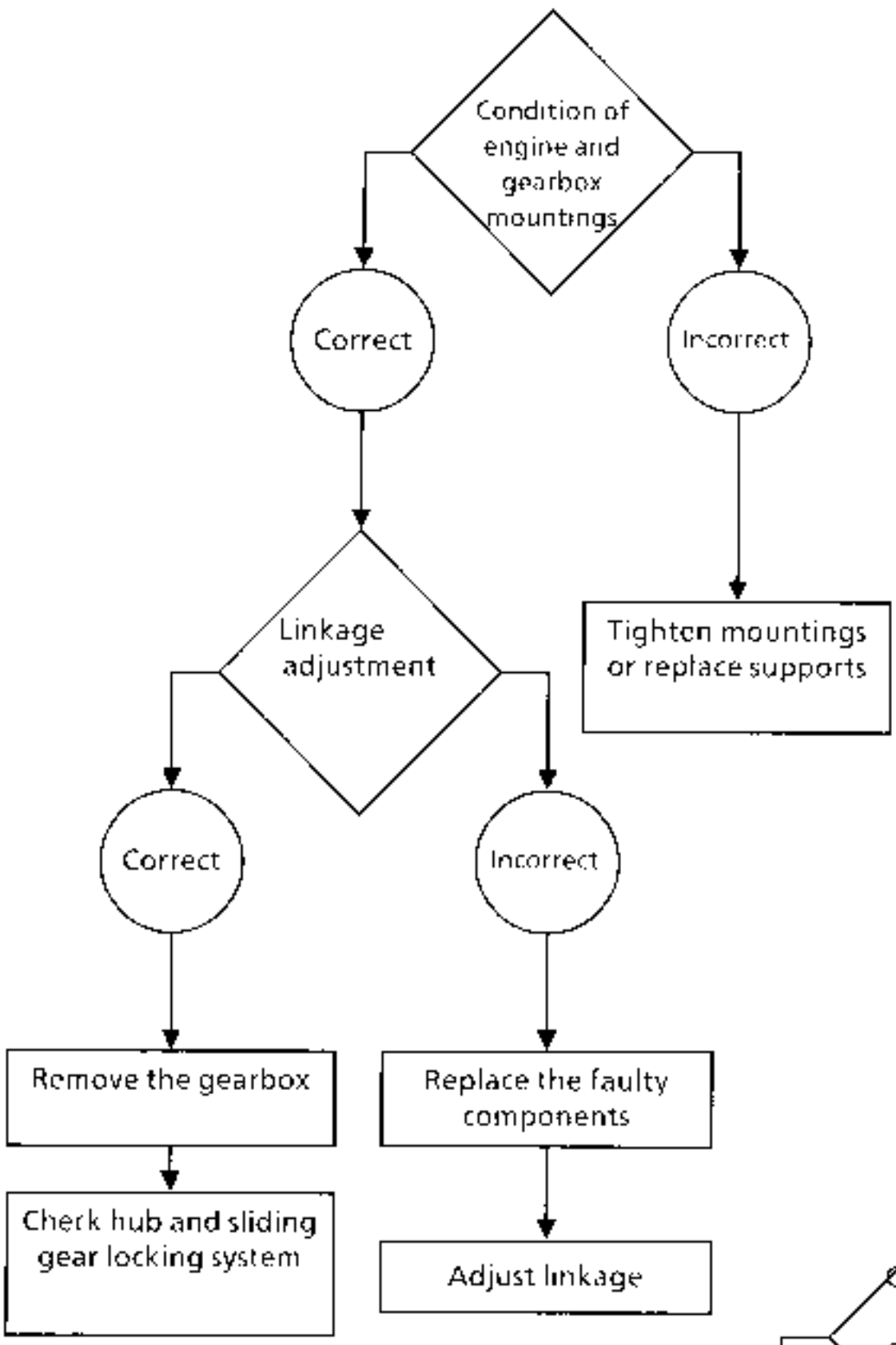
When they have been removed:

- paper seals,
- lip seals,
- differential housing mounting bolts,
- roll pins,
- reverse gear switch bolt,
- O rings,
- locking rings,
- thrust pad guide tube,
- primary and secondary shaft nuts,
- speedo gear,
- output flange bolt (**UN7 - NG7**),
- spring washer on 5th fixed gear.

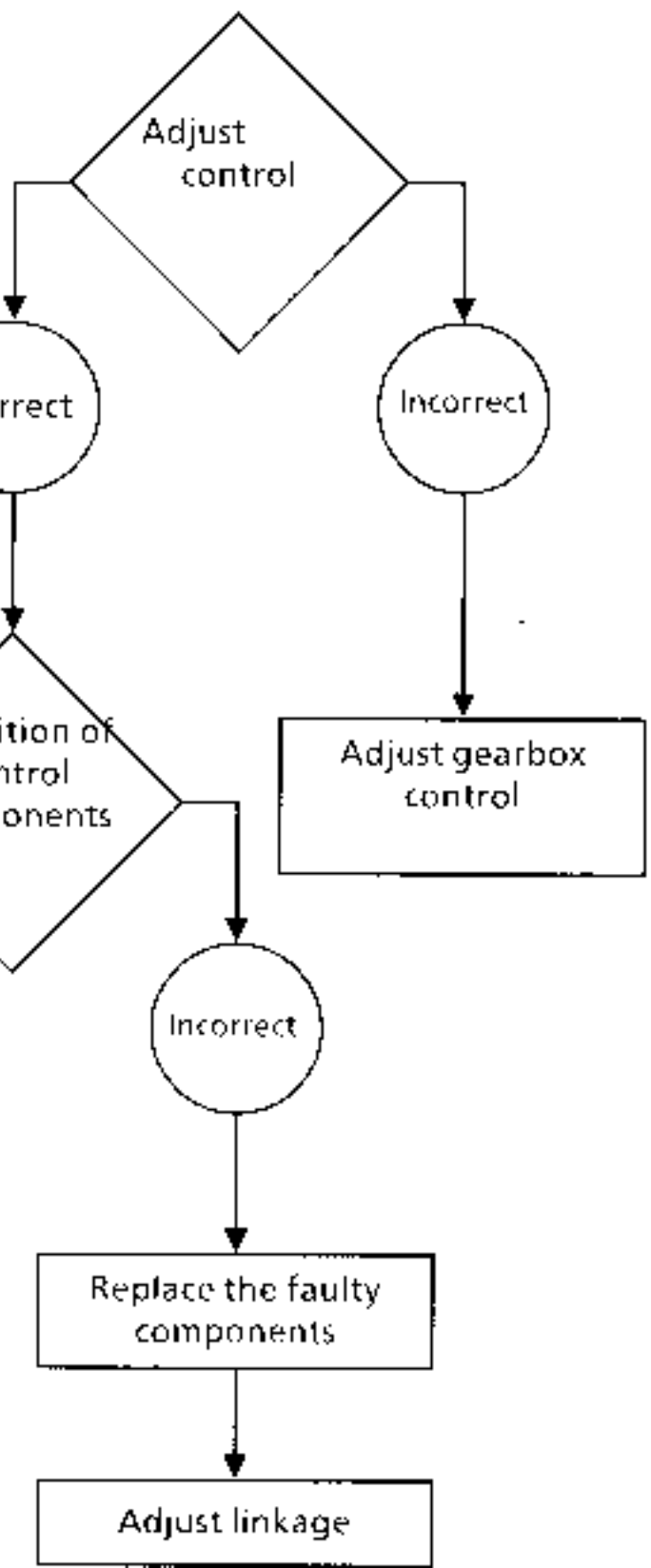
Abnormal noises on the road



Gears slipping



One gear locked



SPECIAL TOOLING REQUIRED		
B.Vi.	31-01	Set of punches
T.Av.	476	Ball joint extractor

TIGHTENING TORQUES (in daN.m)	
Brake caliper mounting bolt	10
Shock absorber base mounting bolt	11
Track rod end nut	3.5
Key nut on stub axle carrier	5.5
Mounting securing bolt	4 to 5
Wheel bolts	9
Left hand driveshaft gaiter mounting bolt	2.5

REMOVAL

The gearbox is removed alone (except for the **diesel F8Q engine** fitted with increased inertia flywheel).

Put the vehicle on a lift or axle stands.

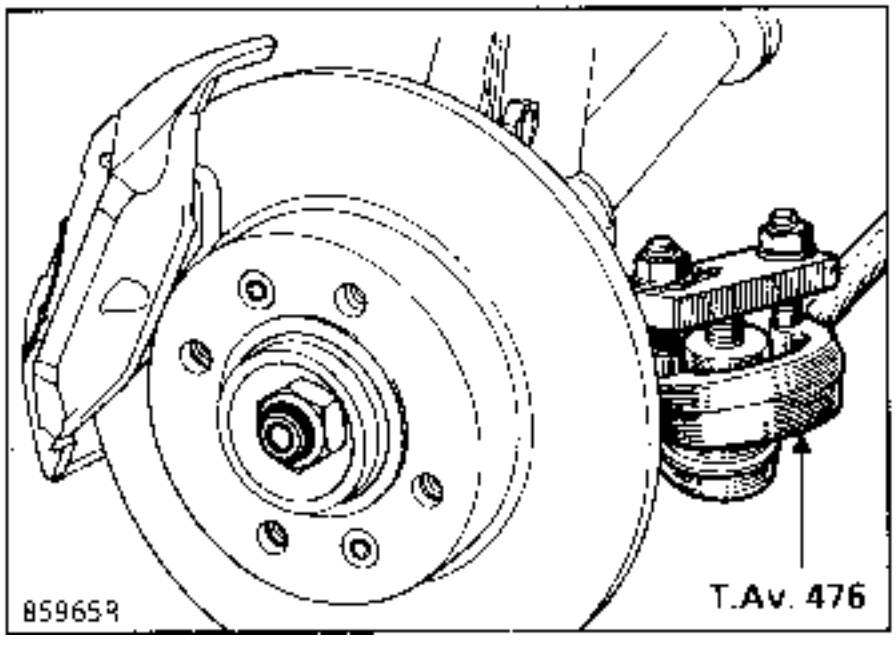
Drain the gearbox.

Disconnect the battery.

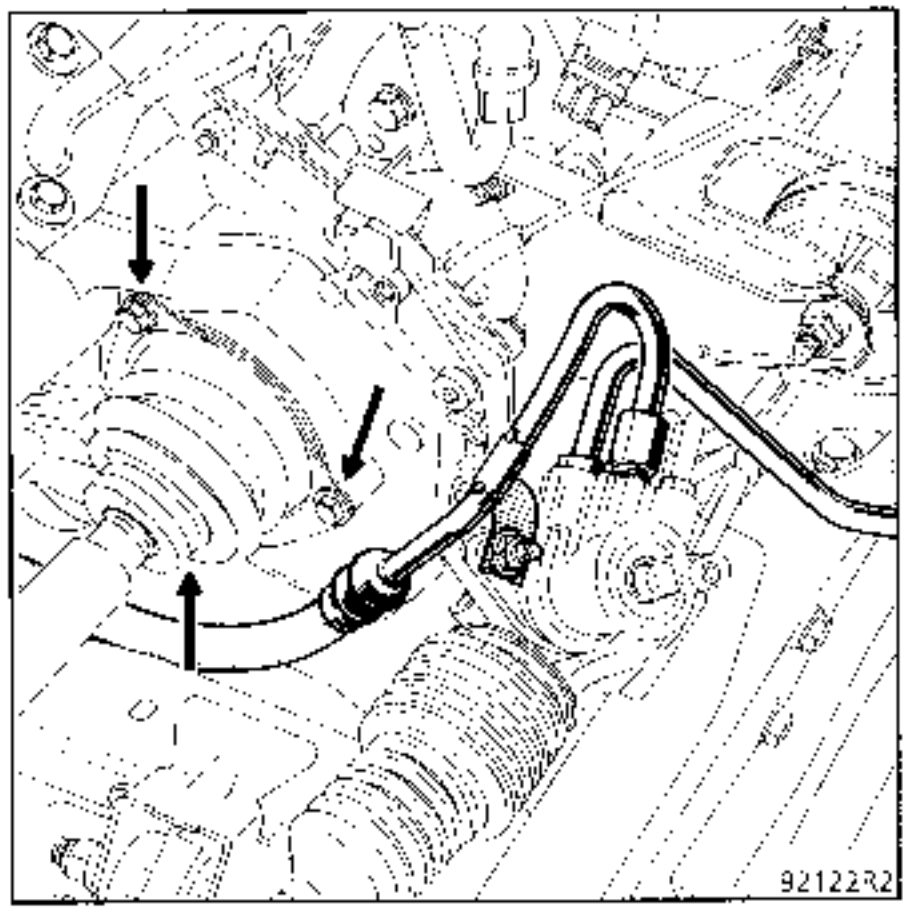
Remove the front wheels.

On the left hand side of the vehicle, remove:

- the track rod end using tool **T.Av. 476**,

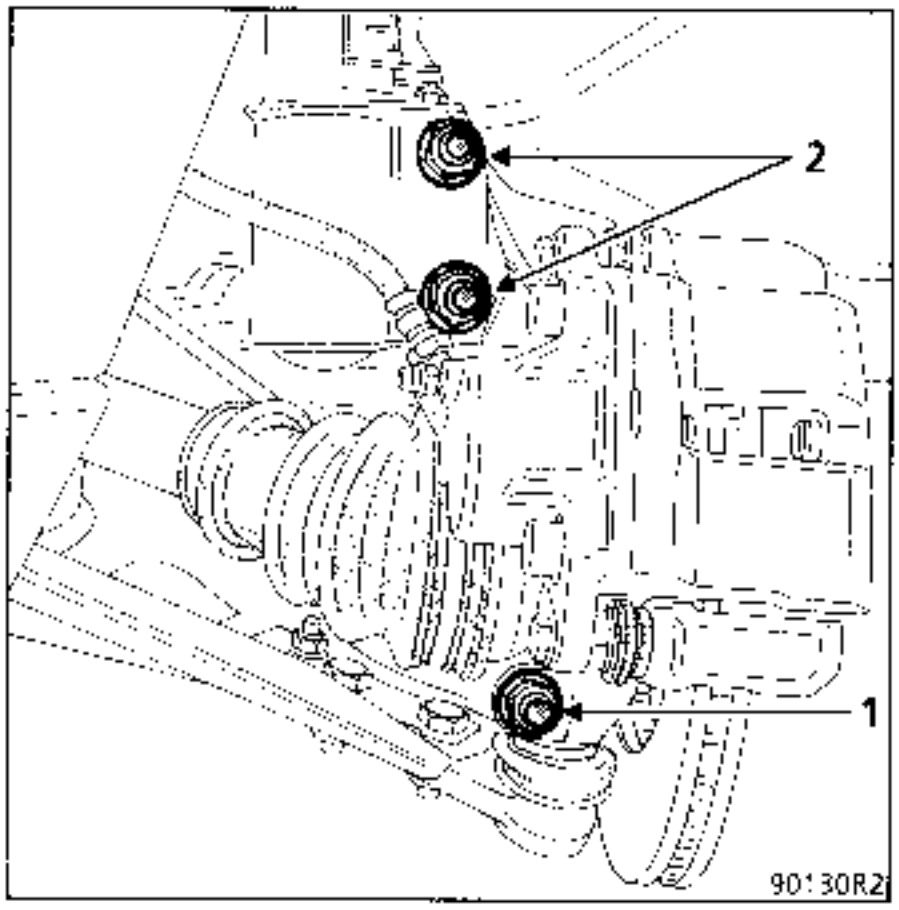


- the three driveshaft gaiter mounting bolts,
- the two caliper mounting bolts, securing the caliper to the suspension spring to prevent the cable from stretching,
- the side protection housing (1 bolt and 3 rivets),

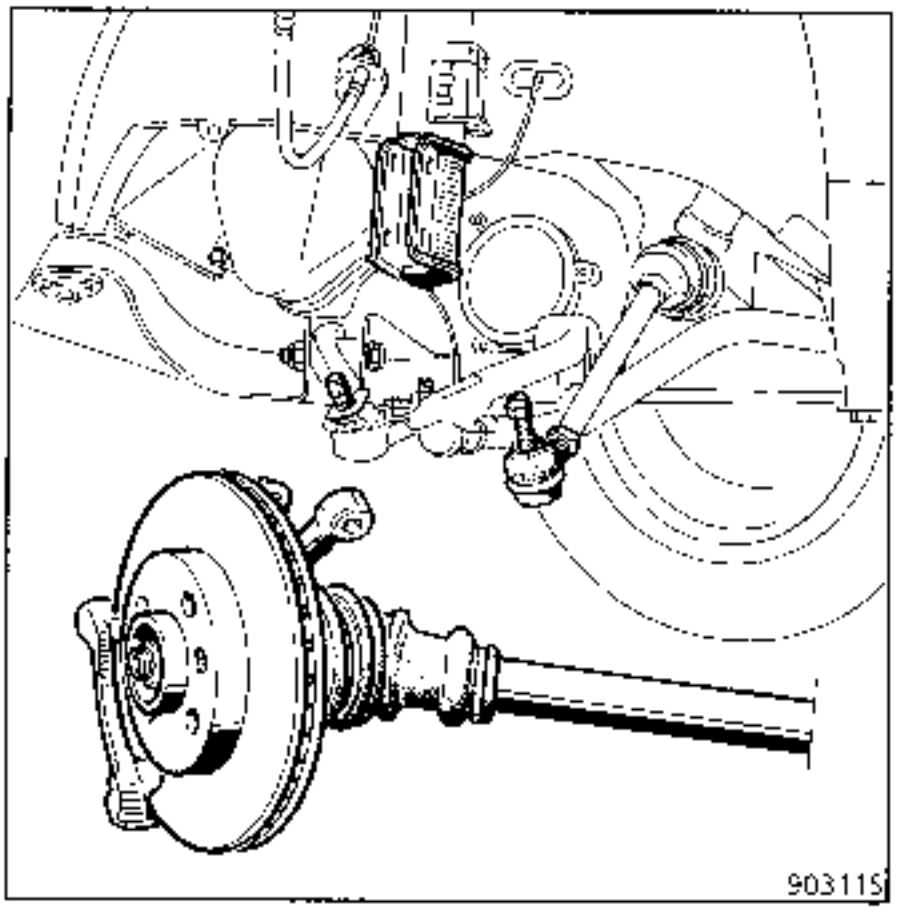


the two bolts (1) at the base of the shock absorber,

the nut and the key (2),

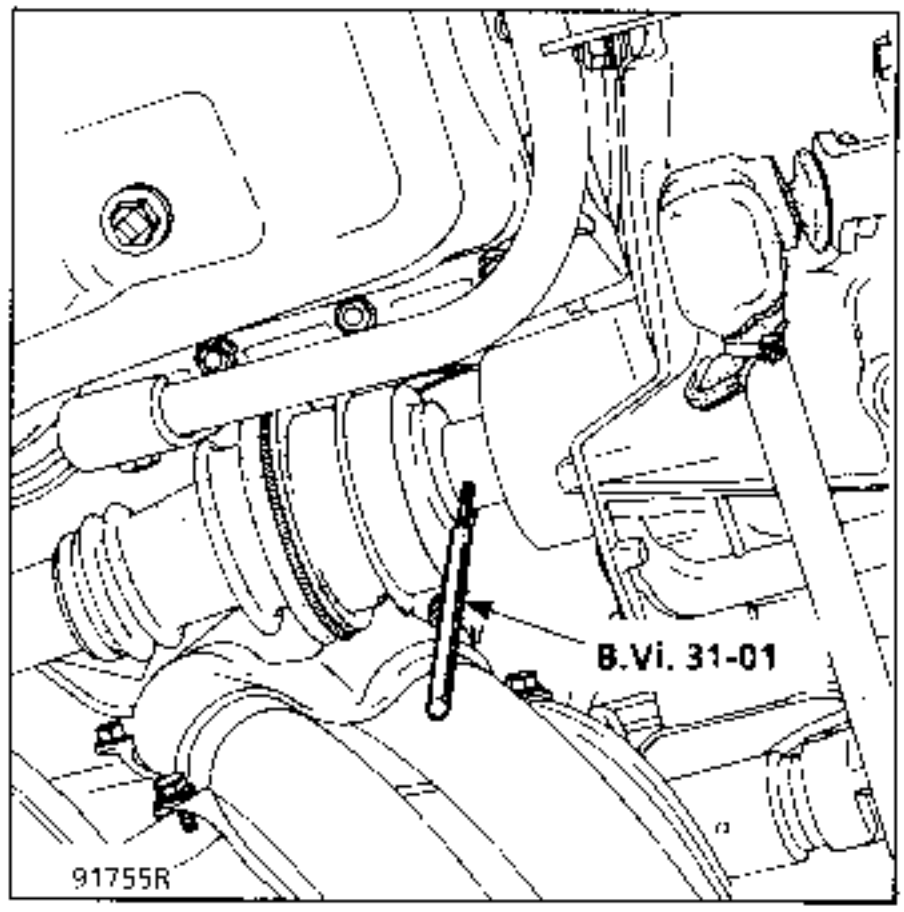


- the stub axle carrier - driveshaft assembly at the lower ball joint.

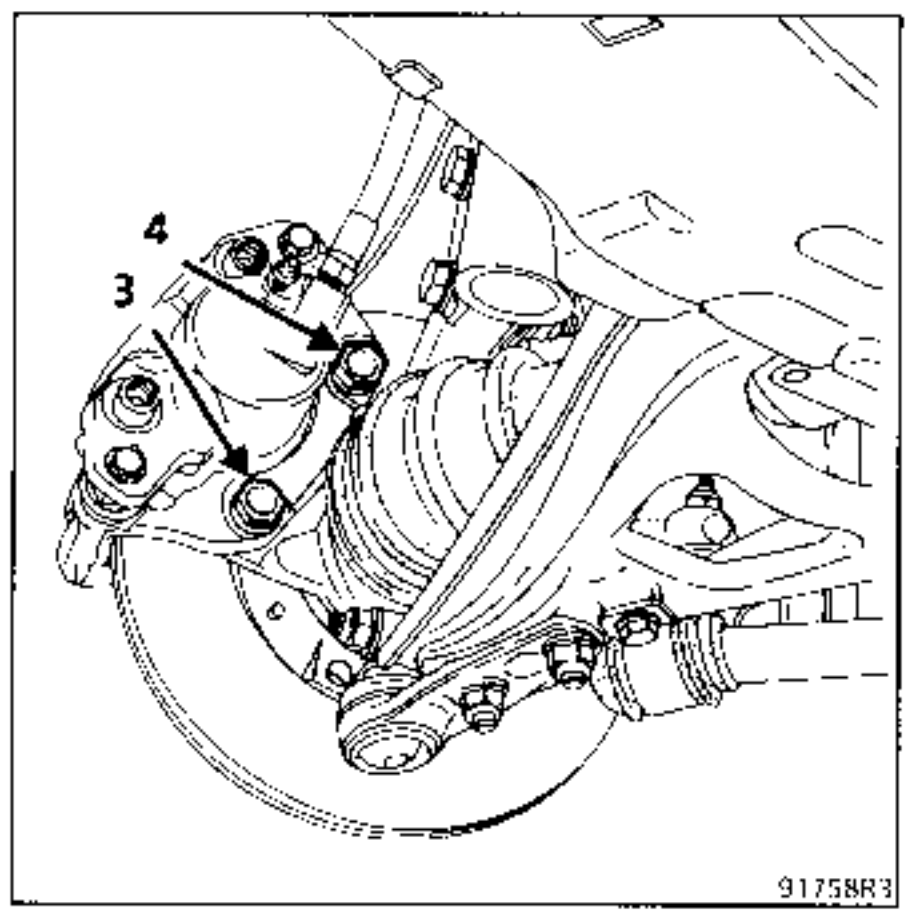


Check that the driveshaft rollers do not come out manually. If they do, on reassembly, check that the needles have not dropped into the gearbox.

On the right hand side of the vehicle , remove the driveshaft roll pins using tool **B.Vi. 31-01.**

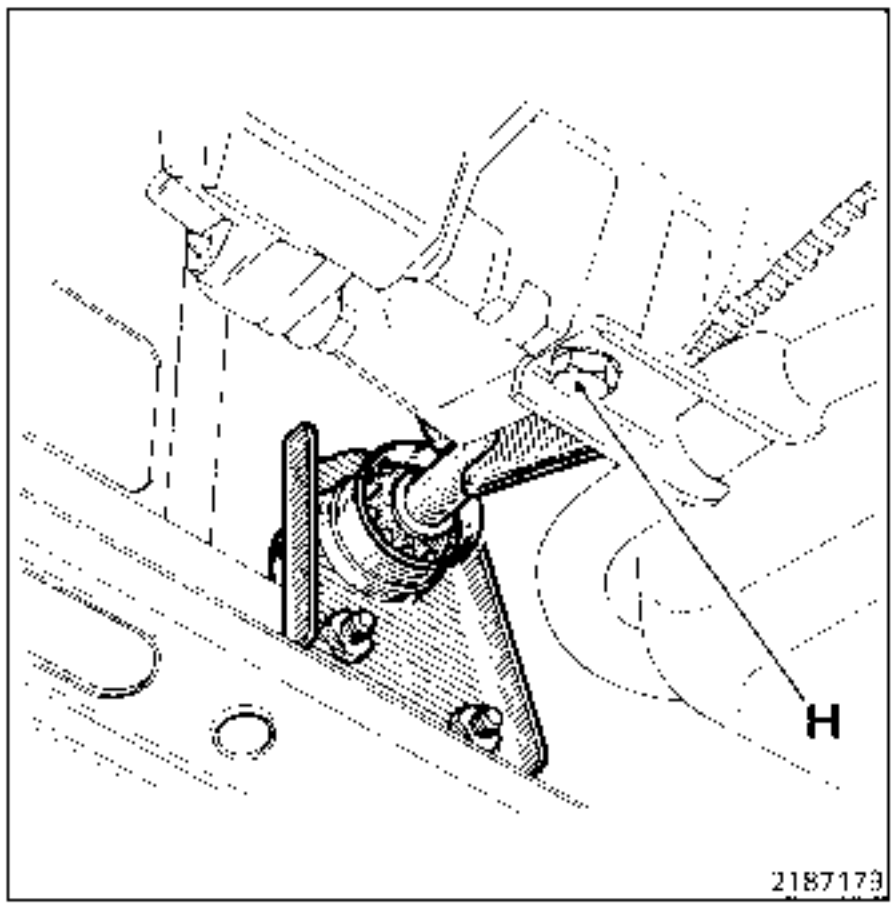


Slacken the lower shock absorber base bolt (3) and remove the upper bolt(4).



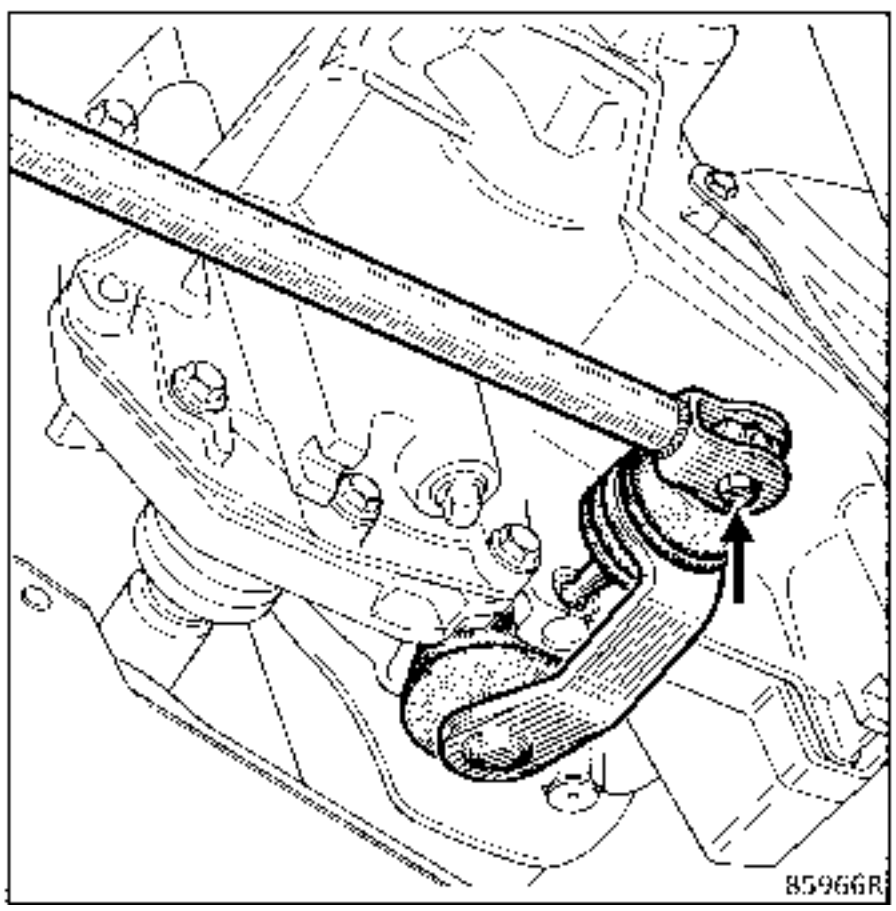
Tilt the stub axle carriers and release the driveshafts.

Under the vehicle, remove bolt (**H**) from the engine - gearbox tie rod and slacken the two side mounting bolts on the engine.



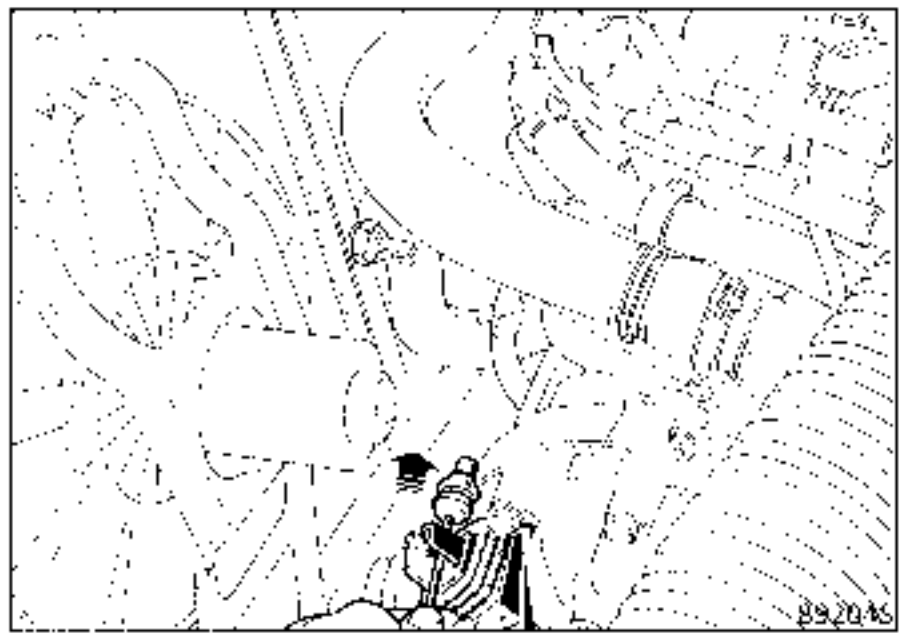
Remove:

- the movement limiter,
- the clutch protection plate,
- the gear control.

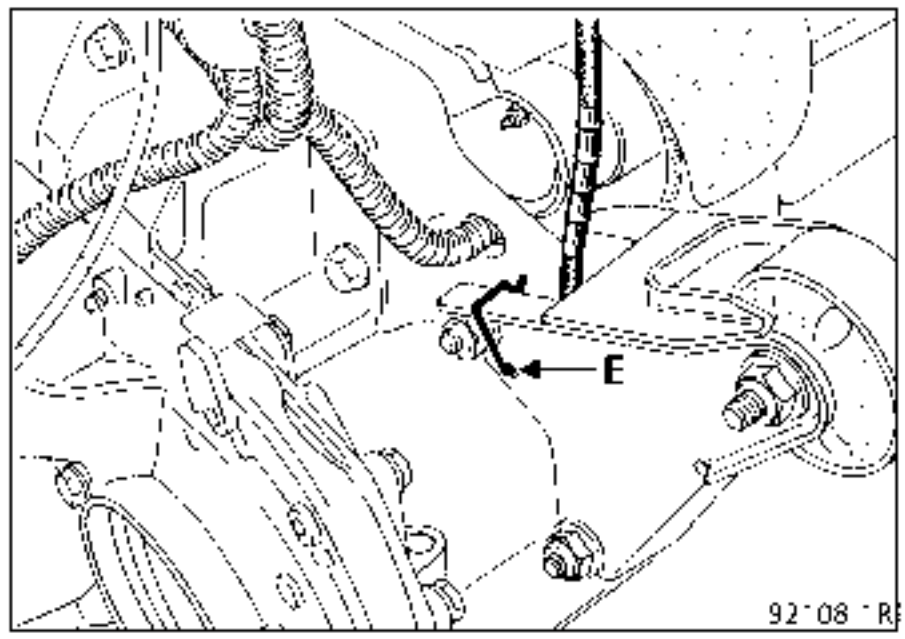


Disconnect:

- the clutch cable,



- the speedo cable and pin,



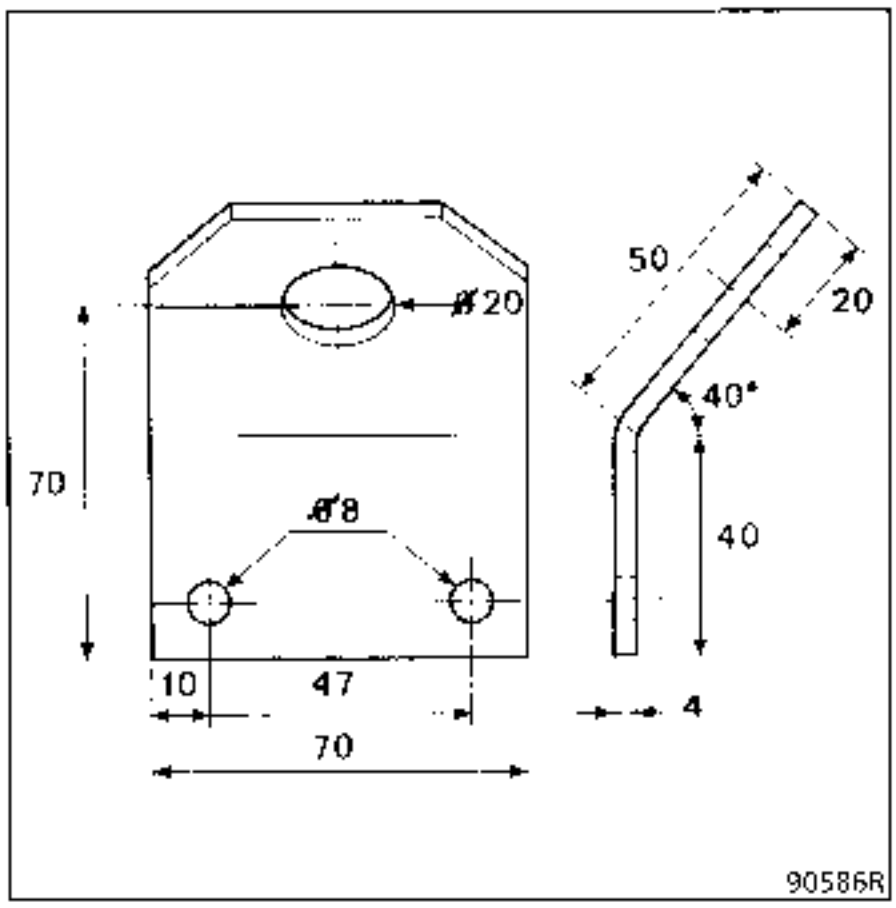
- the starter motor leads,
- the connector on the reversing lights switch,
- the **TDC** sensor.

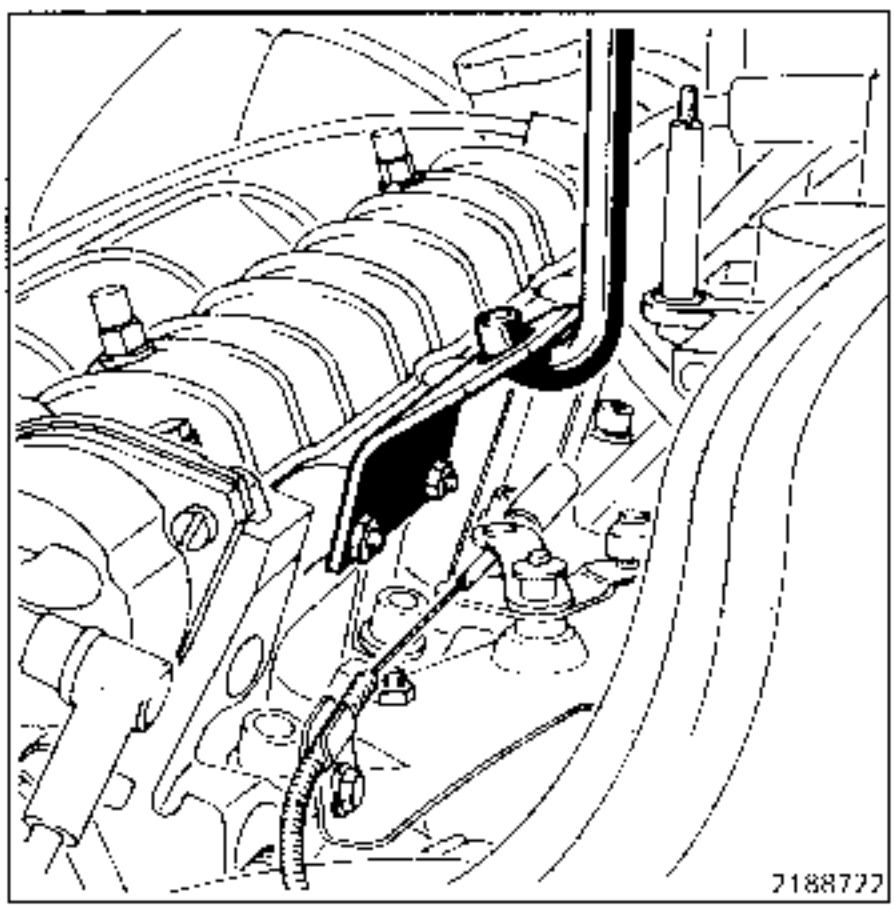
"Petrol" engines - all types

Remove the air filter unit and plug the inlet apertures to the carburettor so that no foreign bodies may enter it.

Disconnect the choke cable from the carburettor.

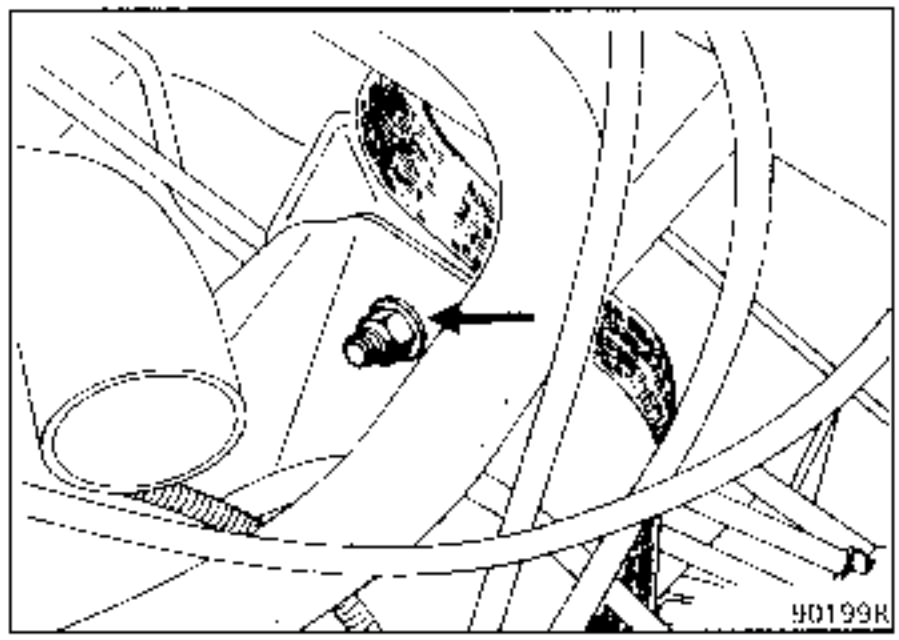
On the cylinder head, remove the air filter mounting plate and in its place secure a locally made bracket to be used as a support.



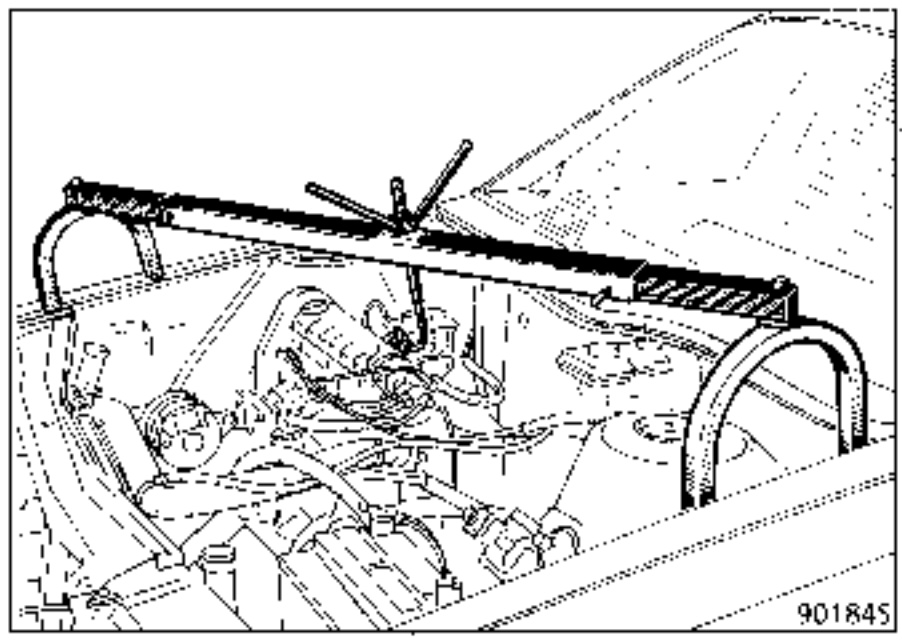


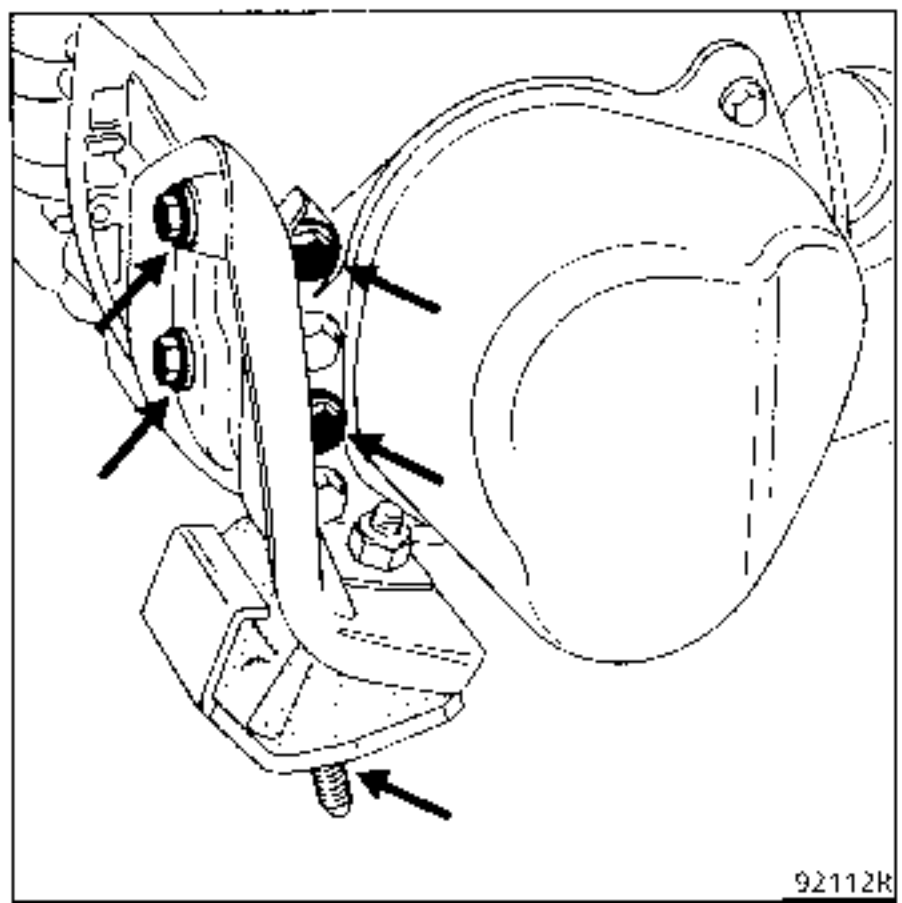
Remove:

- the mounting nut from the rear engine mounting pad.



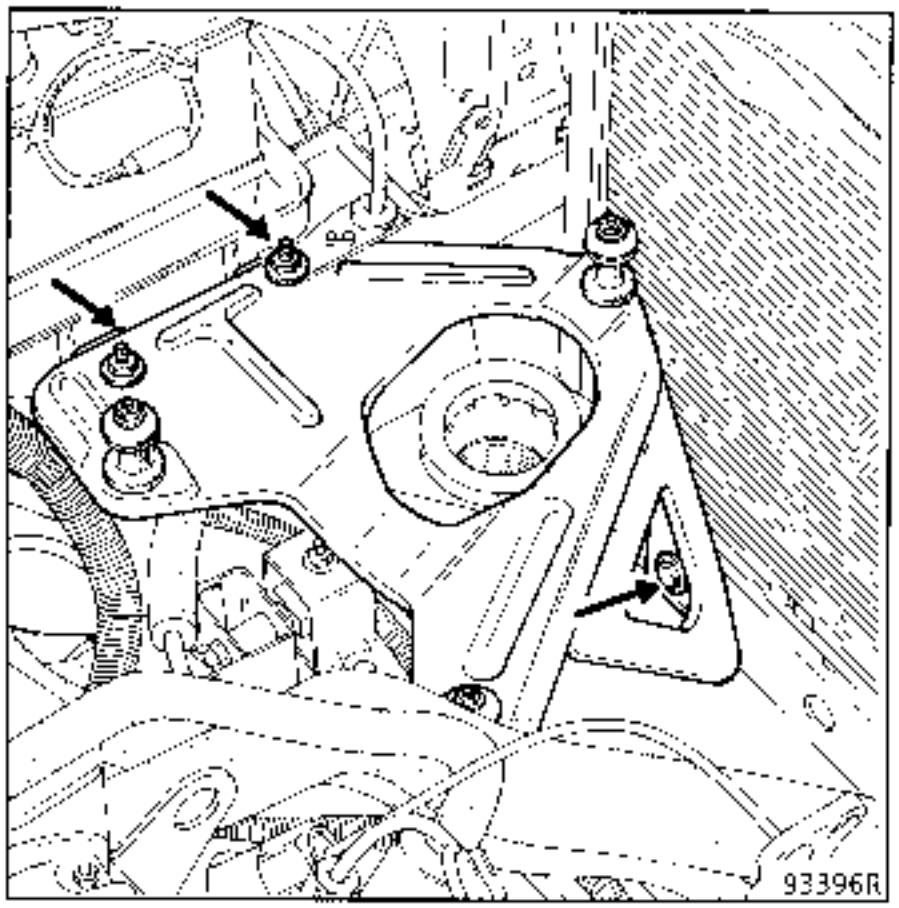
Using an engine support tool, lift the engine and remove the gearbox mountings.





"Diesel" engines - special notes

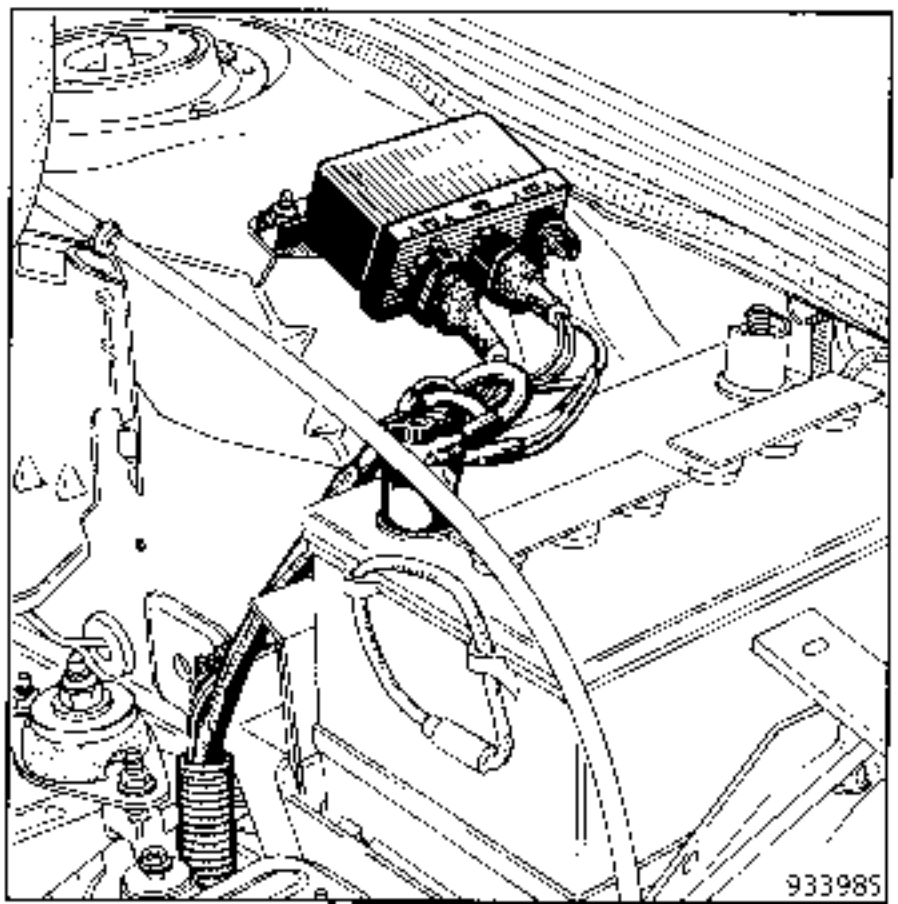
Remove the air filter unit and its mounting.



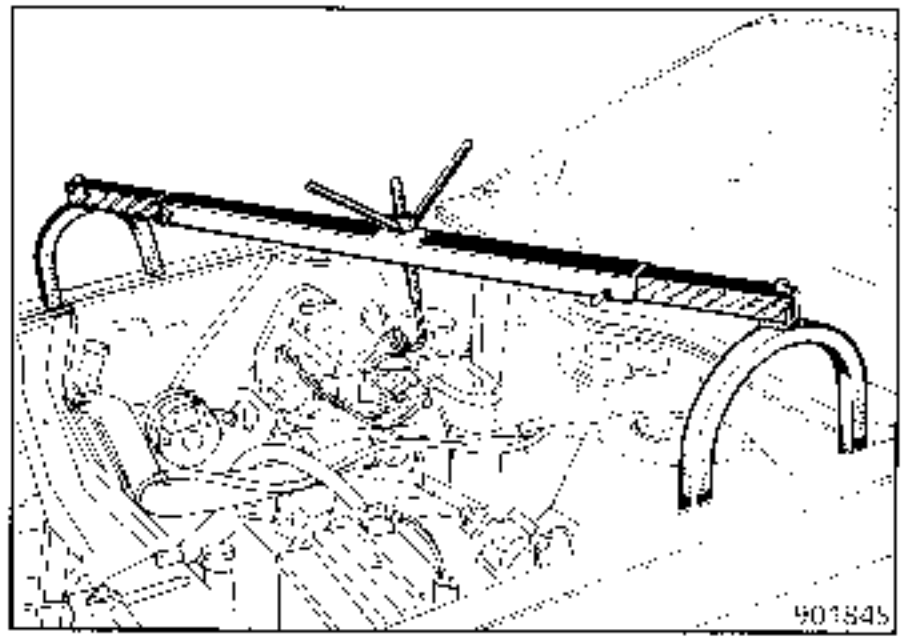
Release the coolant reservoir and the power assisted steering reservoir but do not disconnect the pipes.

Disconnect:

- the engine harness connector,
- the two connectors and the feed wire to the pre-postheating unit.

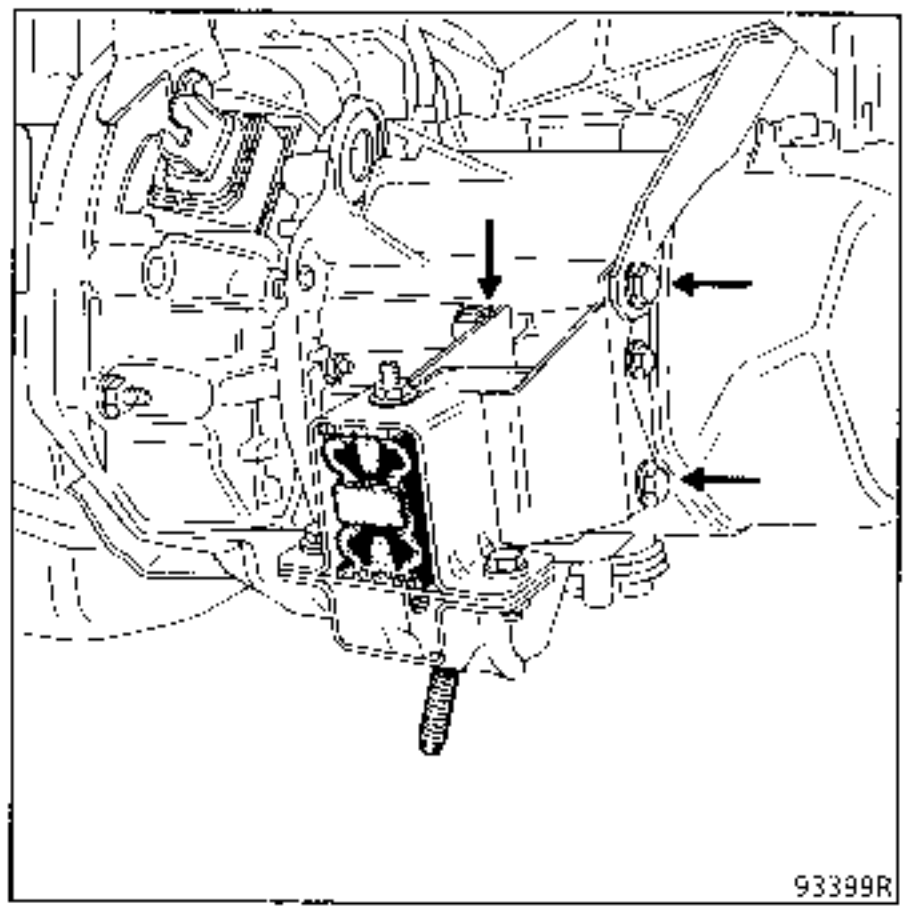


Lift the engine using an engine support tool.



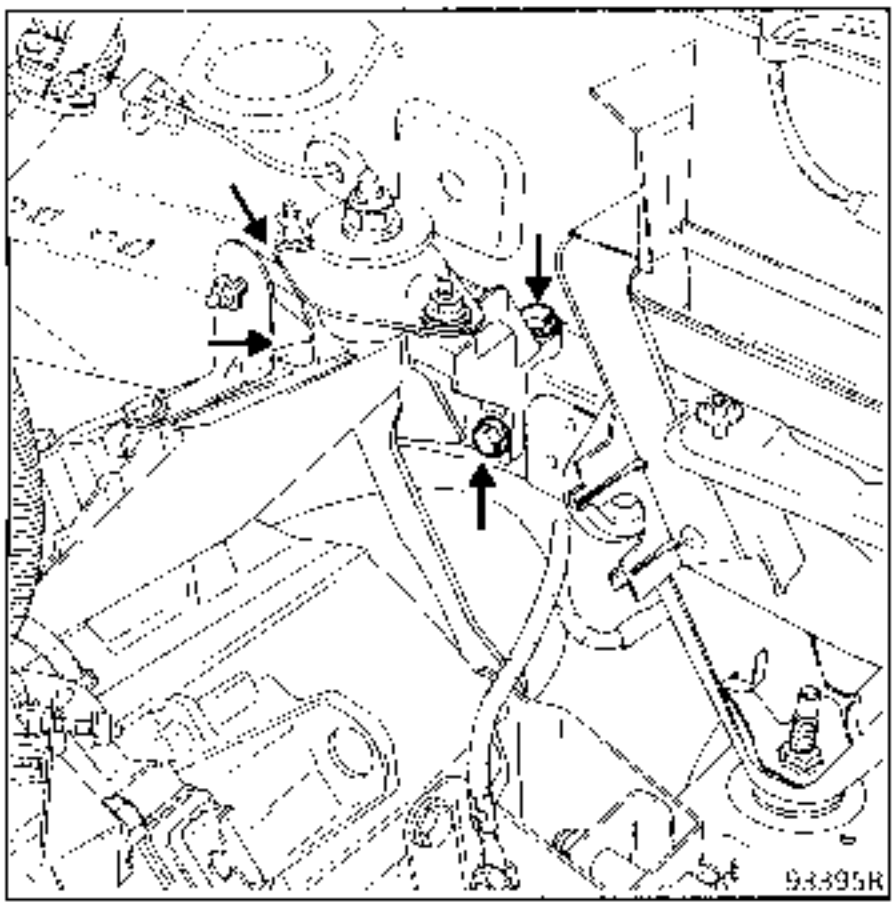
Remove:

- the front mounting,

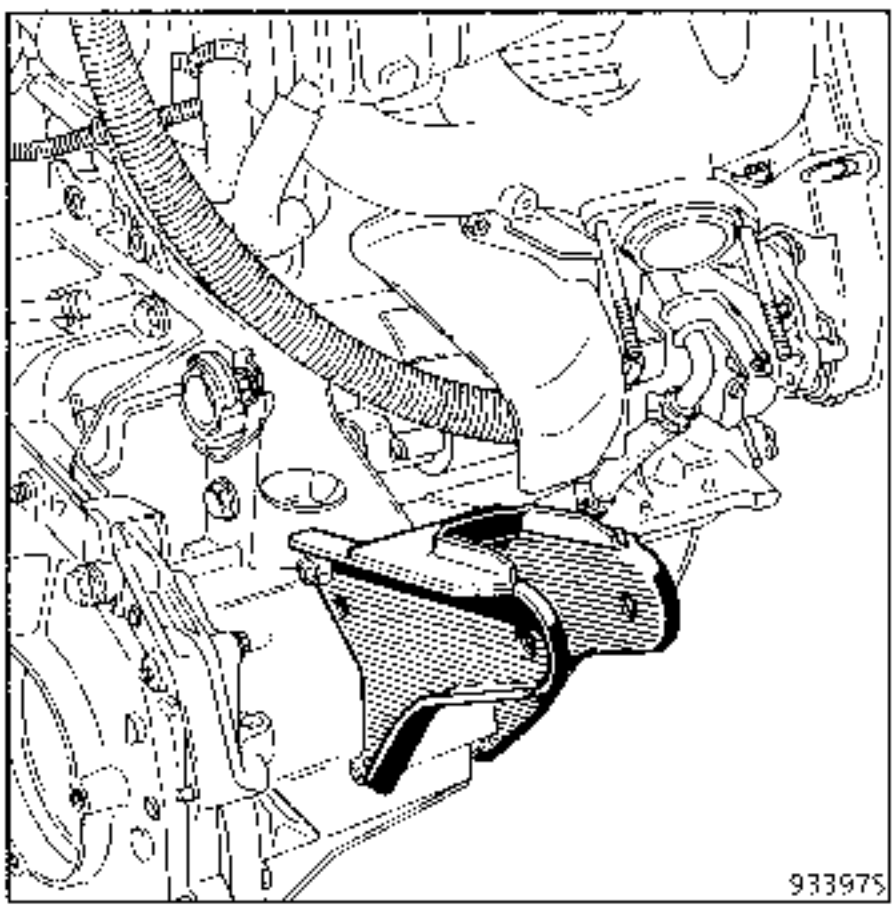


- the front left hand side shield (1 bolt and 3 rivets),

the upper mounting assembly,

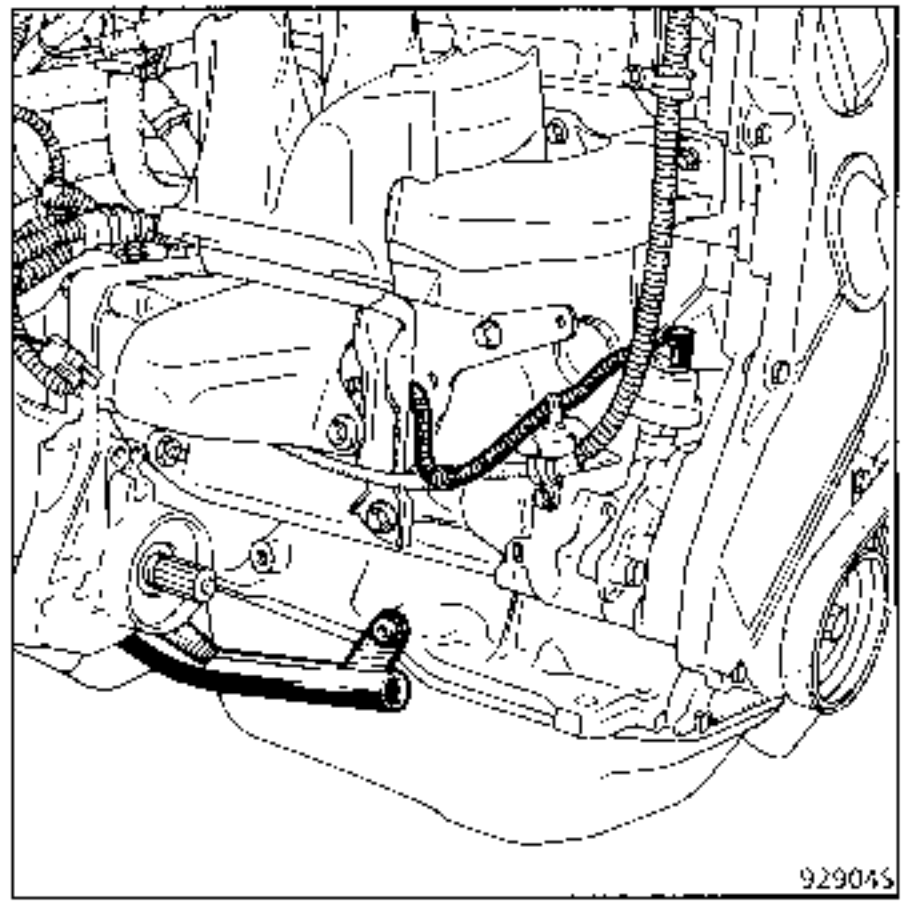


the three bolts from the rear centre mounting and remove the mounting.



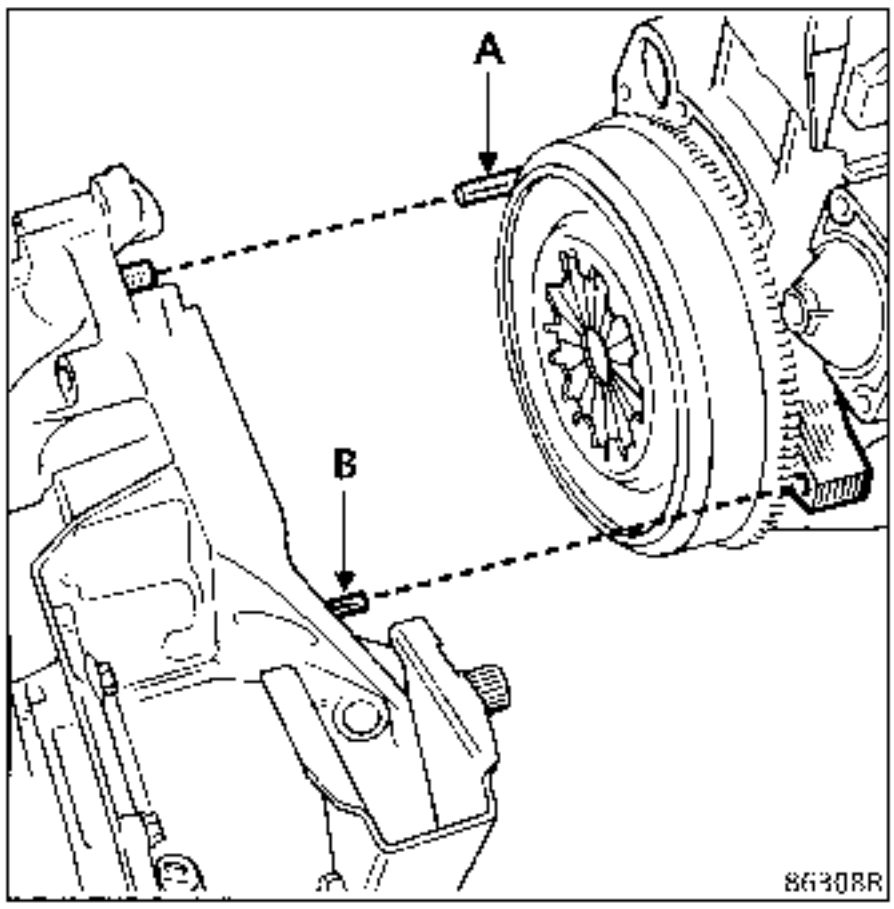
NOTE : to facilitate removal of the bolts, lift the gearbox slightly using a component jack.

Release the two side mounting bolts for the engine - gearbox tie rod.
Note: TORX bolt on starter motor side (**T50** wrench).



All types

Remove studs (**A**) and (**B**) using a nut and lock nut with an angled wrench and a ratchet.



Remove:

- the starter bolts,
- the bolts from the gearbox edge.

Release the gearbox from the engine by sliding the 5th gear housing between the vehicle side member and the sub-frame.

Lift the engine.

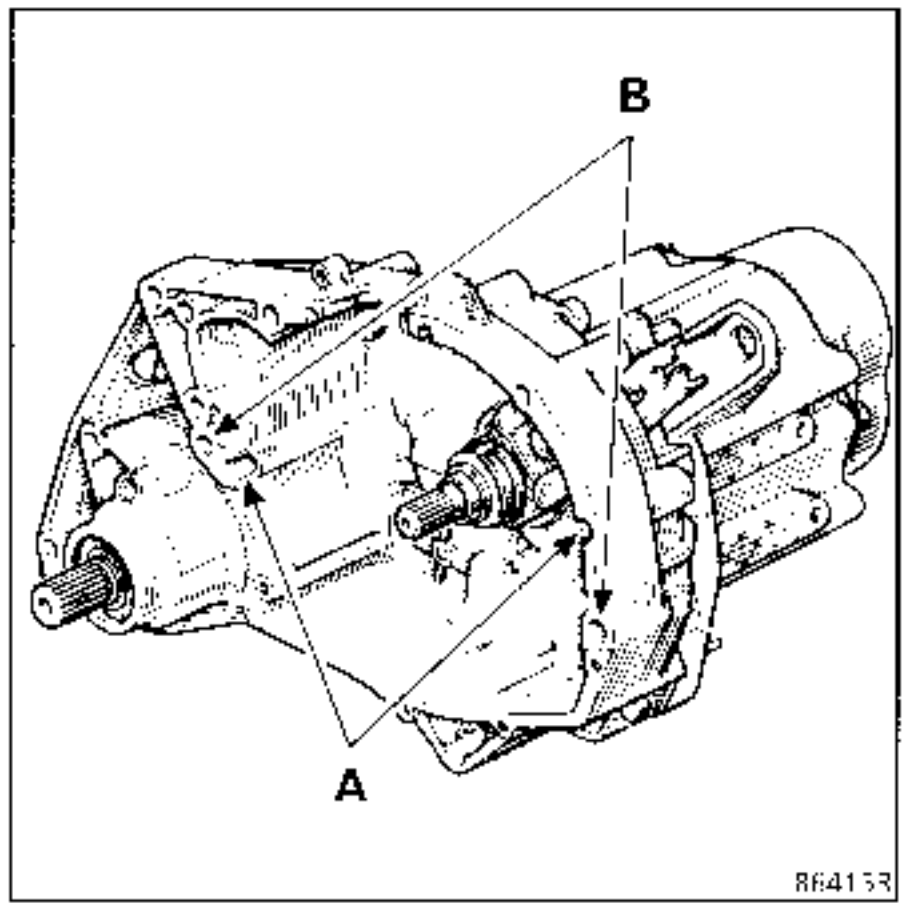
Gently pivot the gearbox forward to release the final drive section then remove the gearbox from the vehicle.

Attach the gearbox to a workshop crane, securing the fastening points to the clutch cable mounting bracket and to one bolt from the gearbox edge fitted in place of stud (**B**).

REFITTING - Special notes

Ensure the engine -gearbox centring rings are present and correctly positioned

- at **A** : gearbox assembled with a **C** type engine, long dowel,
- at **B** : gearbox assembled with an **F** type engine, short dowel.



Coat the clutch shaft splines and the right hand sunwheel with **MOLYKOTE BR2**.

Special note for "diesel" clutch discs:

Diesel engines are fitted with a damping pre-hub which operates most efficiently when its internal components operate dry.

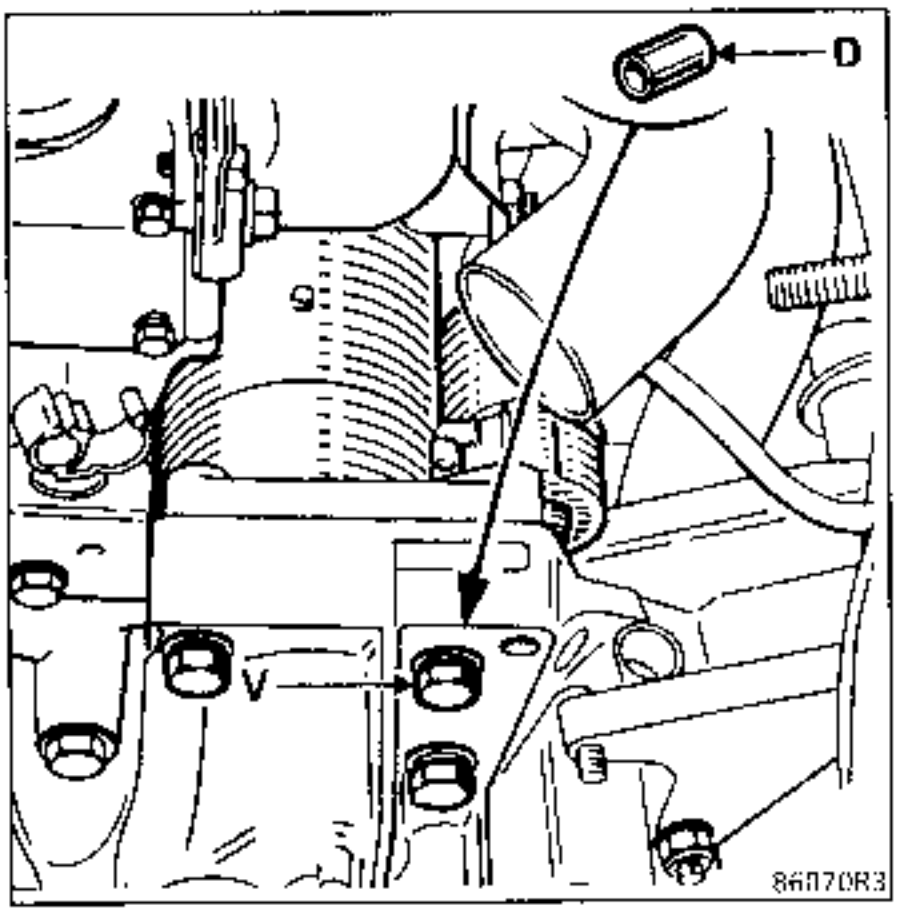
If there is an excess of grease on the hub and this grease penetrates into the damping pre-hub, it will no longer be efficient and gearbox noise will occur.

IMPORTANT

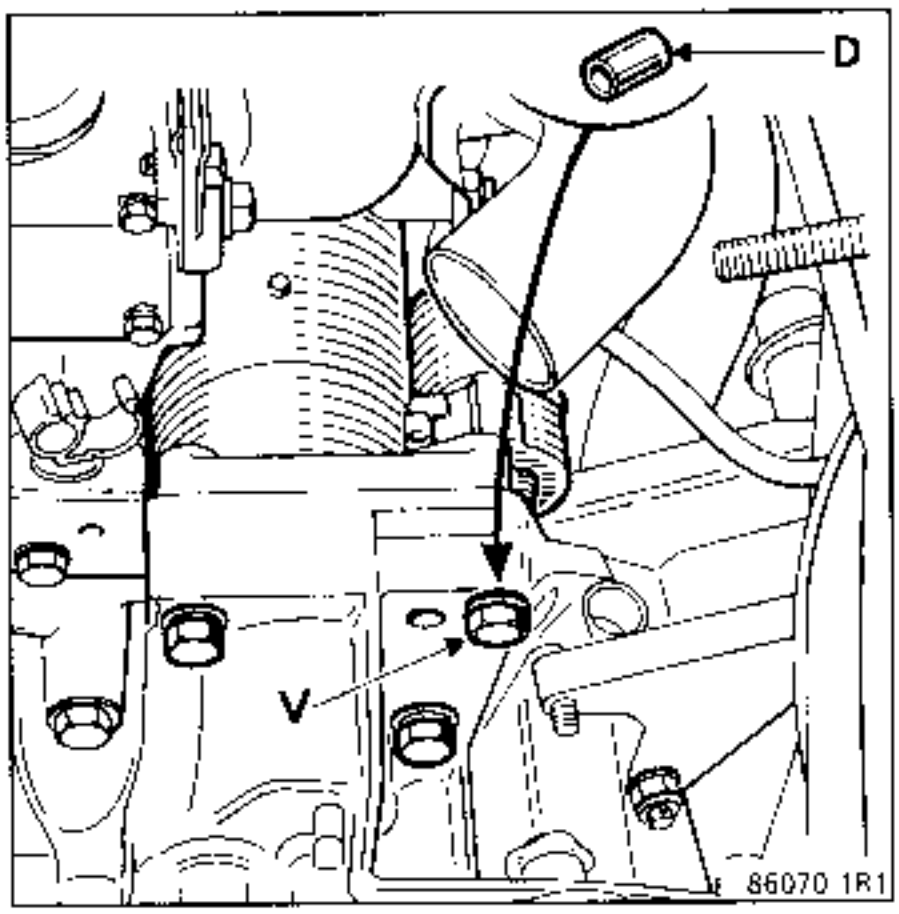
Bolt (V) and the starter motor centring dowel (D) must be fitted correctly.

The heat shields must be correctly refitted.

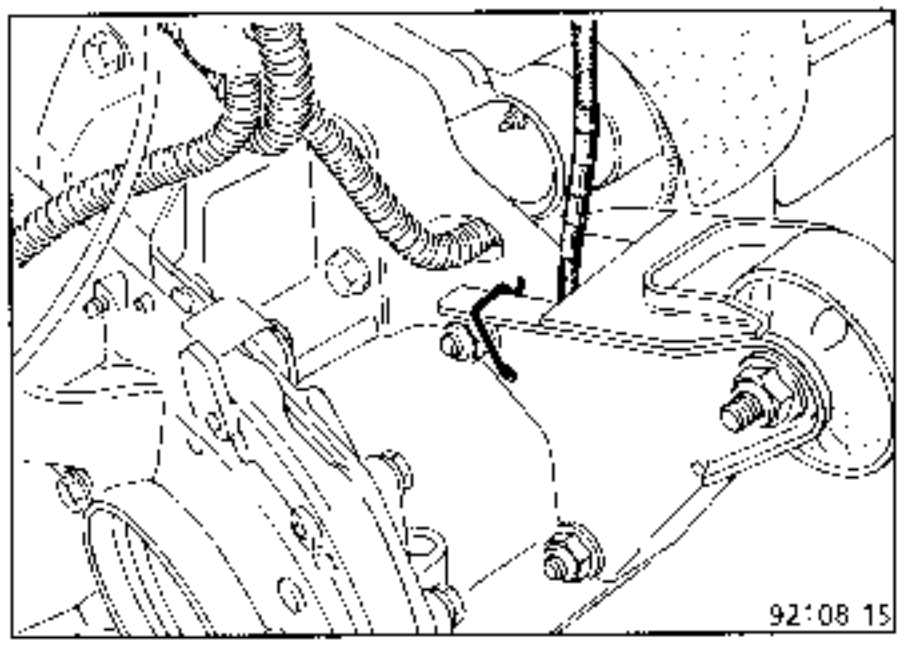
1 - C engine



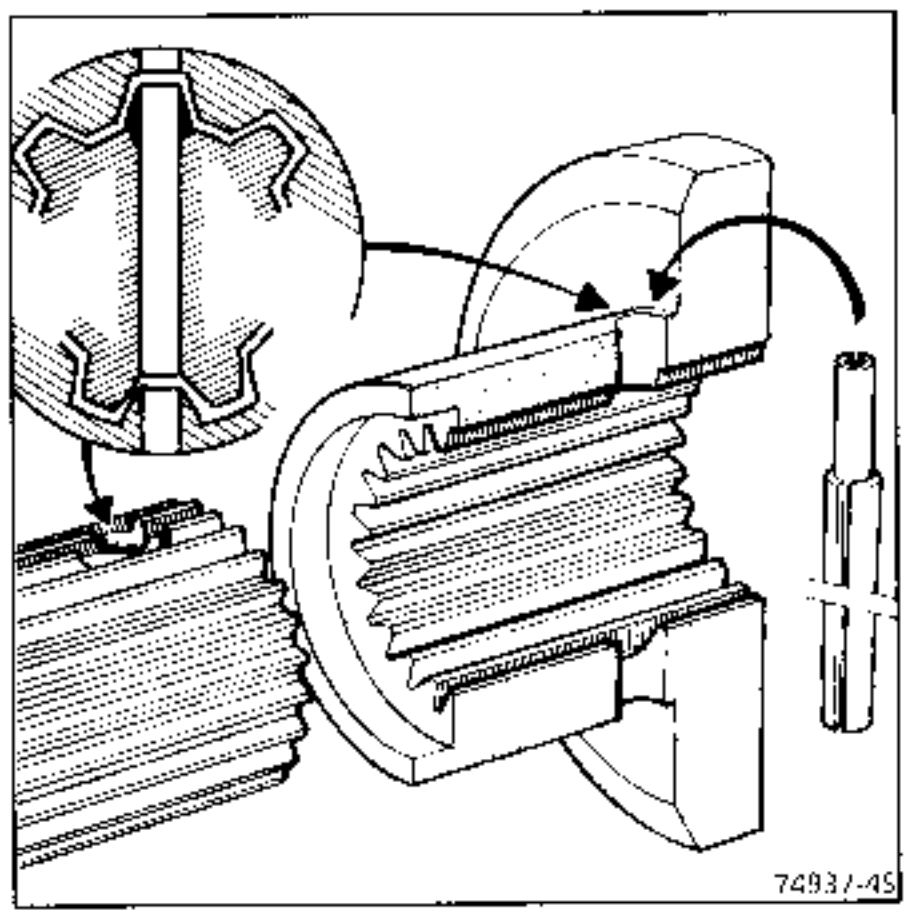
2 - F engine



Reconnect the speedo cable, ensuring the pin is fitted correctly.



Position the driveshaft in relation to the sunwheel, pivot the stub axle carrier, engaging the driveshaft into the sunwheel using the angled pin **B.Vi. 31-01** to align the holes.



An input chamfer on the sunwheel makes fitting the new roll pins easier.

Seal the ends with (**RHODORSEAL 5661**).

Fit the caliper mounting bolts with **LOCTITE FRENBLOC** and tighten to the correct torque.

Press the brake pedal several times to bring the pistons into contact with the brake pads.

Tighten all nuts and bolts to the correct torque

Fill the gearbox with oil.

SPECIAL TOOLING REQUIRED		
B.Vi.	31-01	Set of punches
T.Av.	476	Ball joint extractor

TIGHTENING TORQUES (in daN.m)	
Mounting pad nuts	4
Wheel bolts	9
Shock absorber base mounting bolt	20
Track rod end nut	4
Clutch bellhousing mounting bolt on engine	5

The gearbox is removed alone.

REMOVAL

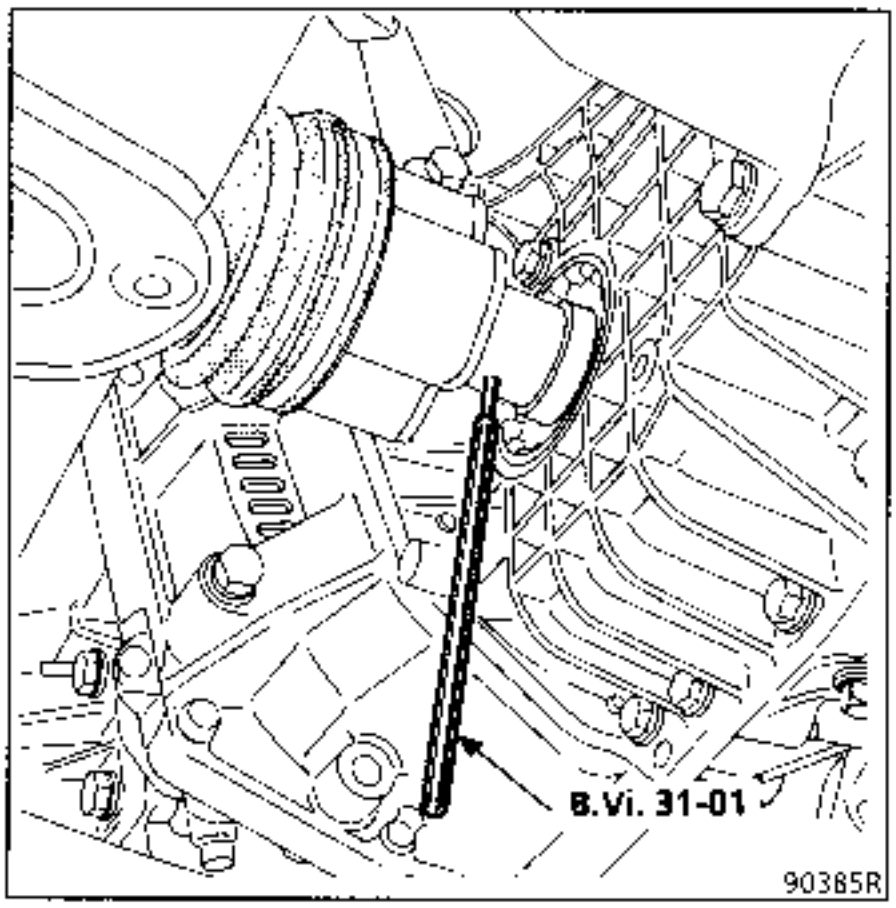
Put the vehicle on a lift.

Disconnect the battery.

Remove the front wheels.

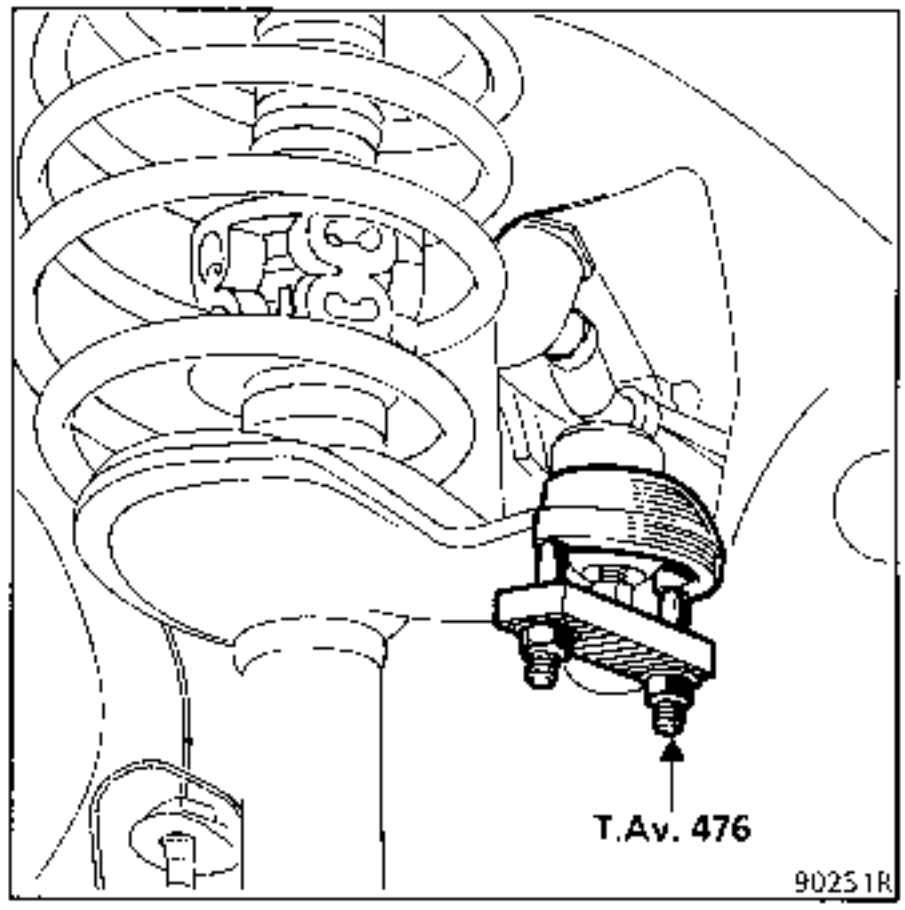
Drain the gearbox if necessary.

Remove the driveshaft roll pins using tool **B.Vi. 31-01**.

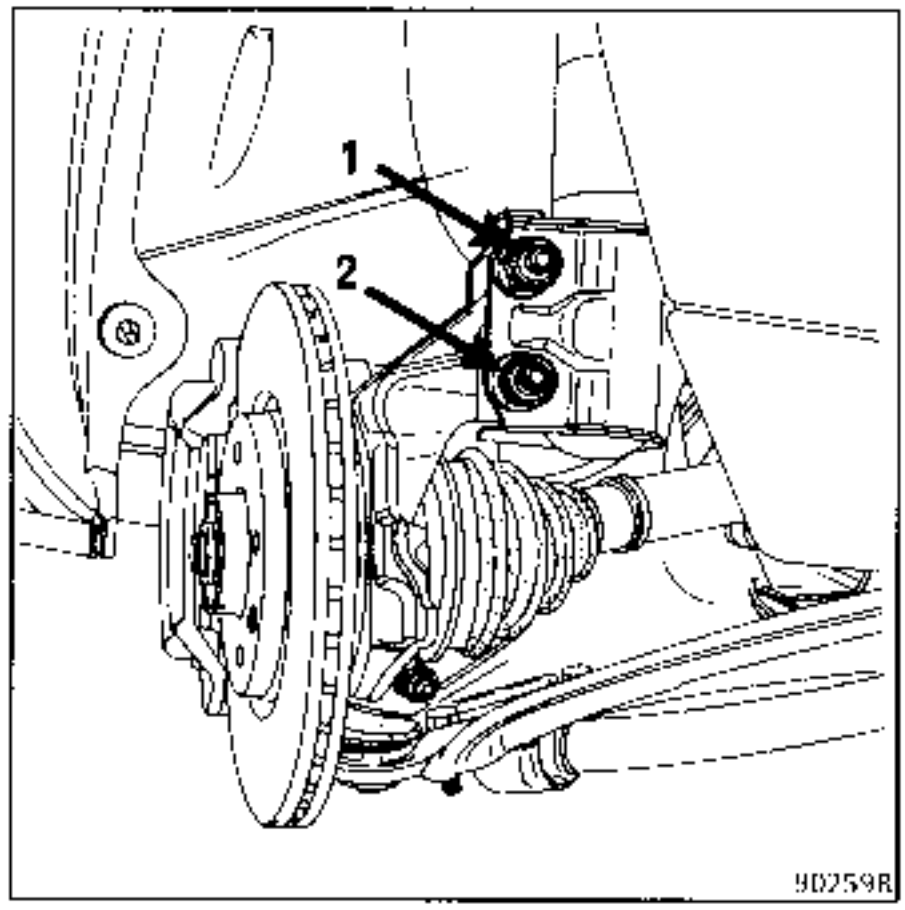


Remove:

- one track rod end using tool **T.Av. 476**,

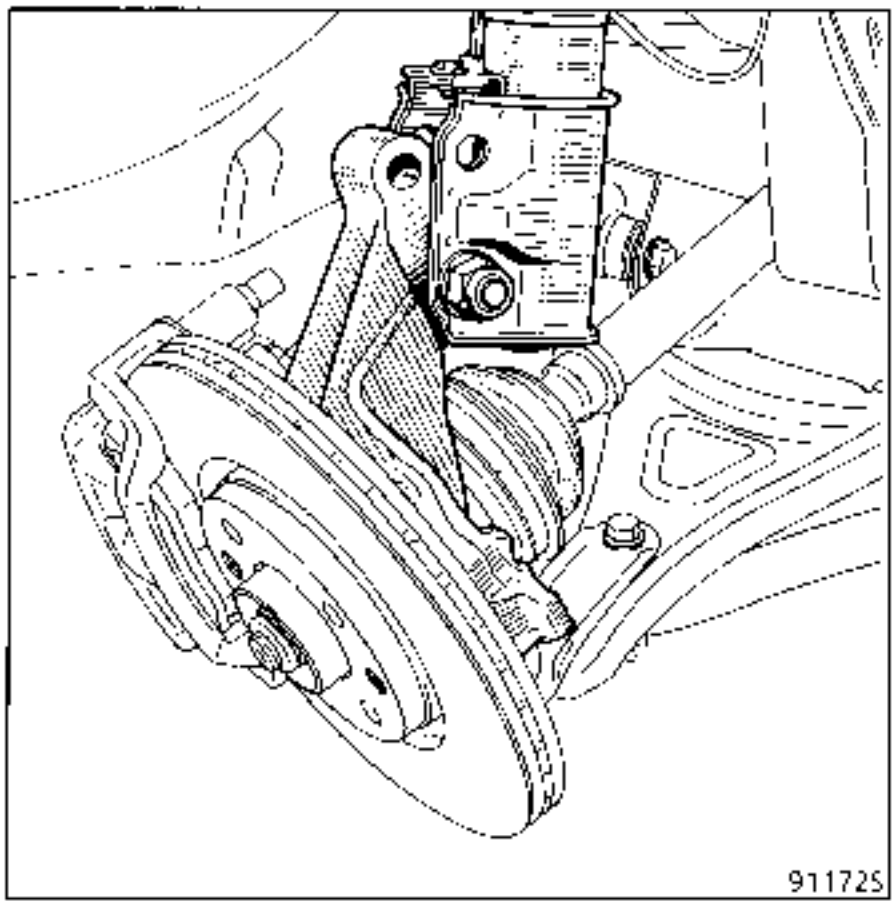


- the upper shock absorber base mounting bolts (1) and slacken the lower bolts (2).



NOTE : the bolts have a splined section and a mallet must be used to remove them.

Tilt the stub axle carriers and release the driveshafts.

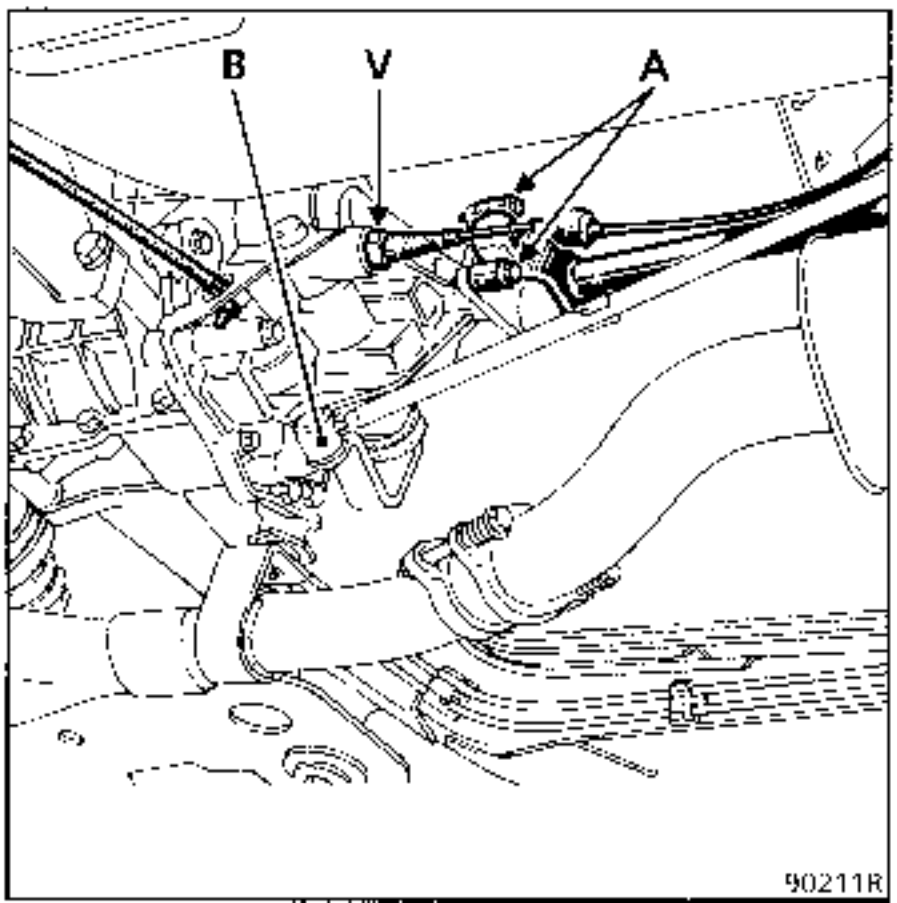


Remove:

- the upper bolts at the edge of the gearbox,
- the starter motor bolts.

Under the vehicle, remove:

- the transverse bar,
- the primary exhaust pipe,
- the selector controls (the two mounting bolts (**A**) and release ball joint (**B**)),
- the reverse gear locking device (**V**).



Remove:

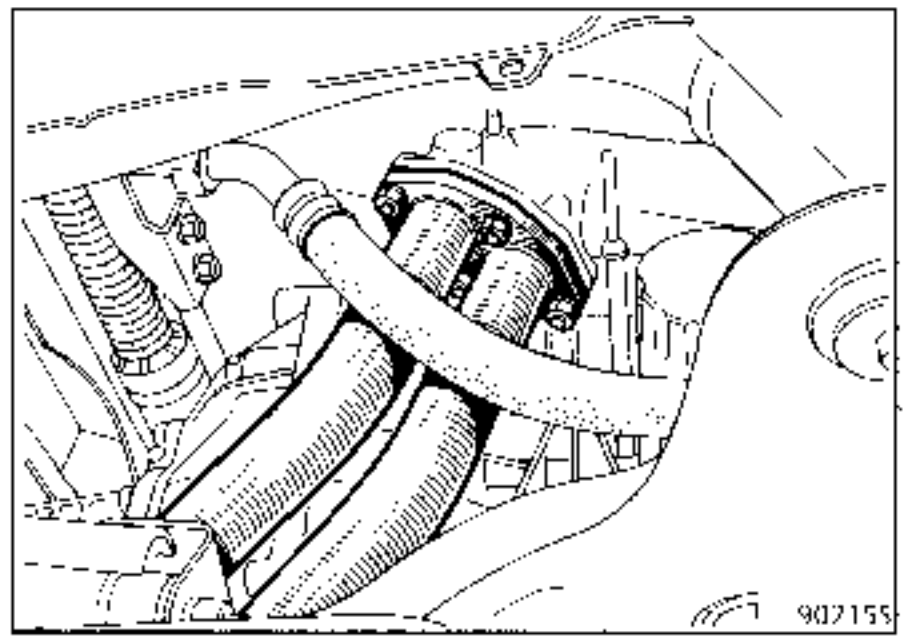
- the earth strap,
- the lower bolts at the edge of the gearbox.

Disconnect:

- the clutch cable,
- the reversing lights switch wires,
- the speedo cable.

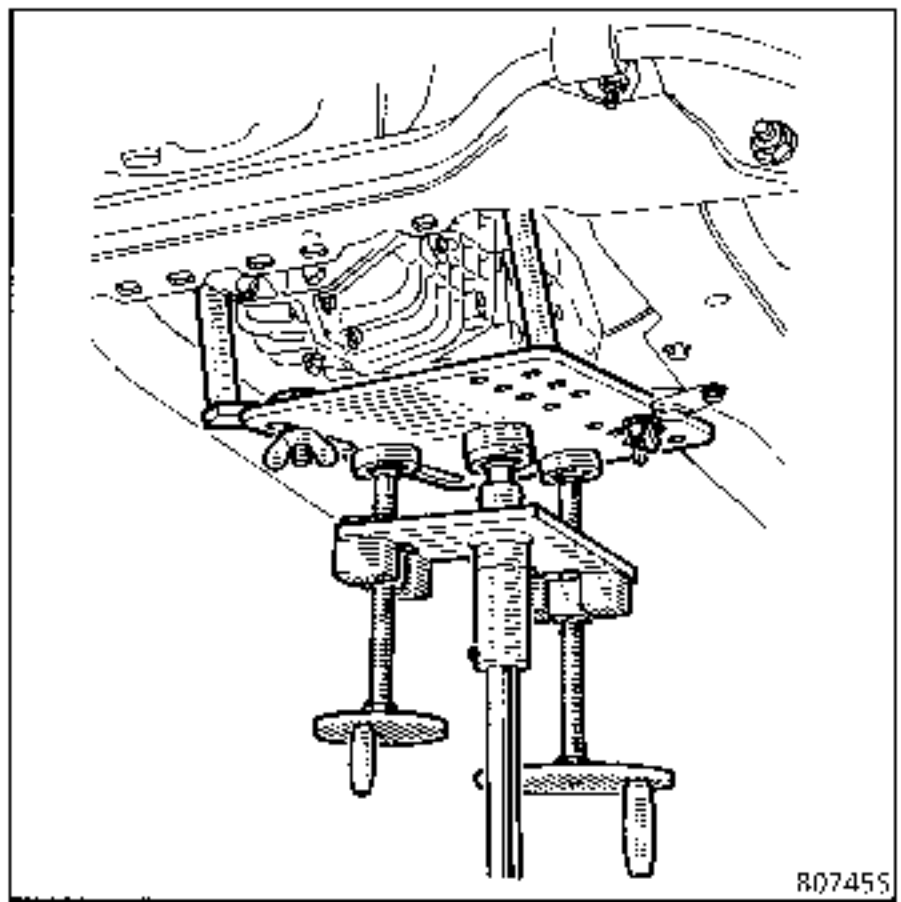
Petrol engine - Special note

Remove the primary exhaust pipe.

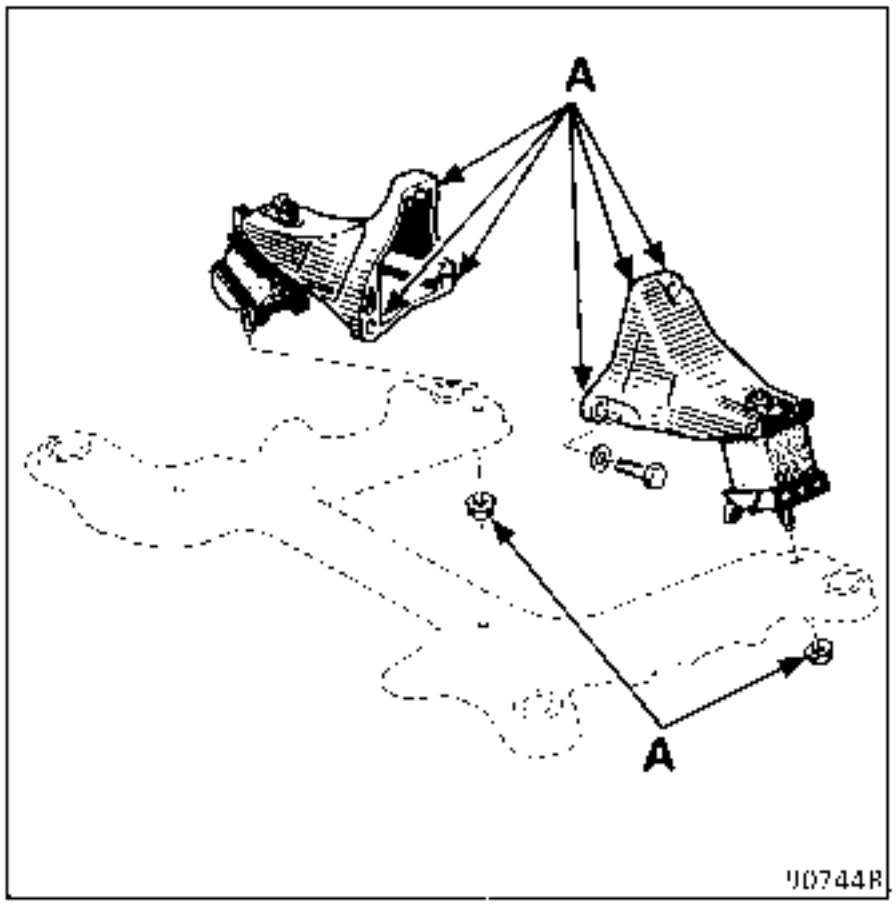


All types

Position the component jack.



Remove the side pad mounting assemblies from the gearbox (bolts **A**).

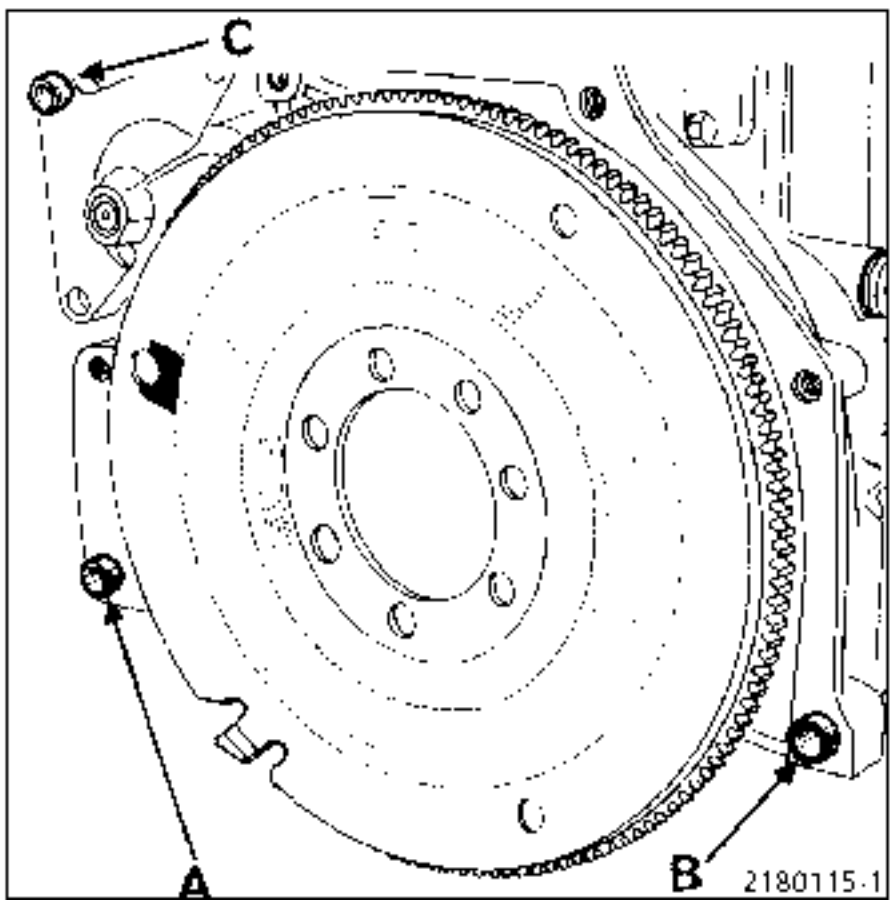


Lift the engine slightly at the front.

Pull the gearbox towards the rear of the vehicle, taking care not to catch the clutch fork control.

REFITTING - Special notes

Before refitting the gearbox to the vehicle, check the centring dowels **(A)**, **(B)** are present on the en gine block and dowel **(C)** is present on the starter motor.



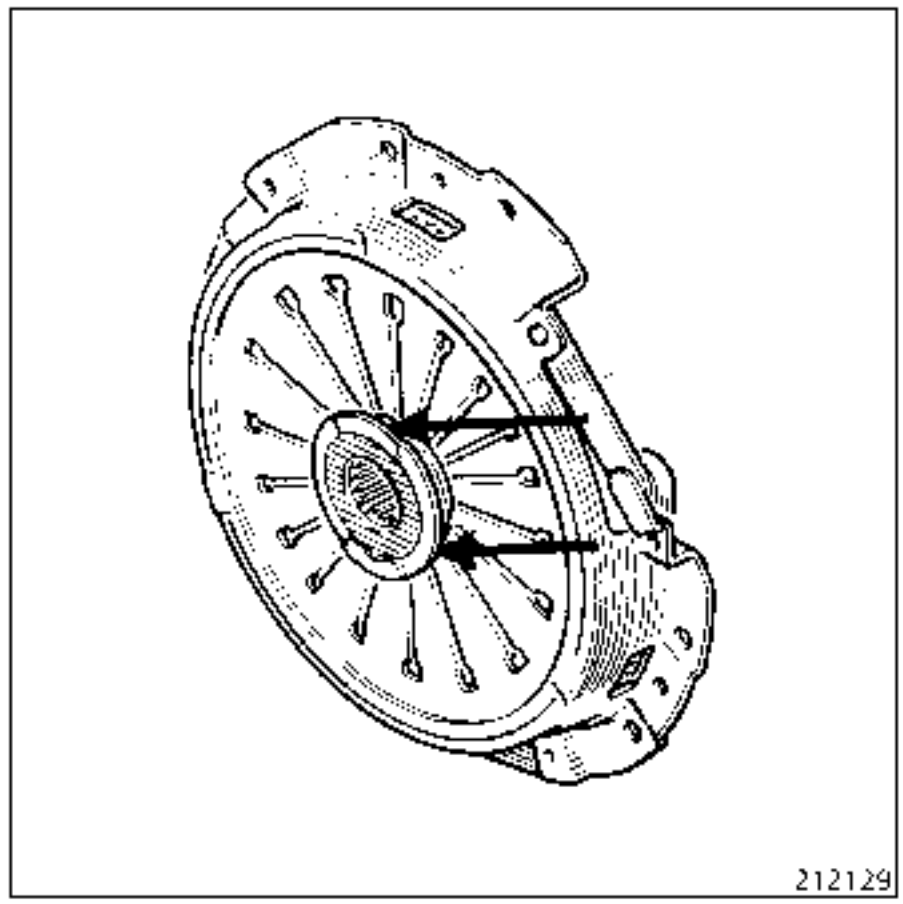
Special note for "diesel" clutch discs:

Diesel engines are fitted with a damping pre hub which operates most efficiently when its internal components operate dry.

If there is an excess of grease on the hub and this grease penetrates into the damping pre-hub, it will no longer be efficient and gearbox noise will occur.

Drawn clutch - Special note

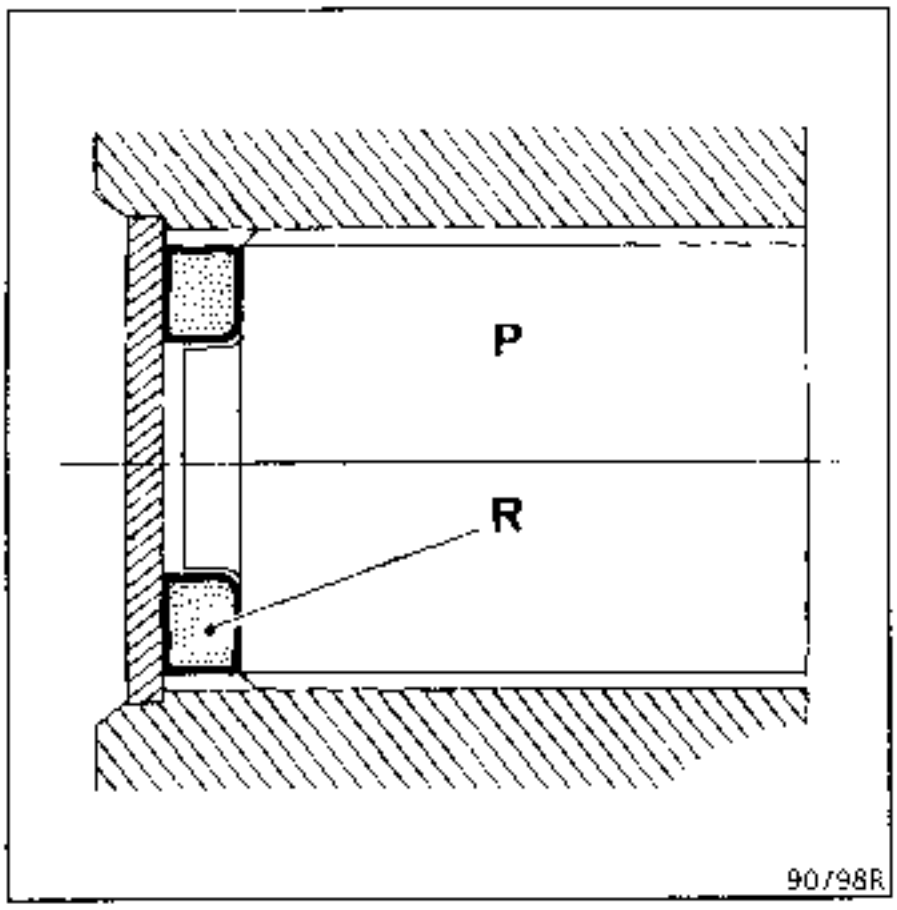
Fit the gearbox in position, ensuring that the clutch fork fingers are correctly positioned behind the thrust pad shoulder (the thrust pad is integral with the clutch mechanism).



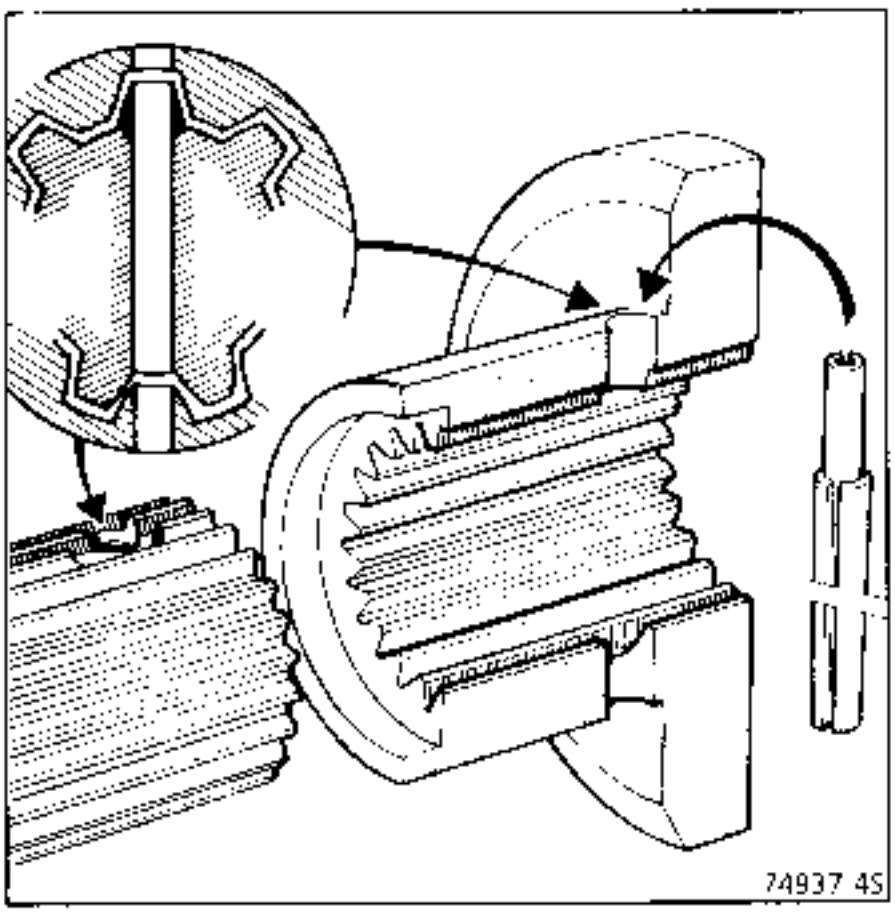
NOTE : when the parts are fitted , moving the fork (without any excessive play) and the gearbox simultaneously enables you to ensure that the fork fingers are correctly positioned.

Assemble the gearbox and engine and refit the side mountings.

Ensure the rubber washer (**R**) is fitted which must be placed between the end of the sunwheel (**P**) and the base of the driveshaft yoke.



Position the driveshaft in relation to the sunwheel, pivot the stub axle carrier, engaging the driveshaft into the sunwheel using the angled pin **B.Vi. 31-01** to align the holes.



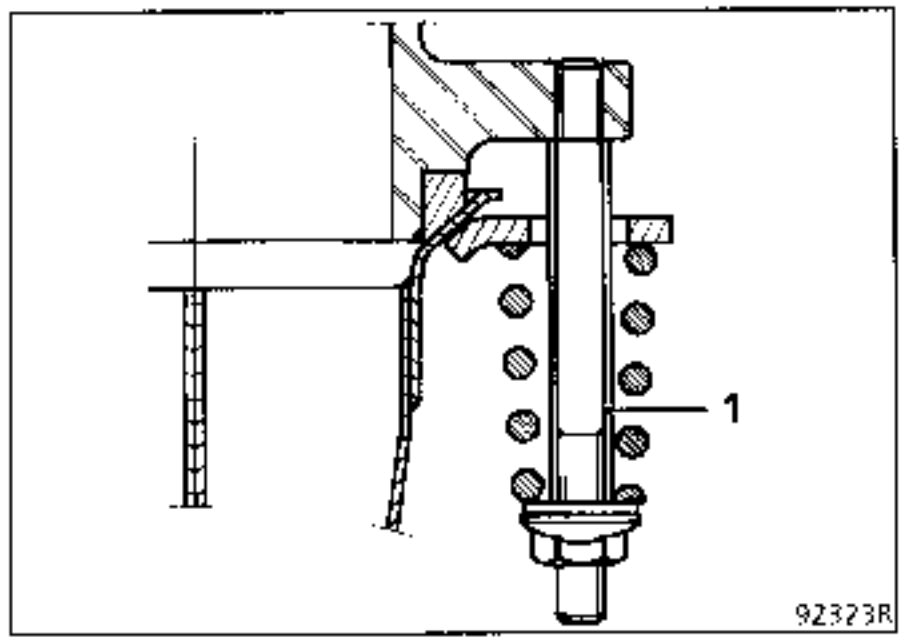
An input chamfer on the sunwheel makes fitting the new roll pins easier.

Seal the roll pin holes (**RHODORSEAL 5661**).

"Petrol" engine

Refit the exhaust flange

NOTE : the exhaust flange has spacers (**1**) which determine the spring tension. Tighten the flange until the spring is against the spacers.



Refit:

- the gear selector controls,
- the speedo cable,
- the transverse bar,
- the earth strap.

Reconnect the clutch cable and check that the automatic wear take-up system is operating correctly.

Tighten all nuts and bolts to the correct torque.

Fill the gearbox with oil if necessary.

Special notes and additional information to the method given for 4 x 2 vehicles (NG9)

TIGHTENING TORQUES (in daN.m)	
Bolt on output flange	2.5

REMOVAL

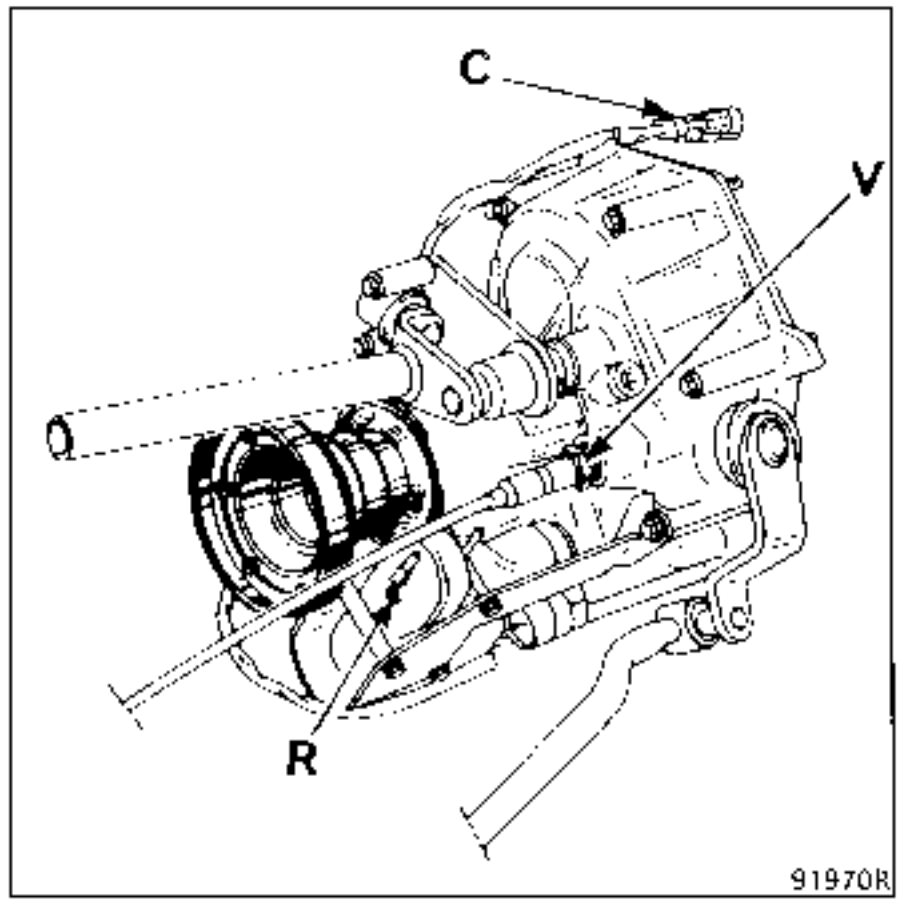
Remove:

the catalytic converter (if necessary).
- the prop shaft.

Disconnect:

- the two pipes from the differential lock pneumatic control,
- connector (C) from the differential lock warning light switch,
- the reverse gear locking device.

Use a standard wrench, modified in the workshop to give better access for this operation.



REFITTING

Special note

Tighten all nuts and bolts to the correct torque.

Ensure the differential lock pneumatic control pipes are correctly connected:

the red pipe must be connected to the marked side (red label (R)) on the vacuum capsule.

SPECIAL TOOLING REQUIRED		
B.Vi.	606	Set of punches
T.Av.	476	Ball joint extractor

TIGHTENING TORQUES (in daN.m)	
Pad mounting nut	4
Wheel bolts	10
Shock absorber base mounting nut	20
Track rod end nut	3.5
Gearbox edge mounting bolt	5

The gearbox is **removed alone.**

REMOVAL

Put the vehicle on a lift.

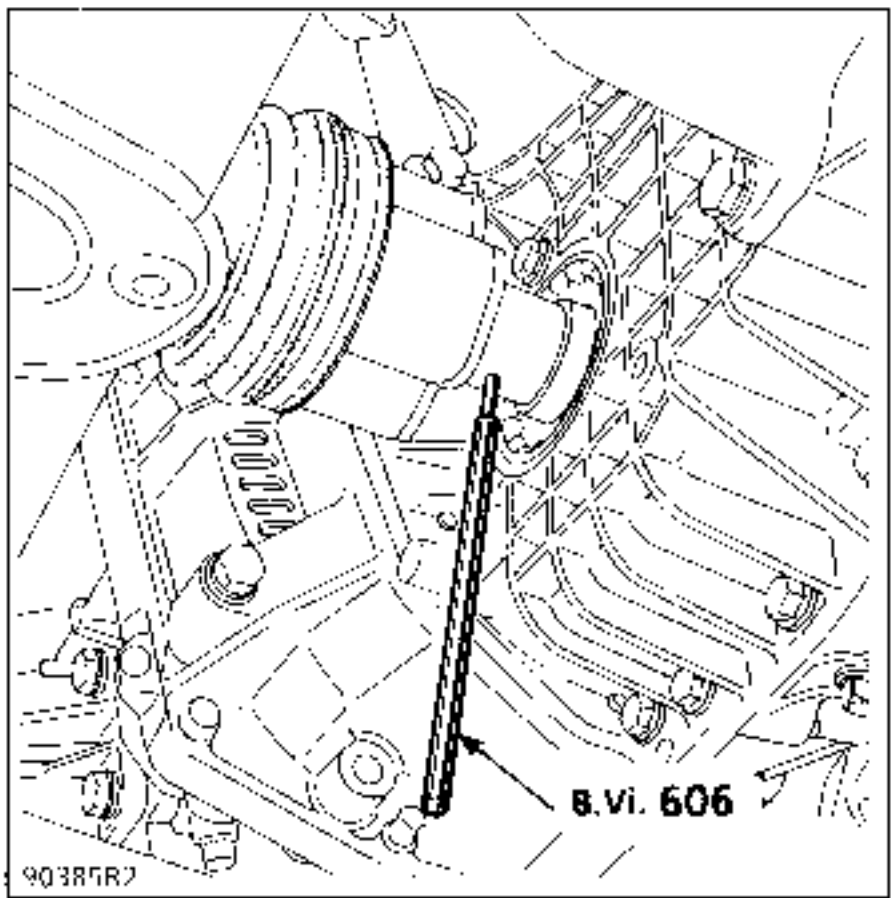
Disconnect the battery

Remove the front wheels.

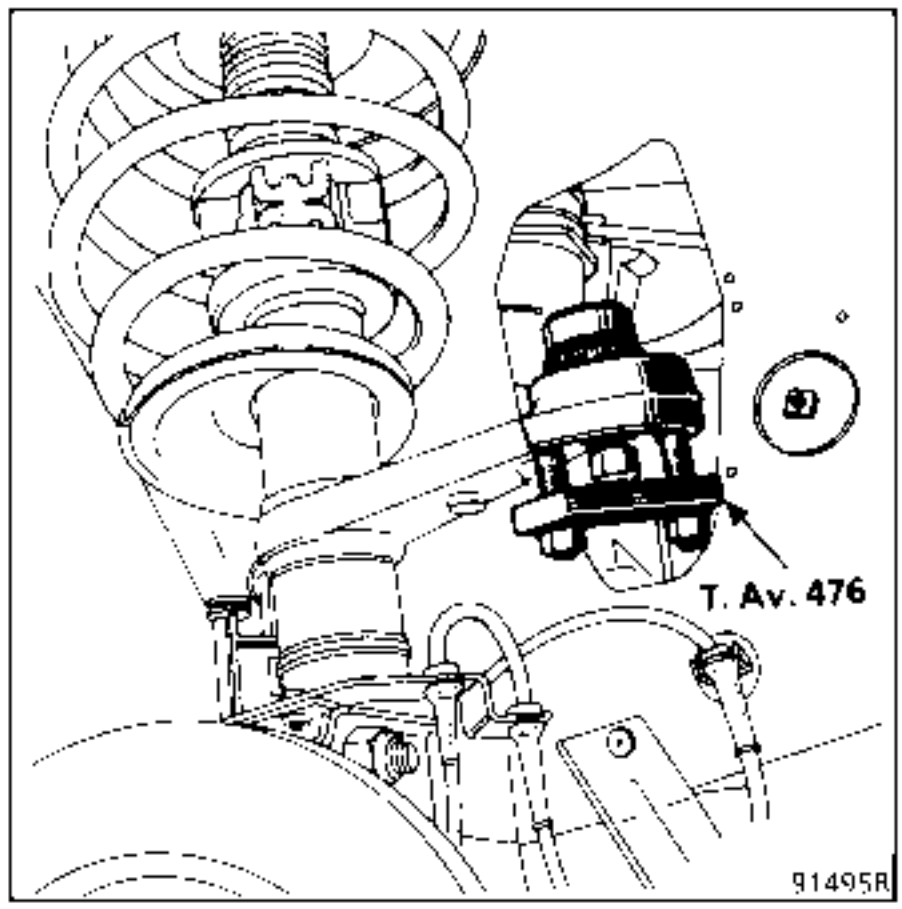
Remove the oil recuperator.

Drain the gearbox.

Remove the driveshaft roll pins (tool **B.Vi. 606**).

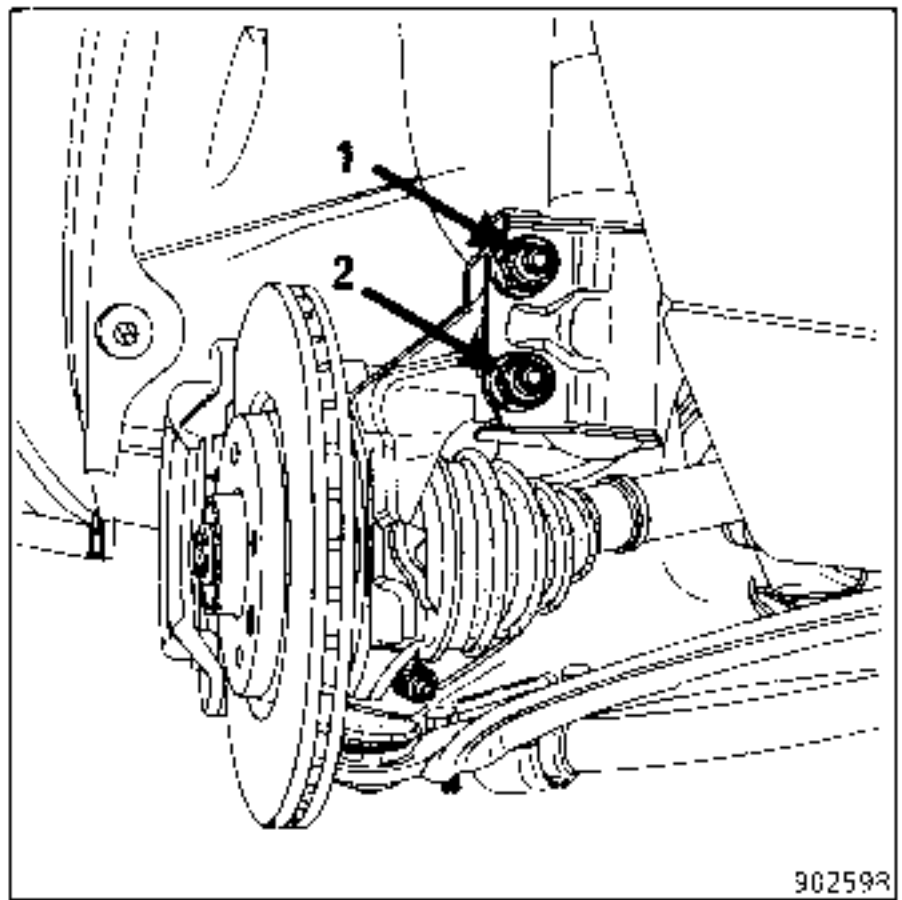


Remove one track rod end (tool **T.Av. 476**).

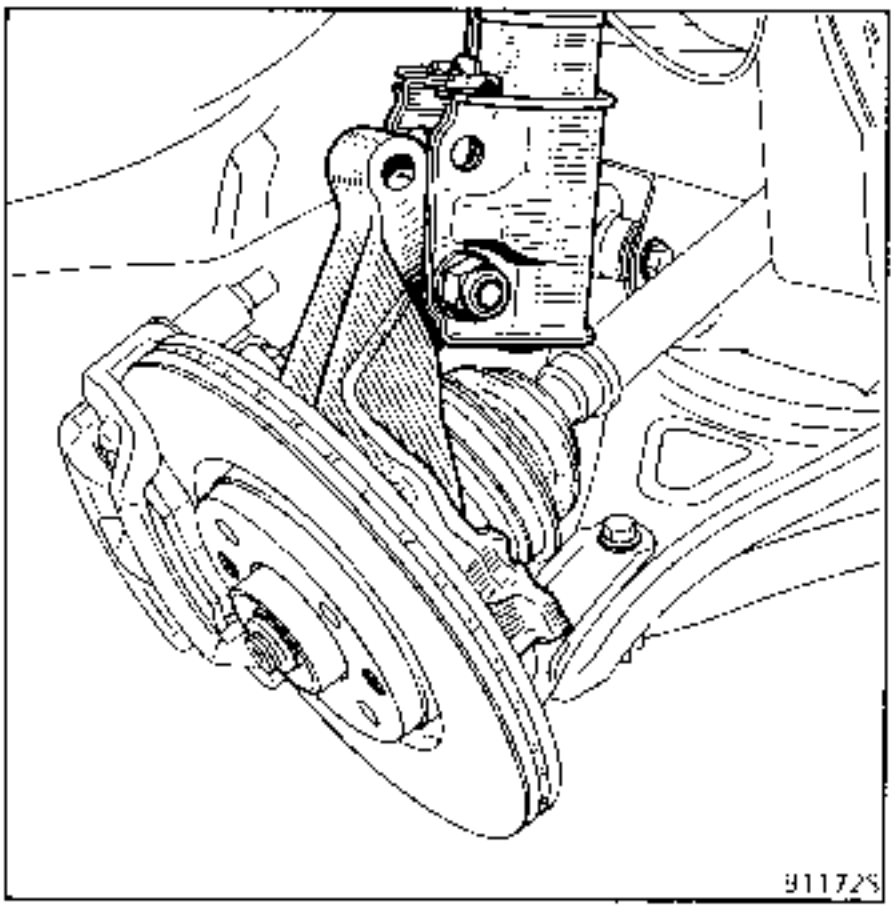


On the left and right hand sides, slacken the lower shock absorber base mounting bolts (**2**) and remove the upper mounting bolts (**1**).

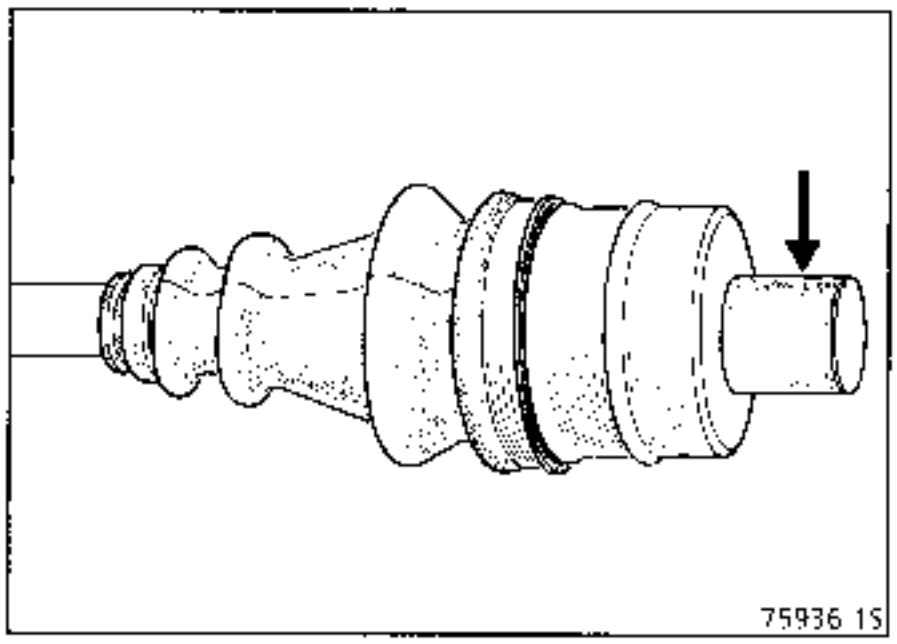
NOTE : the bolts have a splined section and a mallet must be used to remove them.



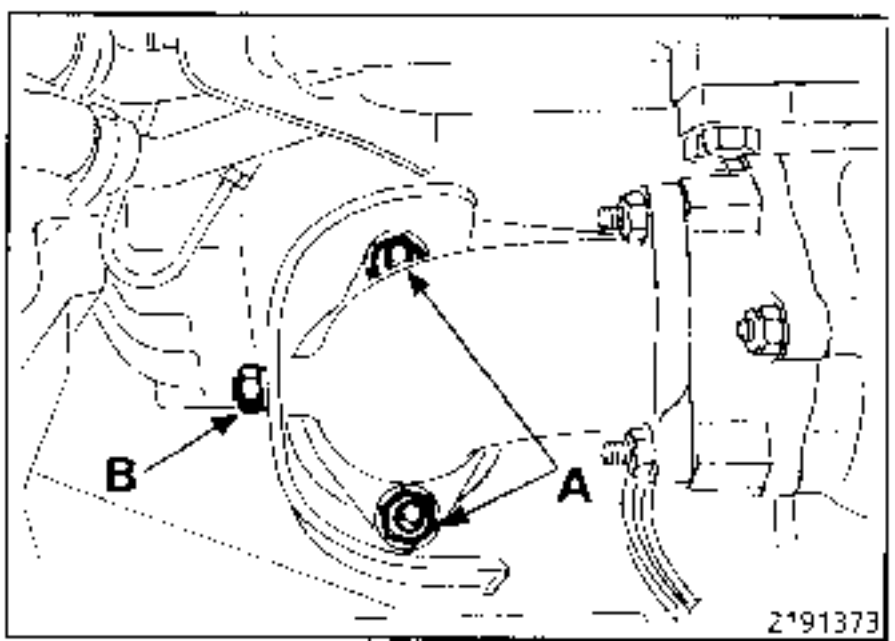
Tilt the stub axle carriers and release the driveshafts.



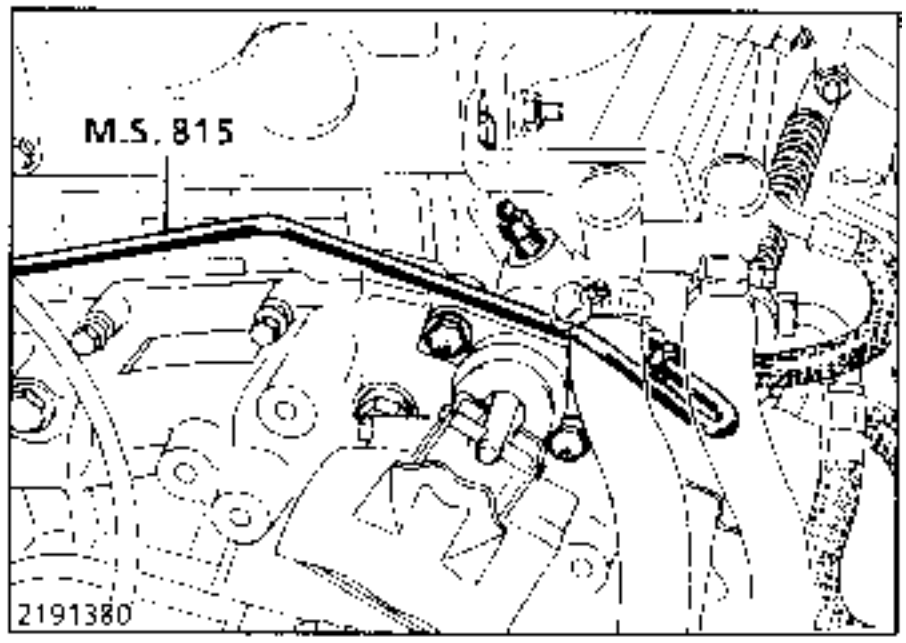
Apply adhesive tape or fit a protective cover (supplied with new driveshafts) to the differential output seal face.



Remove:
- the turbo heat shield,
- the primary exhaust pipe flange,
- the two nuts at (**A**),
- the stud at (**B**).

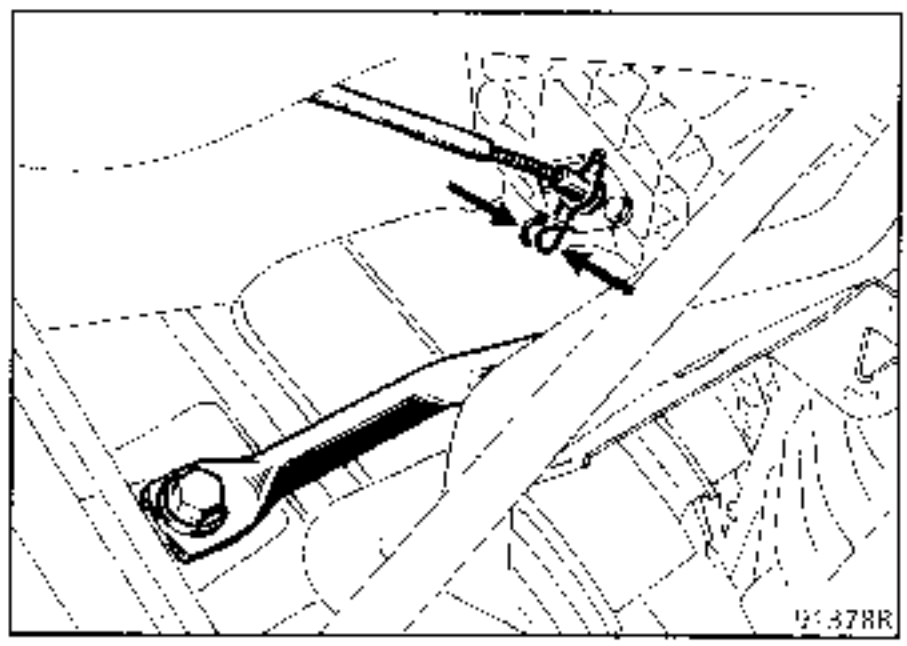


Separate the rigid coolant pipes and remove the clutch slave cylinder (do not disconnect the pipe) and attach it to the steering.



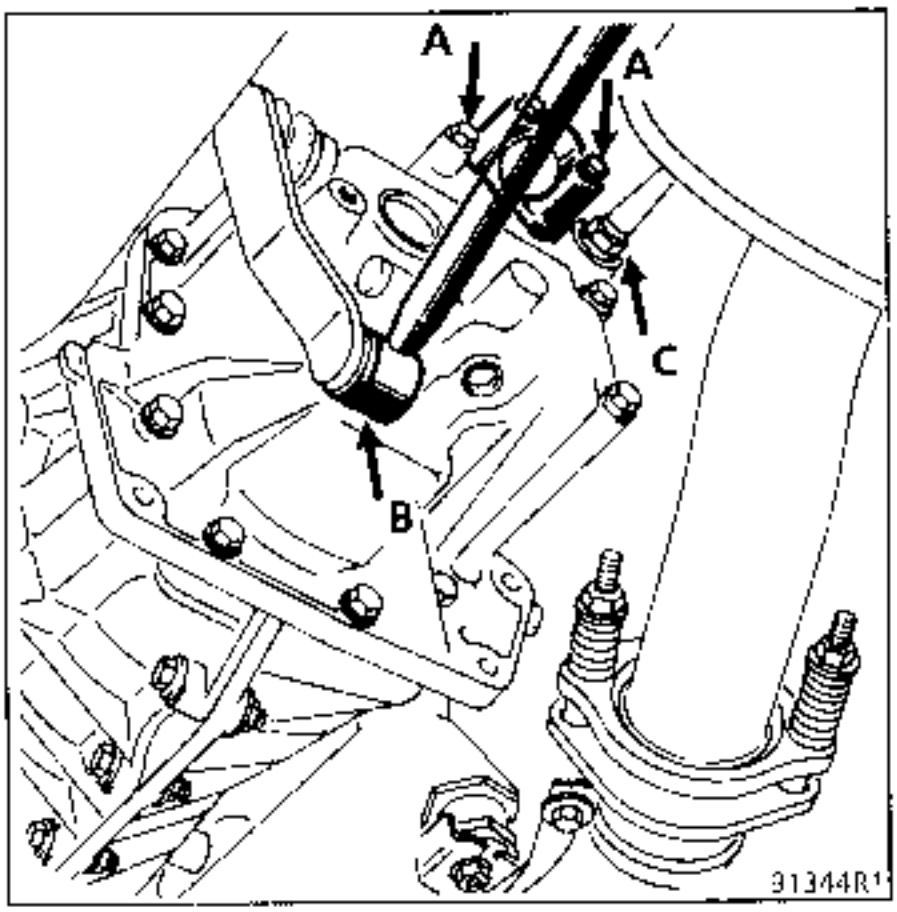
Remove:
- the **A.E.I.** sensor,
- the starter motor bolts,
- the upper bolts at the edge of the gearbox,
- the tie rod mounting bolt.

Disconnect:
- the speedo cable.



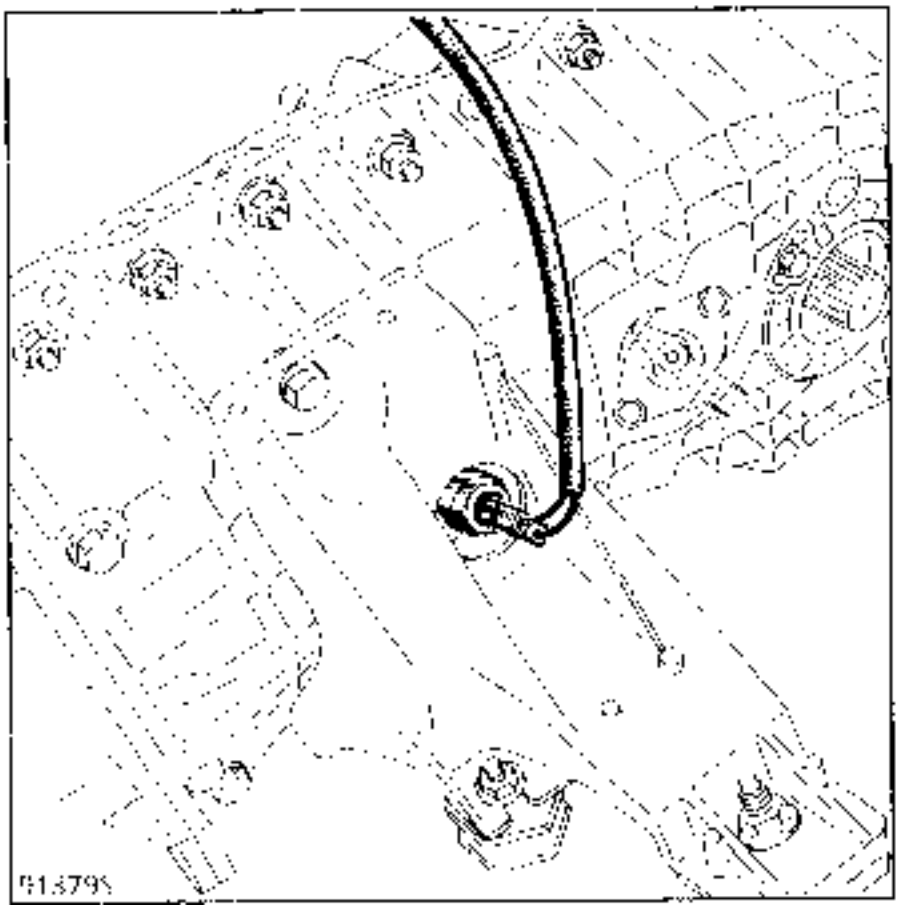
Under the vehicle, remove:

- the tie rod,
- the primary exhaust pipe,
- the gear controls:
  - at (A) the two ball joint cover bolts,
  - at (B) release the ball joint,
  - at (C) the reverse gear locking device.

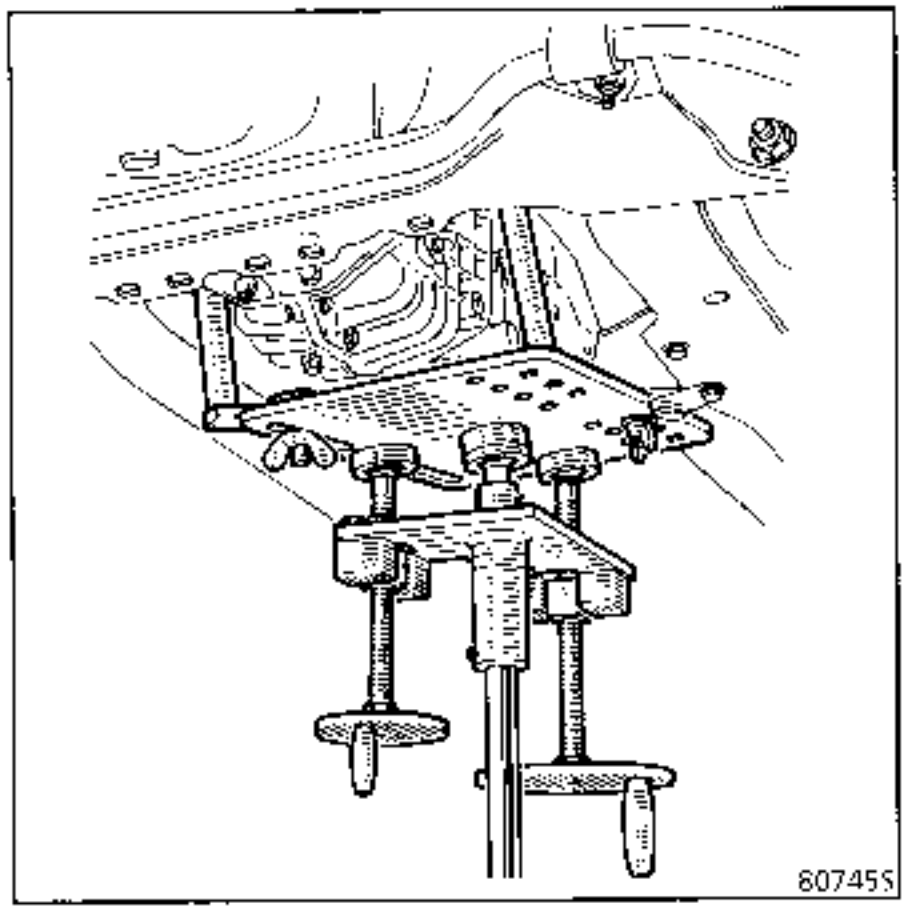


Disconnect:

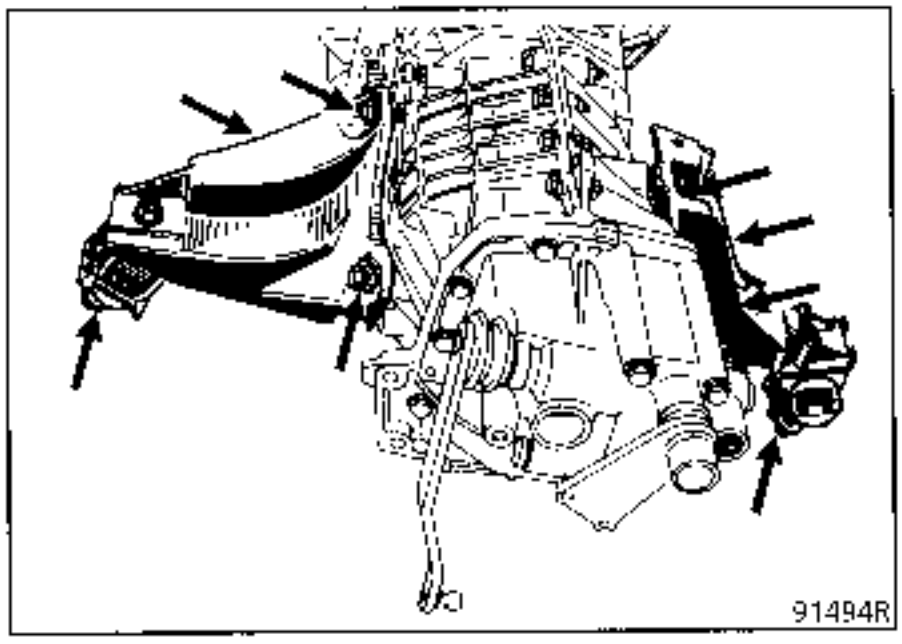
- the reversing lights switch wires,
  the exhaust pipe flexible mountings.



Position the component jack.



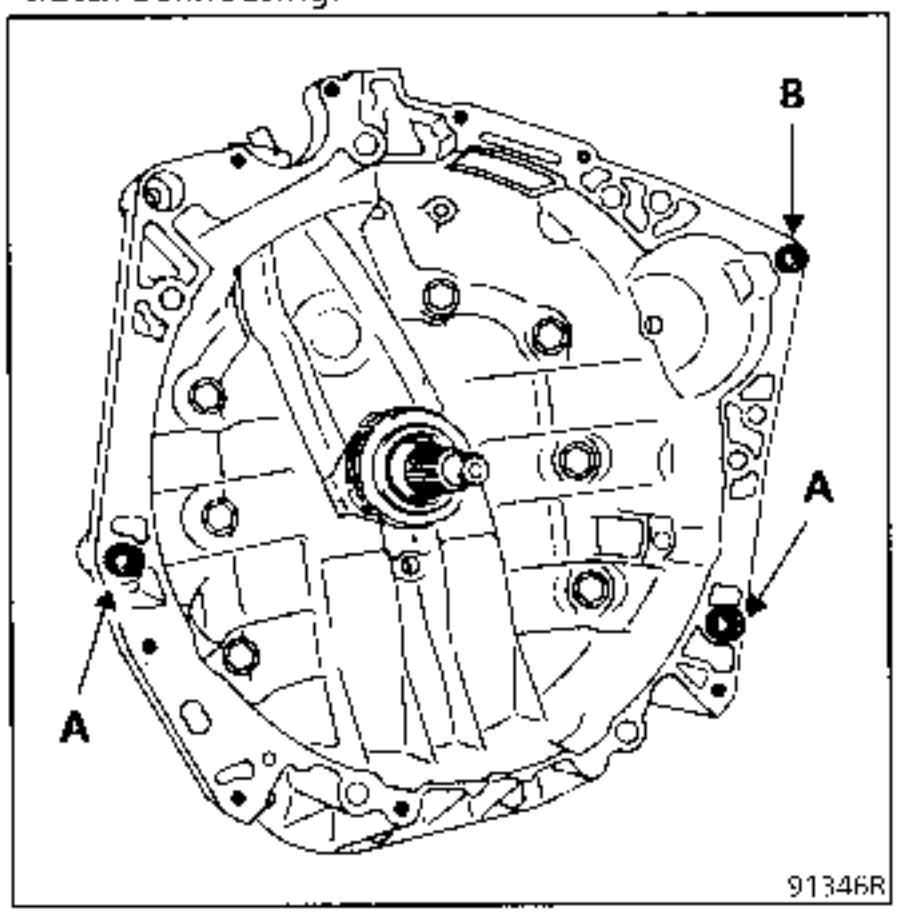
Remove the side mountings.



Pull the gearbox towards the rear of the vehicle taking care not to catch the gear controls.

REFITTING - Special notes

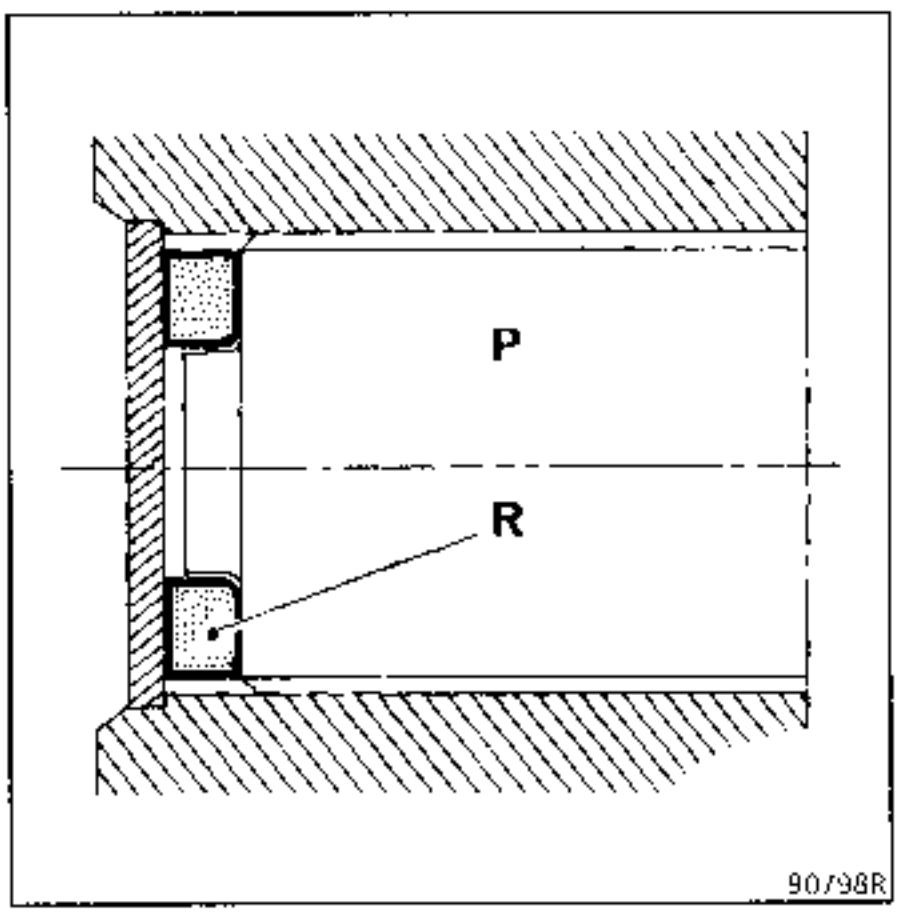
Before refitting the gearbox to the vehicle, check the centring dowels (**A**) and (**B**) are present on the clutch bellhousing.



Coat the splines of the thrust pad bore, the clutch shaft and the sunwheels with **MOLYKOTE BR2**.

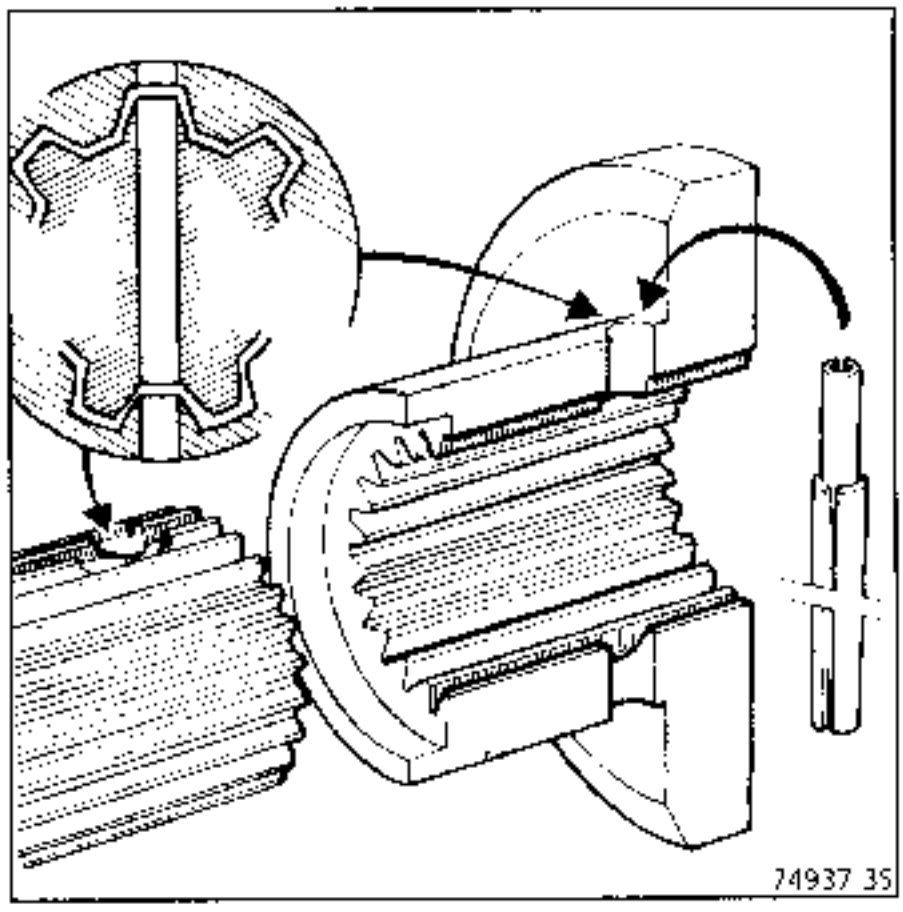
Assemble the engine and gearbox and refit the side mountings.

Ensure the rubber washer (**R**) is fitted which must be placed between the end of the sunwheel (**P**) and the base of the driveshaft yoke.



NOTE : ensure that there are no scratches or abnormal traces of wear on the lip seal bearing face on the driveshaft.

Position the driveshaft in relation to the sunwheel, pivot the stub axle carrier, engaging the driveshaft into the sunwheel using the angled pin **B.Vi. 606** to align the holes.



Fit new driveshaft roll pins and seal the ends (**RHODORSEAL 5661**).

Check the heat shields are correctly refitted.

Tighten all nuts and bolts to the correct torque.

Fill the gearbox with oil.

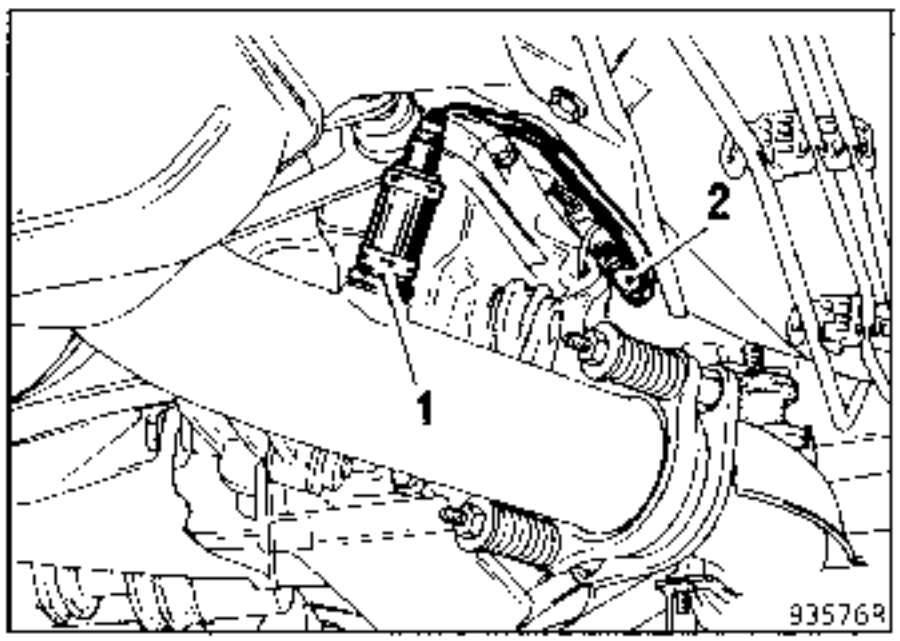
Additional information to the method given for 4 x 2 vehicles (UN1)

TIGHTENING TORQUES (in daN.m)	
Gearbox output flange bolt	2.5
Intermediate bearing mounting bolt	2.5

REMOVAL

Depolluted vehicles - Special notes

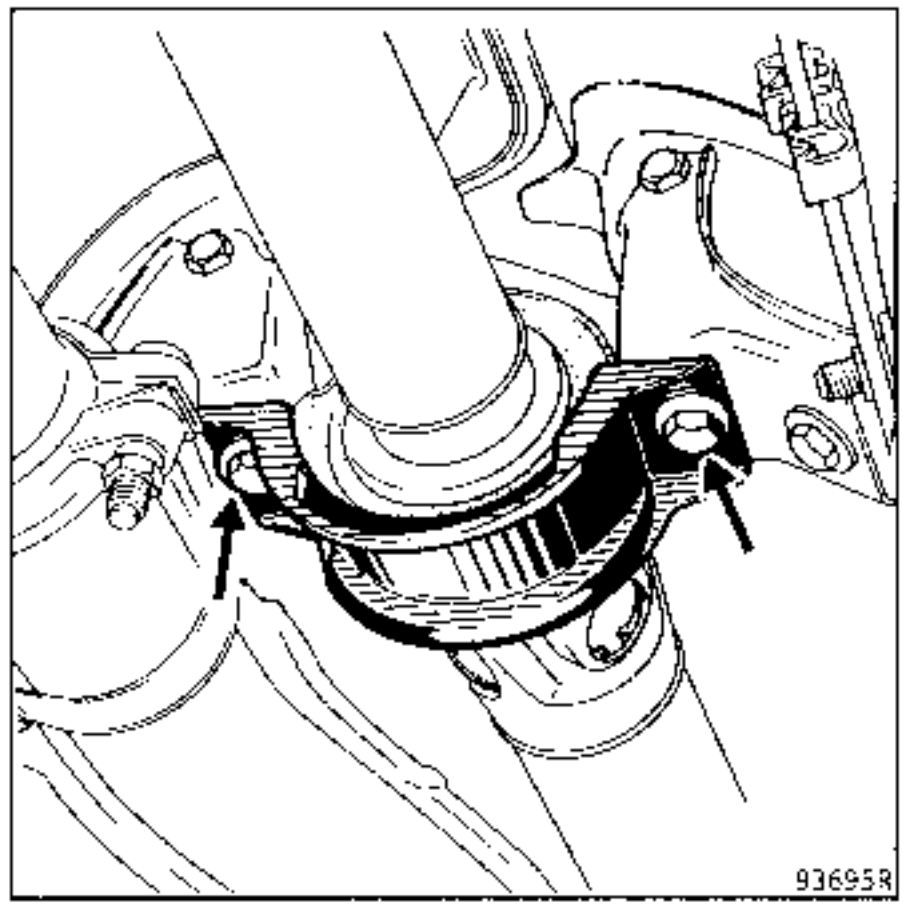
Disconnect the connector (**2**) for the oxygen sensor (1).



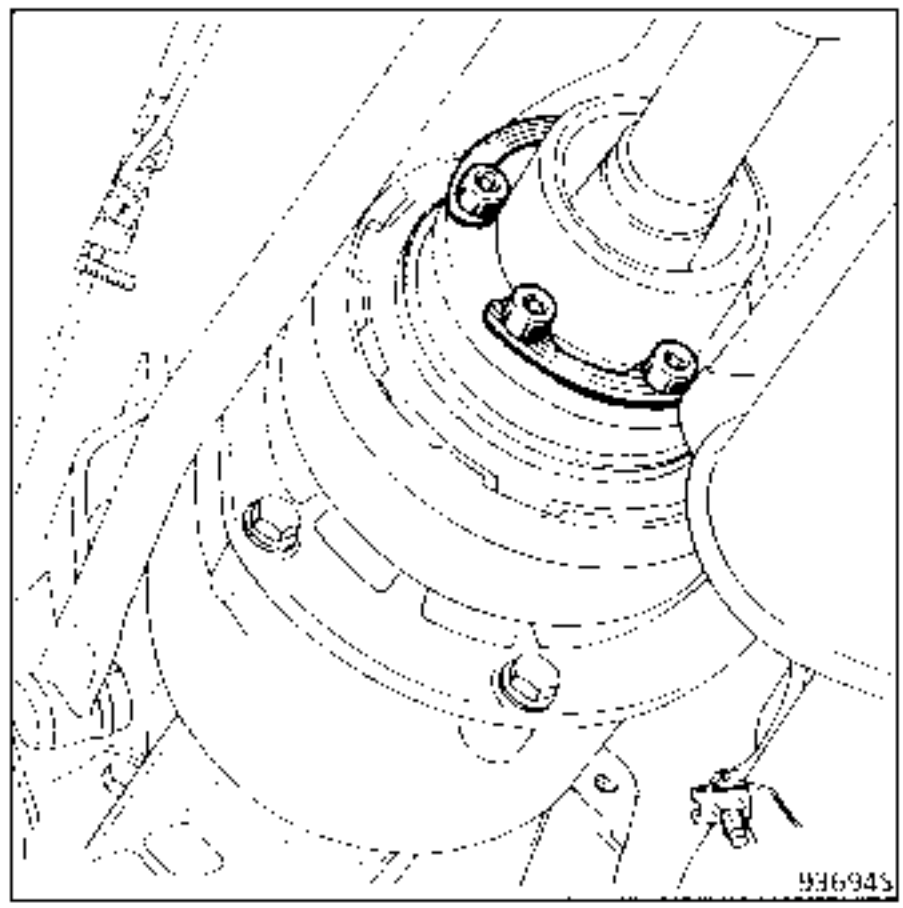
Remove the catalytic converter.

NOTE : the catalytic converter must not be subjected to any mechanical impact as it could be destroyed if the impact is repeated.

Remove the mounting bolts for the prop shaft intermediate bearing.



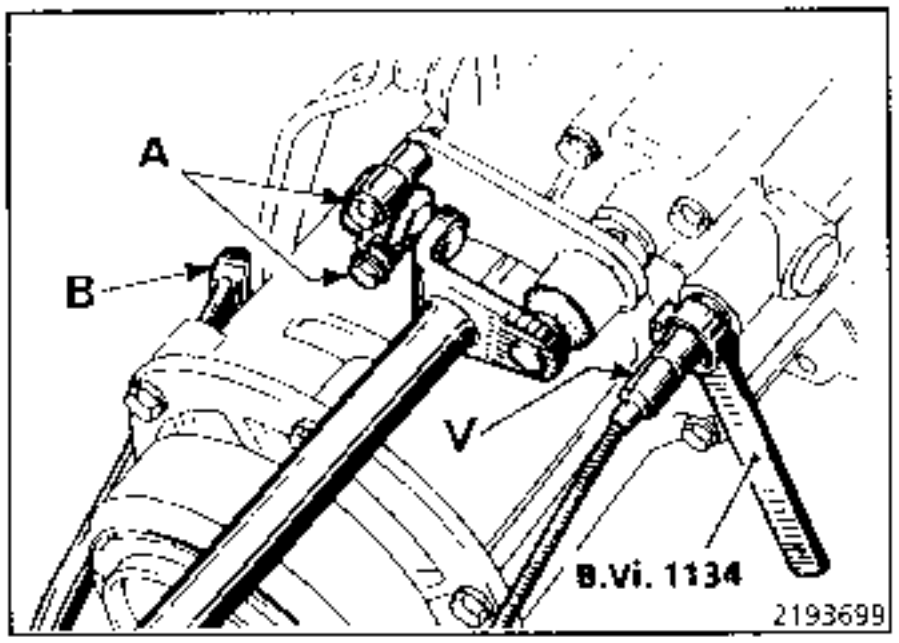
Release the driveshaft from the gearbox output flange.



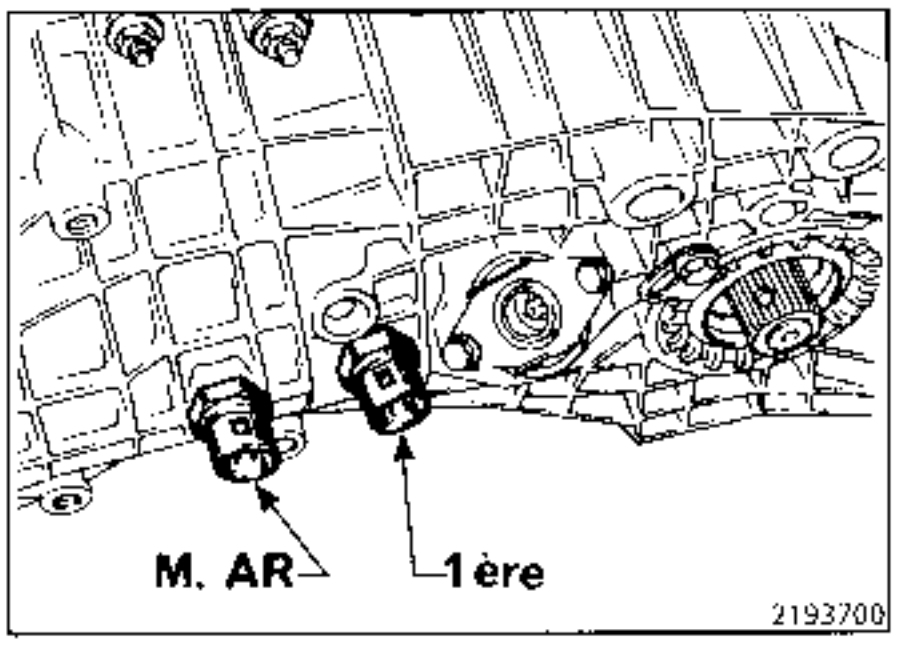
Protect the gaiter on the **LOBRO** joint.

Disconnect:

- the gear controls:
  - at (**A**) the two ball joint cover bolts,
  - at (**B**) release the ball joint,
  - at (**C**) the reverse gear locking device using a standard wrench modified in the workshop.



- the connectors for the reversing lights and first gear switches.



REFITTING - Special notes

Systematically renew the driveshaft mounting bolts and the flange seal which is bonded with grease before the driveshafts are fitted (depending on assembly).

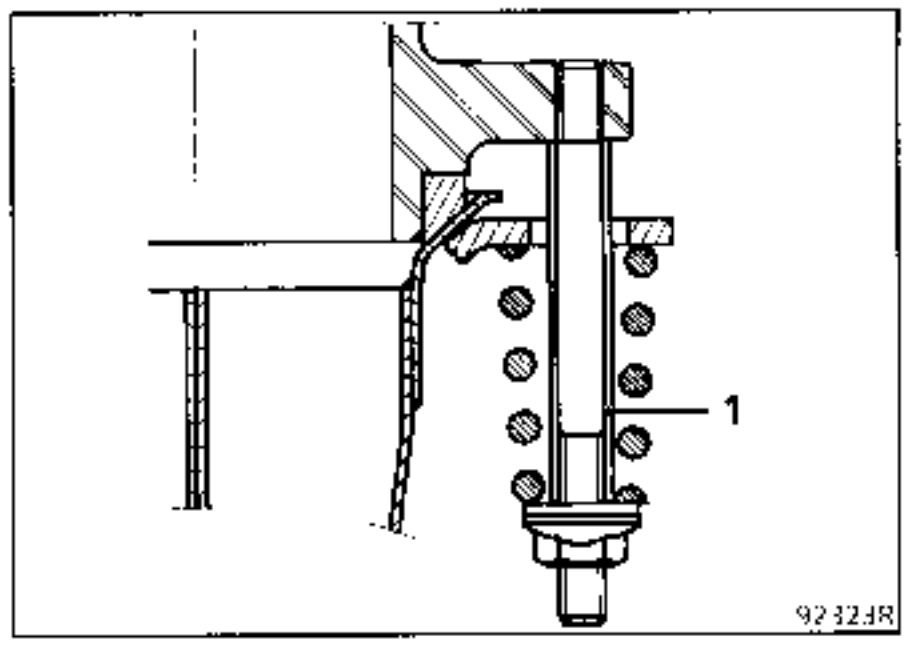
Depolluted vehicles

Reconnect the oxygen sensor connector and ensure it is properly connected.

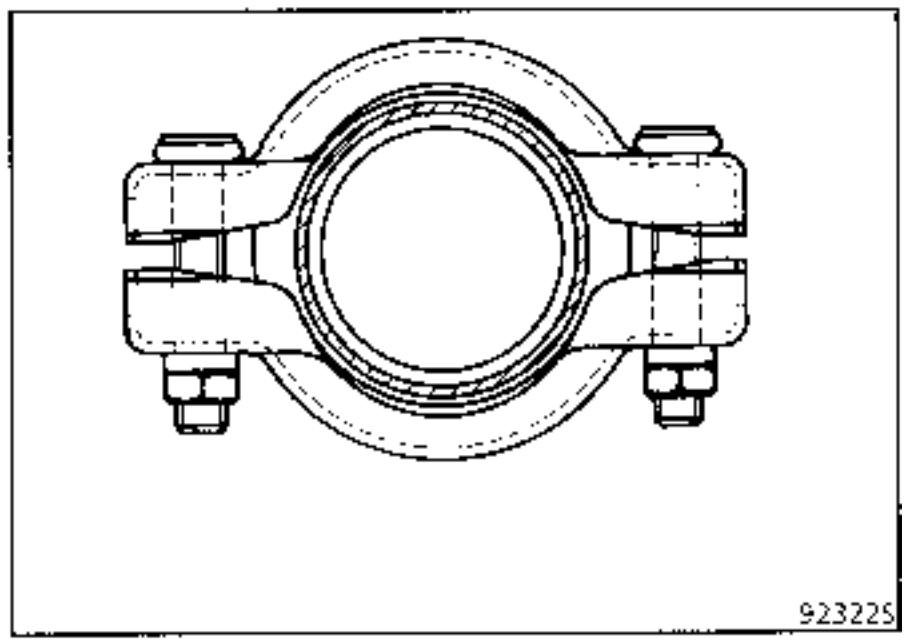
The exhaust pipe must be sealed correctly up to the catalytic converter.

The exhaust flange has spacers (1) which determine the spring tension.

Tighten until the springs touch the spacers.



Position the clips so that their tightening surface bears equally on the two pipes to be connected.



Observe the correct tightening torque.

SPECIAL TOOLING REQUIRED	
B.Vi. 28-01	Extractor tool
B.Vi. 31-01	Set of punches for removing and fitting roll pins of diameter 5 mm
B.Vi. 1007	Jaws for B.Vi. 28-01

TIGHTENING TORQUES (in daN.m)	
Primary shaft nut	13.5
Secondary shaft bolt	7

CONSUMABLES
LOCTITE FRENBLOC :
Primary shaft nut
Secondary shaft bolt
5th fixed gear
5th gear hub

REMOVAL

Put the vehicle on a 2 post lift.

Remove the front left hand wheel.

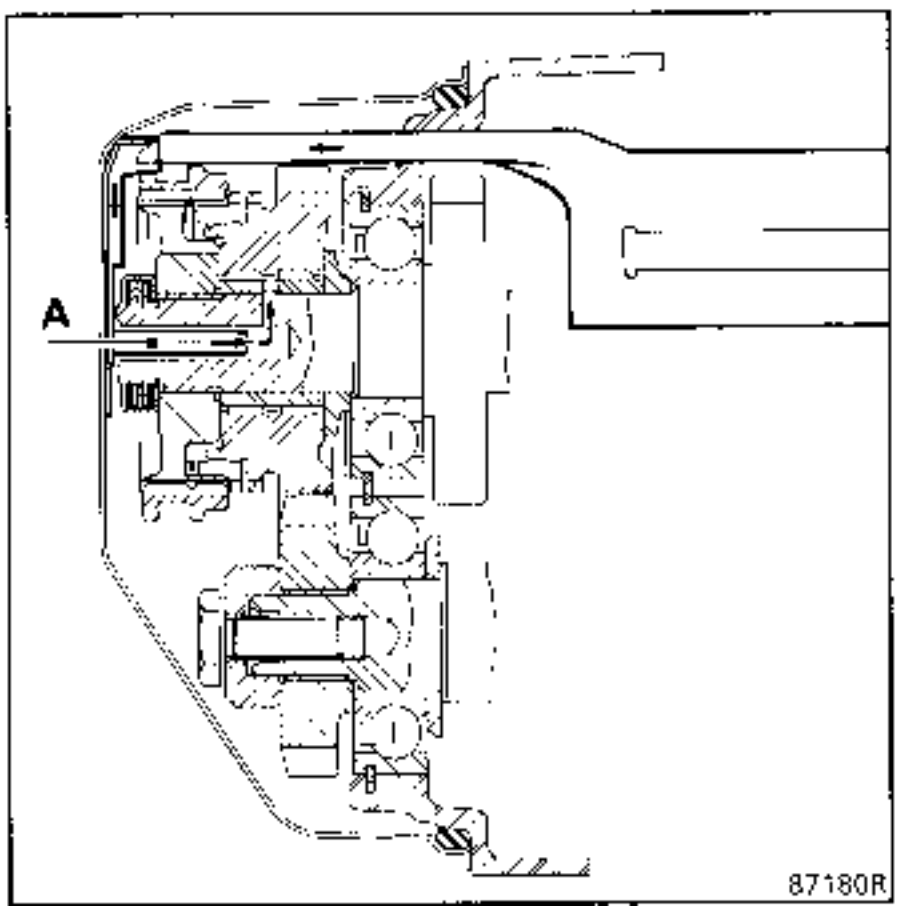
Remove the wheel arch protector.

Remove the sub-frame side member tie rod.

Remove the engine undertray.

Drain the gearbox.

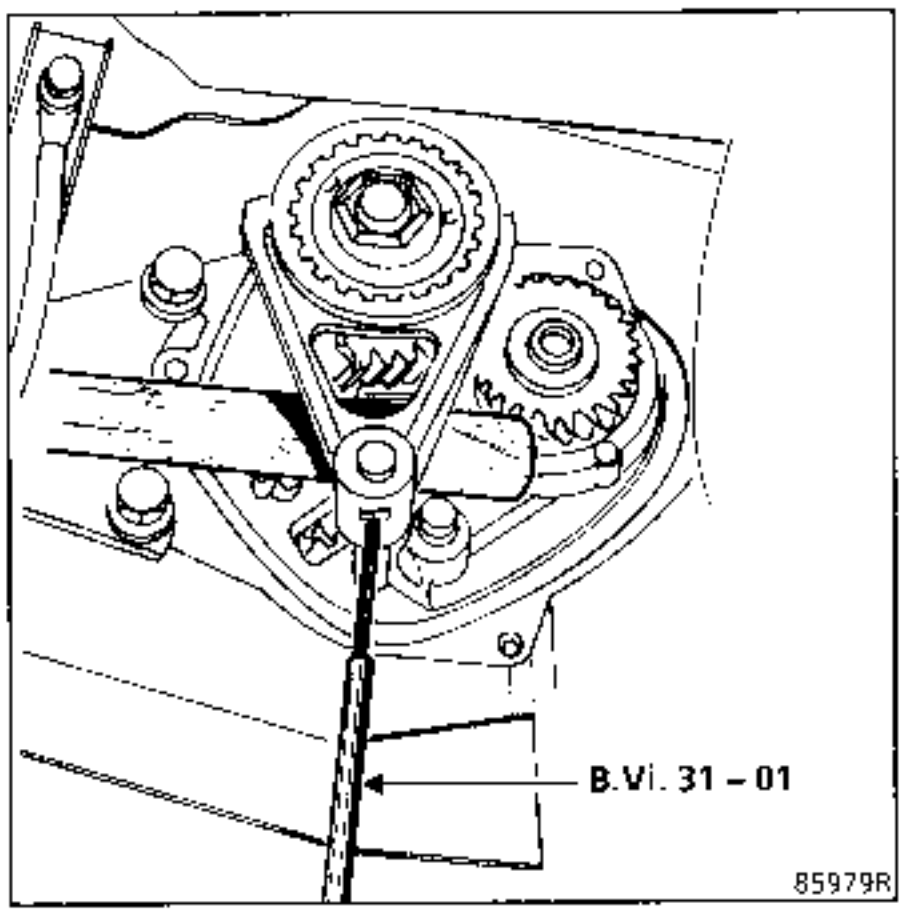
The rear housing must be removed along the horizontal centre line of the gearbox as it bears a lubricating duct (A) which goes into the primary shaft.



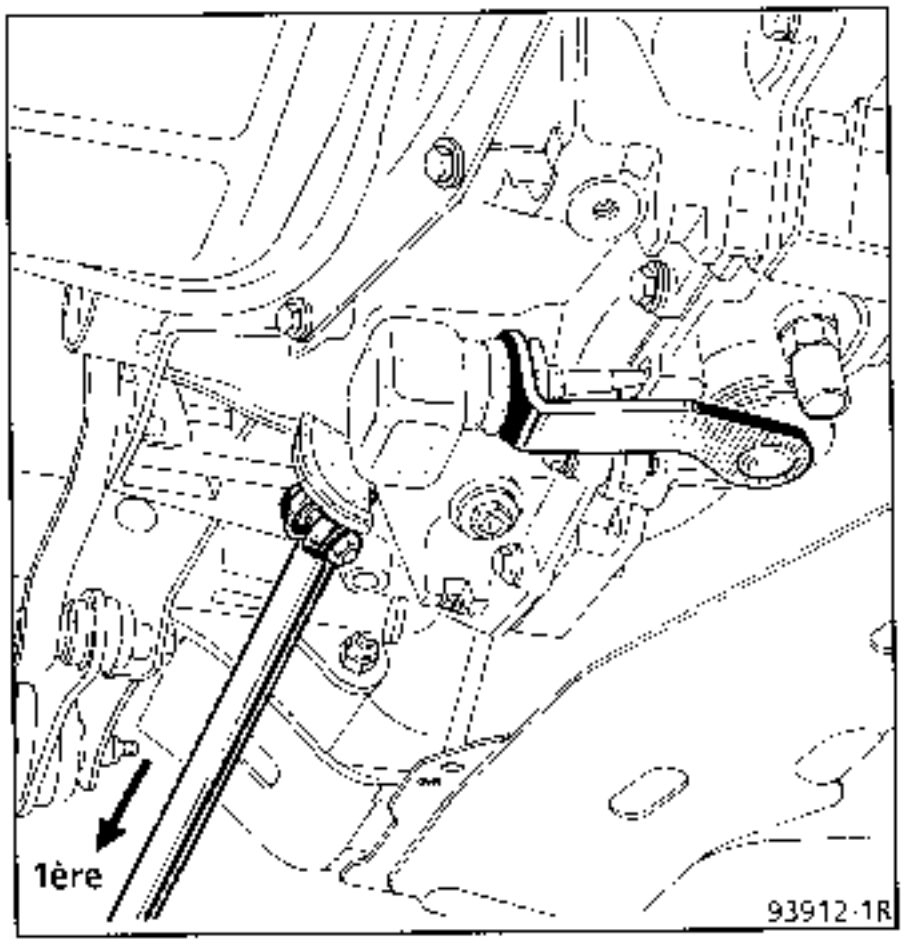
Fit:
- a drainage tray under the rear housing and remove the housing,
- a wooden block between the 5th gear fork and drive pinion as a support then remove the roll pin from the fork using tool **B.Vi. 31-01**.

SPECIAL NOTE
Do not pull outwards on the 5th gear fork shaft as the locking plunger will fall into the gearbox. Engage a gear for safety (3rd or 4th).

Removing the roll pin may be made easier by slightly bending punch **B.Vi. 31-01** to avoid having to lift the gearbox.



Lock the gearbox by selecting 1st at the lever and 5th in the gearbox by sliding the 5th gear fork inwards on its shaft.



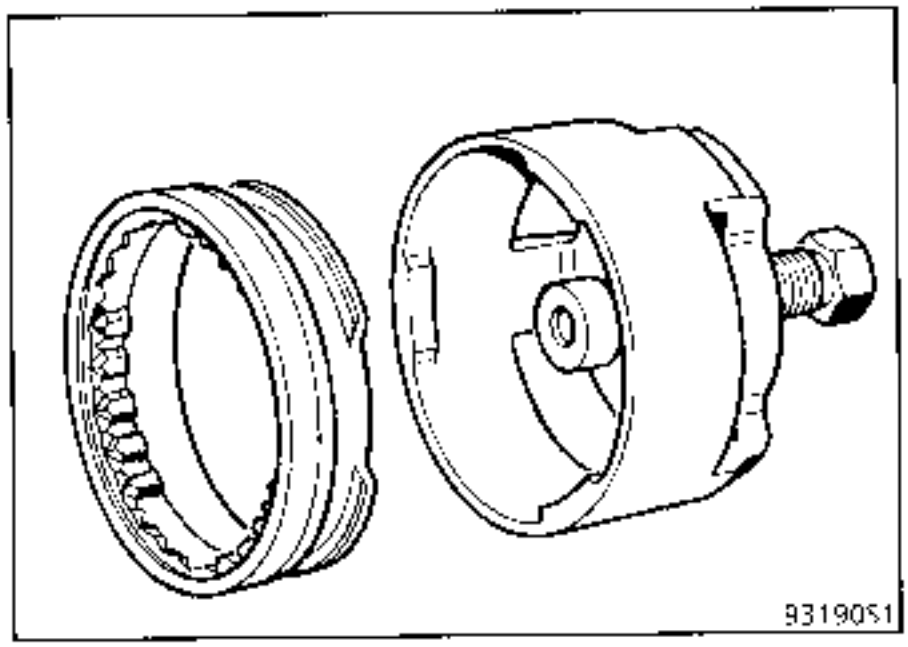
Release and remove the primary shaft nut and the secondary shaft bolt (**65**).

Return the gearbox to neutral.

On the primary shaft

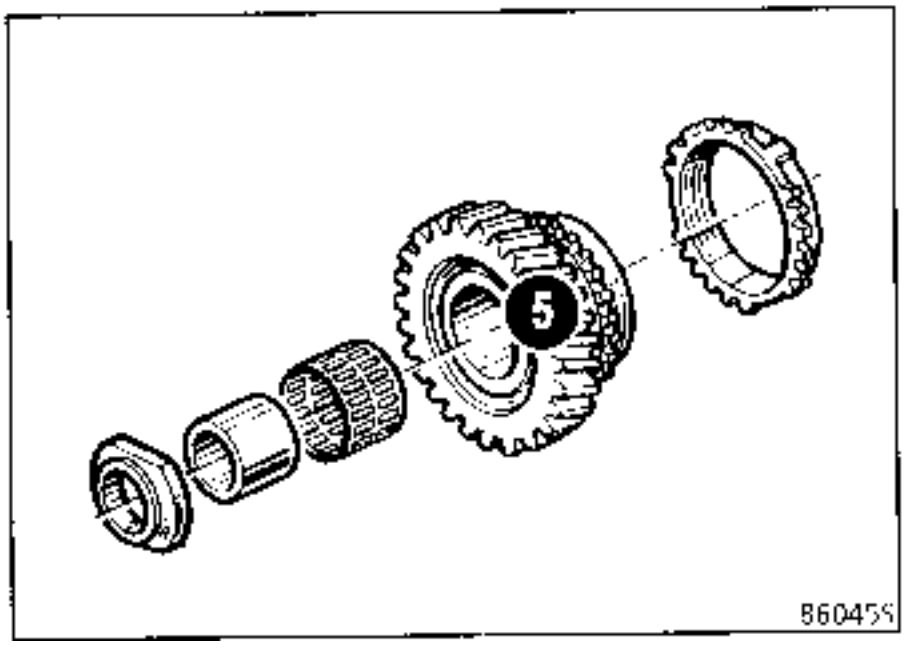
Remove the 5th gear fork and the sliding gear, taking care not to pull the 5th gear shaft outwards.

Remove the synchro hub using tool **B.Vi. 1170.**



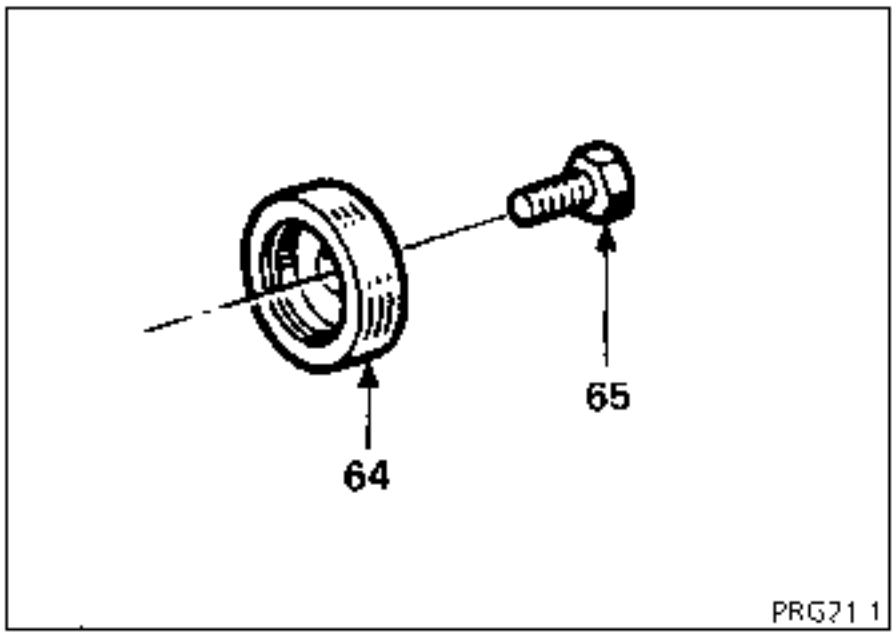
Fit the sliding gear from tool **B.Vi. 1170** as if to engage 5th gear and turn it so the splines on the sliding gear are opposite those on the hub.

Remove the 5th gear assembly.

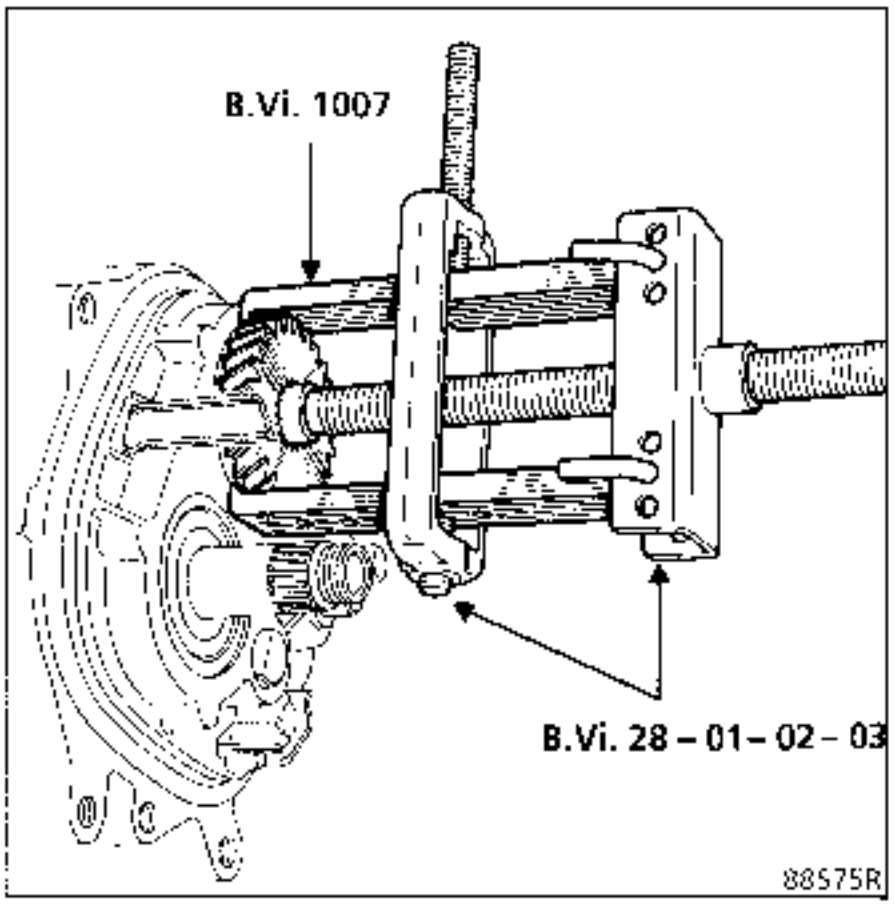


On the secondary shaft

Remove the shouldered washer (**64**).



Remove the fixed gear using tool **B.Vi. 28-01** with jaws **B.Vi. 1007**.



REFITTING

On the secondary shaft

Apply 3 drops of **LOCTITE FRENBLOC** to the splines of the fixed gear.

Fit the shouldered washer (**64**).

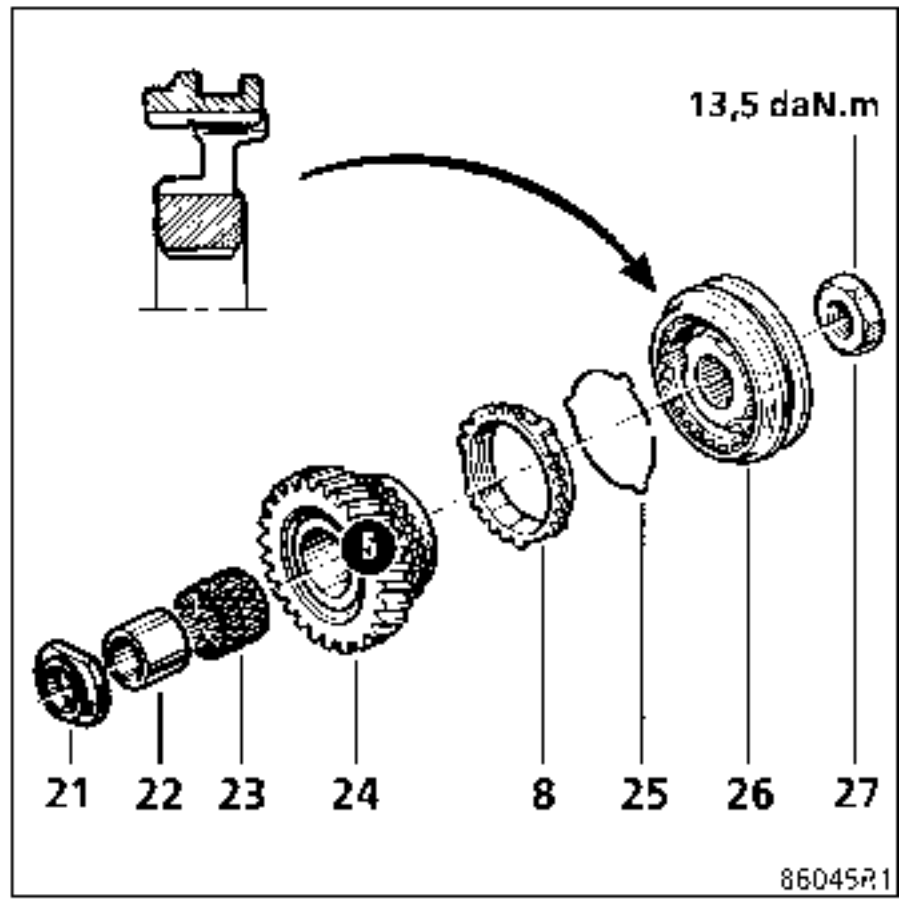
On the primary shaft

Refit the parts in the order (**21**) (shoulder facing ring (**22**), (**23**), (**24**) and (**8**)).

Fit the fork to the sliding gear (**26**) fitted with (**25**).

Apply 3 drops of **LOCTITE FRENBLOC** to the hub and refit the hub sliding gear and fork assembly.

Place the bosses on the synchro ring in the notches on the hub.



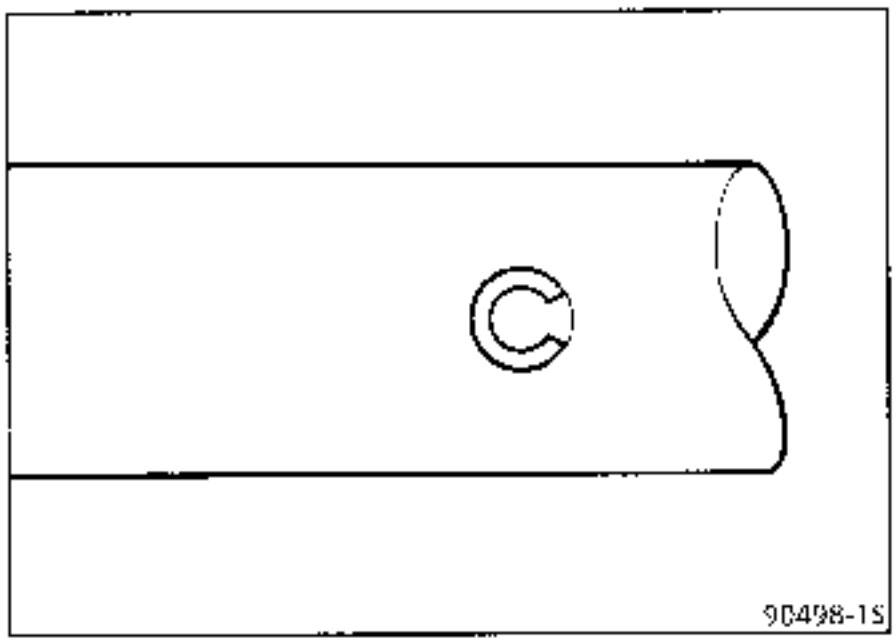
Select 1st at the lever and 5th in the gearbox by sliding the 5th gear fork on its shaft.

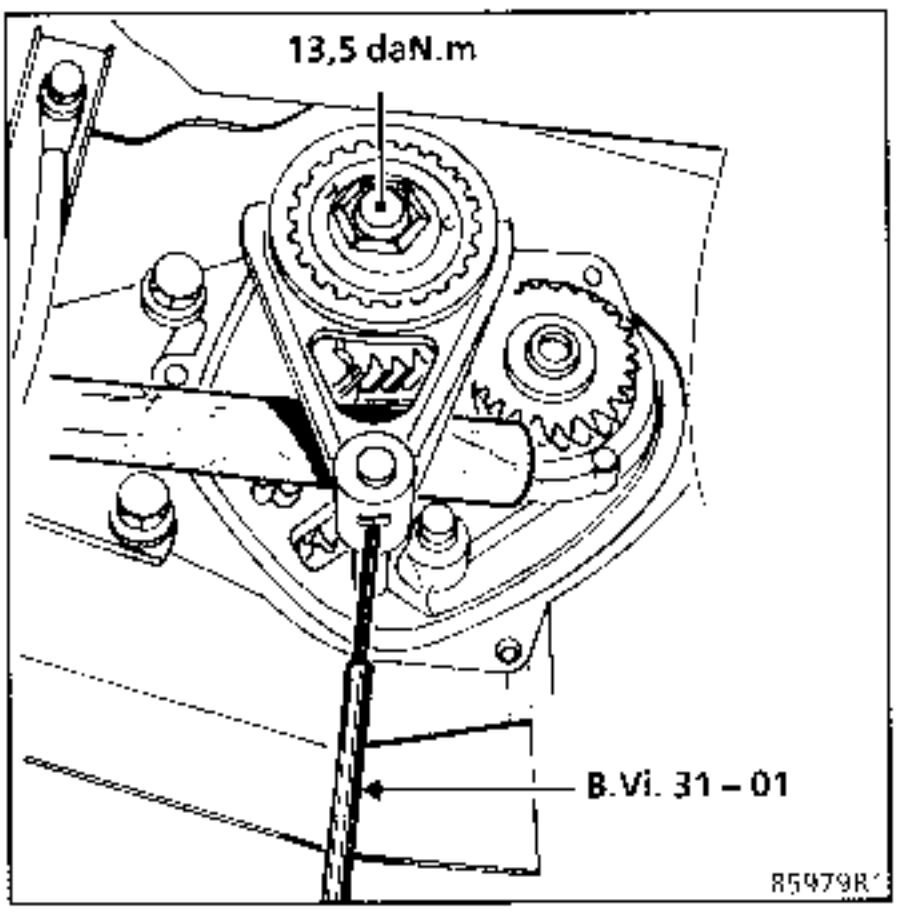
Apply 3 drops of **LOCTITE FRENBLOC** :

- to the nut (**27**) on the primary shaft and torque tighten to **13.5 daN.m**,
- to the bolt (**65**) and torque tighten to **6.3 daN.m** to press the fixed gear into position.

MANUAL GEARBOX
5th speed linkage on vehicle

Place a wooden block between the 5th gear fork and the drive pinion to act as a support and fit a new roll pin in the 5th gear fork using tool **B.Vi. 31-01** ensuring the pin is fitted the correct way round - the slot should be facing the rear housing.





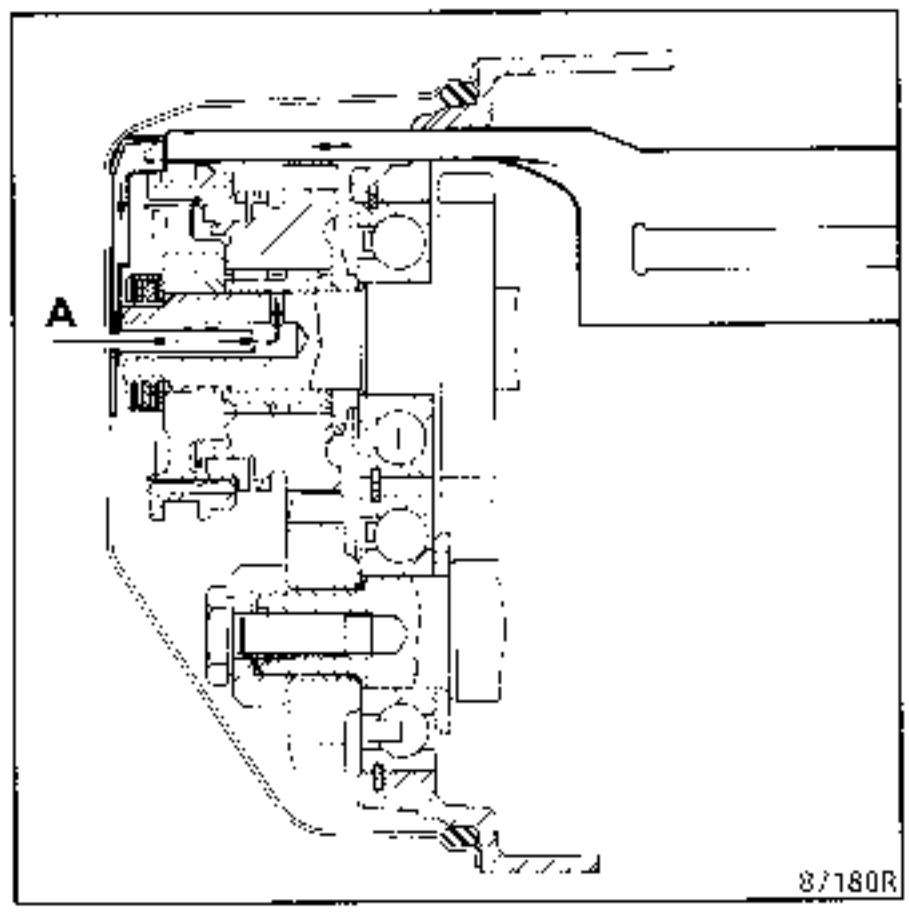
Fit a new O ring to seal the rear housing.

Return the gearbox to neutral and check that all gears can be selected.

If there is a fault, check that reverse gear is not engaged.

Fit the rear housing, fitting duct (A) into the primary shaft.

Torque tighten the mounting bolts to **2.4 daN.m**.



Fill the gearbox with oil.

Check the rear housing is sealed when the engine is running.

REMOVAL - REFITTING

SPECIAL TOOLING REQUIRED	
B.Vi. 31-01	Set of punches for roll pins
B.Vi. 1170	5th gear hub extractor

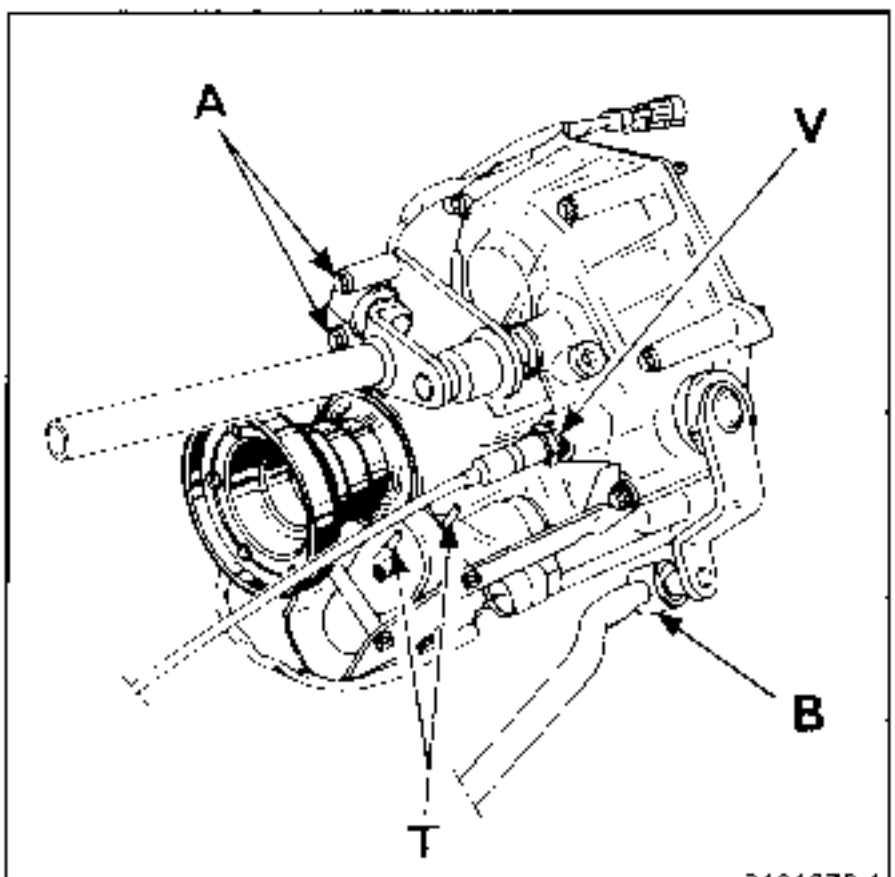
TIGHTENING TORQUES (in daN.m)	
Primary shaft nut	13
Secondary shaft nut	20
Rear housing bolt	1.6 to 2
Output flange bolt	2.5

REMOVAL

Drain the gearbox.

Remove:
- the catalytic converter (if necessary),
- the selector controls:
  - at (A) the two mounting bolts,
  - at (B) release the ball joint,
- the reverse gear locking device (V) (use a wrench modified locally in the workshop),
- the 5th gear locking ball.

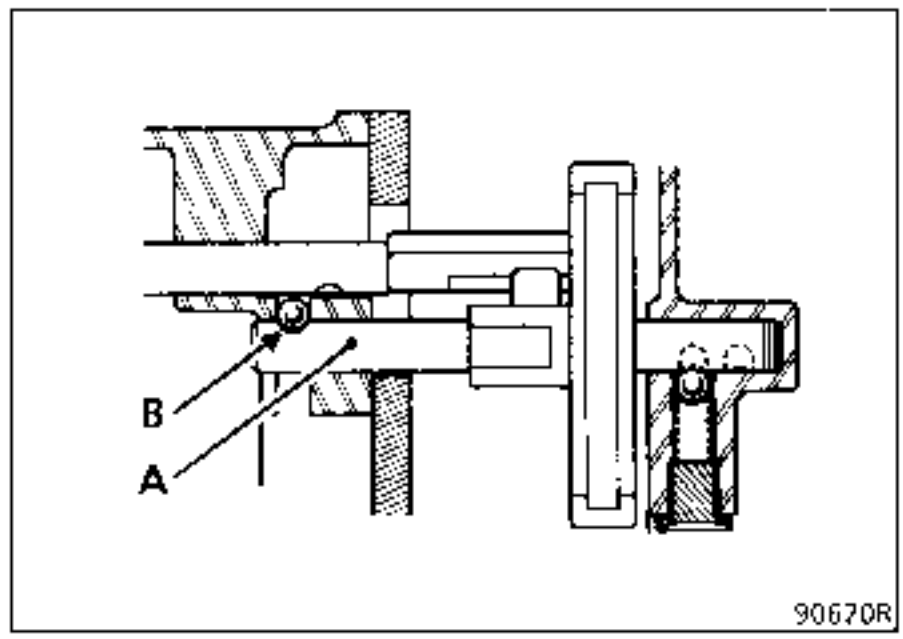
Disconnect:
- the differential lock control pipes (T),
- the speedo cable after removing the plastic roll pin,
- the differential lock switch connector.



Remove the prop shaft.

Select 3rd gear to lock the 5th gear fork shaft.

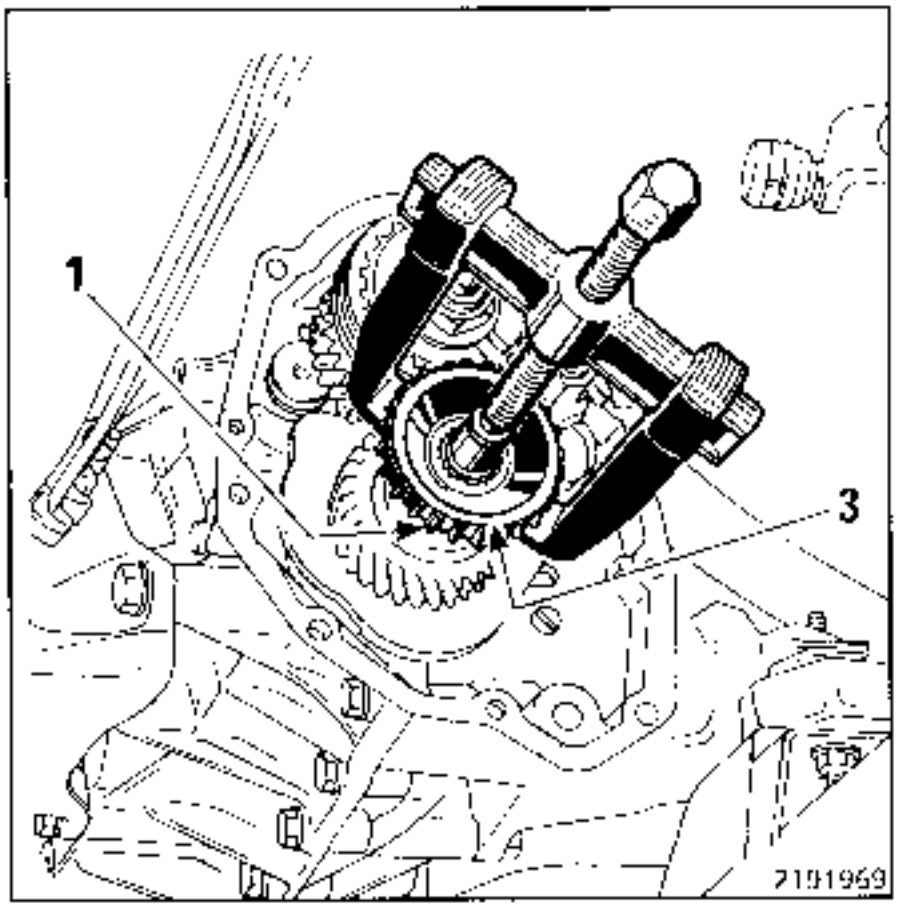
NOTE : do not remove the 5th gear fork shaft (**A**), as the locking ball (**B**) may fall into the gearbox.



REMOVAL - REFITTING (cont)

Remove the rear housing bolts and remove the housing.

Remove the circlip.
Use an extractor (eg- **FACOM U32-120**) or similar to remove the carrier (**3**).



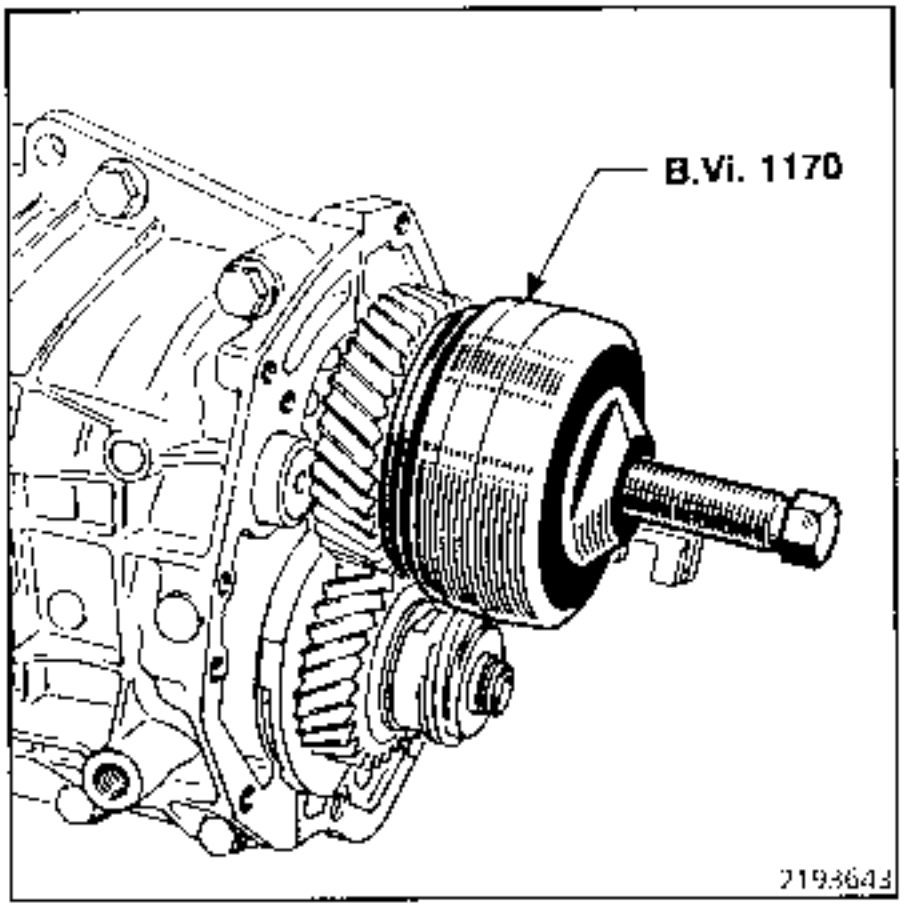
Return the gearbox to neutral, then select 5th gear and 2nd gear and slacken nut (**1**) using a 36 mm long socket (eg- **FACOM K36LA**).

Slacken the primary shaft nut.

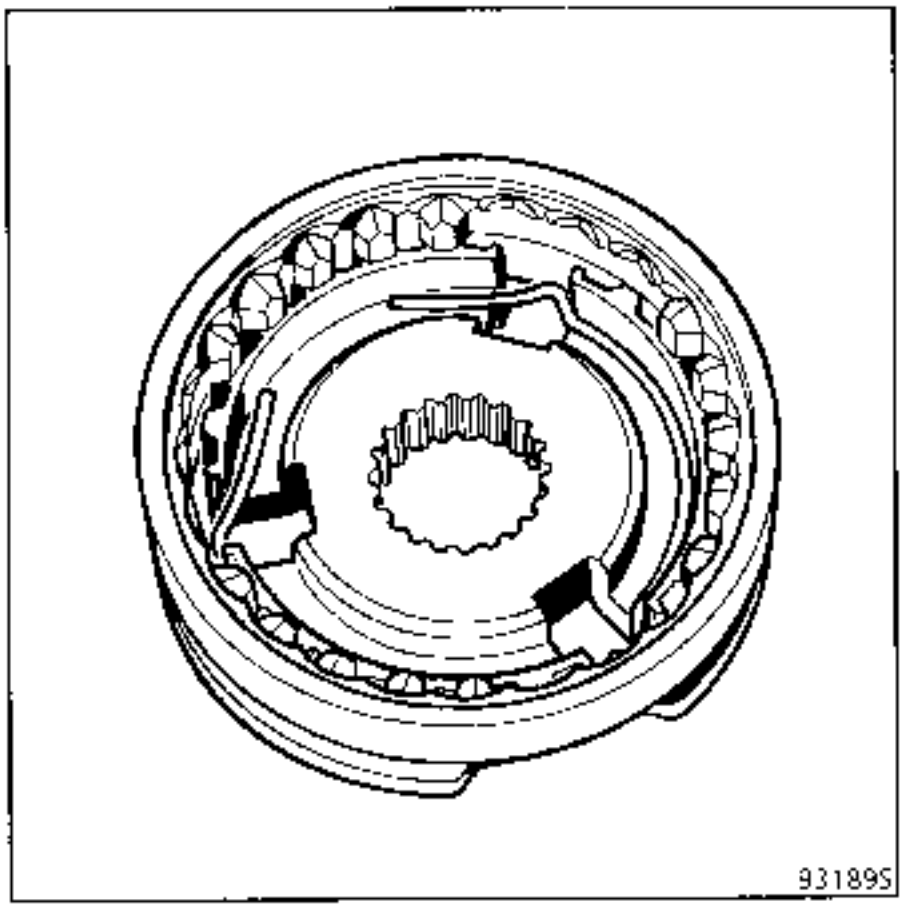
Return the gearbox to neutral then select 3rd gear again.

Remove the roll pin from the 5th gear fork using tool **B.Vi. 31-01**, then remove the 5th gear sliding gear - fork assembly.

Remove the 5th gear hub using tool **B.Vi. 1170**.



Fit the sliding gear from tool **B.Vi. 1170** as if to engage 5th gear and turn it so the splines on the sliding gear are opposite those on the hub.



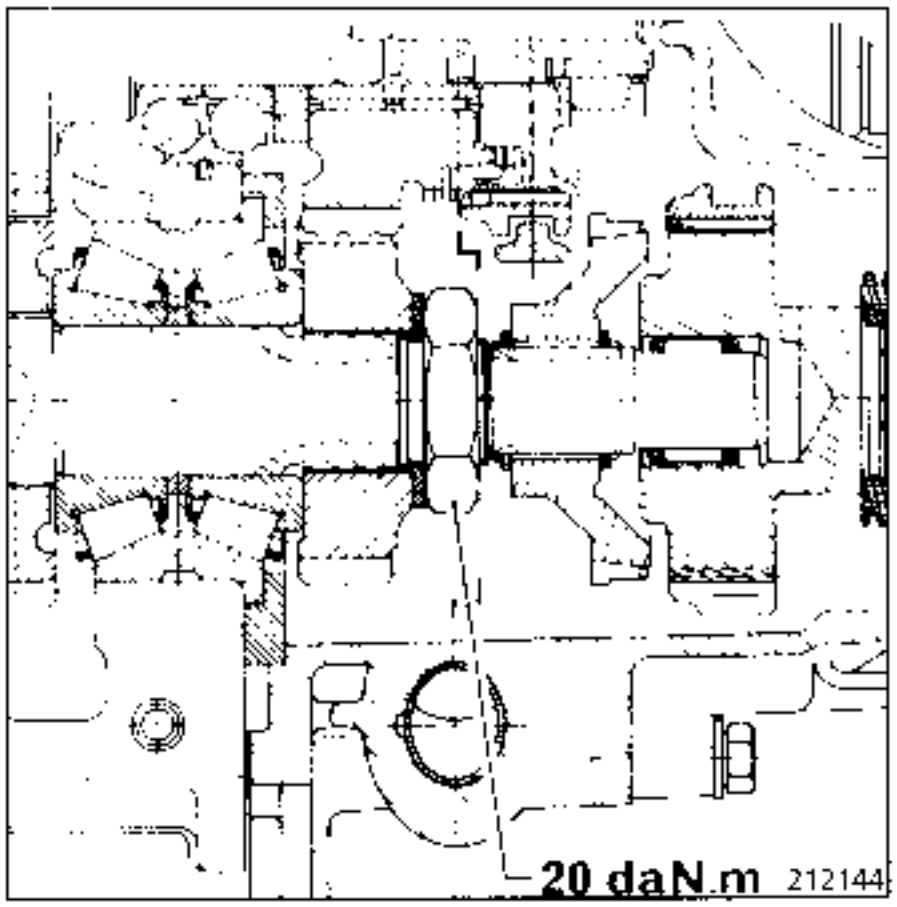
Fit the bell shaped part of the tool on the sliding gear, turn it as far as it will go then remove the hub.

On the secondary shaft

Fit the jaws of the extractor under the spacer plate and remove the 5th gear fixed gear with the plate.

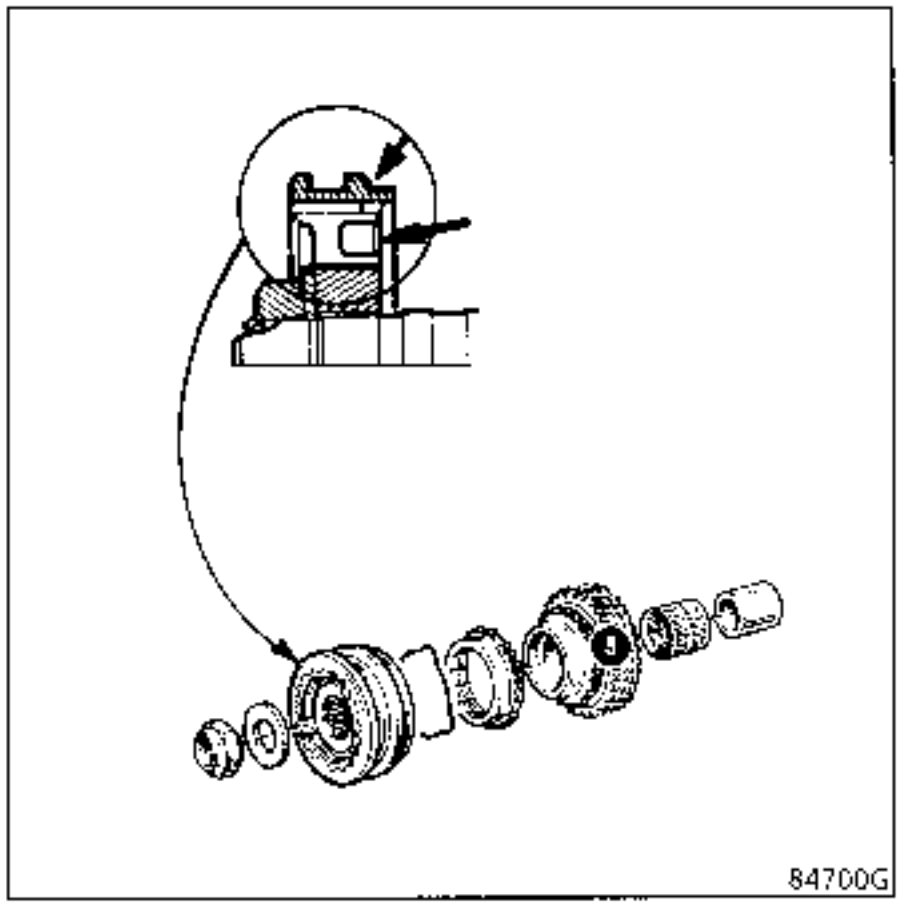
REFITTING - Special notes

Ensure the fixed gear is fitted the correct way round and bond it using **LOCTITE FRENBLOC**.



On the primary shaft

Bond the hub with **LOCTITE FRENBLOC** and ensure the assembly is fitted the correct way round.



Place the bosses on the synchro ring in the notches on the hub.

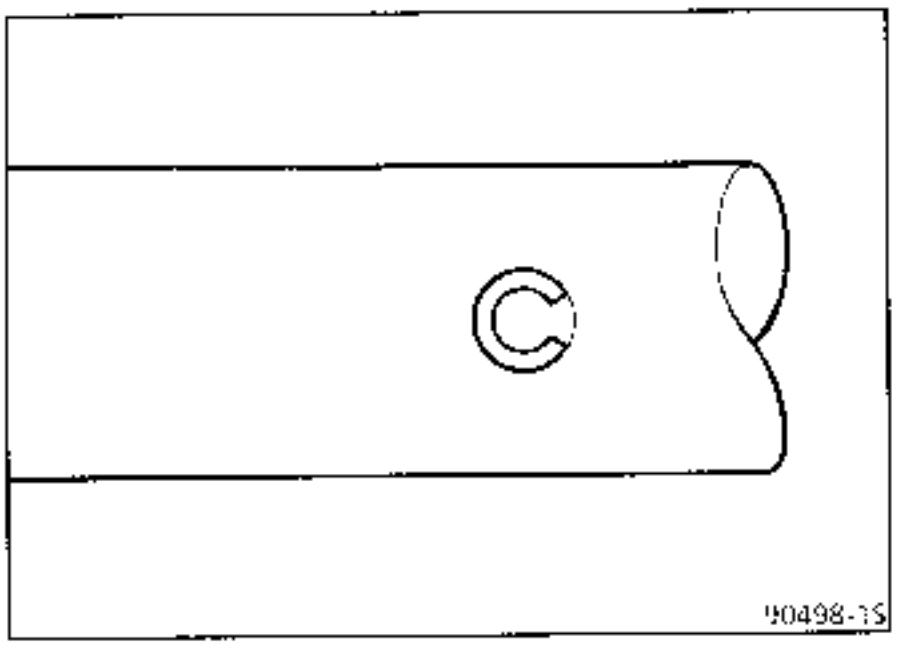
Fit:

- the 5th gear synchro, hub and sliding gear and fork assembly,
- the spring washers.

Apply 3 drops of **LOCTITE FRENBLOC** to the threads of the new nuts and tighten them to the correct torque and lock the primary shaft nut.

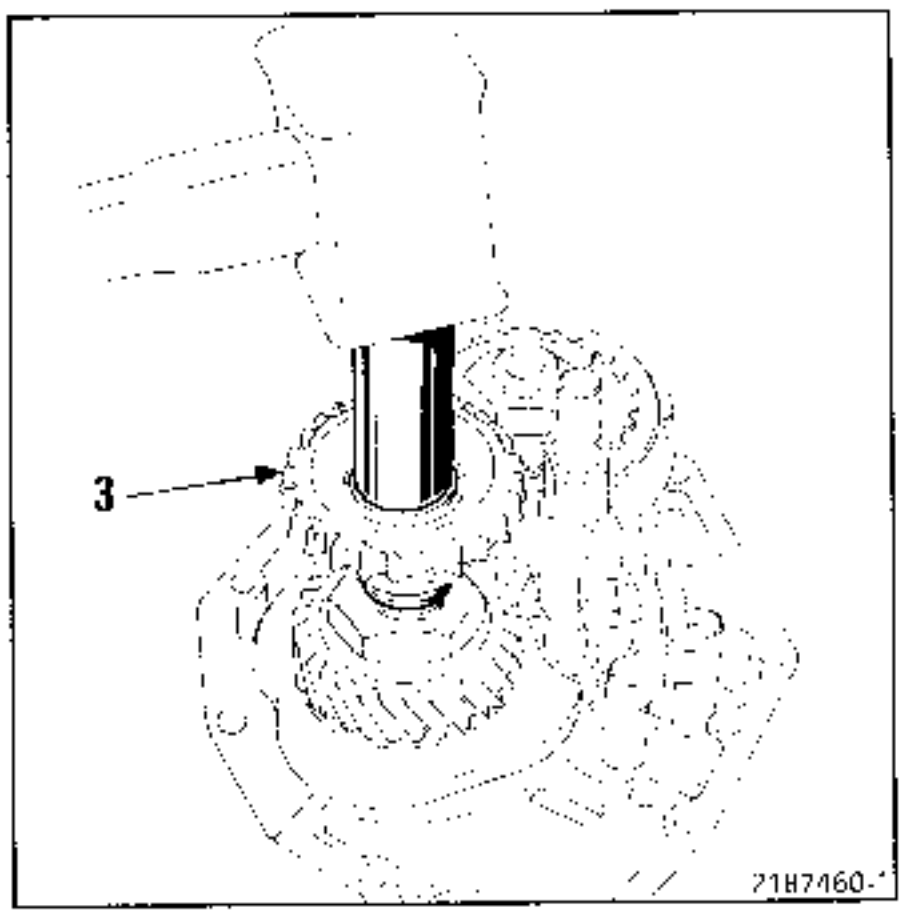
REFITTING (cont)

Fit the roll pins to the fork using **B.Vi. 31-01**, the slot in the pin should be parallel to the shaft.



Fit the circlip.

Apply 3 drops of **LOCTITE FRENBLOC** to the carrier (3) and force fit it into position using a tube and mallet.

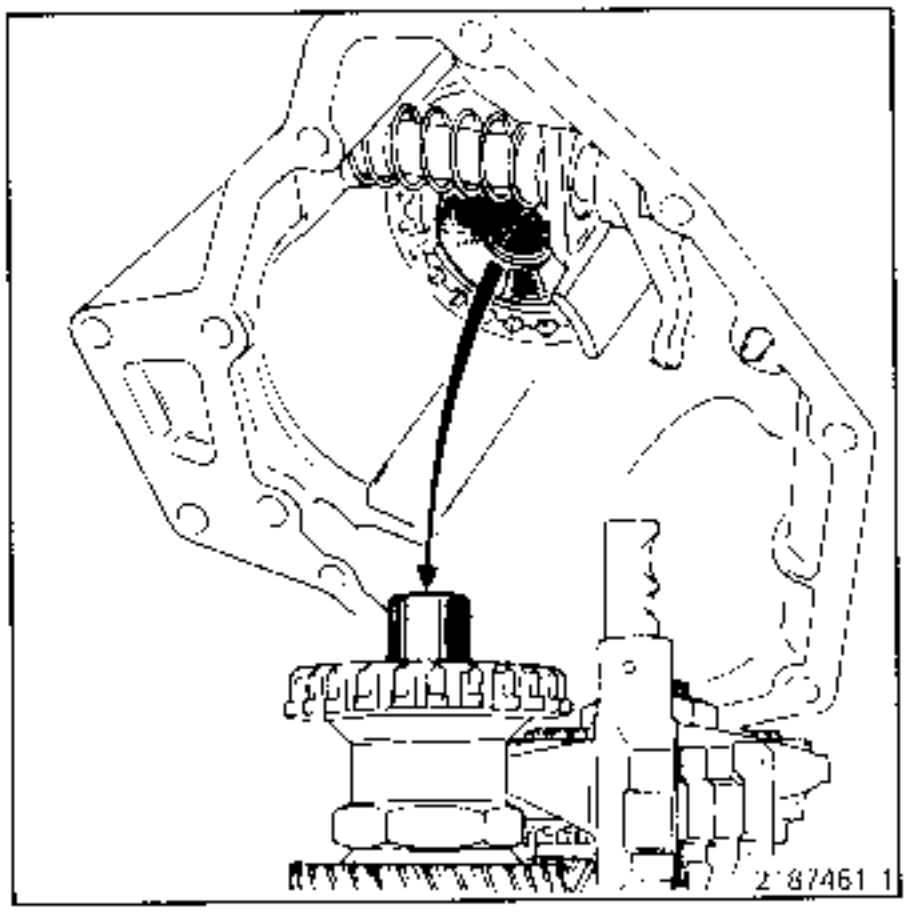


Wipe off all traces of **LOCTITE** from the output shaft bearing seat.

Fit:

- the second circlip,
- the cover seal (dry).

Select 3rd gear and fit the housing, positioning the selector finger in the 3rd gear fork shaft dog clutch.



Position the spacer plate so that it fits in its seating in the rear housing and close the rear housing.

Tighten the bolts to the correct torque.

Refit the 5th gear locking ball, coat the plug thread with **RHODORSEAL 5661**.

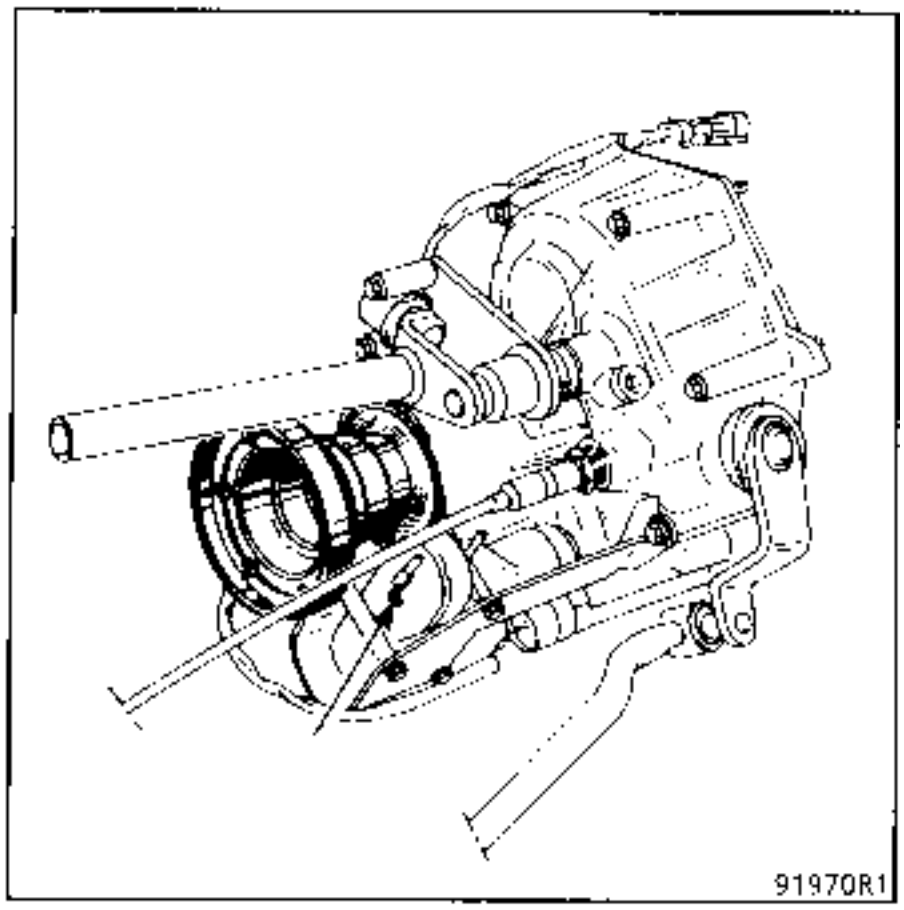
De-select 3rd gear.

Check that all the gears can be selected.

Reconnect all the controls.

Ensure that the differential lock pneumatic pipes are correctly connected:

- the red pipe must be connected to the side marked (red label) on the vacuum capsule.



Refit the prop shaft.

Fill the gearbox with oil.

REMOVAL - REFITTING

SPECIAL TOOLING REQUIRED		
B.Vi	28-01	Extractor tool (UN gearbox)
Rou.	15-01	Shaft protector end piece
B.Vi.	1007	Jaws for B.Vi. 28-01

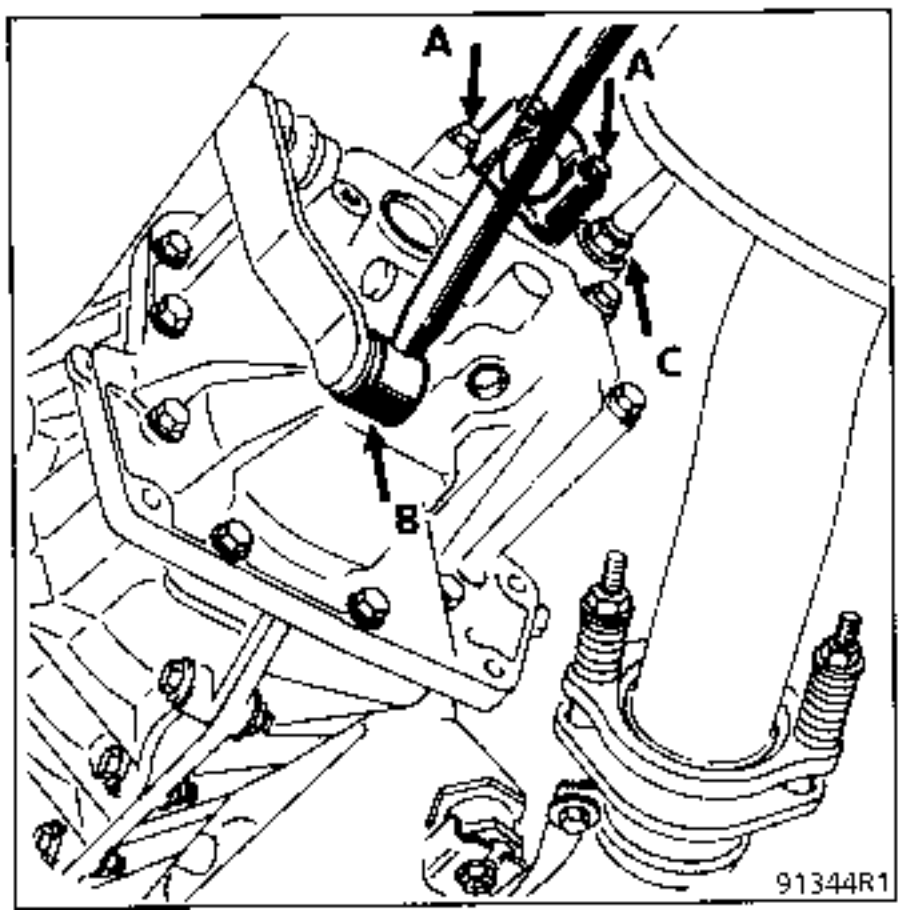
TIGHTENING TORQUES (in daN.m) ▽	
Primary shaft nut	13.5
Secondary shaft nut	20
Rear housing bolt	2.5

REMOVAL

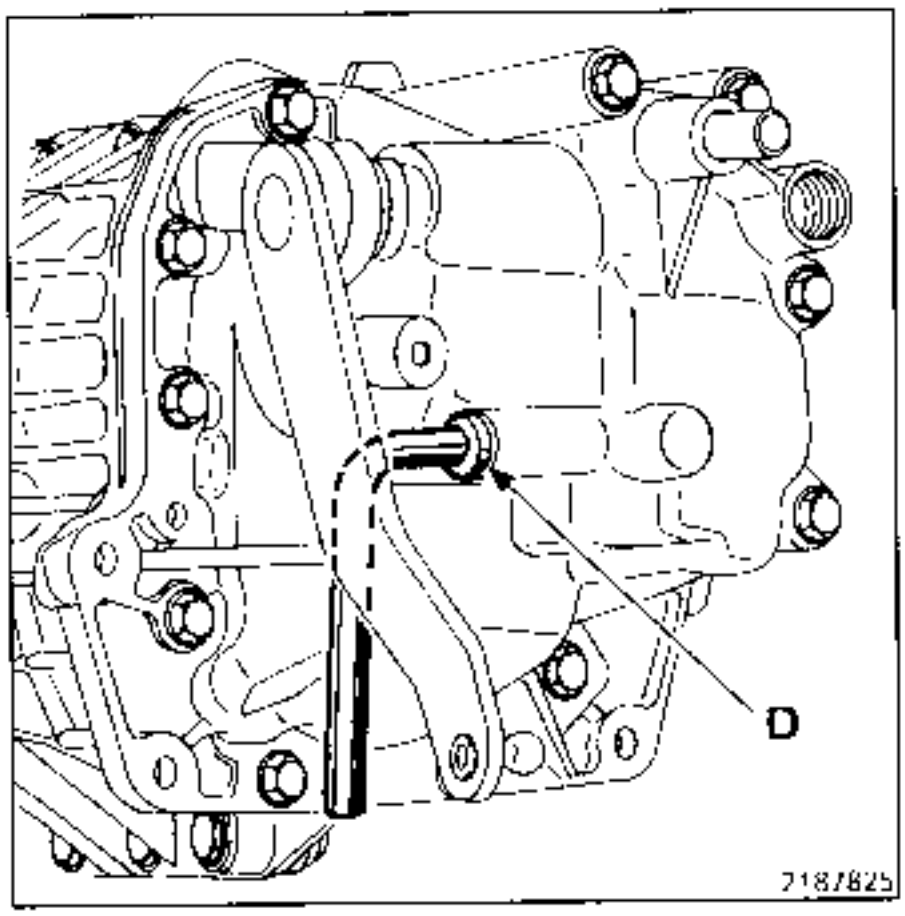
Drain the gearbox.

Remove:

- the gear selector controls:
  - at (**A**) the two mounting bolts,
  - at (**B**) release the ball joint,
  - at (**C**) the reverse gear locking device.



- the 5th gear locking ball plug (**D**).

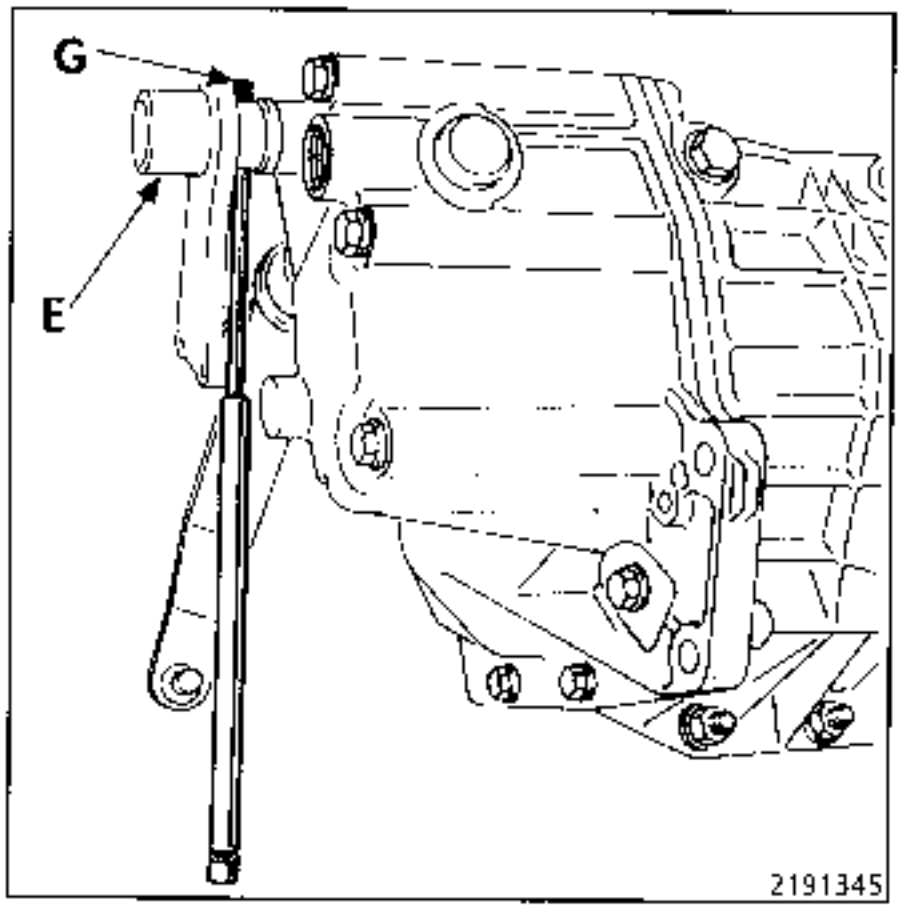


Retain the spring and the locking ball.

REMOVAL - REFITTING (cont)

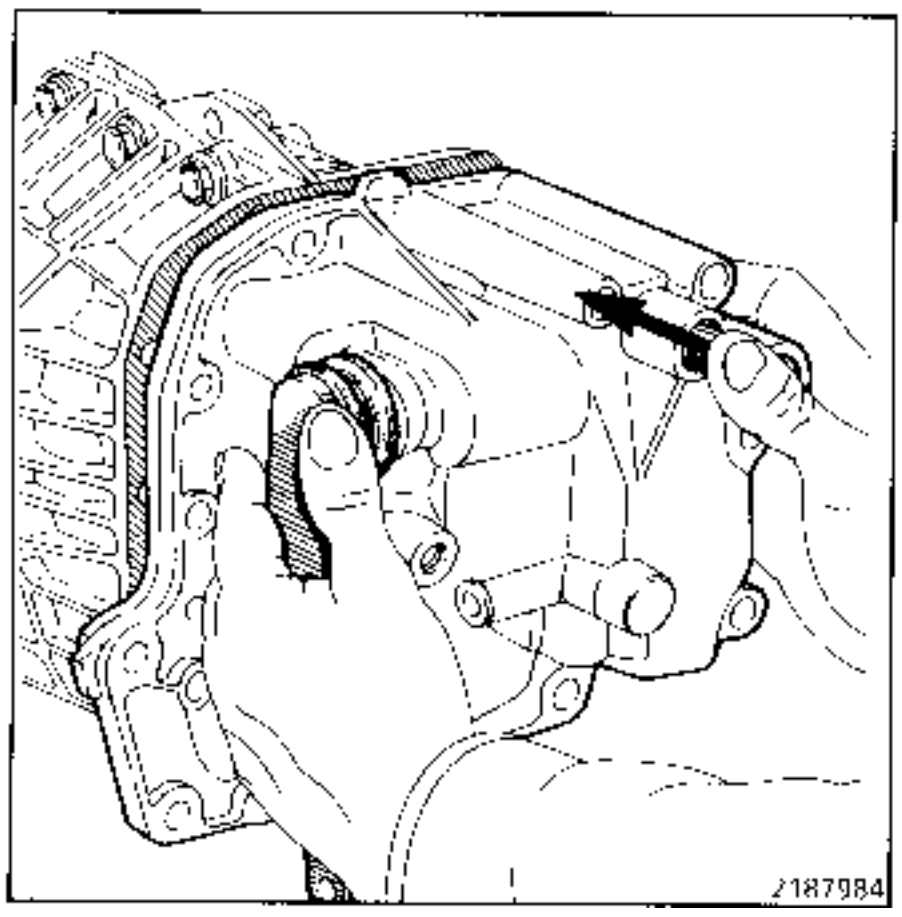
- the roll pins (**G**) : internal diameter **4 mm**
  external diameter **7 mm**

- the sleeve (**E**),



the rear housing mounting bolts.

With the gearbox in neutral, remove the housing by pushing at the same time on the tilting locking shaft.

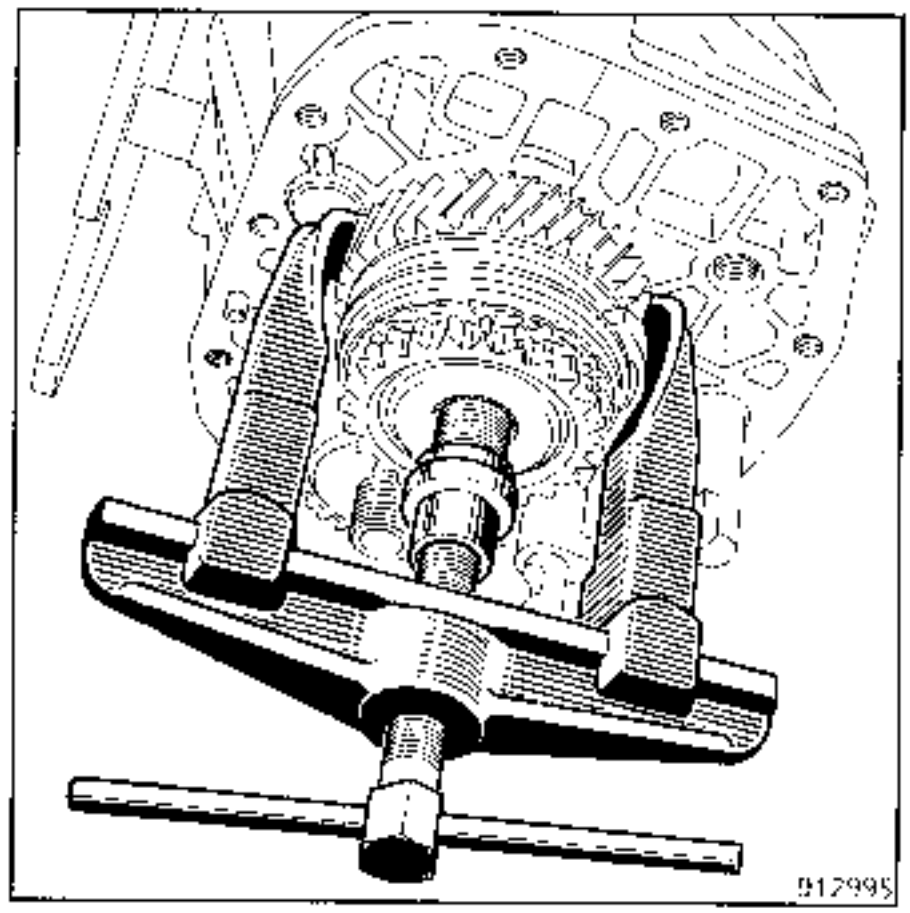


Select two gears: reverse and 4th.

Release and slacken the primary and secondary shaft nuts.

On the primary shaft

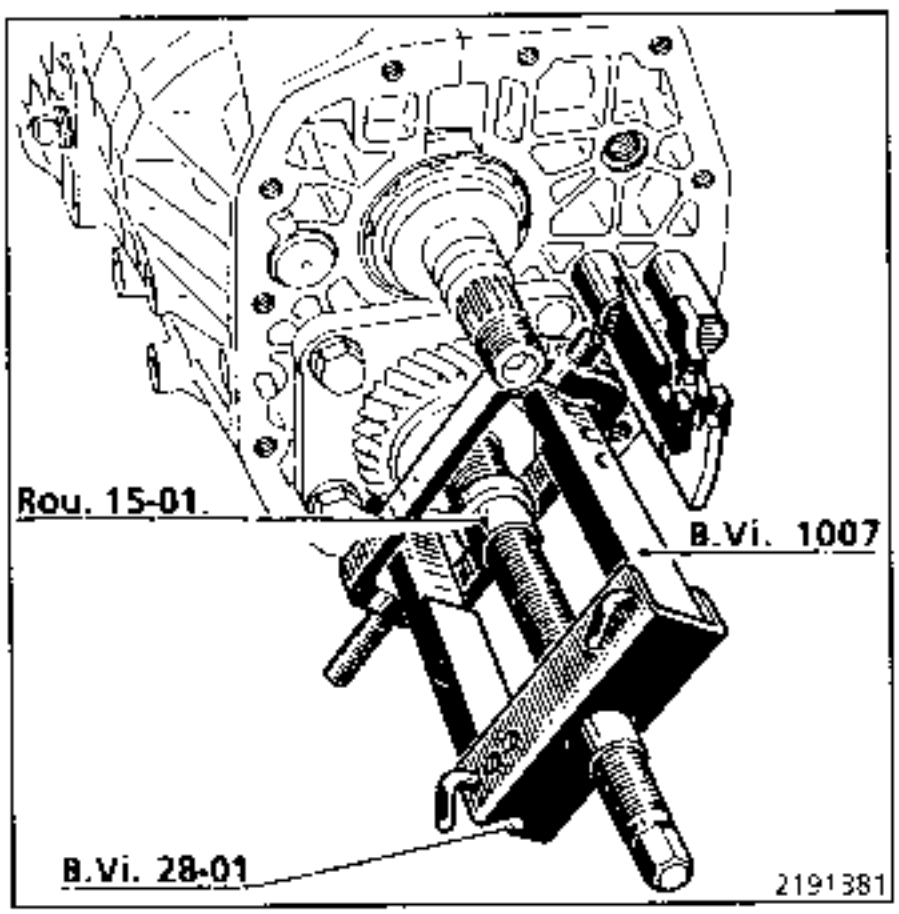
Fit an extractor tool (eg- **FACOM U32-120**) or equivalent and the shaft protecting end piece **Rou. 15-01** and extract the 5th gear assembly: idle gear, sliding gear, fork shaft, synchro ring and dog clutch.



REMOVAL - REFITTING (cont)

On the secondary shaft

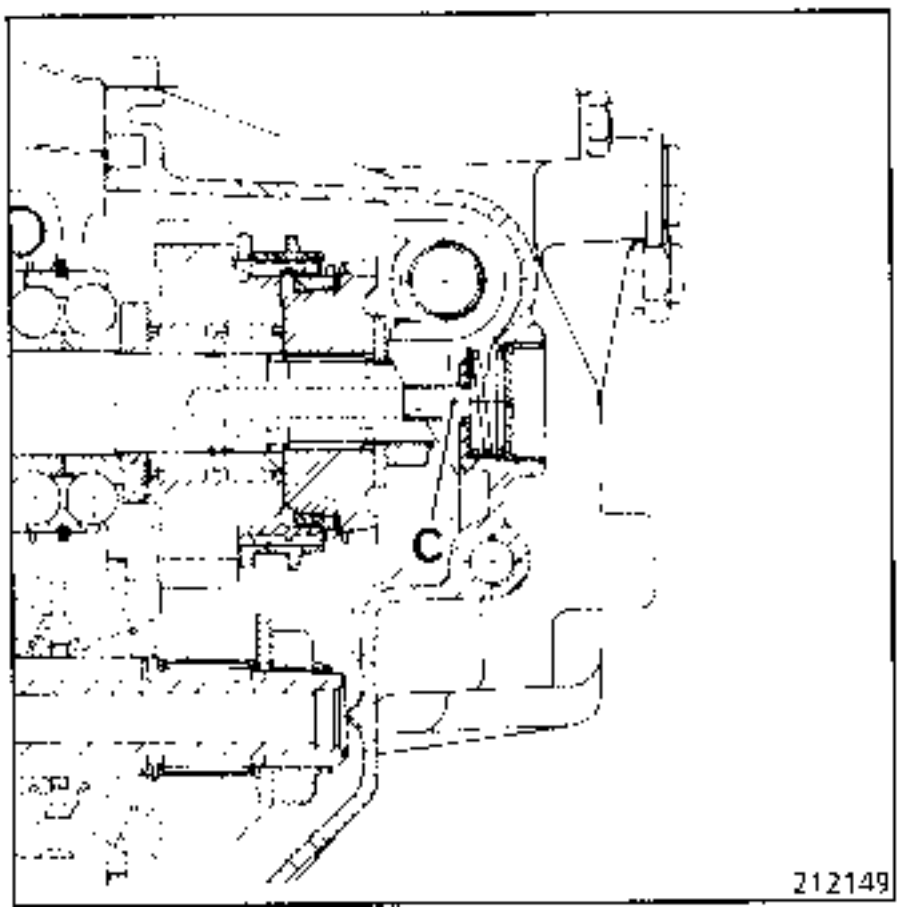
Remove the fixed gear using tool **B.Vi. 28-01** with jaws **B.Vi. 1007** and the protective end piece **Rou. 15-01**.



REFITTING - Special notes

On the secondary shaft

Ensure that the fixed gear is fitted the correct way round and bond it using **LOCTITE SCELBLOC**.



On the primary shaft

Refit the 5th gear synchro assembly: idle gear, sliding gear, fork shaft.

Place the bosses on the synchro ring in the notches on the hub.

Bond the dog clutch using **LOCTITE SCELBLOC**.

Apply 3 drops of **LOCTITE FRENBLOC** to the threads of the new nuts, torque tighten them then lock them.

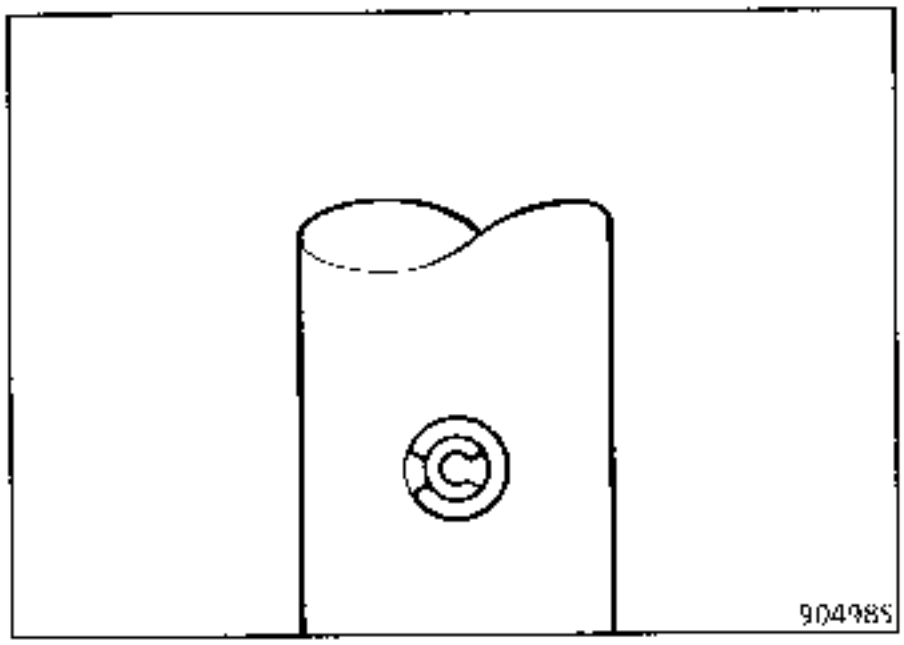
Return the gearbox to neutral.

Fit the rear housing (seal coated with **PERFECT-SEAL**) taking care to fit the selector finger and the tilting latch in the shaft dog clutches.

Torque tighten the bolts.

Fit the anti-dust washer to the shaft and fit roll pins to the selector lever sleeve, ensuring they are fitted the correct way round.

The slots on the roll pins must be perpendicular to the shaft and opposite one another.



Coat the threads on the 5th gear locking ball plug with **RHODORSEAL 5661**, and also coat the reverse gear positive locking mechanism.

Check that all the gears can be selected.

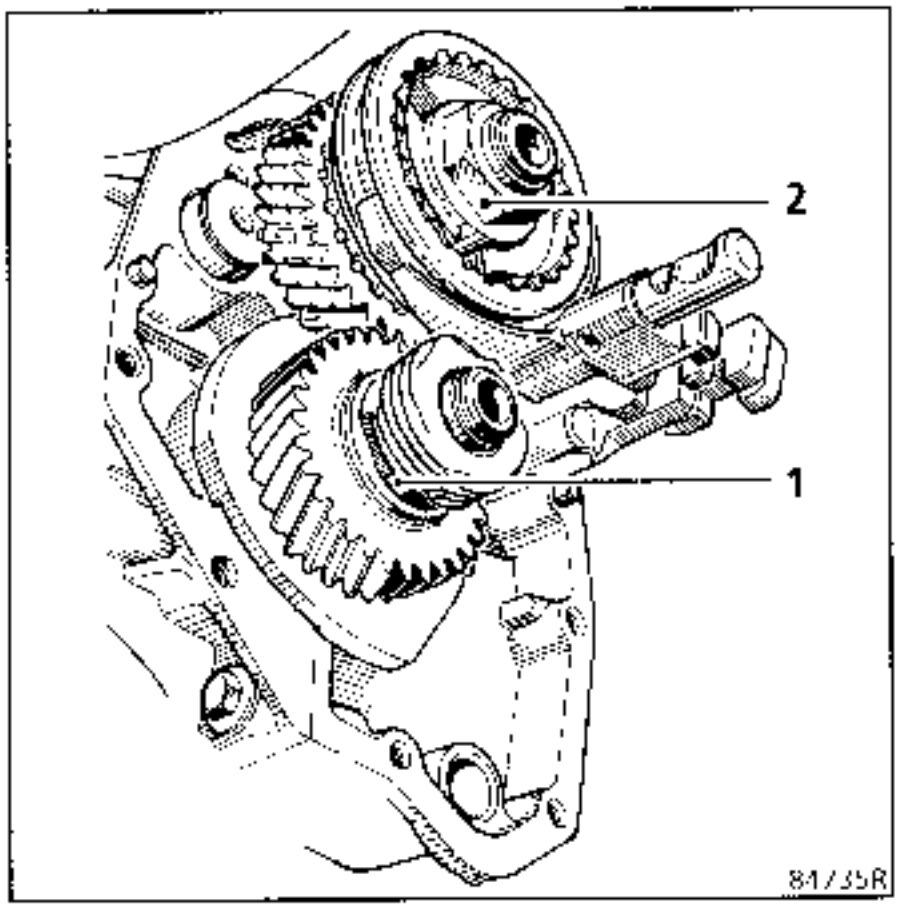
Fill the gearbox with oil.

REMOVAL - REFITTING

SPECIAL TOOLING REQUIRED		
B.Vi.	28-01	Extractor tool
B.Vi.	31-01	Set of 5 mm diameter punches
B.Vi.	204-01	Wrench for secondary shaft nut
B.Vi.	1007	Jaws for B.Vi. 28-01
B.Vi.	1170	5th gear hub extractor

TIGHTENING TORQUES (in daN.m)	
Primary shaft nut	13
Secondary shaft nut	15
Rear housing bolt	1.5

This operation is carried out when the gearbox has been removed and the 5th speed housing removed.
Mark the hub and the sliding gear.

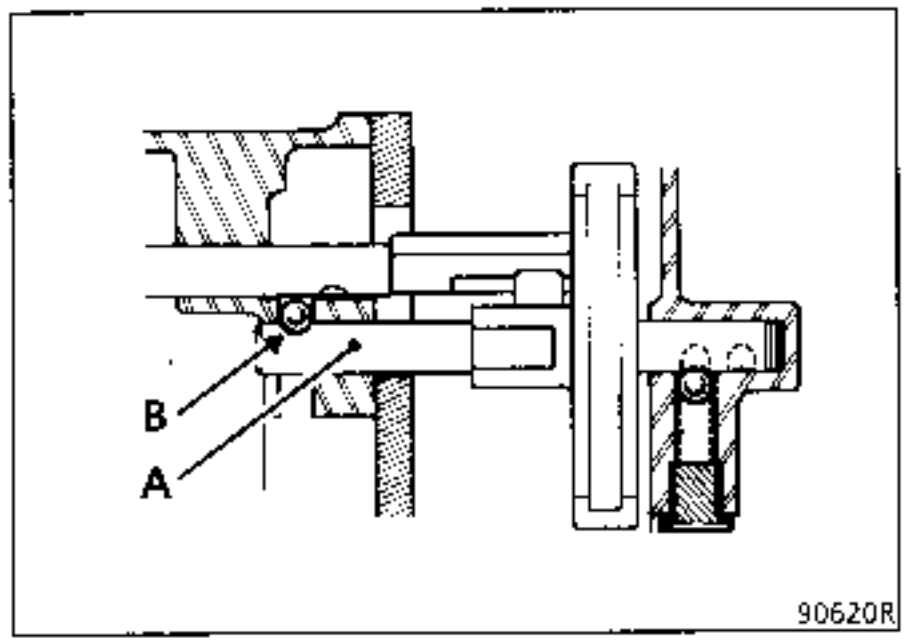


Select 1st and 5th gear.

Release and slacken the primary shaft nut (2).

Release and remove the secondary shaft nut (1) using tool **B.Vi. 204-01** and a torque wrench.

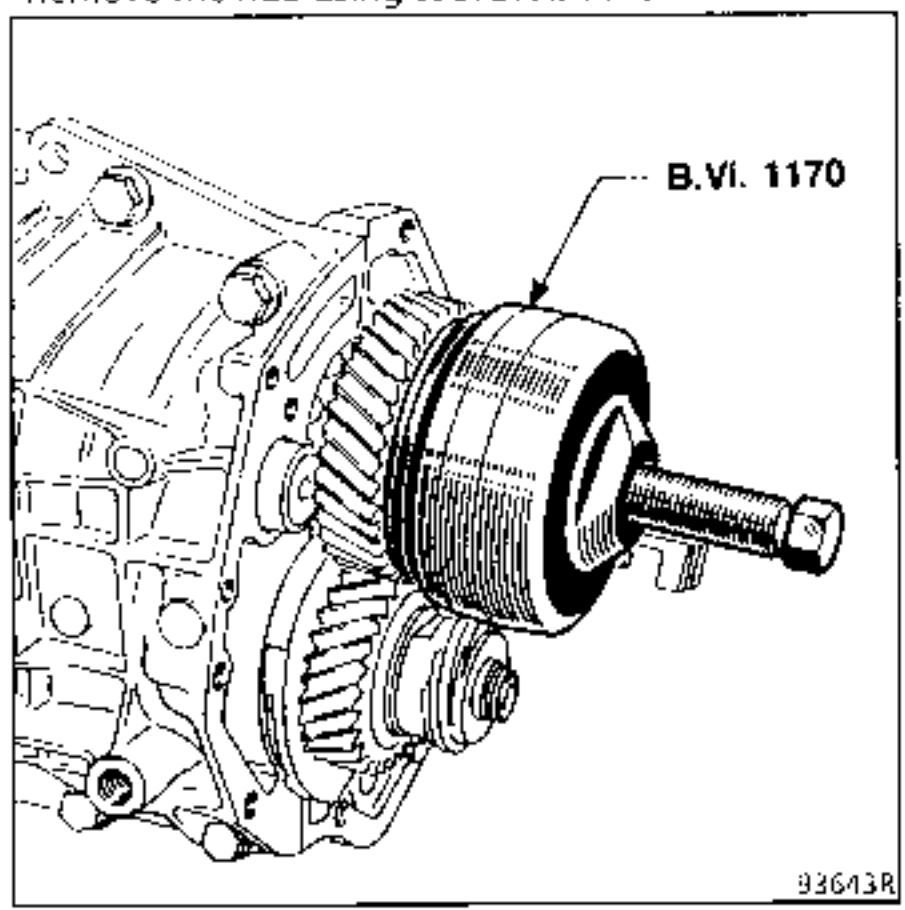
When removing the 5th gear fork and shaft without separating the half housings, the gearbox must be positioned at the reversing lights switch end so that the locking ball does not fall into the gearbox.



Return the gearbox to neutral.

Remove the 5th gear shaft / fork assembly and the sliding gear at the same time.

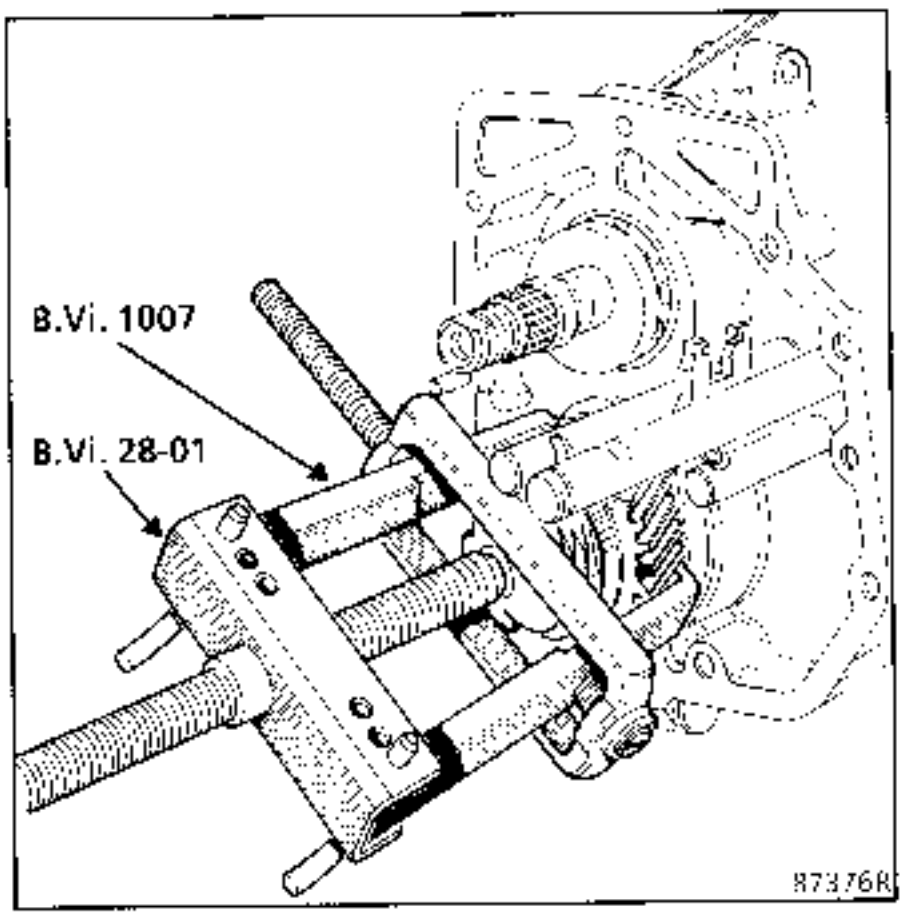
Remove the hub using tool **B.Vi. 1170.**



REMOVAL - REFITTING

Remove the 5th gear idle gear, the bearing and the bush.

Remove the 5th gear fixed gear using tool **B.Vi. 28-01** with jaws **B.Vi. 1007**.

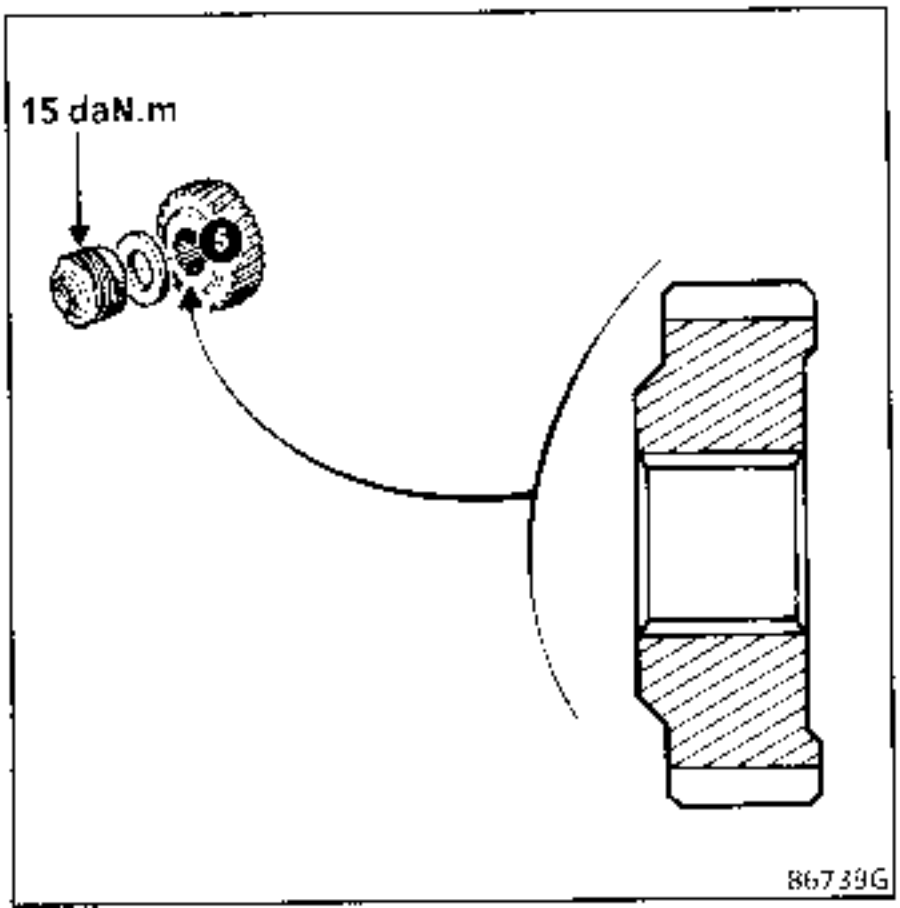


REFITTING

Refitting is the reverse of removal.

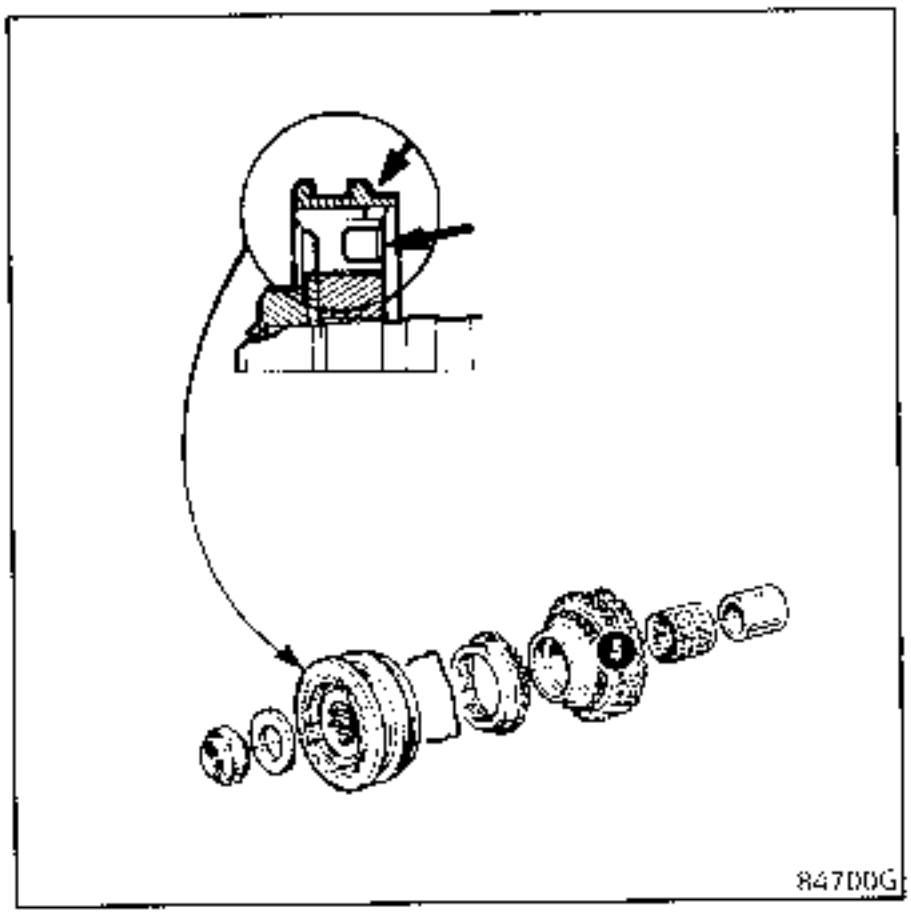
On the secondary shaft

Ensure the fixed gear is fitted the correct way round and bond it using **LOCTITE FRENBLOC**.



On the primary shaft

Bond the hub using **LOCTITE FRENBLOC** and ensure the assembly is fitted the correct way round.



Place the bosses on the synchro ring in the notches on the hub.

Refit the 5th gear synchro assembly, the hub - sliding gear and the fork shaft.

Select 1st gear and 5th gear.

Apply 3 drops of **LOCTITE FRENBLOC** to the threads of the new nuts, torque tighten them and lock them:

- primary shaft : **13 daN.m**,
- secondary shaft : **15 daN.m**.

Refit the 5th gear housing.

Check that all the gears may be selected.

REPLACEMENT

From these fabrication numbers onwards, see the table below, kit Part Number : **77 11 106 100** may be adapted for replacing the 5th gear linkage on **NG** gearboxes except for **NG7**.

Vehicle fabrication numbers from which adaptation is possible.

RENAULT 21				
Vehicle type	**Fabrication number**			
L483	E 052145	S 060157	H 001114	
L486		S 025850	H 014509	U 070022
L488		S 015122	H002212	U 031112
L48V		S 001152	H 000734	
L48K		S 001526		
L48Q		S 000021		
K483	E 006208		H 012877	
K486	E 002360		H 030664	
K488	E 000865		H 010480	
K48V			H 000076	
K48K			H 003087	
S486			H 004089	
S48V			H 000191	

NOTE:

All **R21** vehicles fitted with an **NG** gearbox may be fitted with this kit.

Before any adaptation of the kit, the operation of the clutch must be checked as if it is not correct, the reverse gear brake may not operate correctly.

Initial checks:

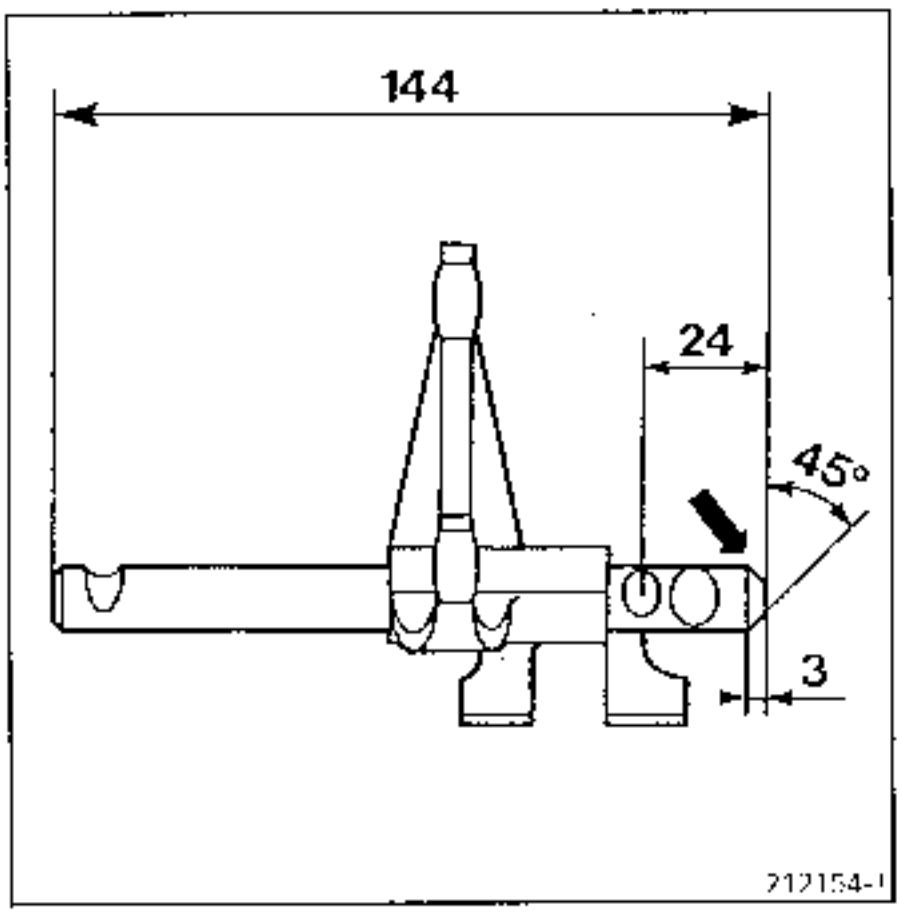
a) **Check the clutch travel at the clutch fork at the gearbox end.**
Travel : **18** to **20 mm**.
If the travel is less than **18 mm**, look for the fault at the control end (pedal assembly, cable, carpet thickness, etc.).

b) **Check the clutch disc is correctly released.**
- Engine and gearbox at operating temperature.
- Let the clutch out, wait for **3 seconds** (delay required for the clutch disc to stop).
- Engage reverse gear. If it makes a noise when engaging, there is a fault with the clutch itself) :
  . sliding of the disc on the clutch shaft (bevels, oxidation, incorrect disc, seizing, etc.),
  . fault with the mechanism (plate lifting incorrectly).

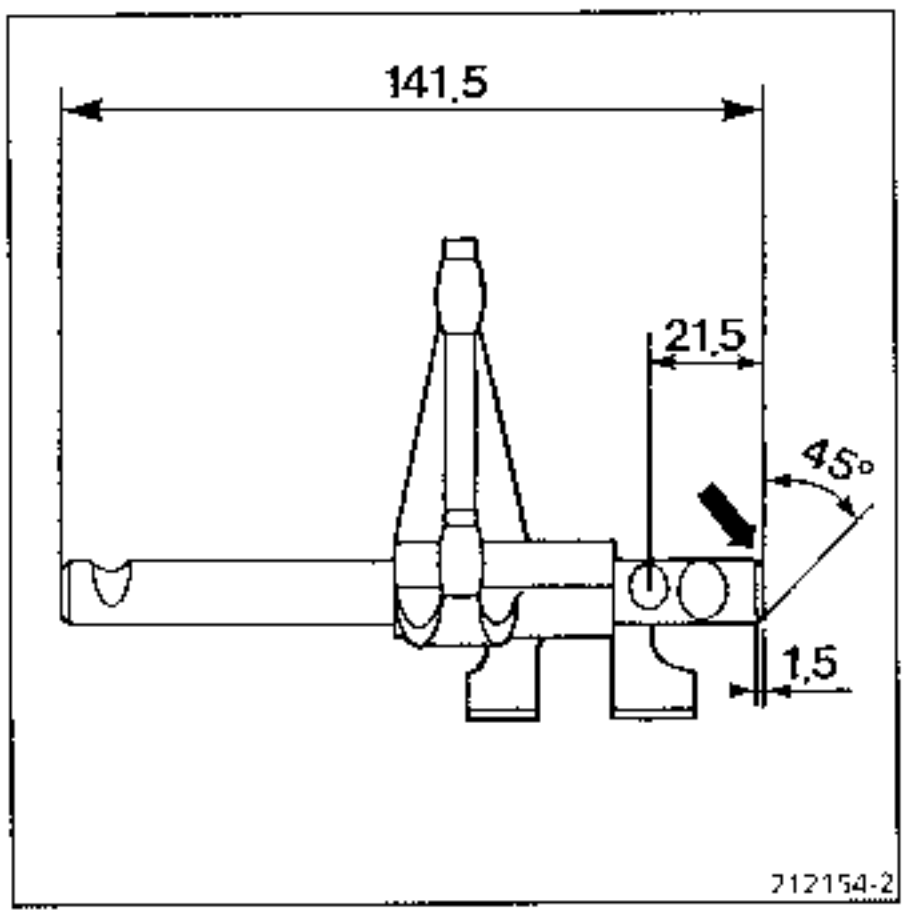
IDENTIFICATION

5th GEAR SHAFT

Shaft to which the kit **cannot** be fitted.



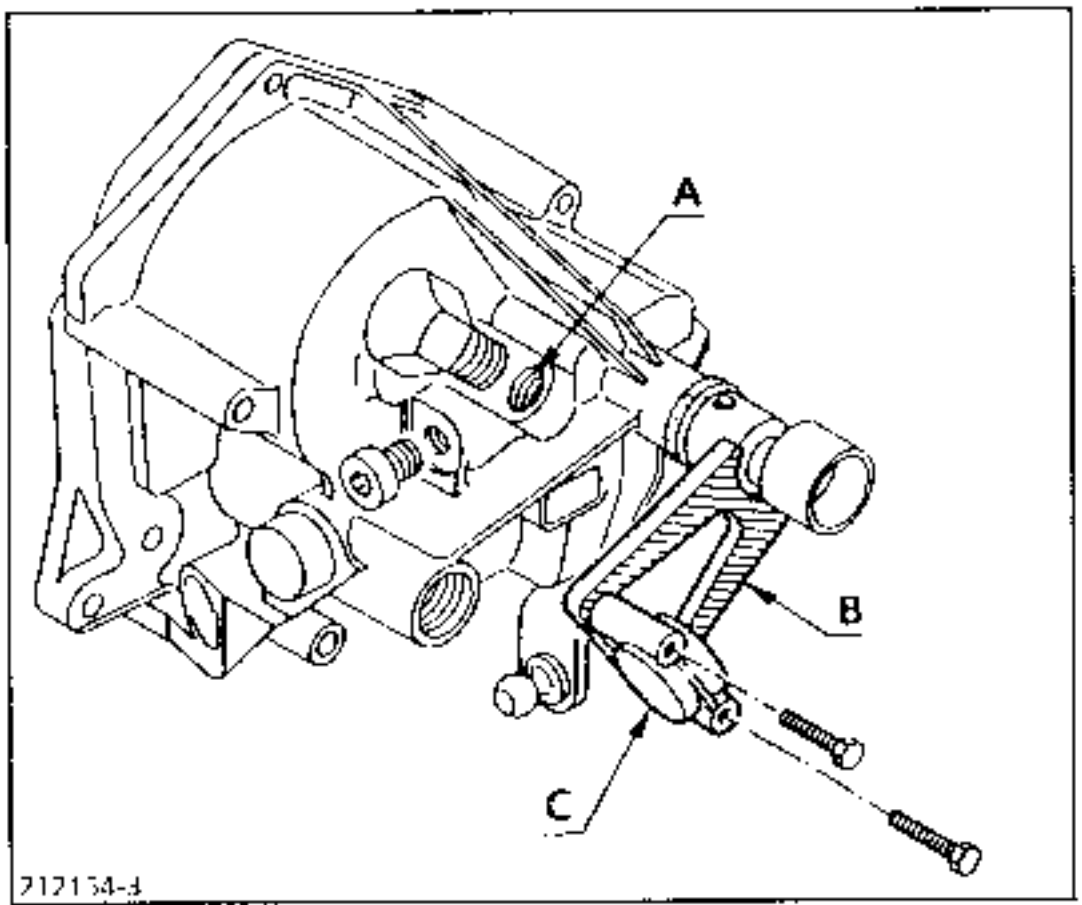
Shaft to which the kit **can** be fitted.



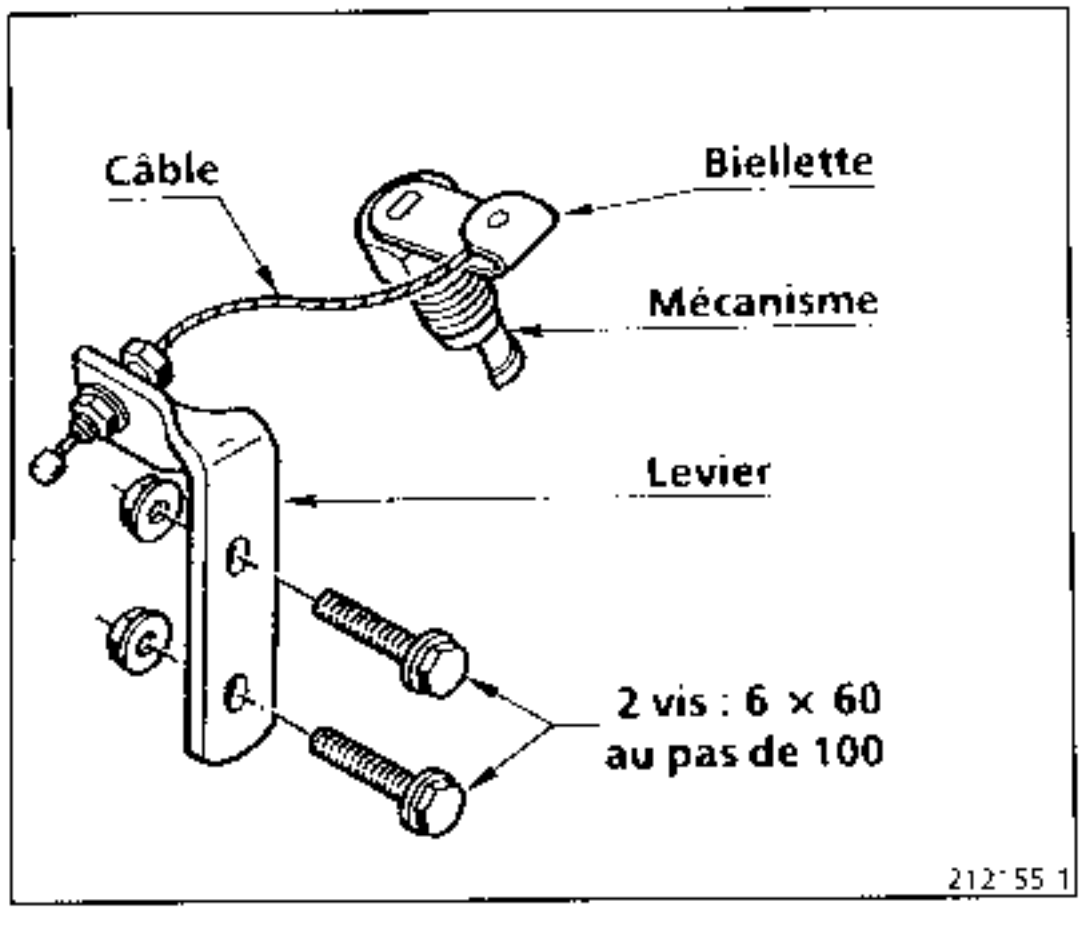
The Parts Department only supplies shafts of length **141.5 mm**.

REAR HOUSING

- The housing is machined at **(A)**. This opening is covered by a plug on the vehicle.
- The gear selector (B) must be triangular and must have a bearing **(C)**.



DESCRIPTION OF THE KIT



OPERATING PRINCIPLE

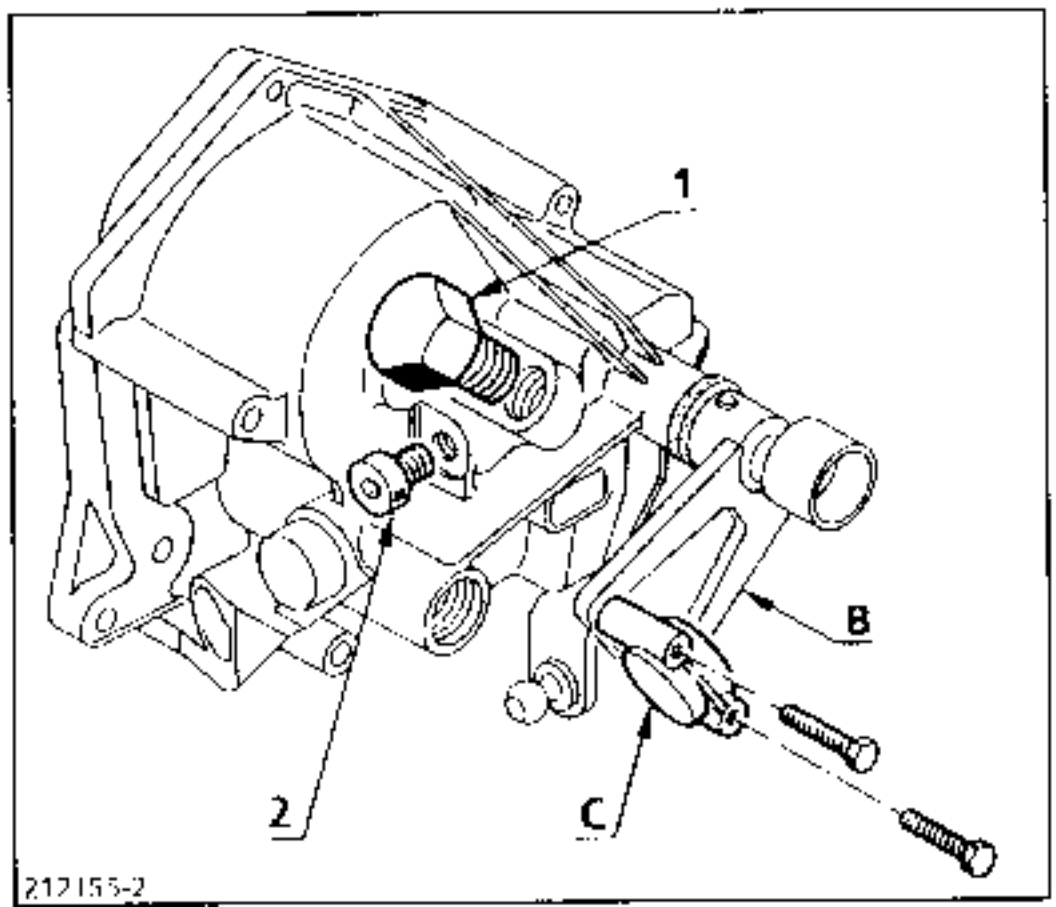
When reverse gear is selected, the selector lever **(B)** on the gearbox pulls the cable while acting on the cam.

When the cam moves round, it pushes gently against the 5th gear shaft which brings the synchro cone into contact with the 5th gear, thus braking the rotation of the primary shaft.

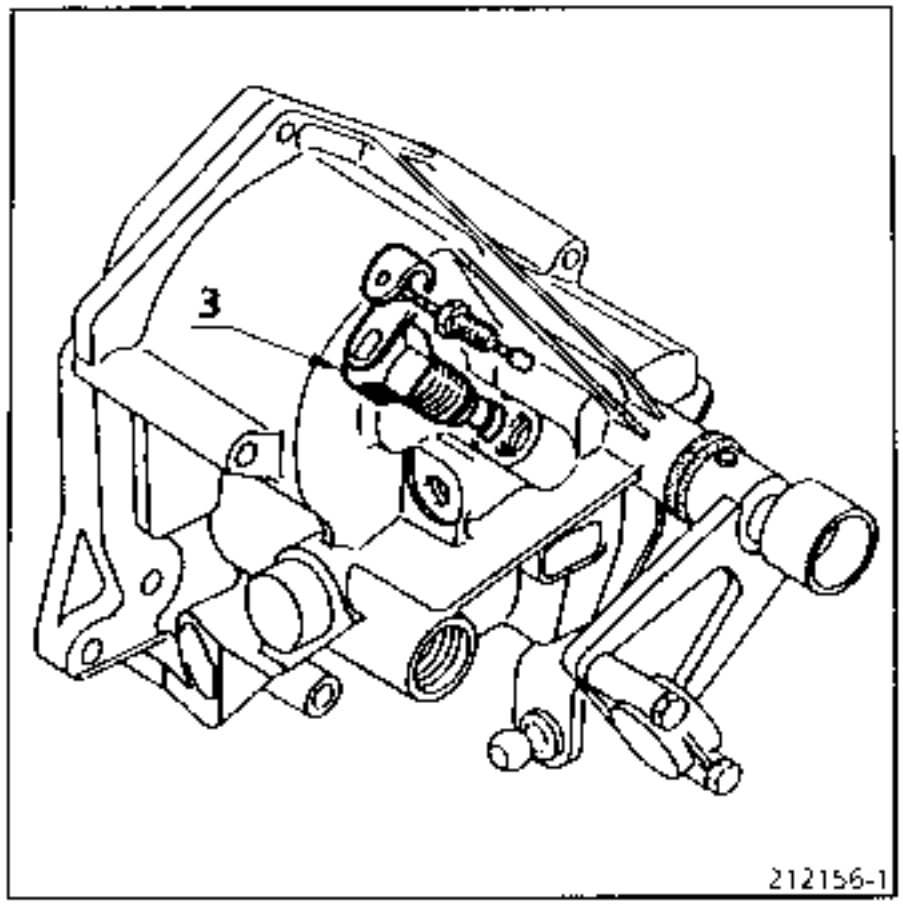
NOTE : as the primary shaft is stopped from rotating, this system may cause blockages when reverse gear is selected.

ADAPTATION

- Remove the two mounting bolts for the bearing **(C)** and replace them with those supplied in the kit (**diameter 6 mm** - length **60 mm** - thread **100**).
- Certain vehicles are fitted with washers between the bearing **(C)** and the gear selector **(B)**. Remember to fit these washers.
- Remove the bolts **(1) and (2)**, retain the spring and the 5th gear resistance ball.

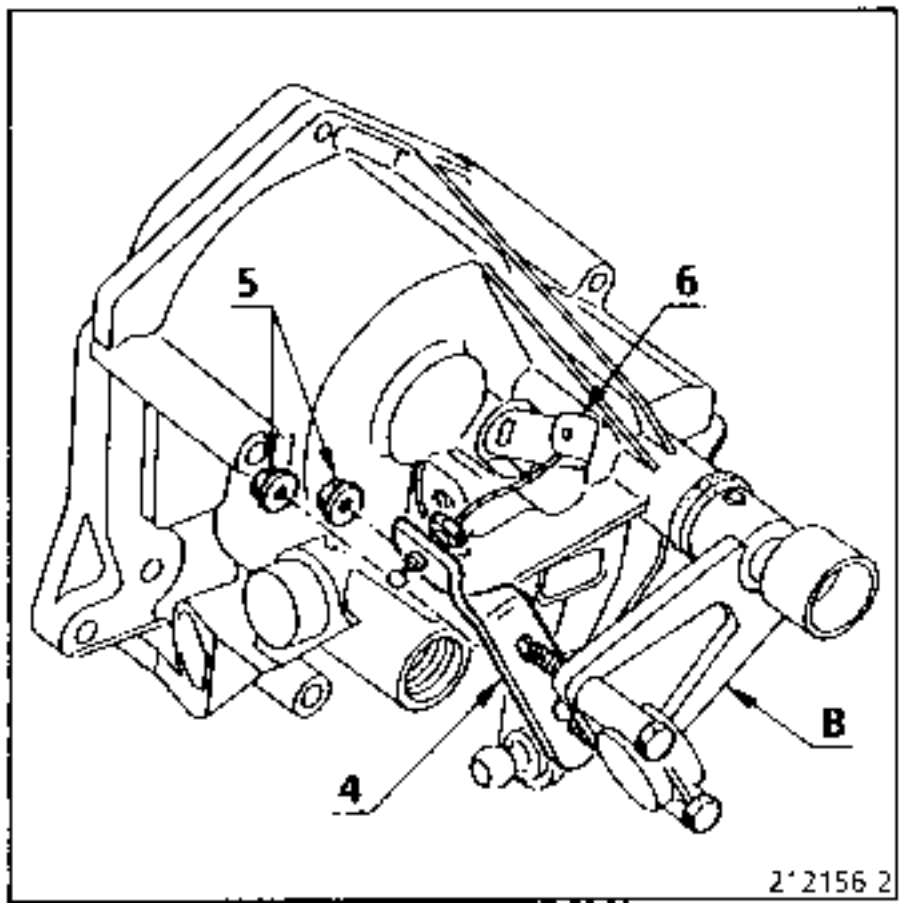


- Insert the 5th gear.
- Coat the threads of the mechanism (3) with a few drops of **LOCTITE FRENETANCH**.
- Fit the mechanism (3) into the machined location and tighten moderately.



Fit:

- the lever (4) on the gear selector **(B)** ; lock the assembly using nuts **(5)**.
- the cable on the lever **(4)**.

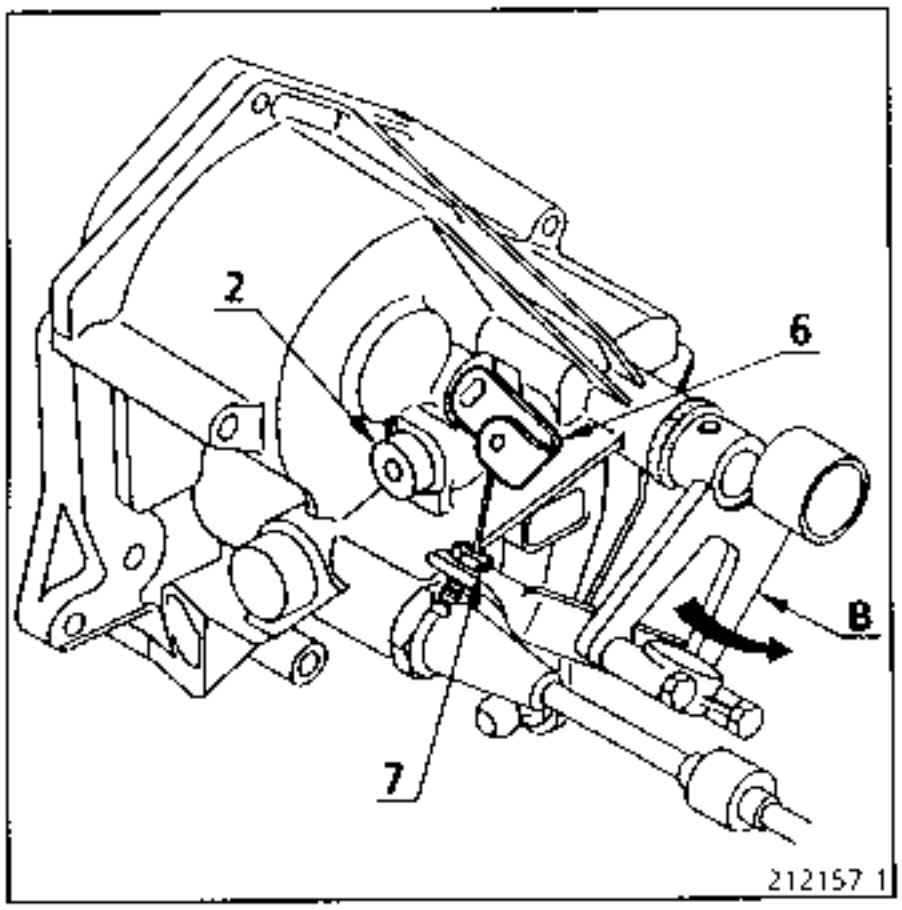


Return the gearbox to neutral and check that 3rd and 4th gears can be correctly selected.

Fit the ball and the resistance spring for 5th gear and refit the plug (2).

IMPORTANT NOTE: do not move the bar (6) by hand as the 5th gear shaft will move forward and exceed the locking ball notch position.

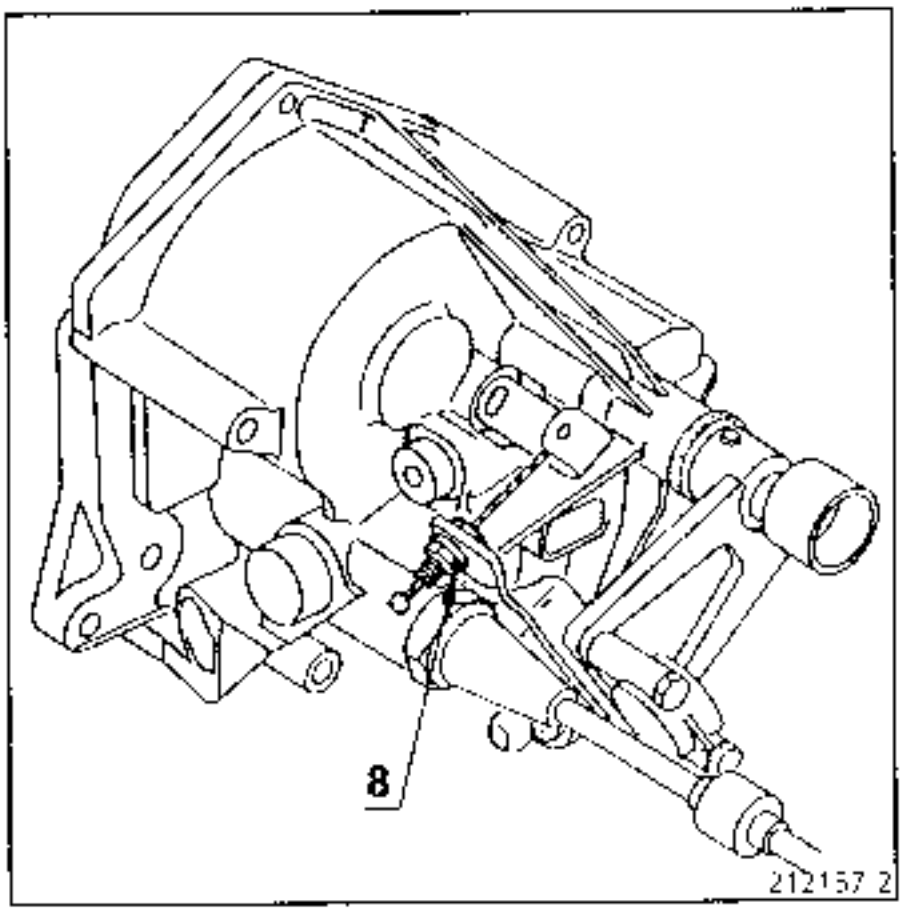
If this happens, try to release the assembly by engaging 2nd gear.



With the reverse gear shaft locking cable in position, tilt the lever (B) downwards (see arrow) without releasing reverse gear.

Bring the bar (6) against the 5th gear shaft, without forcing it.

In this position, adjust bolt (7)until the cable is taut but not stretched.



Lock the lock nut (8).

SPECIAL NOTES FOR ADJUSTMENT

The 5th gear shaft returns to the neutral position thanks to a 5th gear resistance ball and spring pressing against the shaft locking ball rail.

The efficiency of the system may be increased by turning bolt (7) one or two additional turns. In this configuration however, it is vital to check after engaging reverse gear several times that the 5th gear shaft is returning to neutral correctly.

If the shaft does not return to neutral, it will be impossible to select 3rd gear after selecting reverse since the locking ball between the shafts for 3/4 and 5th gear will prevent selection.

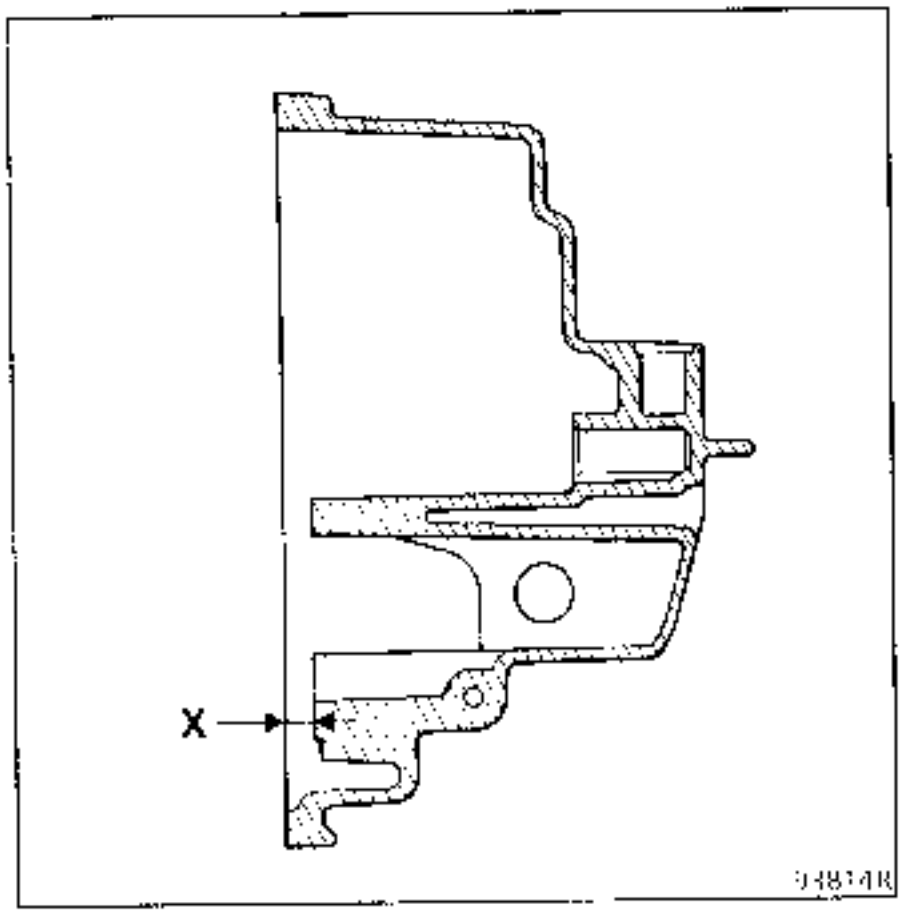
In this case, slacken the cable until the shaft returns to neutral correctly.

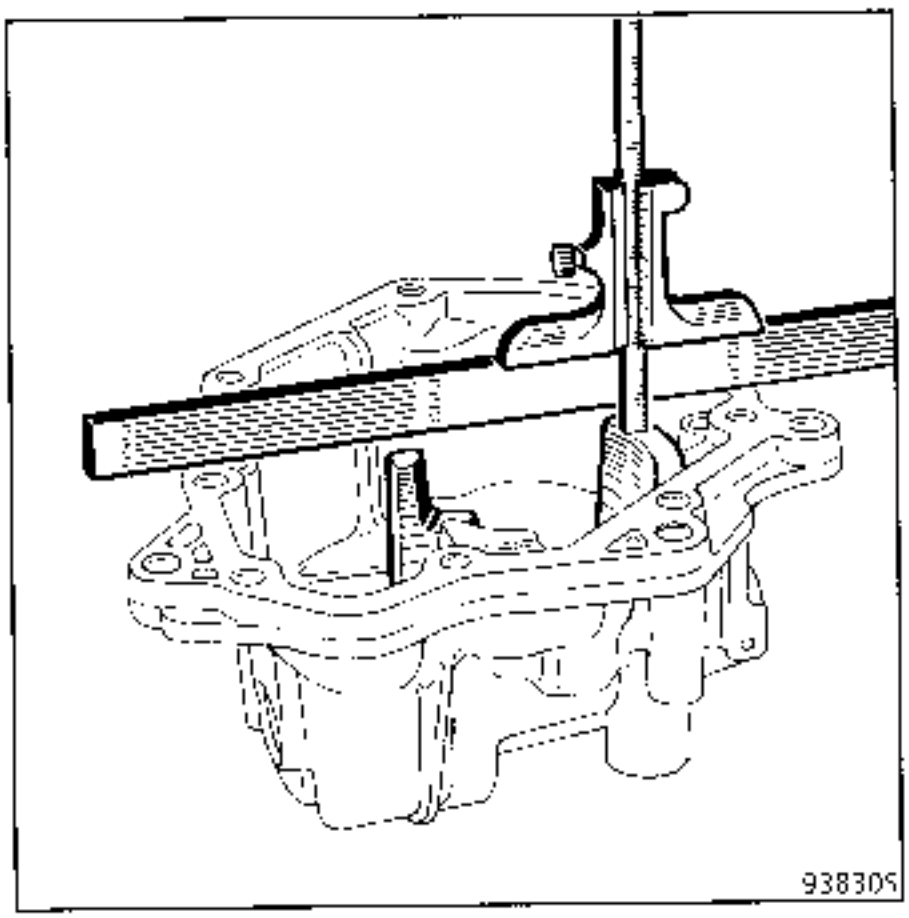
The paper seal which has until now sealed the rear housing for "**NG**" type gearboxes, has now been replaced by a thicker "**VULCOFLEX**" seal.

To enable this new seal to be fitted, the rear housing sealing face has been reduced by **0.5 mm**.

Consequently, the correct type of seal must be fitted for the housing type.

To identify the housings, measure the dimension "**X**" between the sealing face and the secondary bearing face or consult the application numbers table.





1st assembly

X = 8 + 0.03 mm.

Assembly : with paper seal (thickness = **0.4 mm**) coat with **PERFECT SEAL LOWAC**

2nd assembly

X = 7.48 ± 0.03 mm.

Assembly : with **VULCOFLEX** seal (thickness = **0.8 mm**) fit dry.

Rear housing mounting bolts tightening torque : 1.6 to **2 daN.m**.

The 2nd assembly applies from the following numbers

NG9	
Suffix	**Application number**
00	149145
01	74416 to 74596
01	74705
02	175194
03	6890
06	16312
07	305
08	1924
09	142

SPECIAL TOOLING REQUIRED	
B.Vi. 31-01	Set of punches
T.Av. 476	Ball joint extractor
B.Vi. 945	Mandrel for fitting differential seal
B.Vi. 1058	Mandrel for fitting differential seal (JB2 and JB3 with tapered bearings)

TIGHTENING TORQUES (in daN.m)	
Brake caliper mounting bolt	10
Shock absorber base mounting bolt	11
Track rod end	3.5
Wheel bolts	9

INGREDIENTS
LOCTITE FRENBLOC
Brake caliper mounting bolts
RHODORSEAL 5661
Ends of driveshaft roll pins
MOLYKOTE BR2
Right hand sunwheel splines

REMOVAL

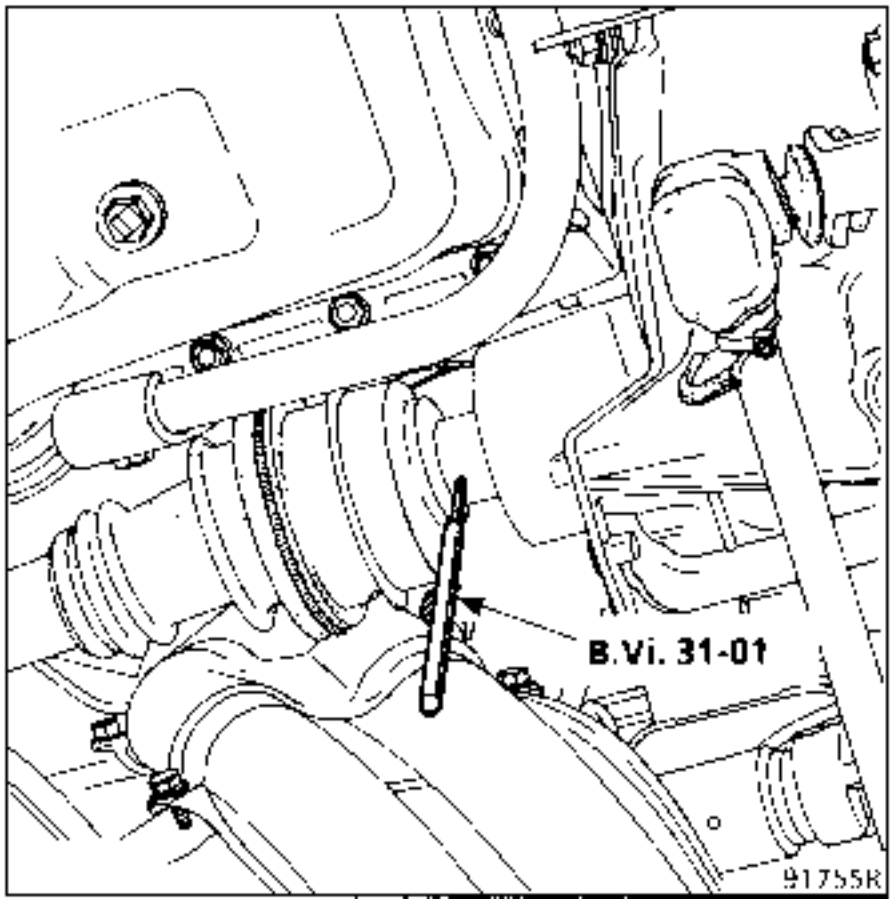
Remove the engine undertray.

Drain the gearbox.

Place the front right hand side on an axle stand.

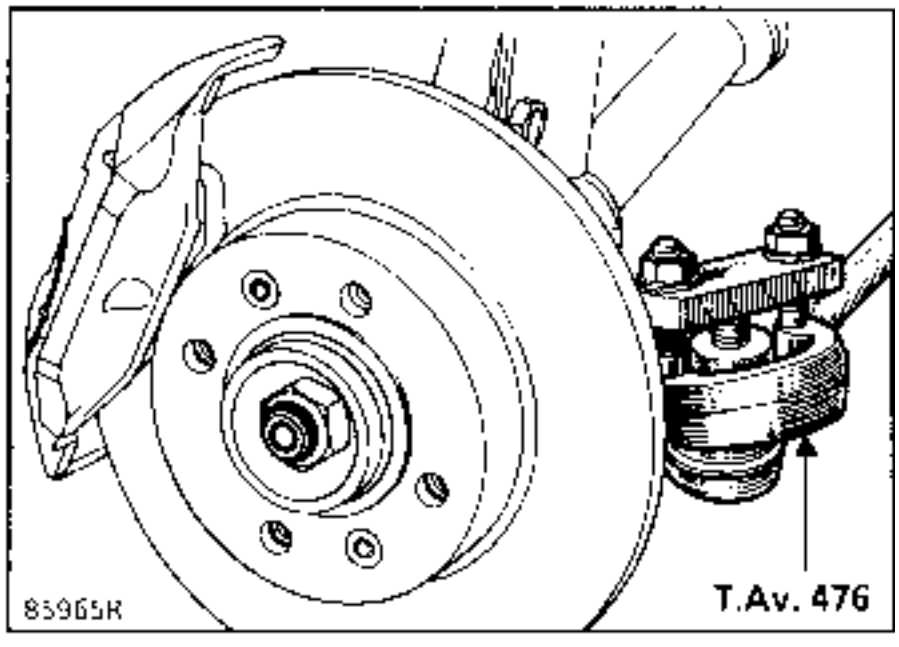
Remove the wheel.

Remove the driveshaft roll pins using tool **B.Vi. 31-01**.

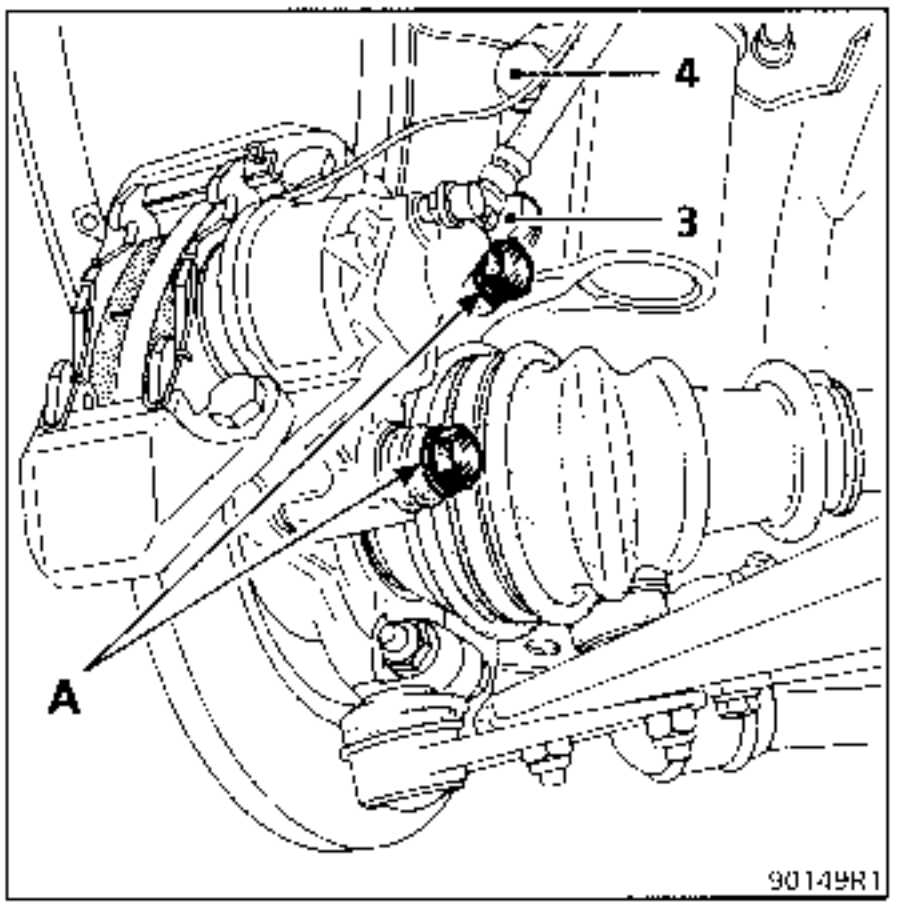


Remove:

- the track rod end (tool **T.Av. 476**),



- the two mounting bolts (**A**) for the brake assembly.



Attach the caliper to the suspension spring to prevent the hose from stretching.

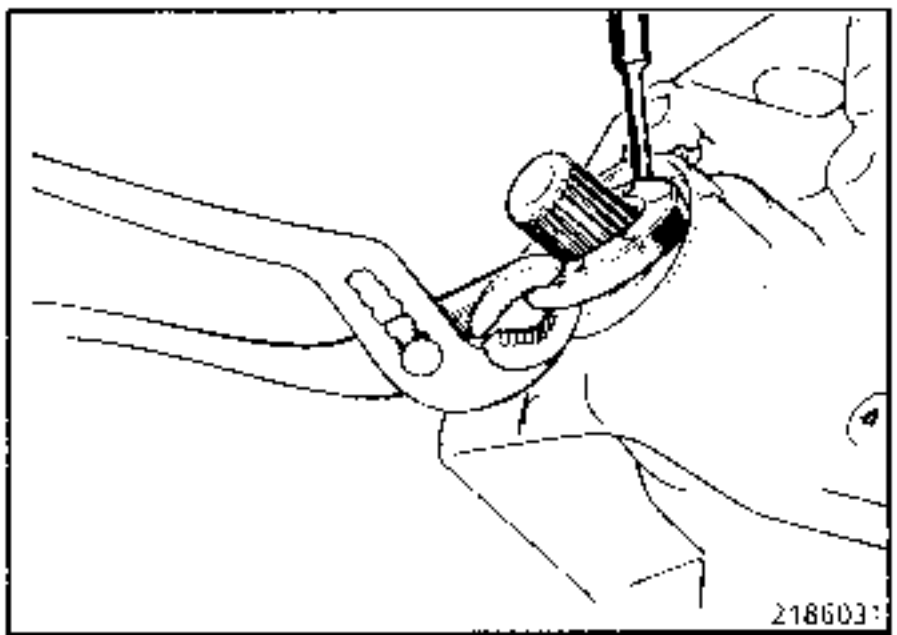
Slacken the lower shock absorber base bolt (**3**) and remove the upper bolt (**4**).

Tilt the stub axle carrier and release the driveshaft (take care not to damage the gaiters during this operation).

Remove the O ring from the sunwheel.

Tap the bottom of the O ring using a roll pin punch and a small mallet to tilt it.

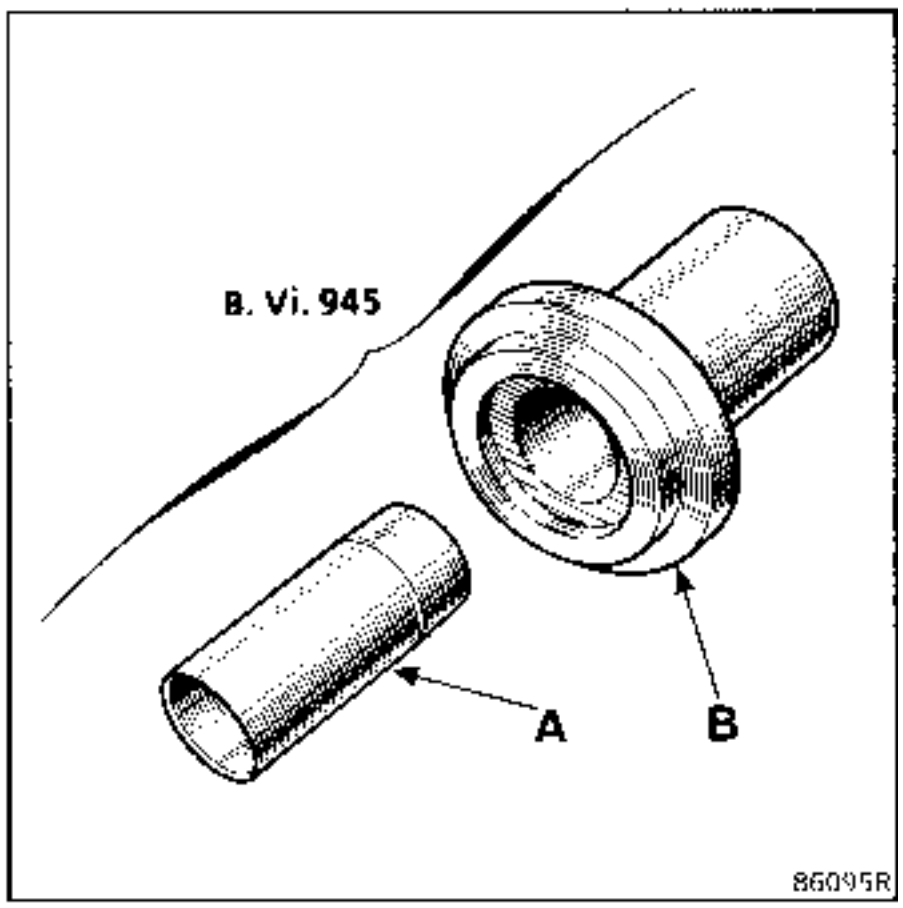
Once the seal has been released, remove it using pliers, taking care to avoid damaging the splines of the sunwheel.



REFITTING

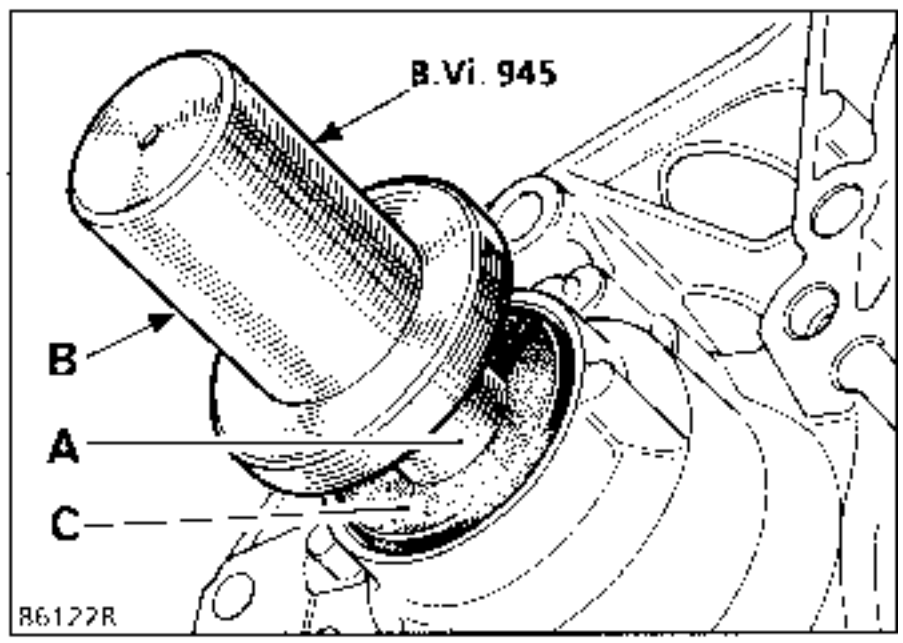
1. JB1 gearboxes

The seal is refitted using tool **B.Vi. 945** consisting of :
- the seal protector (**A**),
- the seal fitting tool (**B**).



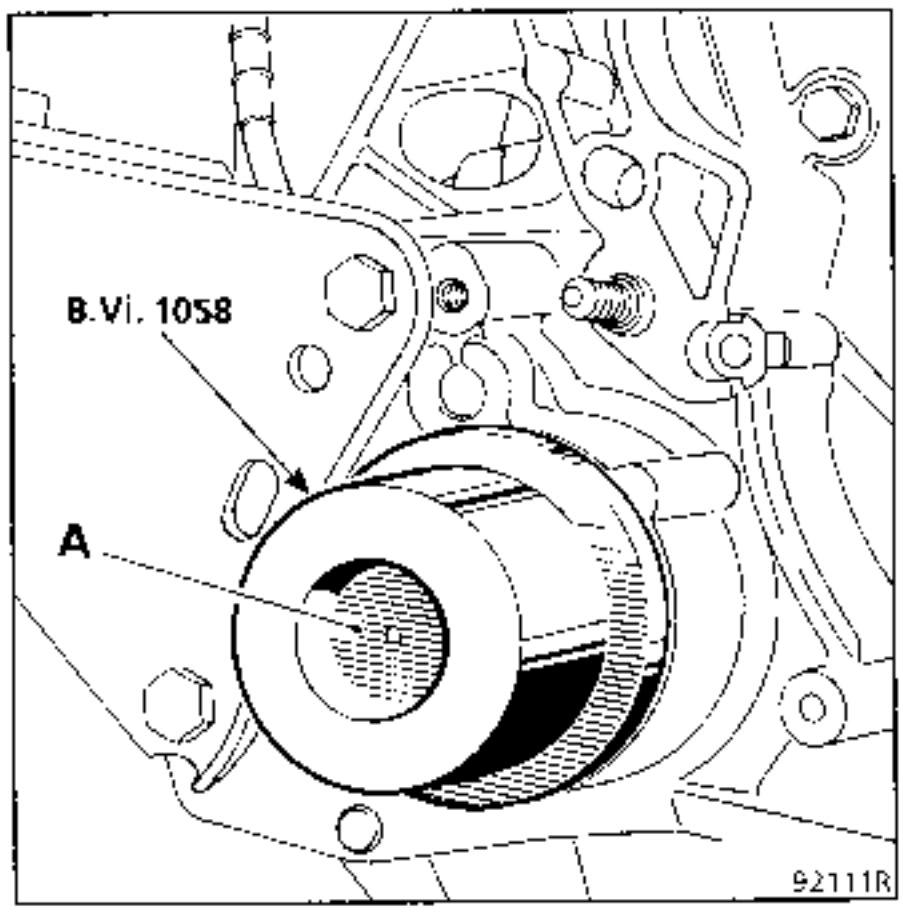
METHOD

Fit the greased protector (**A**) to the sunwheel and position the lubricated seal (**C**) using tool (**B**).



2. JB2 and JB3 gearboxes (differential mounted on tapered bearings).

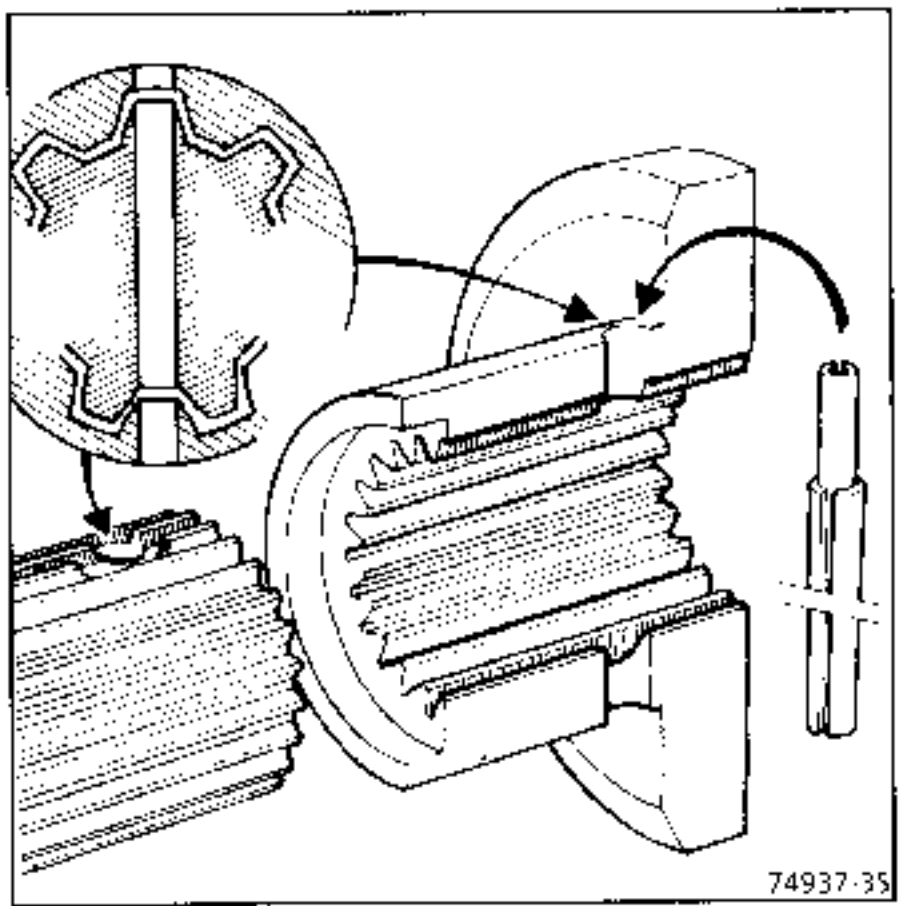
Proceed in the same manner but use tool **B.Vi. 1058** and the protector **(A)** from tool **B.Vi. 945**.



Fit the O ring on the sunwheel and coat the splines with **MOLYKOTE BR2**.

Position the driveshaft in relation to the sunwheel.

Pivot the stub axle carrier, engaging the driveshaft into the sunwheel. Use tool **B.Vi. 31-01** to align the holes.



Fit the new roll pins and seal the ends using **(RHODORSEAL 5661)**.

Tighten the nuts and bolts to the recommended torque.

Fit the brake caliper and coat the bolts with **LOCTITE FRENBLOC**.

Fill the gearbox with oil.

REPLACEMENT

SPECIAL TOOLING REQUIRED		
B.Vi.	807-01	Castellated wrench for differential nut
B.Vi.	813	Seal protector
B.Vi.	1154	Tool for fitting differential seal

REMOVAL

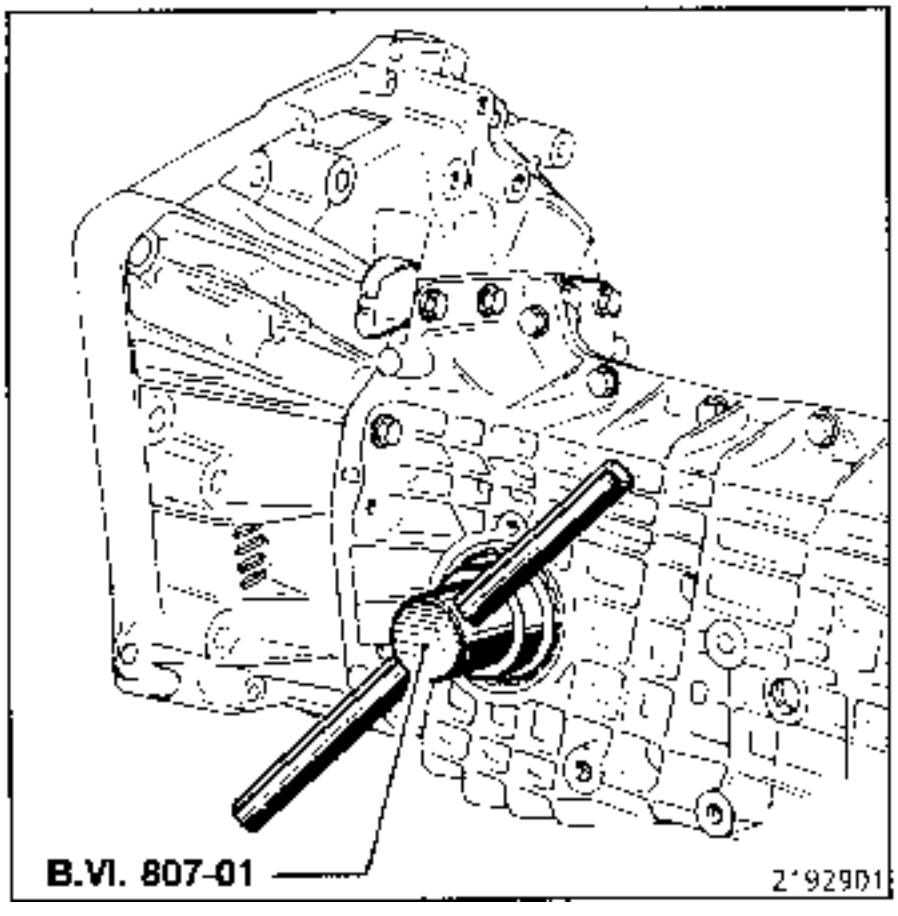
Drain the gearbox.

Tilt the stub axle carriers and release the driveshaft from the sunwheel.

Mark the position of the adjusting nut in relation to the housing.

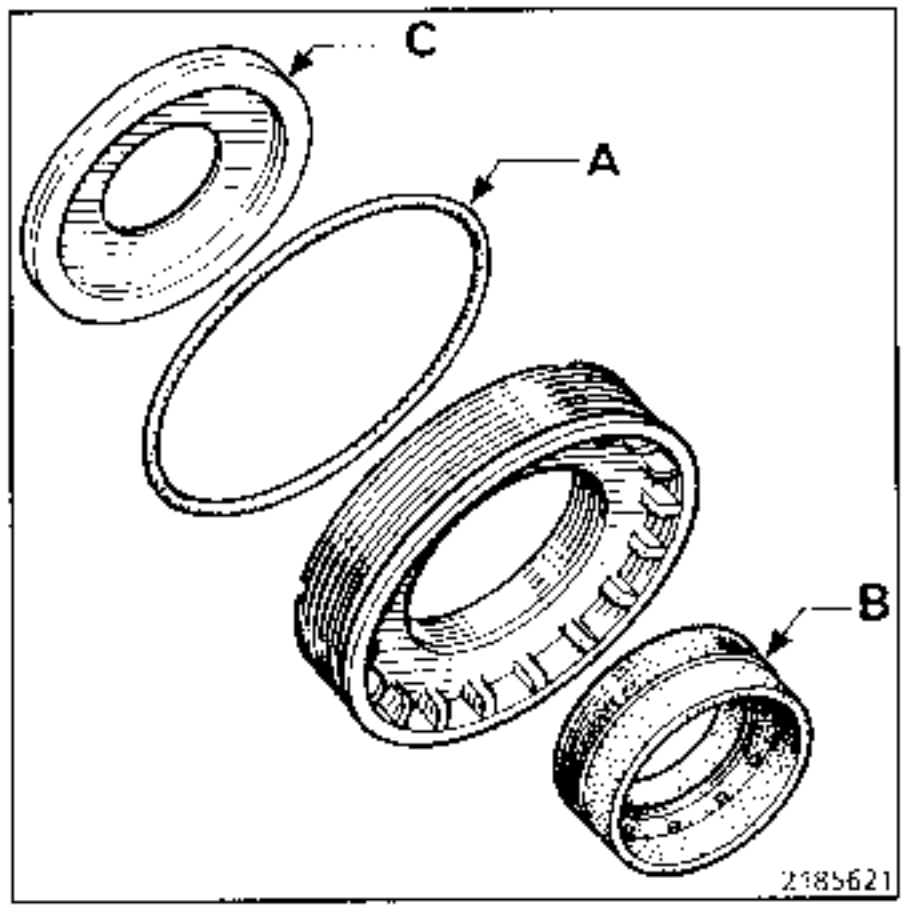
Remove the O ring and the locking plate.

Using tool B.Vi. 807-01, slacken the nut, counting the number of turns.



On the nut, remove:

- the O ring (**A**),
- the deflector (**C**),
- the lip seal (**B**).

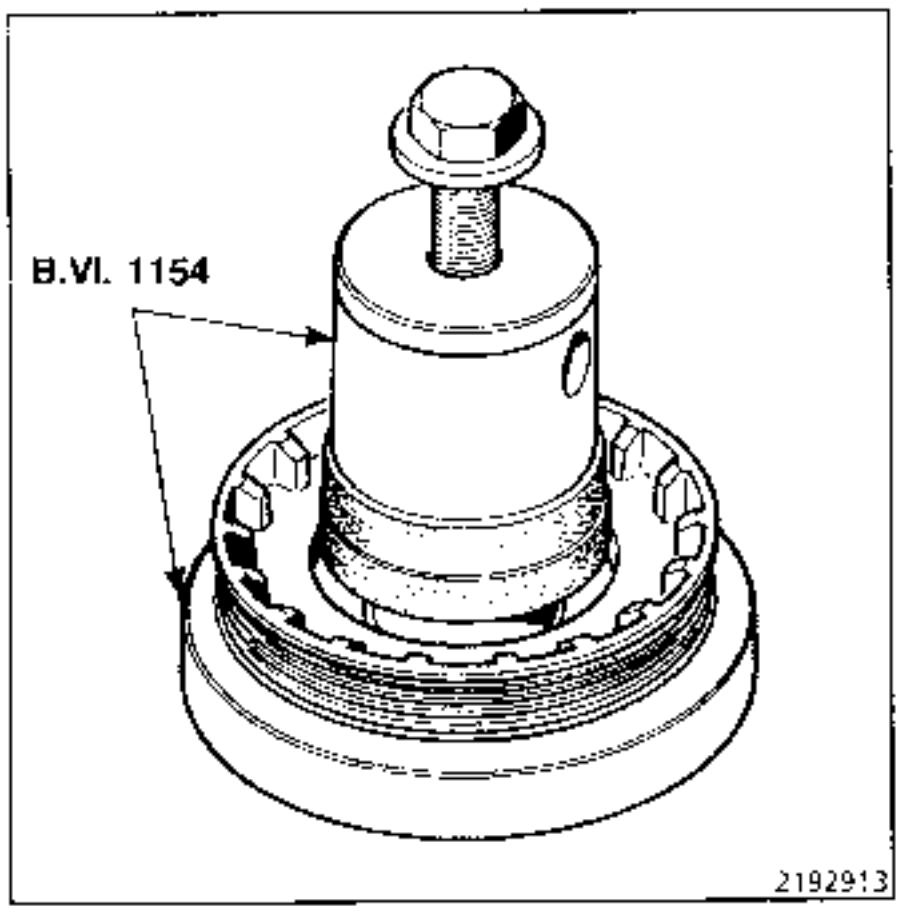


REPLACEMENT (cont)

REFITTING

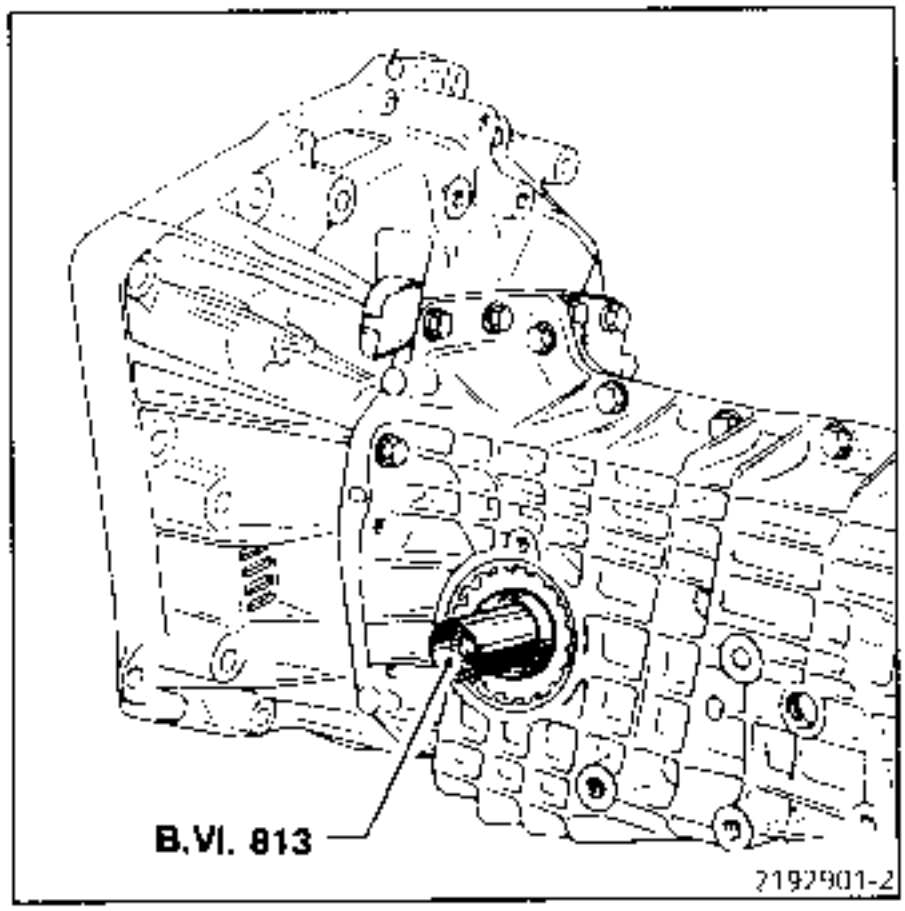
Fit the deflector (C) to the nut.

The lip seal (lubricated) is fitted using tool B.Vi. 1154 which ensures it is correctly positioned.



Fit the O ring (A).

Fit tool B.Vi. 813 to the sunwheel splines.



Using tool B.Vi. 807-01, tighten the differential nut until the reference mark on the housing is aligned.

Lock the nut using the locking plate.

Refit the O ring to the sunwheel.

Reconnect the driveshaft.

Fill the gearbox with oil.

SPECIAL TOOLING REQUIRED		
B.Vi.	606	Set of punches
T.Av.	476	Ball joint extractor
B.Vi.	1081-01	Tool for fitting differential seals

TIGHTENING TORQUES (in daN.m)	
Wheel bolts	9
Shock absorber base mounting nut	20
Track rod end nut	4

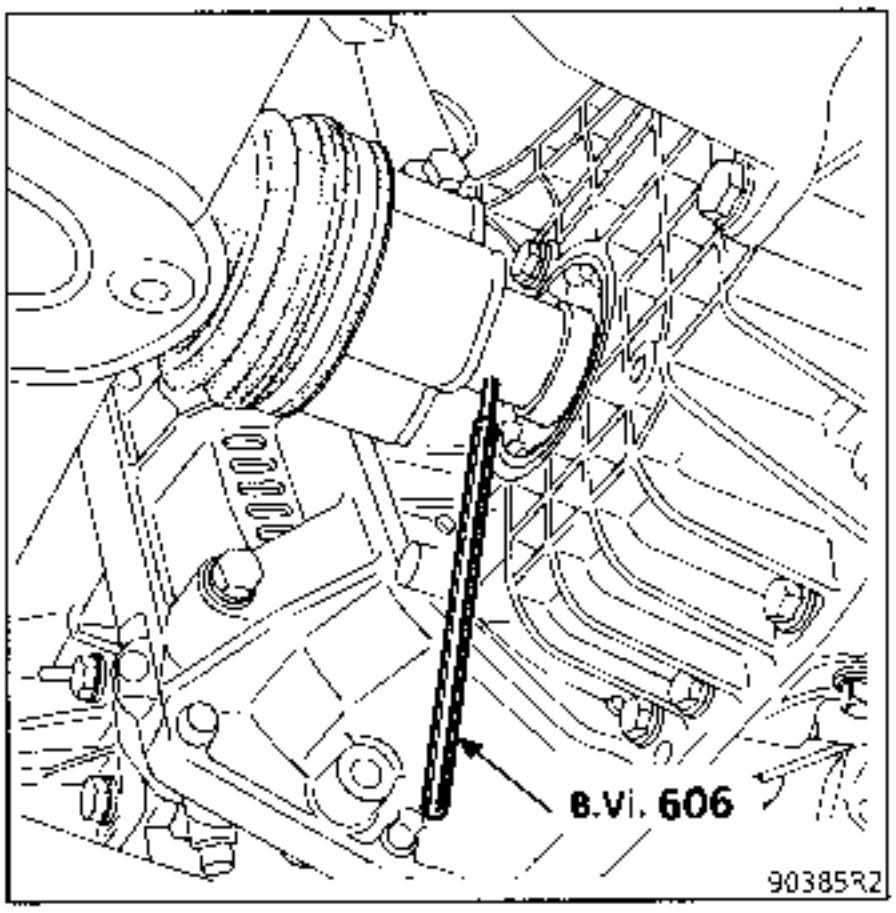
REMOVAL

Drain the gearbox.

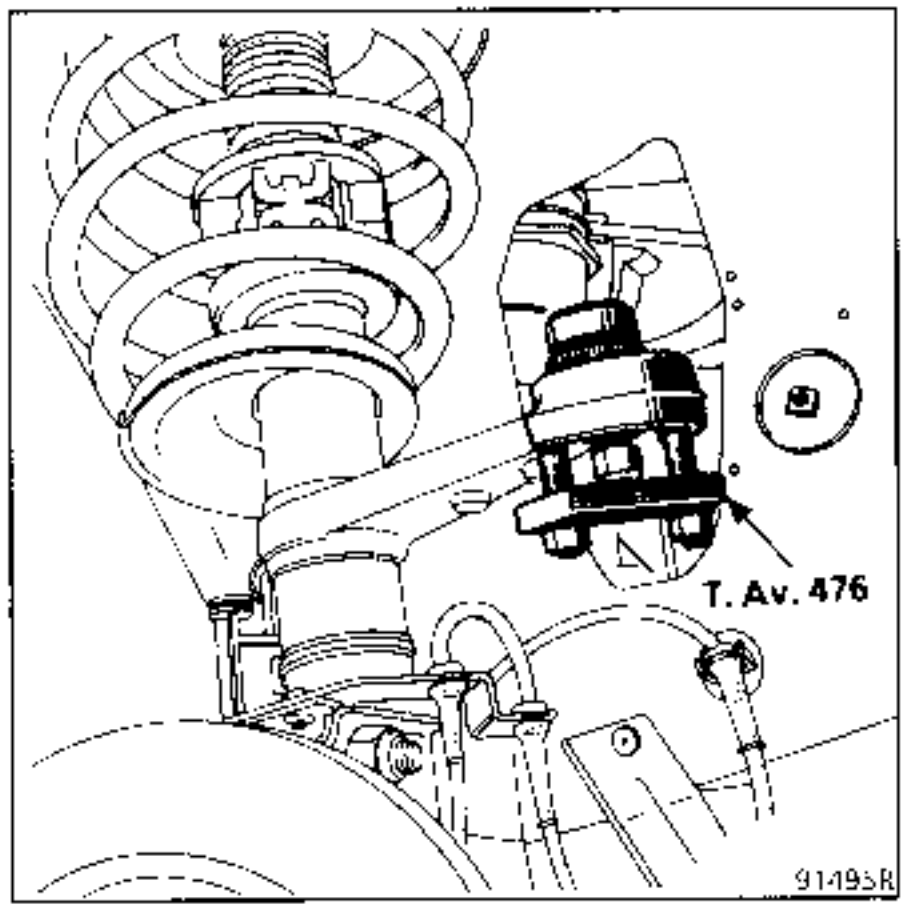
Put the front of the vehicle on axle stands on the side in question.

Remove the wheel.

Remove the driveshaft roll pins (tool **B.Vi. 606**).

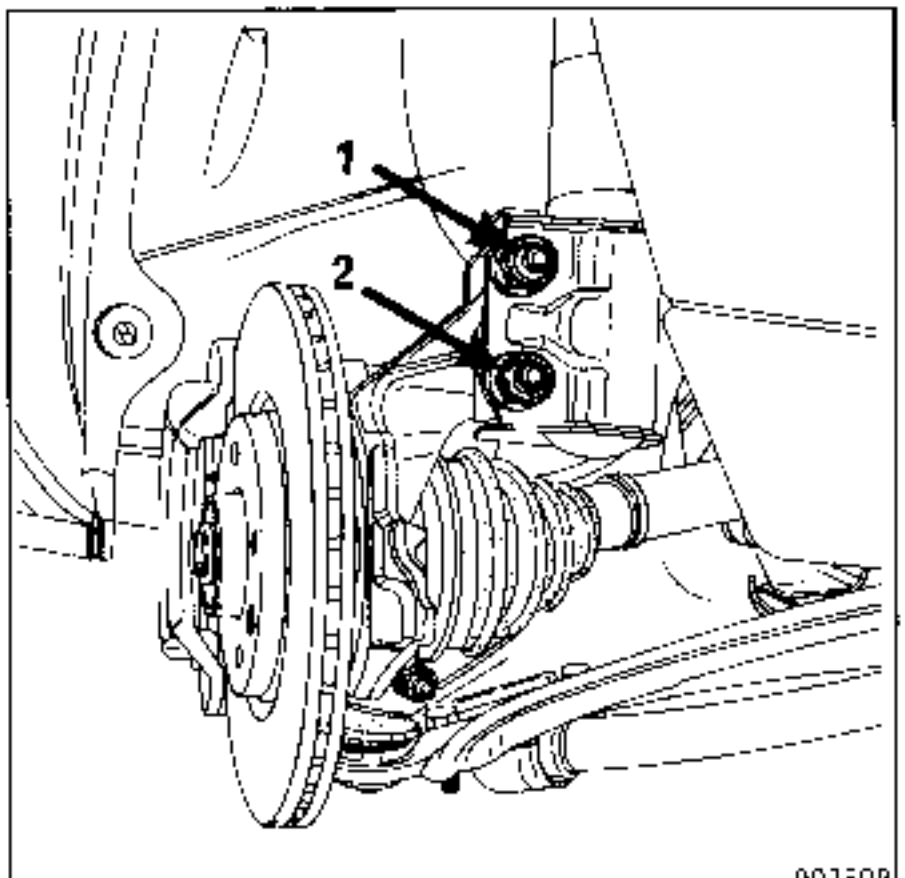


Remove the track rod end (tool **T.Av. 476**).

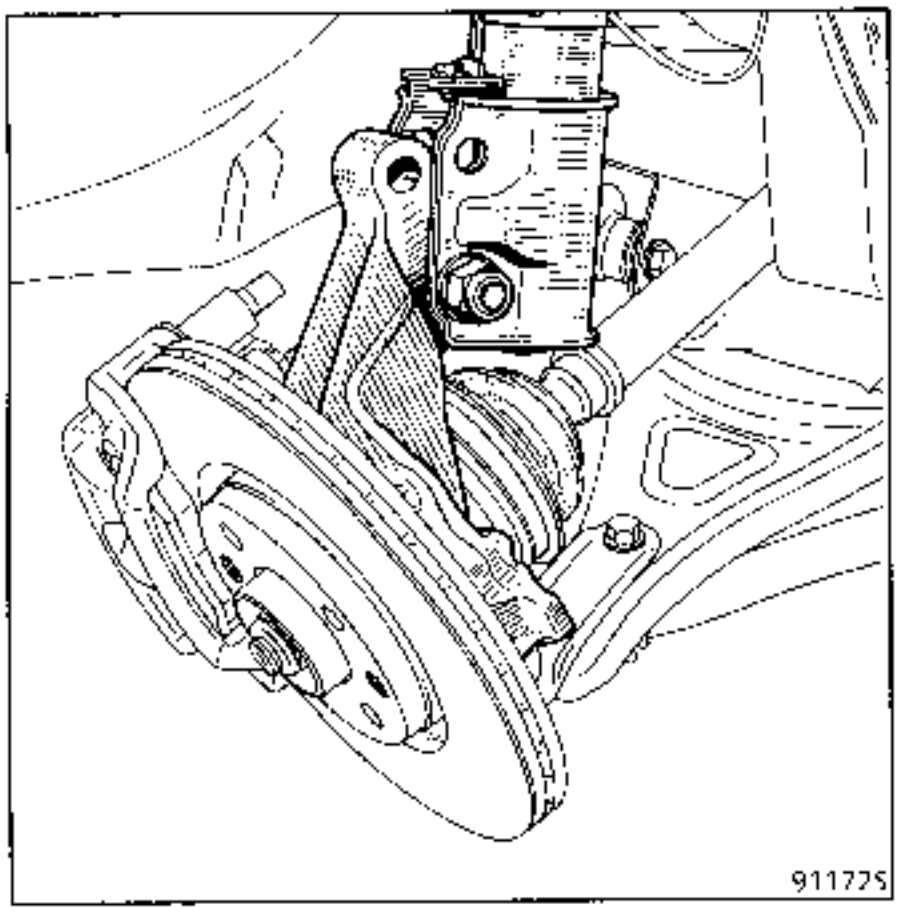


Slacken the lower shock absorber bolt (**2**) and remove the upper bolt (**1**).

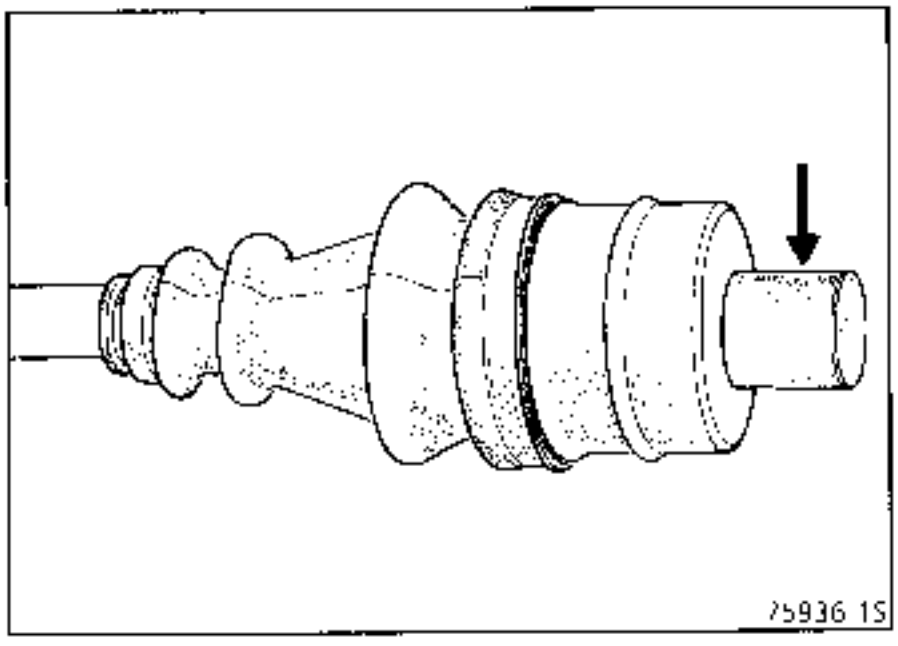
NOTE : the bolts have a splined section which means that a mallet must be used to remove them.



Tilt the stub axle carrier and release the driveshaft from the sunwheel.

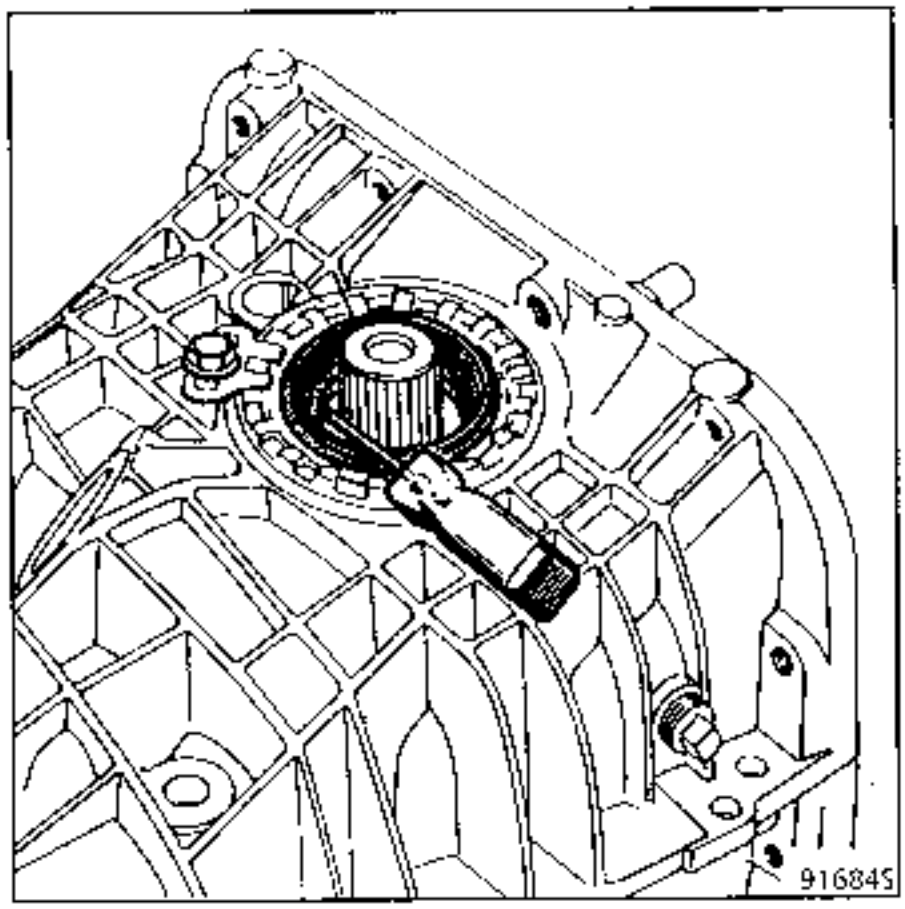


Apply adhesive tape or fit a protector (supplied with new driveshafts) to the differential output seal bearing face.



Using a roll pin punch and a small mallet, tilt the seal in its location.

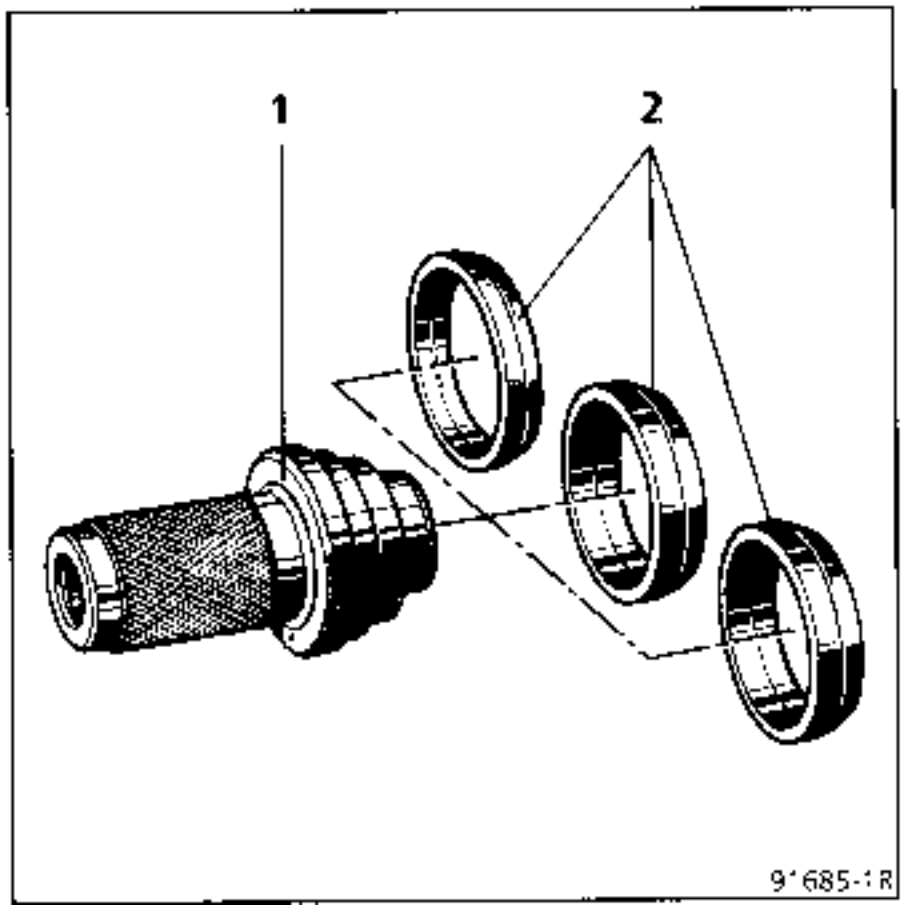
Remove the seal using a screwdriver, taking care not to damage the sunwheel splines.



REFITTING

The lip seals are refitted using tool **B.Vi. 1081-01**.

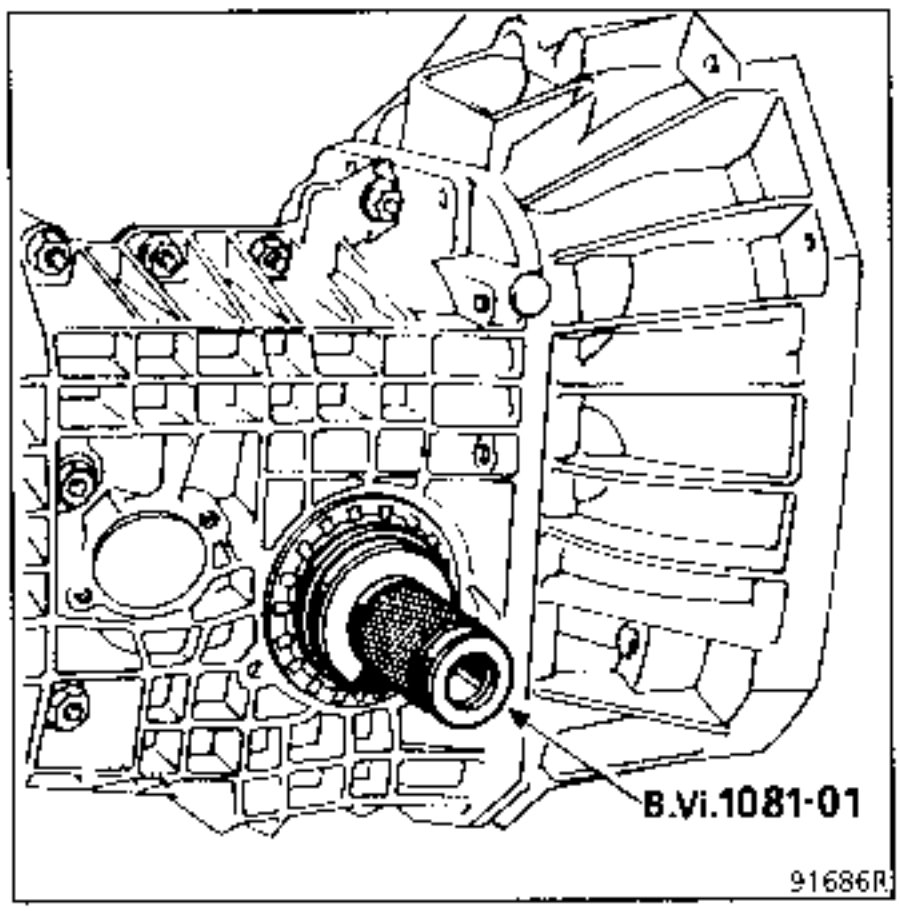
Fit the locating ring (**2**) (corresponding to the lip seal to be fitted, chamfer towards the outside) to the sleeve (**1**). Fit the lubricated lip seal to tool **B.Vi. 1081-01.**



The markings I, II and III appear on the locating rings :

- **Ring I** : thickness **14 mm**.
- **Ring II** : thickness **17 mm**.
- **Ring III** : thickness **20.8 mm**.

Fit the seal into position.

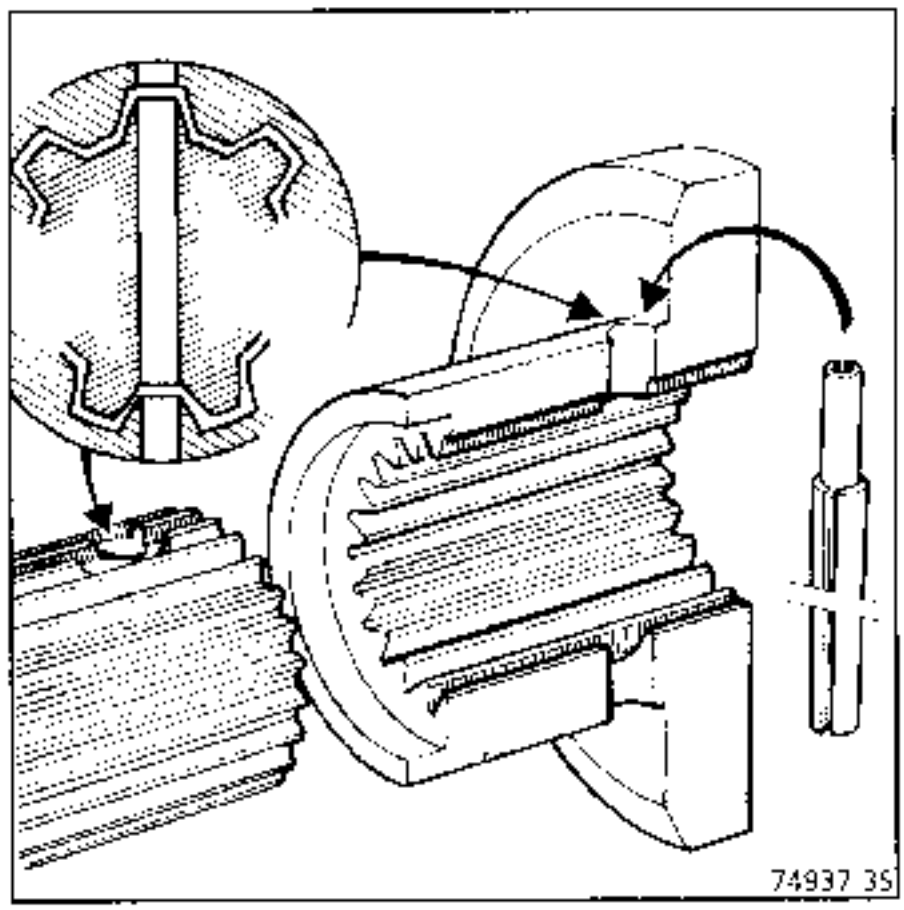


Before fitting the driveshaft, ensure the lip seal bearing face is not scratched or abnormally worn.

Coat the sunwheel splines with **MOLYKOTE BR2**.

Ensure the rubber washer is present which fits between the end of the sunwheel and the bottom of the driveshaft yoke.

Position the driveshaft in relation to the sunwheel, pivot the stub axle carriers and fit the driveshafts into the sunwheels, using tool **B.Vi. 606** to align the holes.



Fit the new roll pins and seal the ends (**RHODORSEAL 5661**).

Refit :

the shock absorber base bolts to the stub axle carrier and tighten them to the correct torque,

- the track rod end, then torque tighten it.

Fill the gearbox with oil.

Torque tighten the wheel bolts.

REPLACEMENT

1ST CASE

Only the speedo drive or shaft is damaged.

REMOVAL

The gearbox does not need to be completely dismantled.

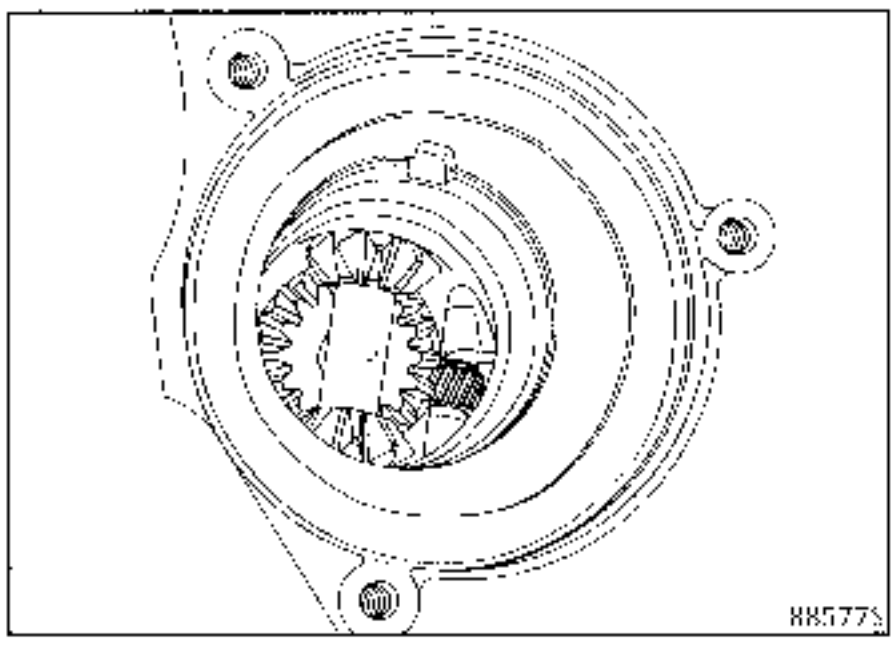
Release the left hand driveshaft

Remove the sunwheel spider.

Turn the differential by hand so that the speedo pinion is accessible.

Release the shaft, pulling vertically using long nosed pliers.

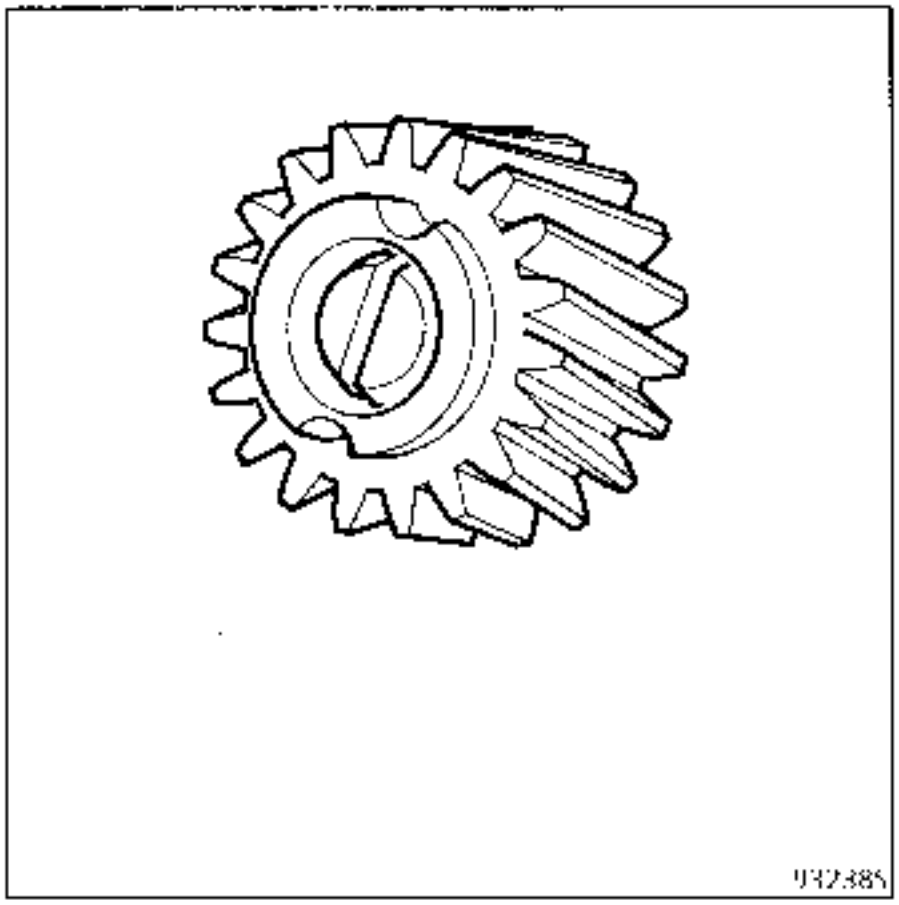
Use these pliers to remove the pinion from its location.



NOTE : The pinion and shaft must be renewed each time they are removed.

REFITTING

Fit the pinion, ensuring it is correctly located, the correct way round.



Ensure that it is correctly clipped in.

Refit the sunwheel spider.

2ND CASE

The speedo drive pinion and crown wheel are damaged.

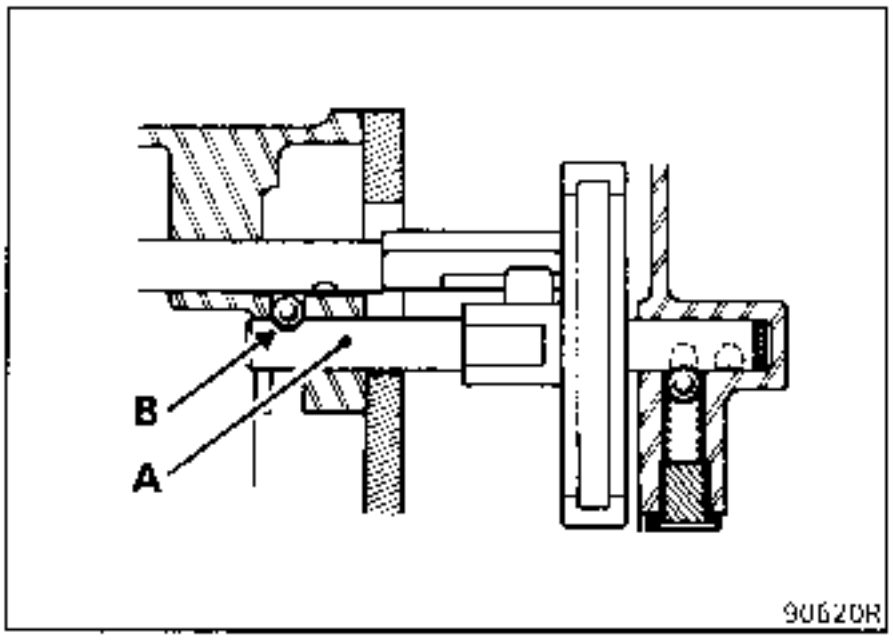
The gearbox must be removed and the final drive dismantled.

SPECIAL TOOLING REQUIRED		
B.Vi.	204-01	Wrench for secondary shaft nut
B.Vi.	905-02	Speedo shaft seal fitting and removal tool

TIGHTENING TORQUES (in daN.m)	
Primary shaft nut	13
Secondary shaft nut	15
Rear housing bolt	1.6 to 2

It is not possible to replace the 5th speed gear linkage on the vehicle as it is essential not to remove the 5th gear fork shaft (A), as the locking ball (B) may fall into the gearbox.

This section however deals with the removal of the 5th gear housing on the vehicle for an operation on this part or replacement of the speedo drive.



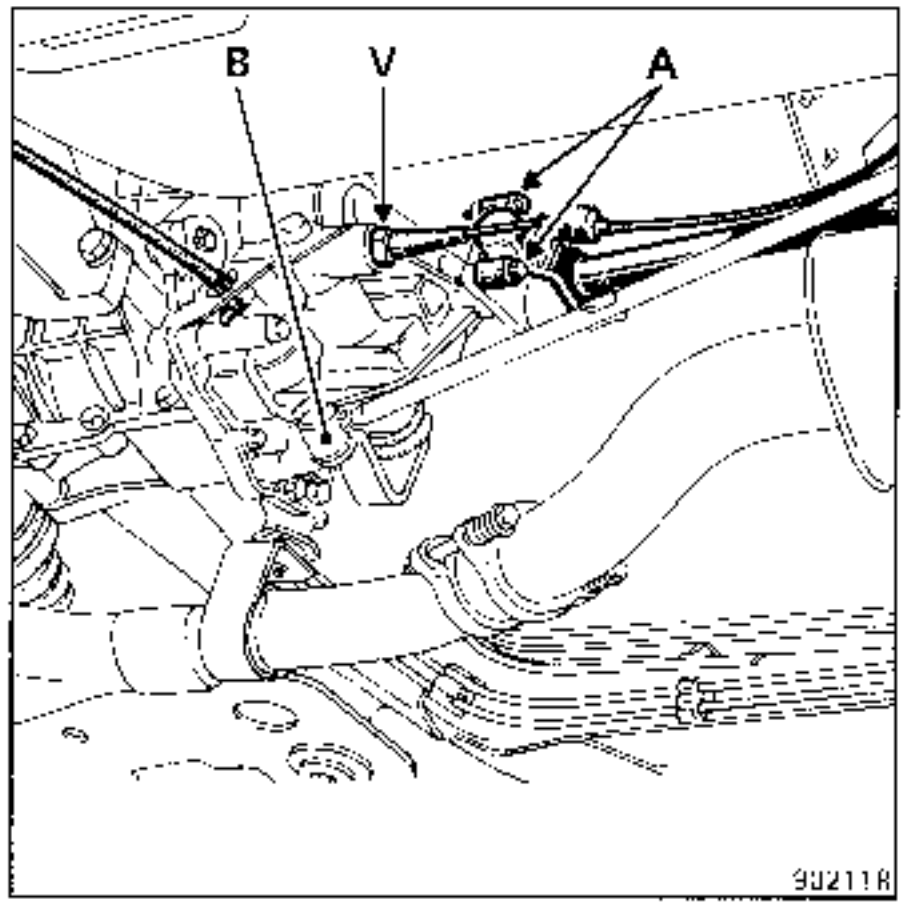
90620R

REMOVAL

Drain the gearbox.

Remove:
- the selector controls:
  - at (A) the two mounting bolts,
  - at (B) release the ball joint,
- the reverse gear locking mechanism (V),
- the 5th gear locking ball.

Disconnect the speedo cable after removing the plastic roll pin.

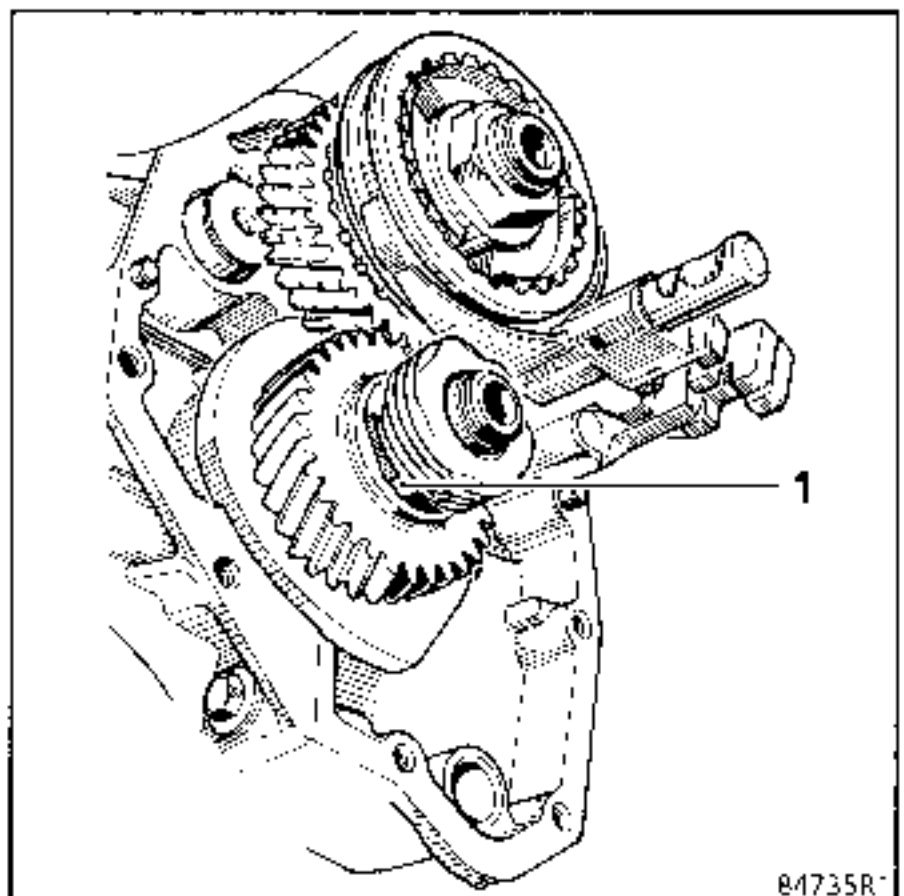


90211R

Select 4th gear so the 5th gear locking ball does not fall into the gearbox.

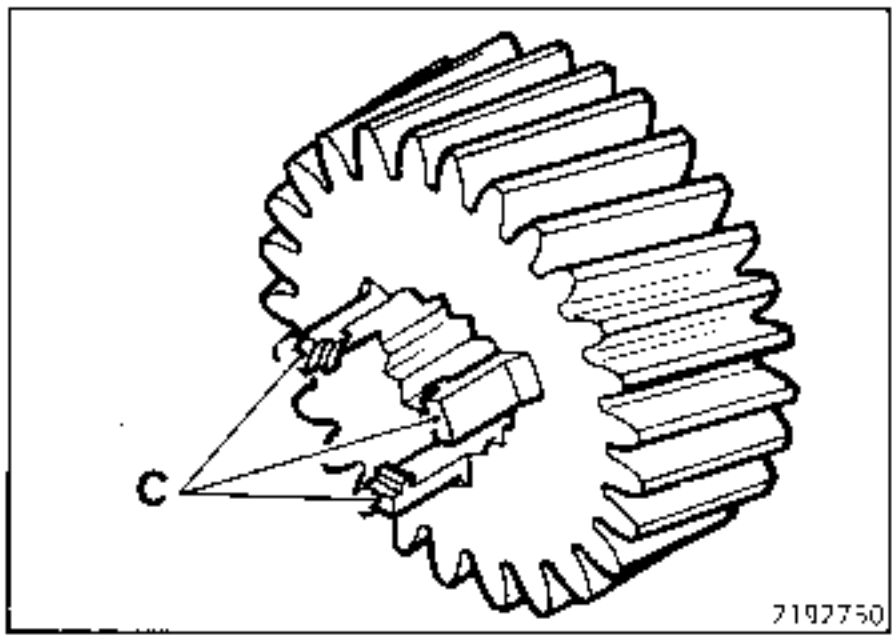
Remove the 5th gear housing.

Replacing the secondary shaft nut:
- return the gearbox to neutral, select 1st and 5th,
- replace the secondary shaft nut (1) using wrench B.Vi. 204-01 and a torque wrench.



84735R

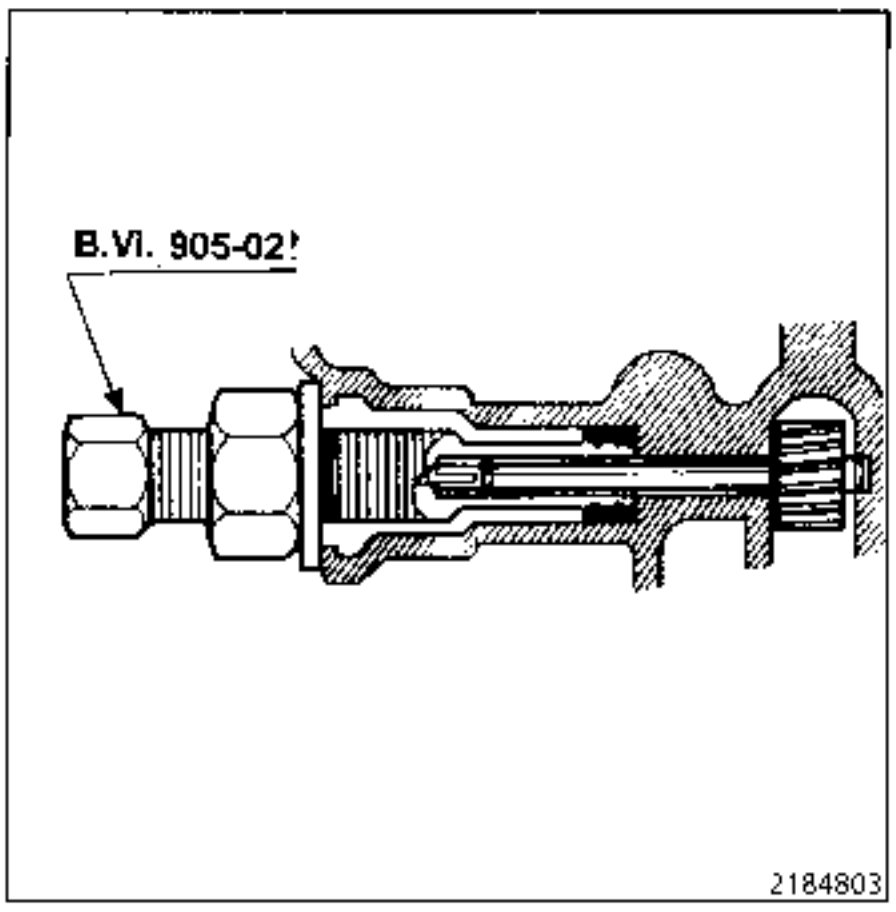
Separate catches (**C**) mounting the pinion to the shaft. Pull on the speedo shaft.



NOTE : the pinion must be renewed after each removal.

Remove:

- the speedo seal, use tool **B.Vi. 905-02**.

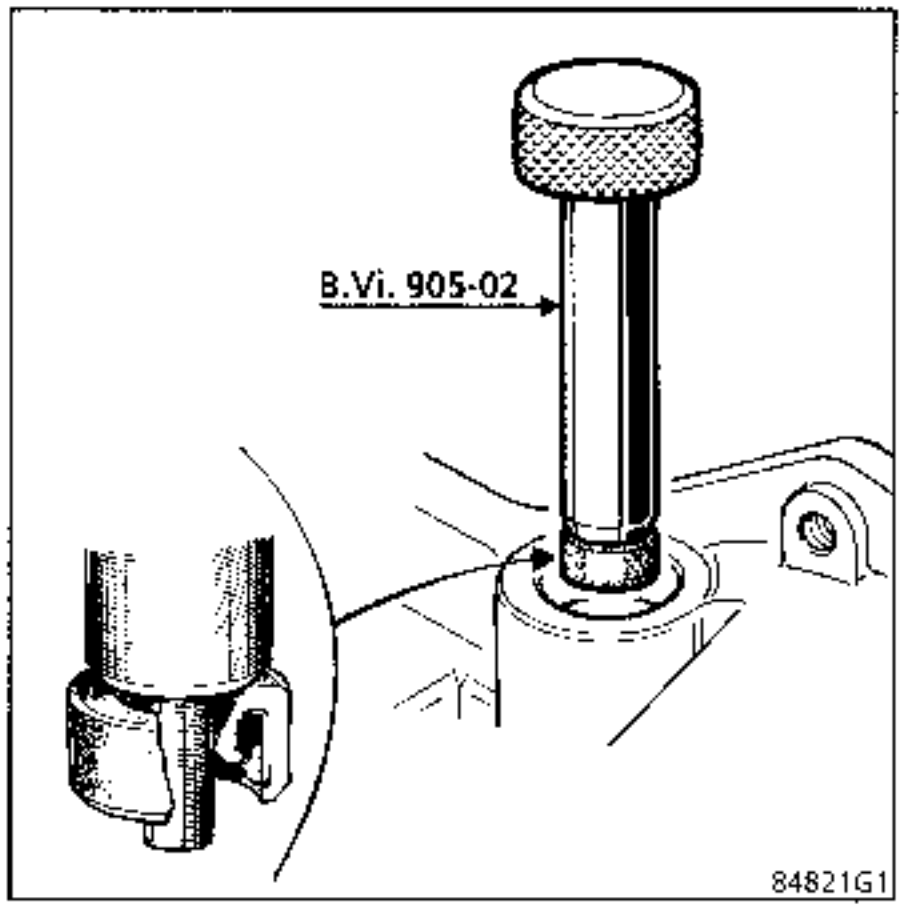


REFITTING

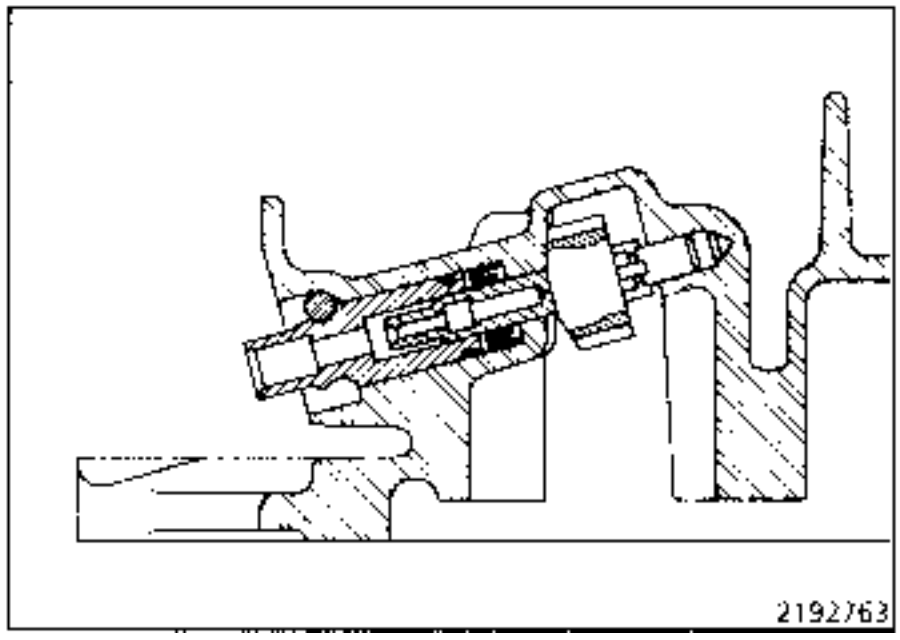
Fit the lubricated lip seal to the tool of **B.Vi. 905-02** ensuring it is the correct way round.

Refit:

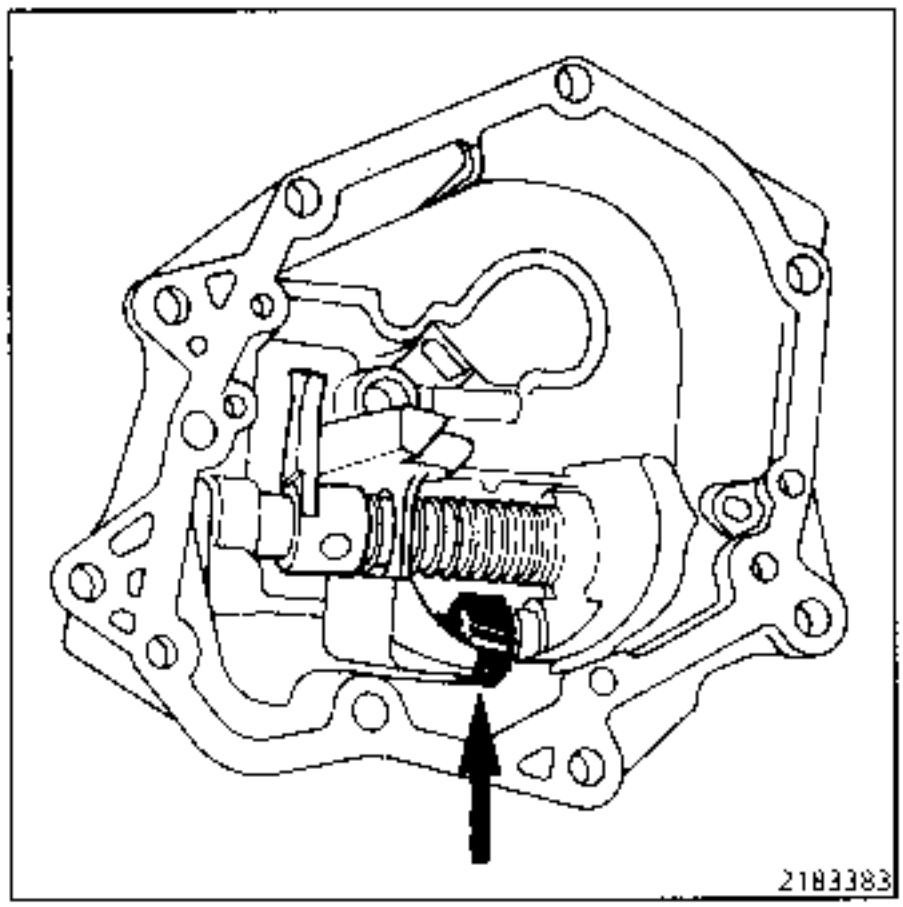
- the speedo shaft seal,



- the speedo pinion and shaft.



Check that the pinion mounting catches clip into the groove on the shaft.



Return the gearbox to neutral, select 4th gear then fit the housing into position (paper seal coated with **PERFECT SEAL**).

Tighten the bolts to the recommended torque.

Check that all the gears can be selected.

Use **RHODORSEAL 5661** to coat the threads of the 5th gear locking ball plug and the reverse gear positive locking mechanism.

Fill the gearbox with oil.

REPLACEMENT

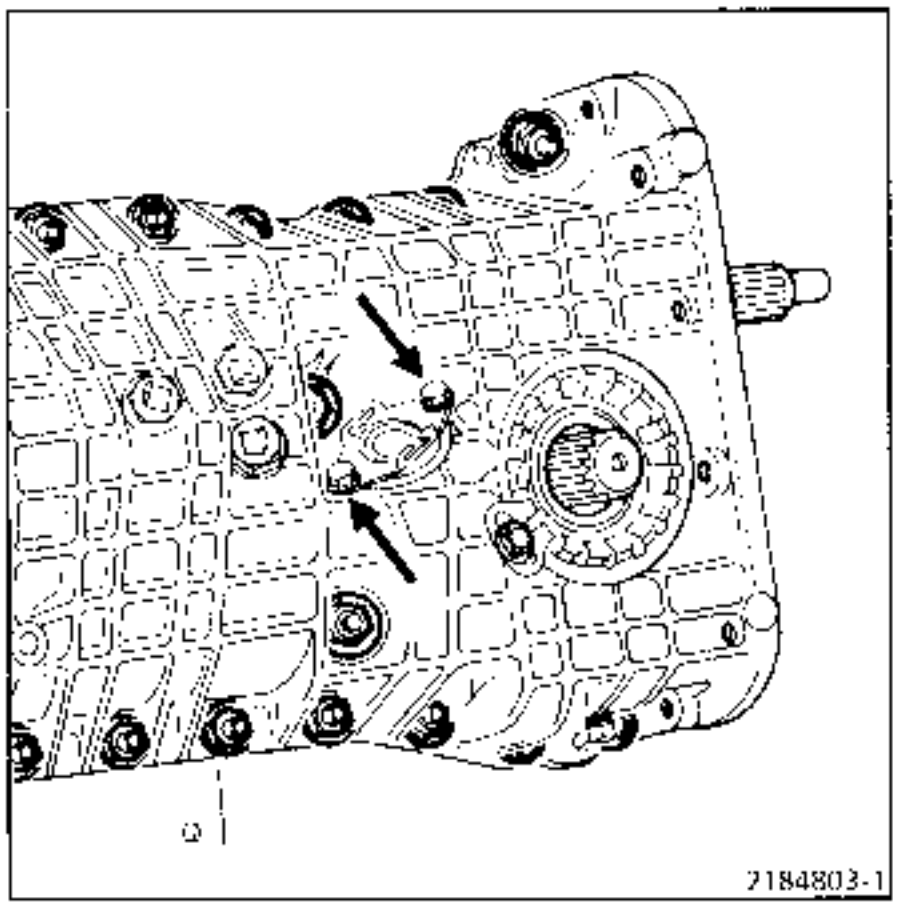
1ST CASE

Only the speedo drive or shaft is damaged.

REMOVAL

The gearbox does not need to be completely dismantled.

Remove the two mounting bolts for the locking plate and take out the guide, shaft and speedo pinion assembly.



2184803-1

REFITTING

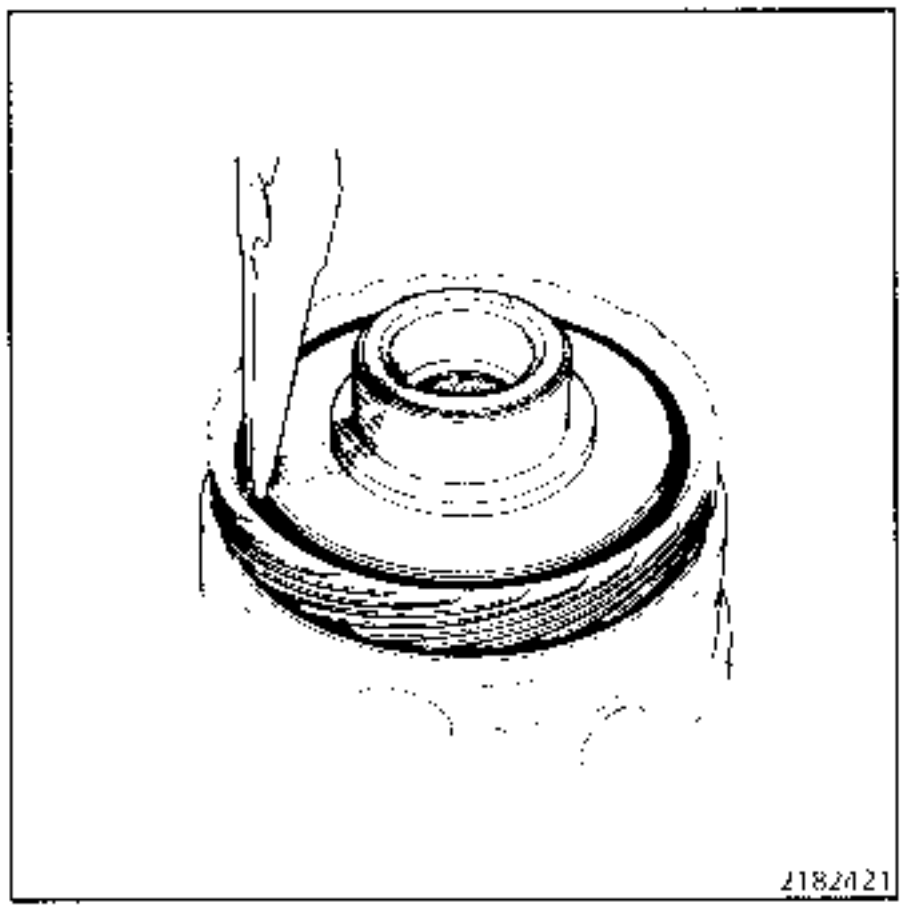
Refit the pinion, shaft and guide assembly with a new, lubricated O ring.

2ND CASE

The speedo pinion and crown wheel are damaged.

The gearbox must be removed and the half-housings separated.

On the differential housing, unclip the circlip securing the speedo crown wheel and remove it.



2182421

There are no special notes for refitting.

REMOVAL - REFITTING

TIGHTENING TORQUES (in daN.m)	
Rear housing mounting bolt	2.5
Gearbox output flange bolt	2.5
Bearing mounting bolt	2.5

REMOVAL

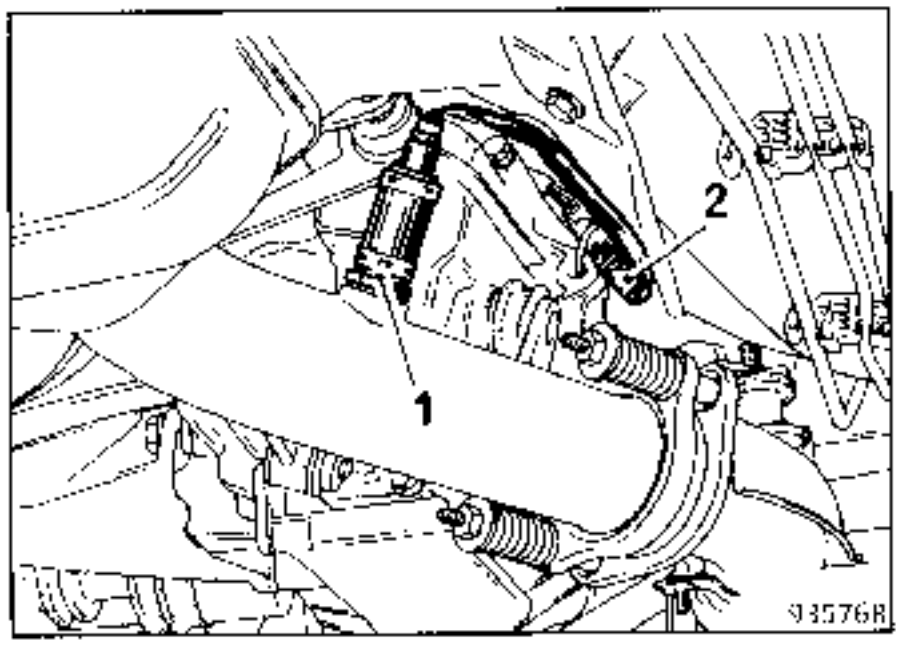
Drain the gearbox.

Remove the expansion chamber.

Depolluted vehicles

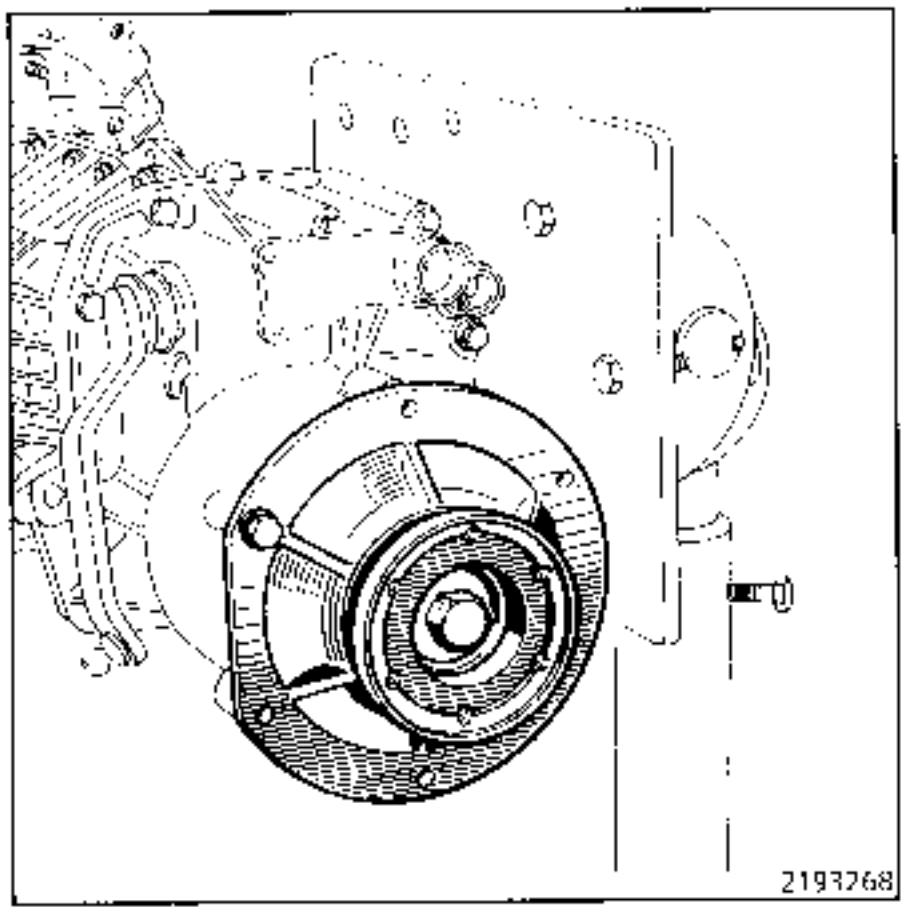
Disconnect the connector (2) for the oxygen sensor (1).

Remove the catalytic converter.



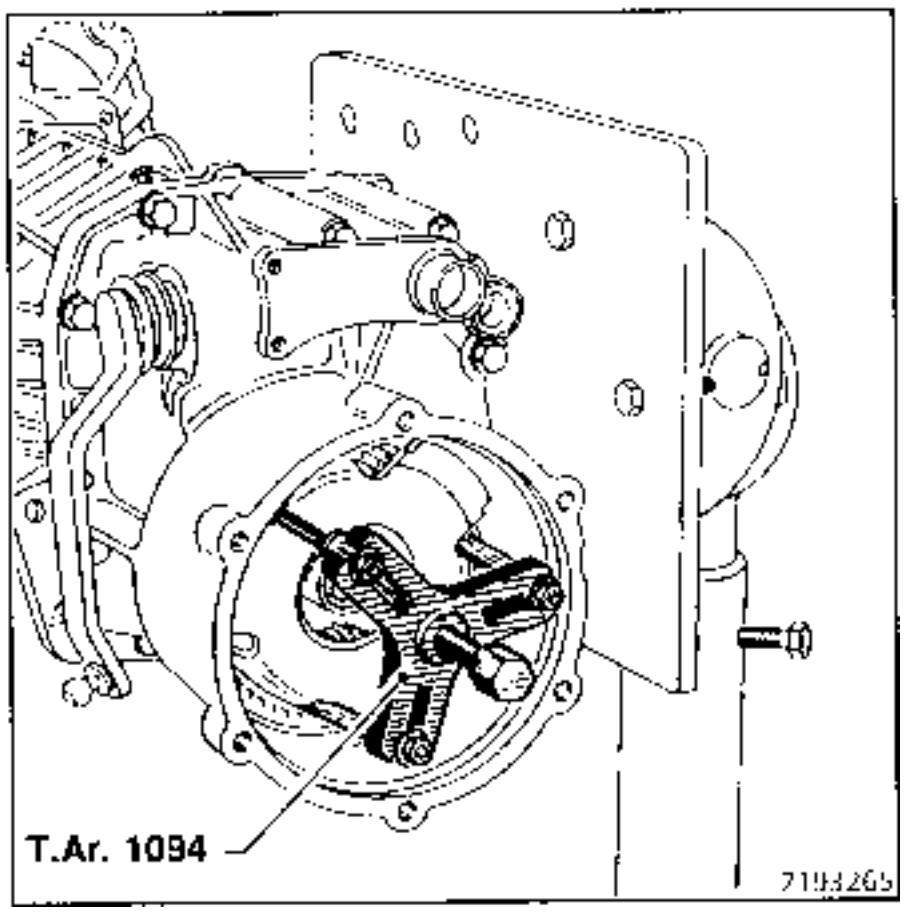
NOTE : the catalytic converter should not be subjected to impacts, which may damage it if repeated.

Remove the rear cover mounting bolts (leaving one partially screwed in to retain the assembly).



Release and remove the cover - flange - visco coupling assembly.

If necessary, remove the planet wheel carrier using tool **T.Ar. 1094**.

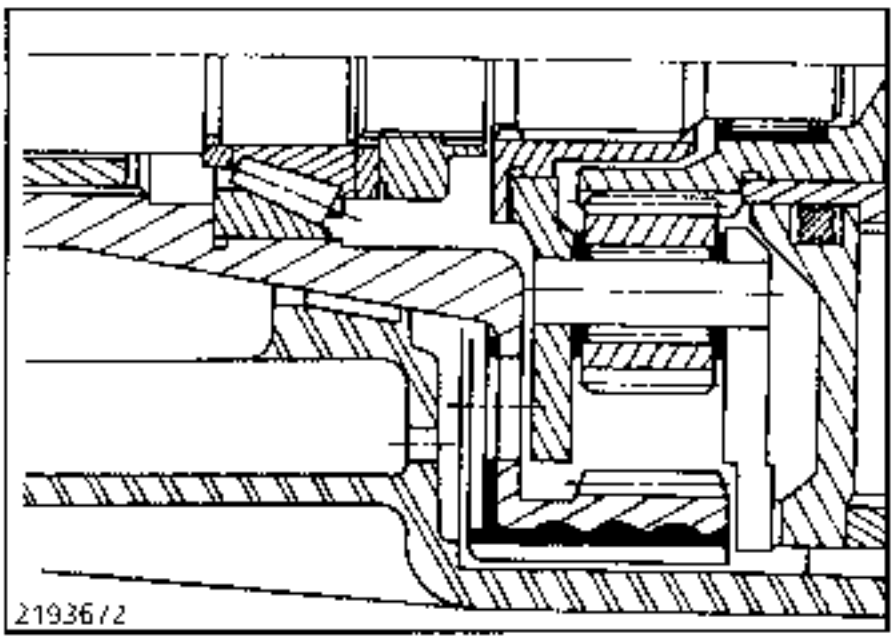


REMOVAL - REFITTING (cont)

Check the condition of the parts :
- the planet wheel teeth should have no gaps, traces of seizing or abnormal wear.
  ensure the planet wheels turn freely, without excessive play on their shafts.

REFITTING

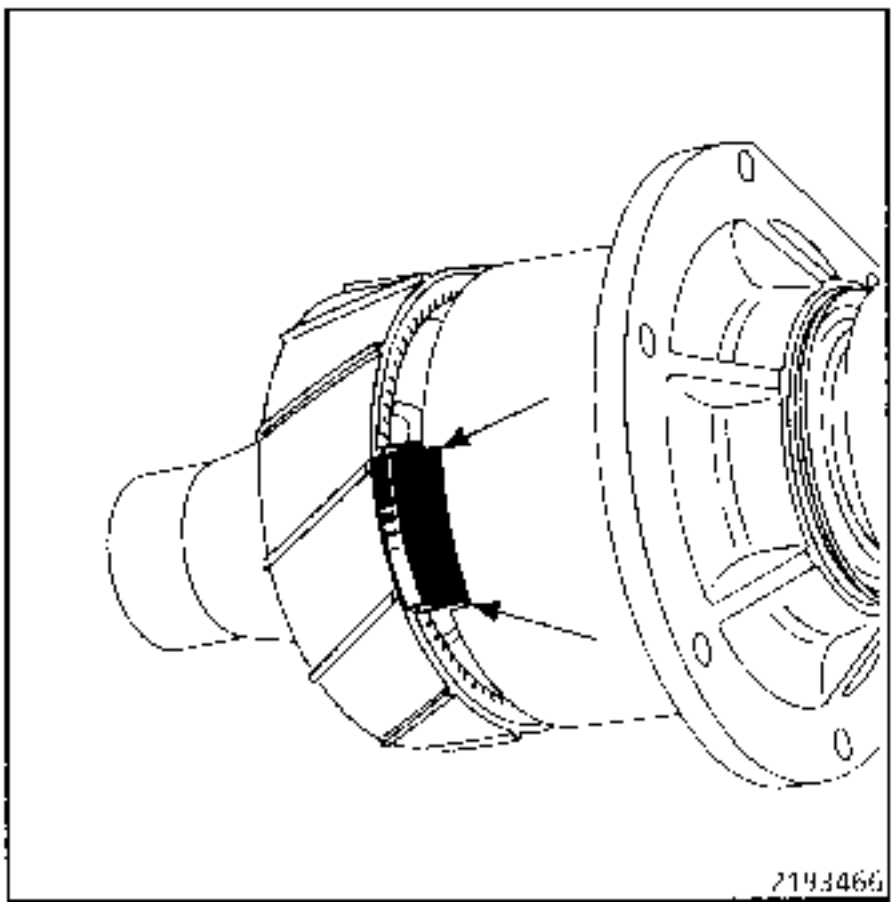
Renew the rear cover O ring systematically.
Fit the planet wheel carrier into the inlet bellhousing.



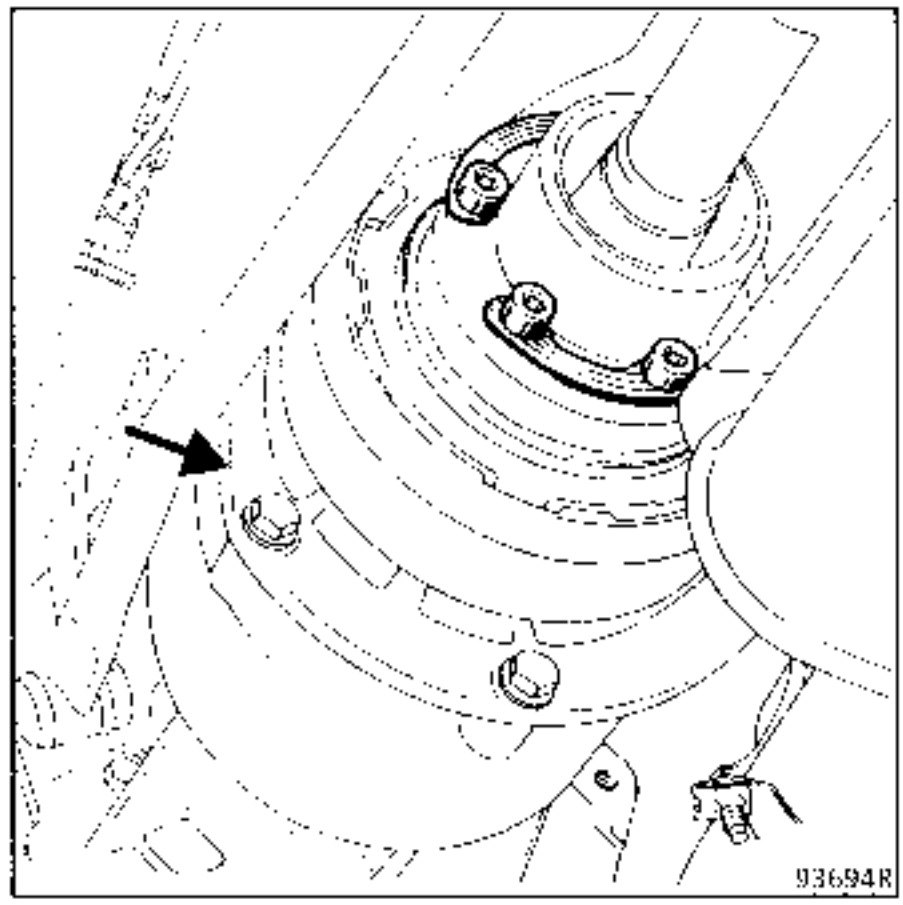
Turning the flange, and without forcing it, fit the cover - flange - visco coupling assembly.

Check the position of:

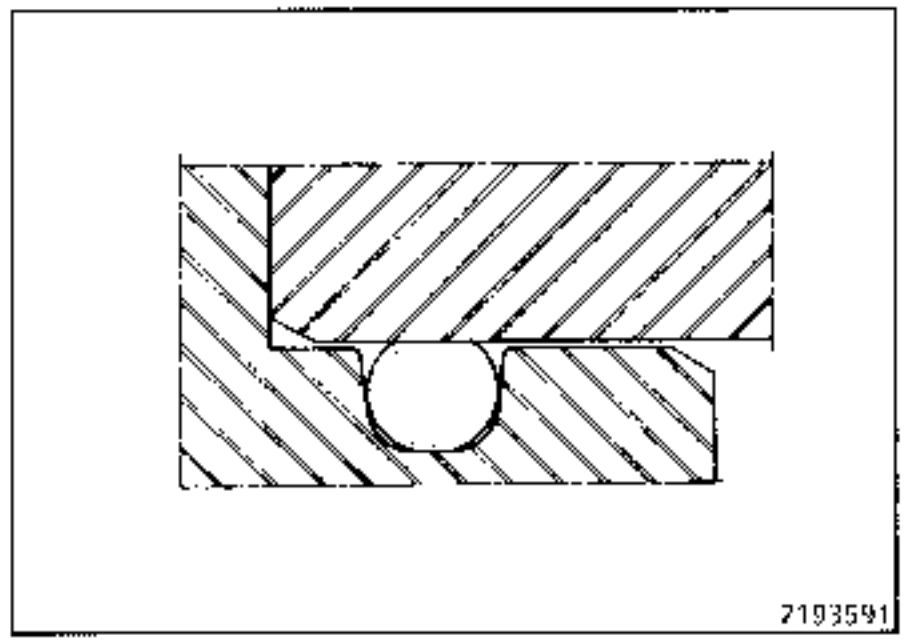
- the planet wheel carrier in the visco coupling notches,



- the rear cover on the intermediate housing: one of the mountings is offset to align the bearing and seal lubrication openings,



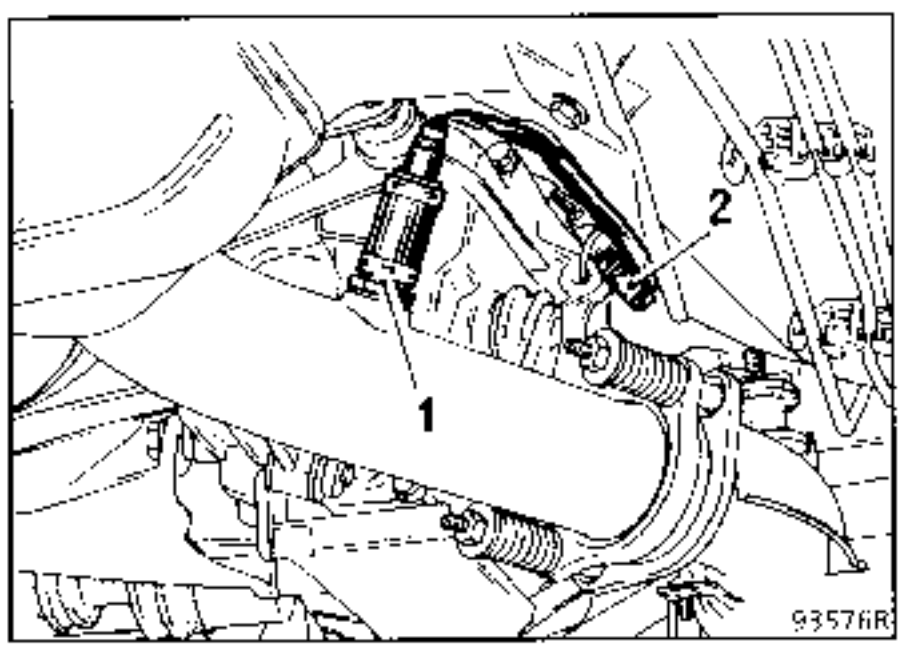
- the O ring.



Refit the expansion chamber or catalytic converter (depending on version).

Depolluted vehicles

Reconnect the connector (2) for the oxygen sensor (1) and ensure the connection is correct.



IMPORTANT:

- the oxygen sensor wires cannot be spliced or soldered; if the wires are broken, the oxygen sensor must be replaced,

- sealing from the exhaust manifold sealing face to the catalytic converter must be perfect,

- all seals which are removed **MUST** be renewed.

▽

Tighten all nuts and bolts to the recommended torque.

Fill the gearbox with oil.

REPLACEMENT

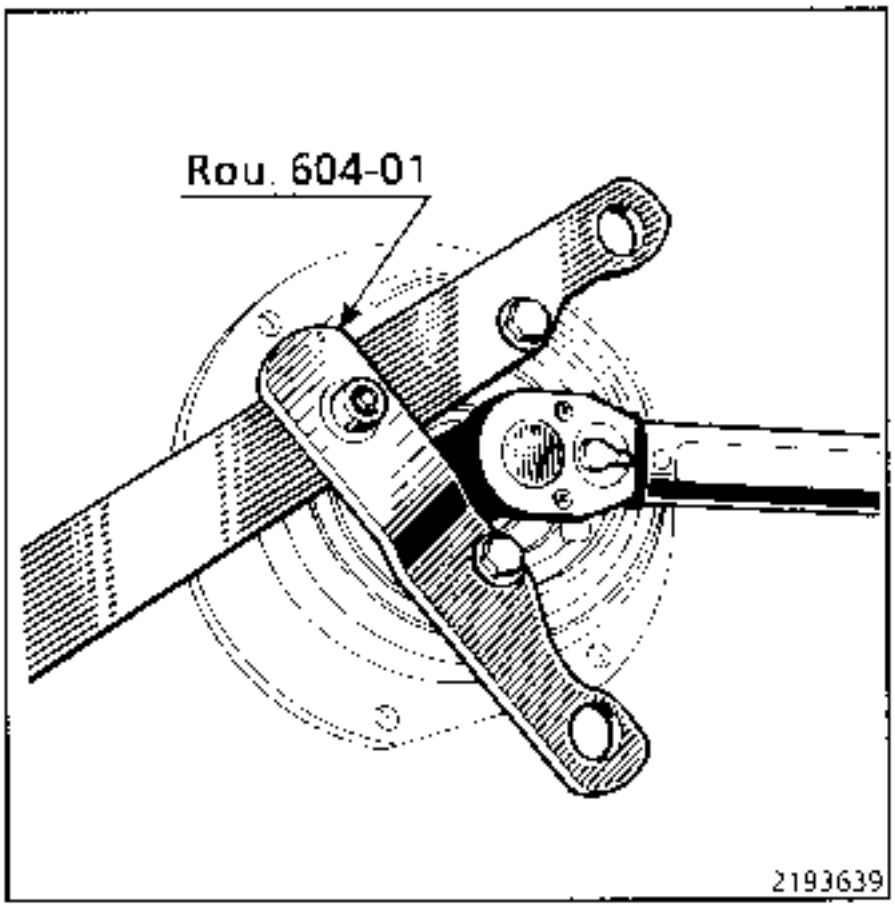
This operation is carried out after removing the rear cover - visco coupling - flange assembly.

SPECIAL TOOLING REQUIRED		
B.Vi.	1078	Tool for fitting sensor ring spring
B.Vi.	1106	Tool for fitting bearing
B.Vi.	1185	Tool for fitting O ring
Rou.	604-01	Hub locking tool

TIGHTENING TORQUES (in daN.m)	
Output flange mounting bolt	7 to 8

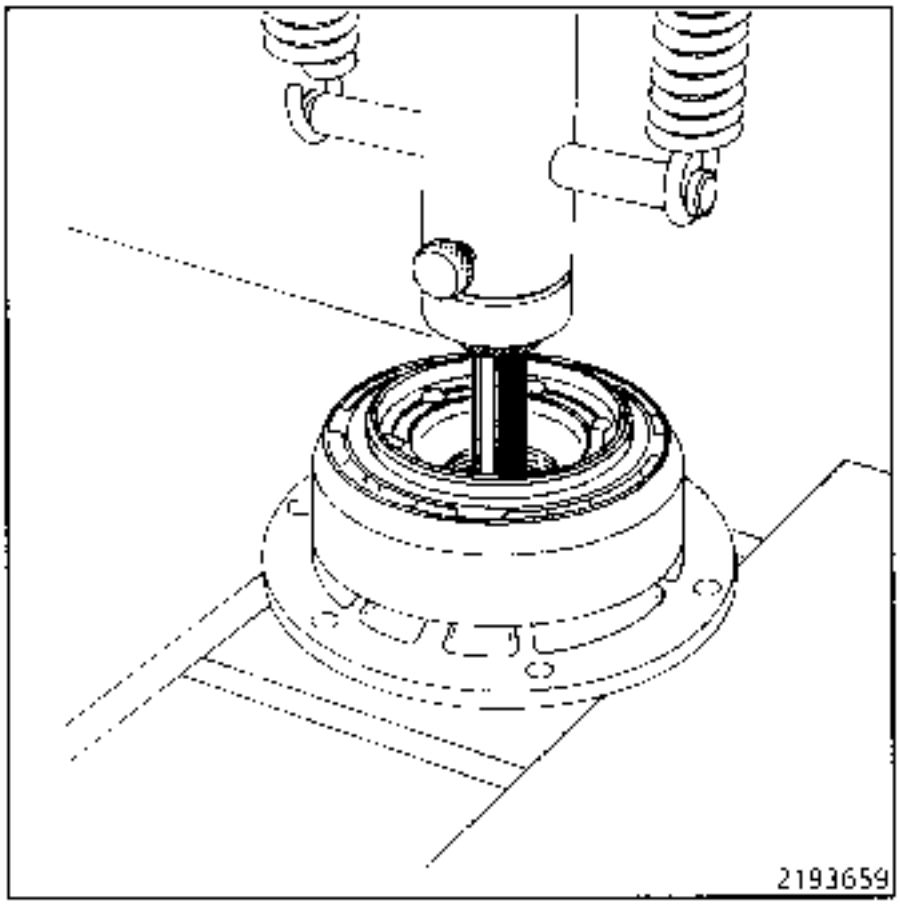
Remove the blanking cover.

Fit tool **Rou. 604-01** to the flange and remove the flange mounting bolt.



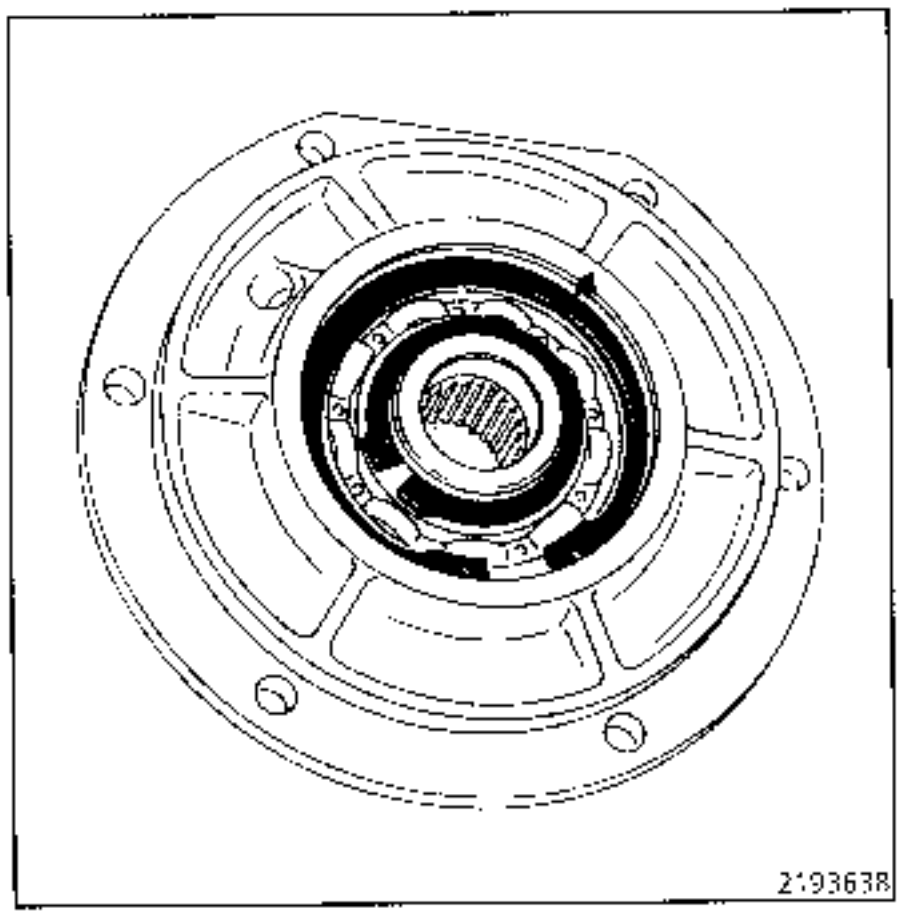
NOTE : the bolt must be renewed each time it is removed.

Take the weight on the rear cover and remove the output shaft - visco coupler assembly on the press.

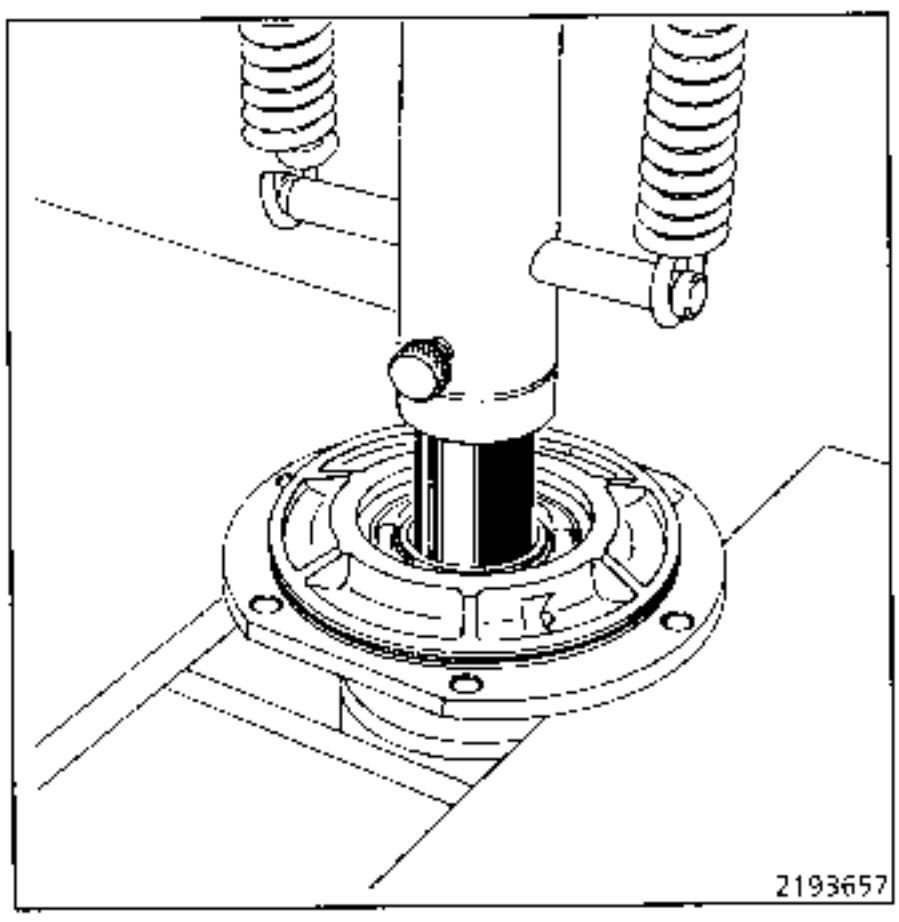


REPLACEMENT

Remove the flange and bearing mounting circlips.



Take the weight on the cover and remove the flange on the press.



NOTE: the bearing has to be renewed systematically when removing the flange.

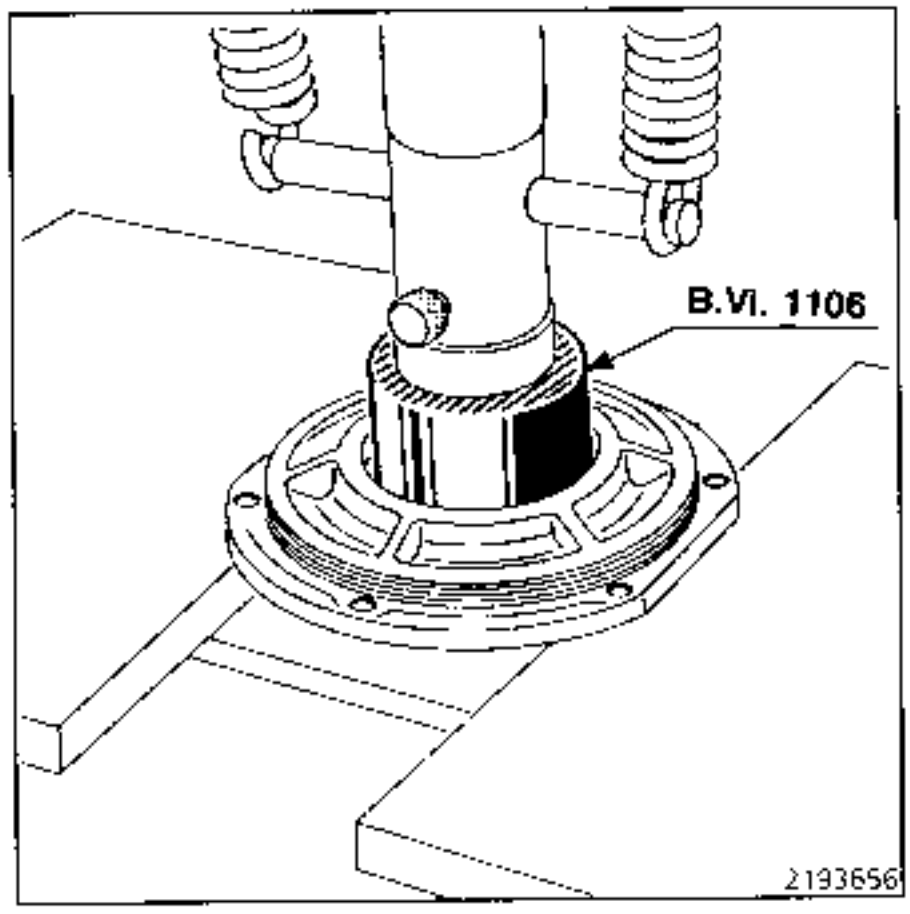
Remove the lip seal and remove the bearing using tool **B.Vi. 1078**.

REFITTING - Special notes

Ensure the seal bearing face on the flange is free from all scratches or traces of abnormal wear.

The Parts Department supplies the flange with the **DAMPER** (vibration damper) assembled.

Fit the bearing taking the weight on the external ring using tool **B.Vi. 1106**.

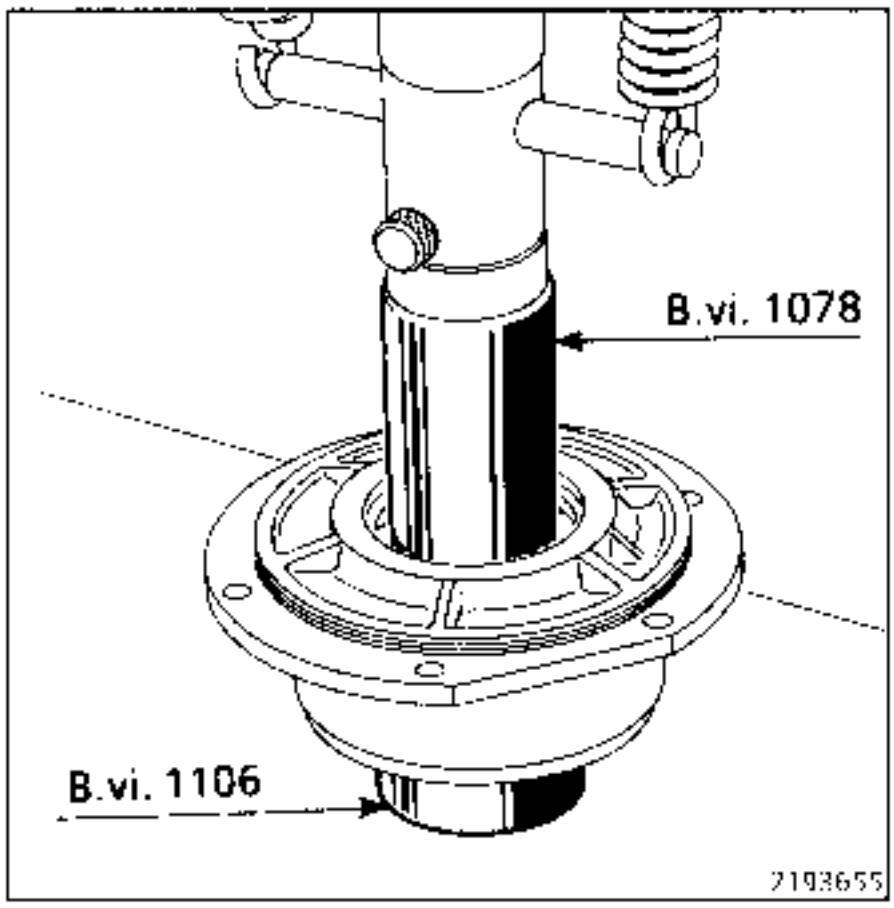


Fit the bearing retaining circlip.

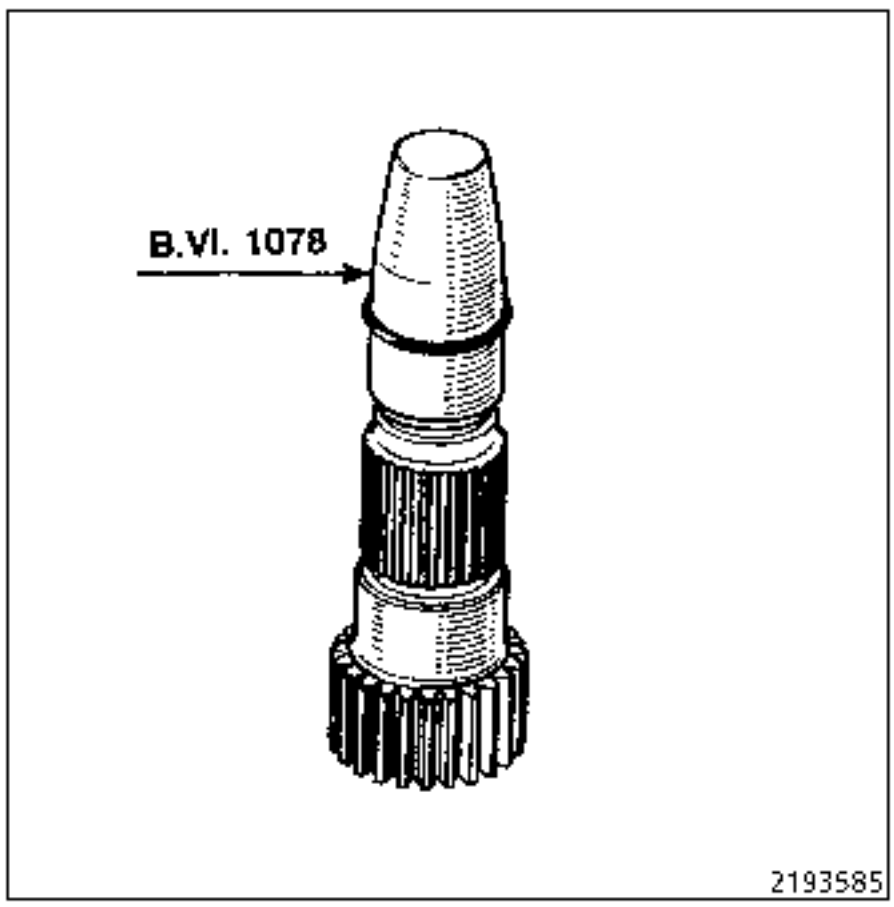
REPLACEMENT

Fit the lip seal (lubricated).

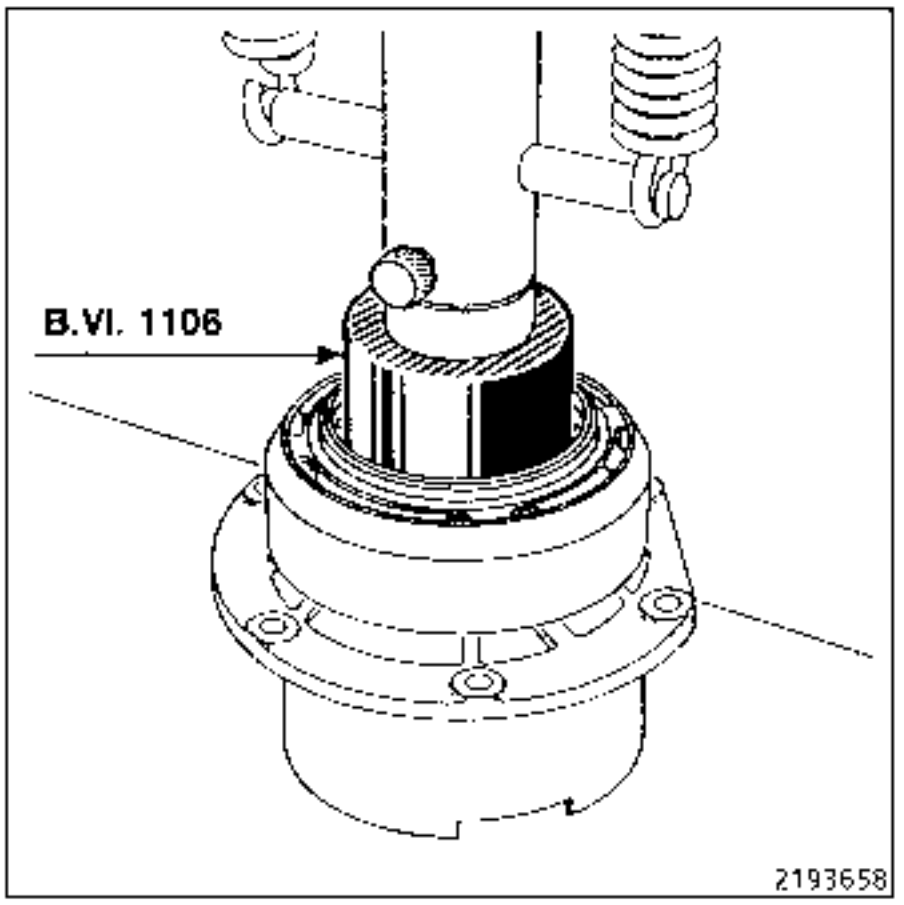
Fit the flange on the press using tools **B.Vi. 1106** and **1078** so that the weight may be taken on the inner bearing ring.



Replace the O ring on the output shaft using tool **B.Vi. 1185**.



Fit the output shaft - visco coupling assembly and fit the output flange - rear cover assembly on the press using tool **B.Vi. 1106**.

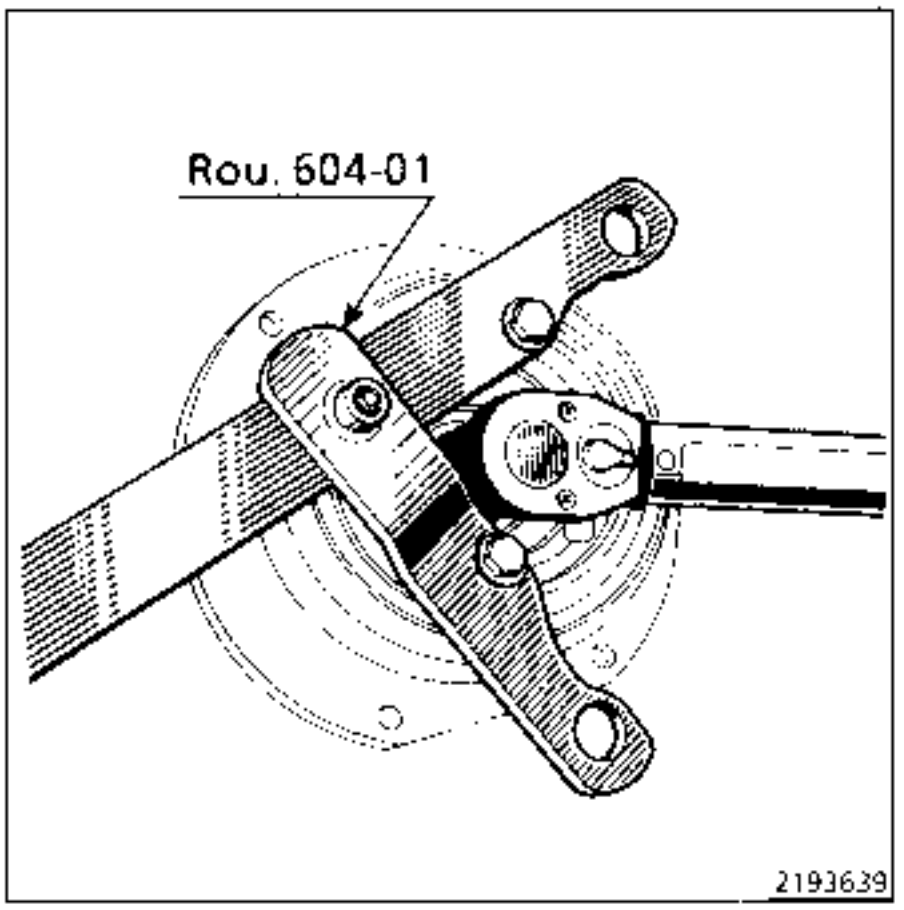


REPLACEMENT

Refit:

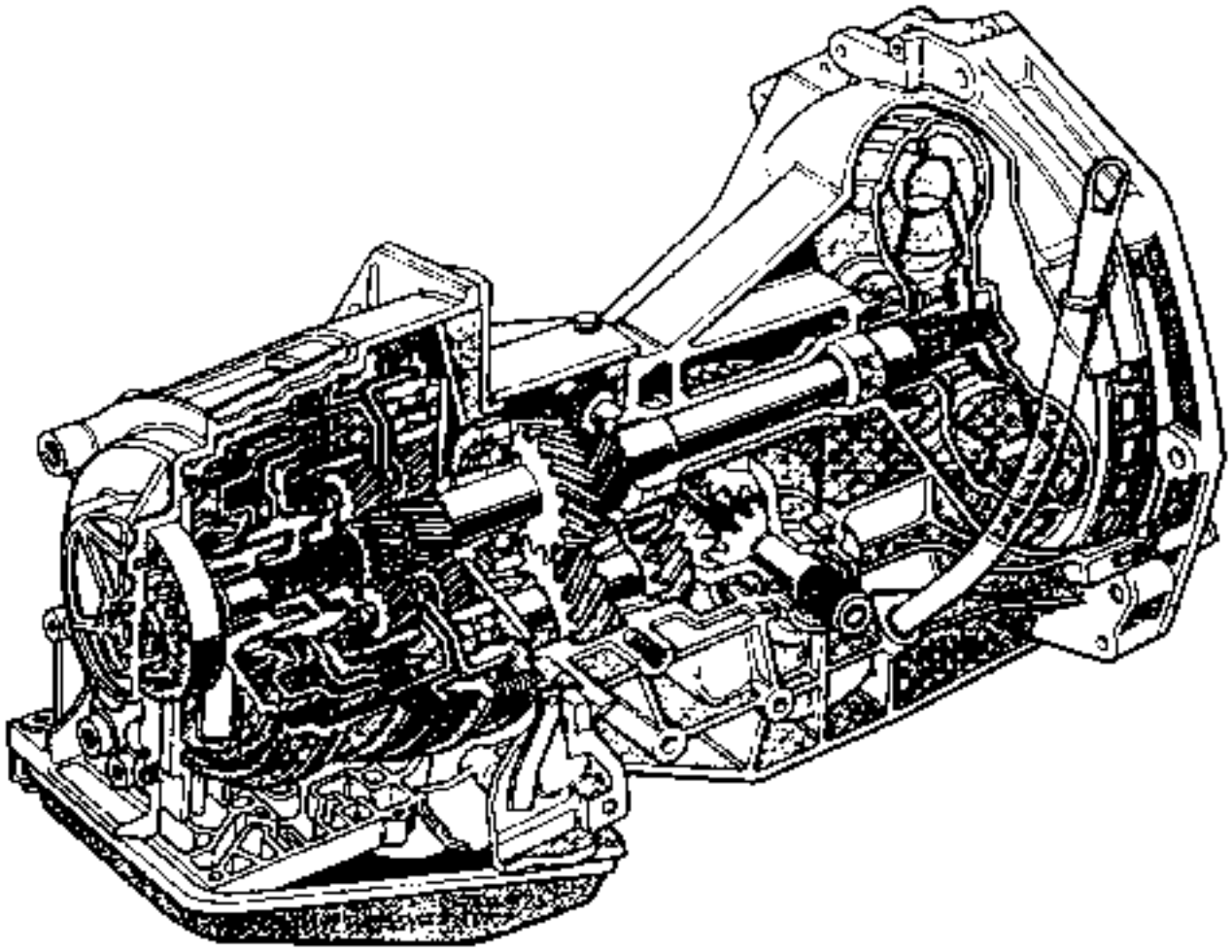
the thrust washer,

- the mounting bolt (new, lubricated) and tighten to a torque of 7 to **8 daN.m**.



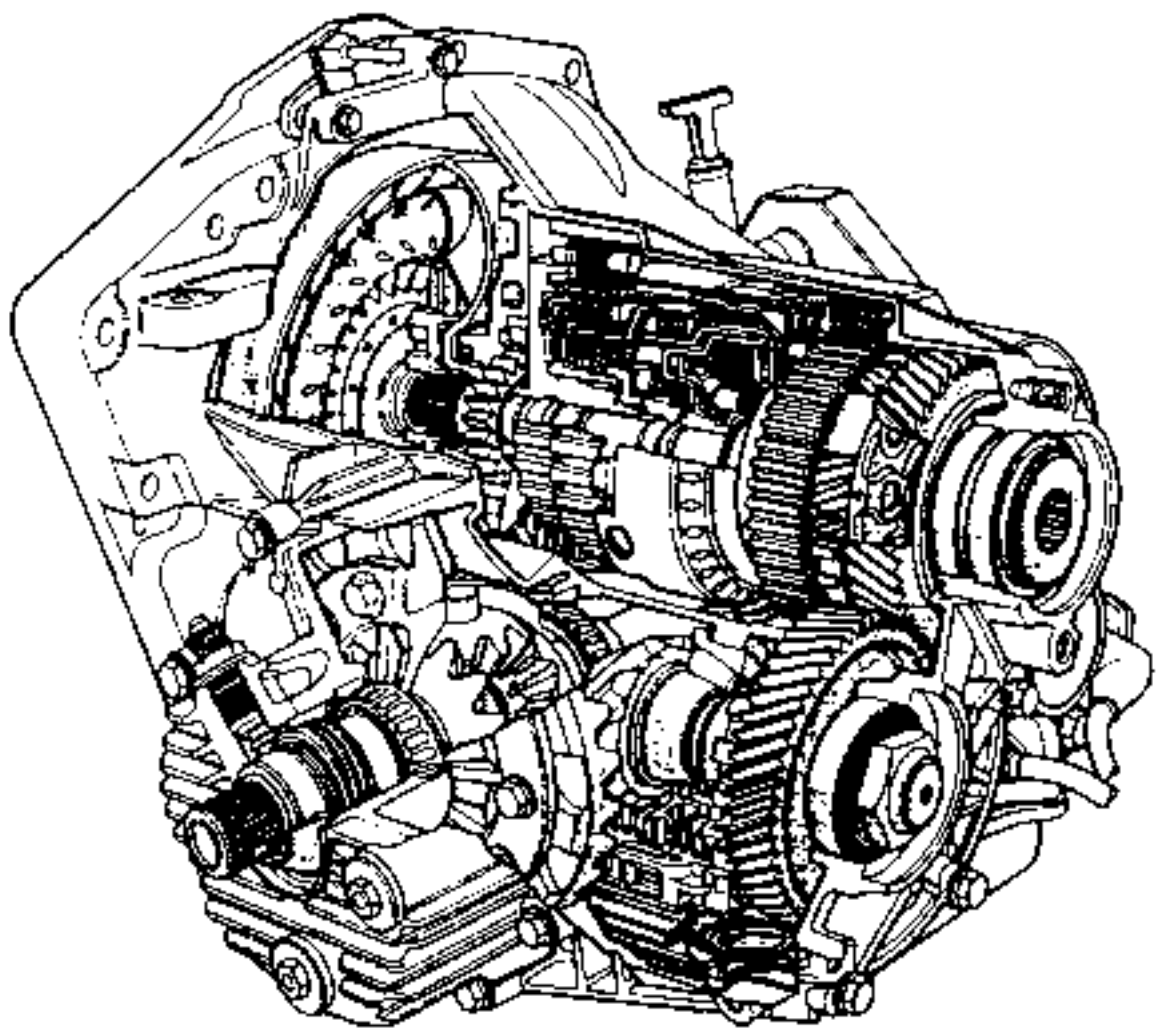
Refit the plastic blanking plug.

MJ3



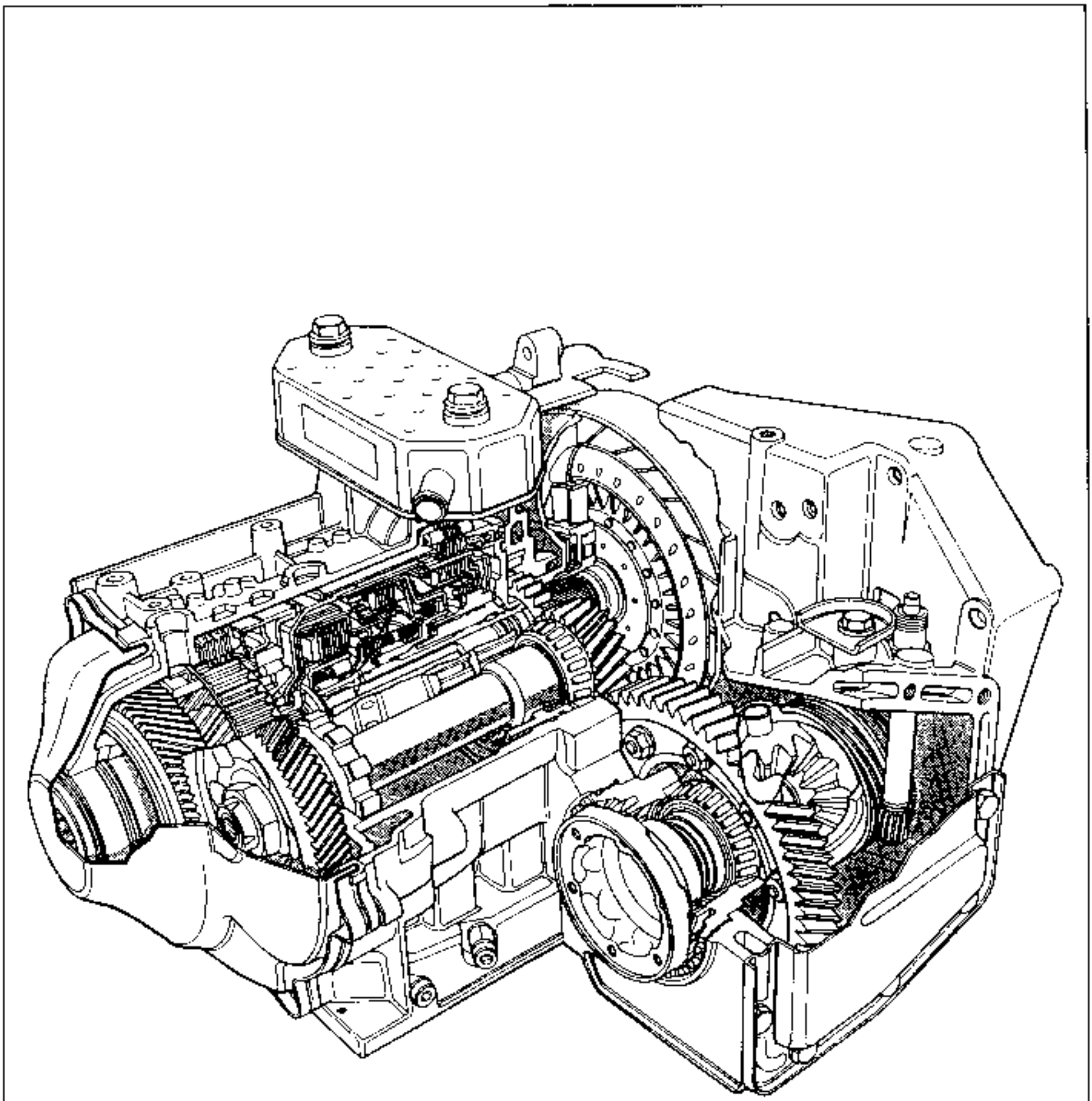
21231 1

AR4



21231 2

AUTOMATIC TRANSMISSION TYPE AD4



21737

DRIVING

The automatic transmission is lubricated under pressure, which only happens if the engine is running.

Consequently, at the risk of causing serious damage, the following recommendations should be observed

- never drive with the ignition off (down a hill for example), this practice is extremely dangerous,

- never push the vehicle (example to reach a petrol station, unless the precautions specified in the "**Towing**" section are observed).

The vehicle is also only driven if the engine is running. The engine on a vehicle with automatic transmission cannot be started by pushing the vehicle.

TOWING

In all cases it is preferable to tow the vehicle on a flat bed trailer or with the front wheels lifted
If this is impossible, the vehicle may be towed in exceptional circumstances, under the following conditions:

1 - Rear wheels **15 cm** off the ground or all four wheels on the ground (with no oil added to the mechanism).

2 - Only tow the vehicle at a speed less than **25 mph** (40 km/h) and for a maximum distance of **15 miles** (25 km) maximum (lever in N).

AUTOMATIC TRANSMISSIONS MJ3 AND AR4

Vehicle	AT type	Suffix	Final drive	Step down	Speedo drive	Oil pressure	Computer number
L 485 B L K 489 L-K 483 L-K 48K	MJ3	800 (1) 801 (2)	9/37	26/20	7/19	4.7*	130 126
L-K 483	MJ3	860	9/37	6/19	26/25	4.7	
L-K-B 483	AR4	000 020	9/34	76/85	15/13	Non adjustable	009 014
B-L-K 48C B L K 482 B-L-K 48K	AR4	018 025	9/34	76/85	15/13	Non-adjustable	015 029
B-L-K 483 B-L-K 48C B-L-K 48K	AR4	021	9/37	76/85	15/13	Non-adjustable	018
L 48Q	AR4	024	9/34	76/85	15/13	Non-adjustable	019

AUTOMATIC TRANSMISSION AD4

Vehicle	AT type	Converter	Final drive	Step down	Speedo drive	Computer number
X482	AD4000	227 DAA	17/64 or 49/50	18/16	17/64 or 17/70	100
X48E	AD4003	227 DAA	17/64 or 17/70	18/16	17/64 or 17/70	101

(1) Sump **6 mm** deeper, felt strainer with increased surface, sealed dipstick with reduced level.

(2) Sump **6 mm** deeper, felt strainer with increased surface, sealed dipstick with reduced level, unidirectional differential output seals (specific to left / right hand sides).

(*) On the road, lever in 2nd gear hold, accelerate fully (PF - **full load**) and brake at the same time to stabilise the speed at **50 mph** (80 km/h).

CONVERTER DRIVE PLATE

Maximum permitted run-out: **0.3 mm**.

Tightening torque for automatic transmission **MJ3** :
- mounting bolts on crankshaft **7 daN.m**,
- mounting bolts on converter **3 daN.m**.

Tightening torque for automatic transmission **AR4** :
- mounting bolts on crankshaft **6 daN.m**,
- mounting bolts on converter **3.5 daN.m**.

GEAR RATIOS	1st	2nd	3rd	4th	Reverse
Gear reduction - all types	2.71	1.55	1	0.68	2.11

TRANSMISSION AR4

X483 X48K X48C	Overall reduction	11.46	6.55	4.22	2.86	8.91
	Speed in km/h at 1000 rpm with 1.815 m tyres	9.43	16.61	25.77	37.98	12.20
X48Y	Overall reduction	11.45	6.59	4.22	2.86	8.9
	Speed in km/h at 1000 rpm with 1.790 m tyres	9.38	16.4	25.42	37.5	12.58

TRANSMISSION AD4

X482 X48E	Overall reduction	11.40	6.51	4.20	2.85	8.86
	Speed in km/h at 1000 rpm with 1.760 m tyres	9.26	16.20	25.13	37.04	11.90

AUTOMATIC TRANSMISSION MJ3

	1 ⟷ 2		2 ⟷ 3	
Position of foot	↗	↘	↗	↘
No load in km/h	26*	17	43*	30
Full load in km/h	75	66	122	107

(*) These values are given for information only.

PL : no load - accelerator pedal not depressed.
PF : full load - accelerator pedal fully depressed.

NOTE : the kickdown switch is integral in the computer via the load potentiometer.

IF THERE IS A FAULT, CHECK AND ADJUST THE LOAD POTENTIOMETER (see **A.T.M.**)

AUTOMATIC TRANSMISSION AR4

A.T. type	Accelerator position	1 → 2		2 → 3		3 → 4		4 → 3		3 → 2		2 → 1	
		A	B	A	B	A	B	A	B	A	B	A	B
AR4 000 020 021	PL in km/h	14		30	35	60	65	50	55	27	30	10	
	PF in km/h	50		87		140		97	120	50	55	30	
AR4 024	PL in km/h	15		40		60	65	52		32		9	
	PF in km/h	41	51	75	93	124	150	102	130	60	80	32	
AR4 018 025	PL in km/h	14		30	34	60	66	50	53	27	30	10	
	PF in km/h	45	52	82		130		125		47	75	33	50

Tolerances ± 10 %.

PL : no load - accelerator pedal not depressed.
PF : full load - accelerator pedal fully depressed.

A : gear change thresholds offset in upward direction*.
B : gear change thresholds offset in downward direction*.

(*) See note on following page.

AUTOMATIC TRANSMISSION AD4

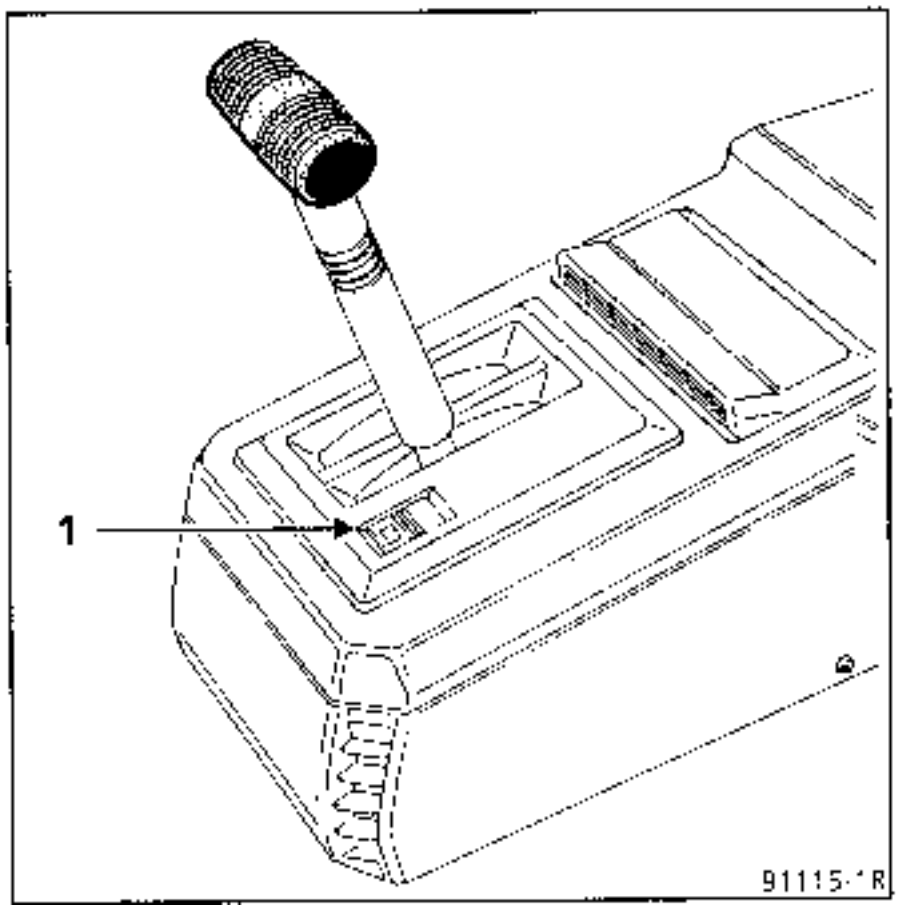
Vehicles	AT type	Accelerator position	1 → 2		2 → 3		3 → 4		4 → 3		3 → 2		2 → 1	
			A	B	A	B	A	B	A	B	A	B	A	B
X 487	AD4 000	PL	17	20	35	40	60	70	46	51	31		10	
		PF	41	46	76	83	120	130	103	112	46	68	26	30
		RC	48		88		136		130	133	85		41	45
X 48E	AD4 003	PL	17	20	35	40	60	70	47	50	30		10	
		PF	36	42	70	80	117	128	103	112	52	68	26	30
		RC	42	44	80		131		130		78	81	40	

The values given in the table are theoretical average gear change threshold values in **km/h**, tolerance ± **10 %**.

PL : no load - accelerator pedal not depressed.
PF : full load - accelerator pedal fully depressed.
RC : kickdown (change down to a lower gear).

A : gear change thresholds offset in downward direction. Gears change at lower engine speeds. Switch (**1**) is depressed and warning light **E** on the instrument panel is illuminated.
B : gear change thresholds offset in upward direction. Gears change at higher engine speeds. Switch (**1**) is not depressed and warning light **E** is extinguished.

NOTE :



SPECIAL NOTES FOR AUTOMATIC TRANSMISSION AR4

Up to model year 1989
Press switch **1**, warning light **PERF** illuminates, the gears change at higher engine speeds.

From model year 1990
Press switch **1**, warning light **E** illuminates, the gears change at lower engine speeds.

GRADE

AUTOMATIC TRANSMISSION MJ3

Then same oil is used for the converter, the final drive and the mechanism.
Grade : **ELF RENAULTMATIC D2.**

AUTOMATIC TRANSMISSION AR4

Mechanism : **ELF RENAULTMATIC D2.**
Final drive : **80W-B.**

AUTOMATIC TRANSMISSION AD4

Mechanism : **ELF RENAULTMATIC D2.**
Final drive : **TRANSELF TRX 76W 80W.**

AUTOMATIC TRANSMISSION MJ

OIL CAPACITY

	Total volume	Volume after draining
Mechanism	6 litres	2.5 litres

AUTOMATIC TRANSMISSION AR4

OIL CAPACITY

	Total volume	Volume after draining
Mechanism	5.7 litres	4 litres
Final drive	0.85 litres	0.8 litres

AUTOMATIC TRANSMISSION AD4

OIL CAPACITY

	Total volume	Volume after draining
Mechanism	5.7 litres	3.5 litres
Final drive	1 litre	-

NOTE : if the automatic transmission is to be replaced, only the level needs to be checked as the component is supplied ready filled from the Parts Department.

Materials

DESCRIPTION	COMPONENT CONCERNED
RHODORSEAL 5661	Sealing driveshaft roll pins
MOLYKOTE BR2 grease	- Sunwheel splines - Converter centring device
LOCTITE FRENBLOC	Brake caliper mounting bolts

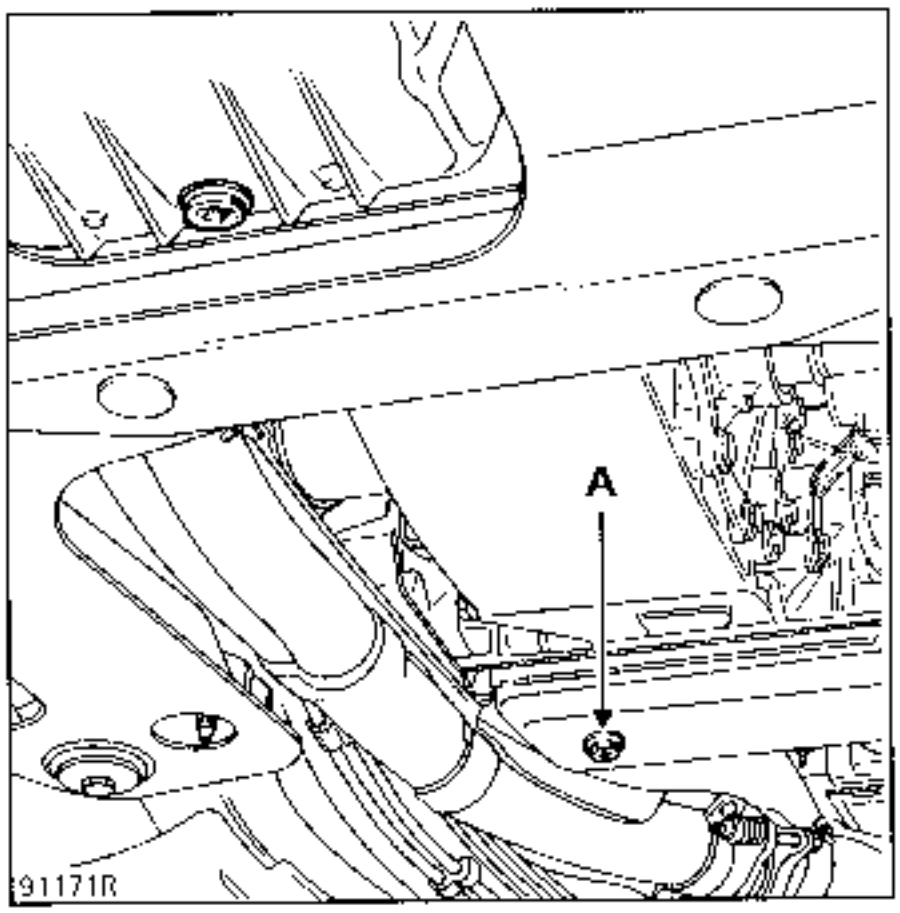
Parts to be replaced systematically

Parts to be renewed when they are removed:

- roll pins,
- self locking nuts,
  copper seals.

The oil must be changed when cold, with the dipstick and plug (A) removed.

Renew the strainer.



Refit the plug, with a new seal.

The transmission is filled via the dipstick tube.

Use a funnel fitted with a **15/100** filter, to prevent foreign bodies from entering the transmission.

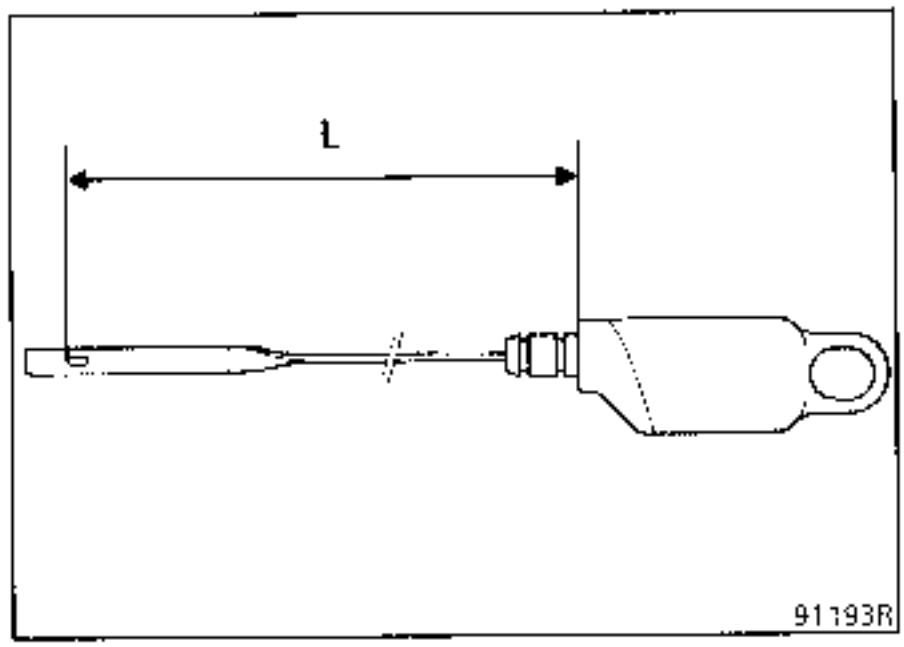
Use the recommended oil.

Run the engine at idle speed, check the level and top up if necessary.

CHECKING THE OIL LEVEL WHEN COLD

IMPORTANT: in order to ensure that the level is correct, ensure the dipstick is to specification.

MJ800 and **MJ801**, blue in colour.
L = **247 mm**.



Vehicle unladen.

Put the vehicle on a flat, horizontal surface.

Position the selector lever in **"PARK" (P)**.

Start the engine and wait **for 1 to 2 minutes** to allow the converter and cooler to fill with oil.

The oil is at ambient temperature **(20 °C)**.

Remove the dipstick with the engine running.

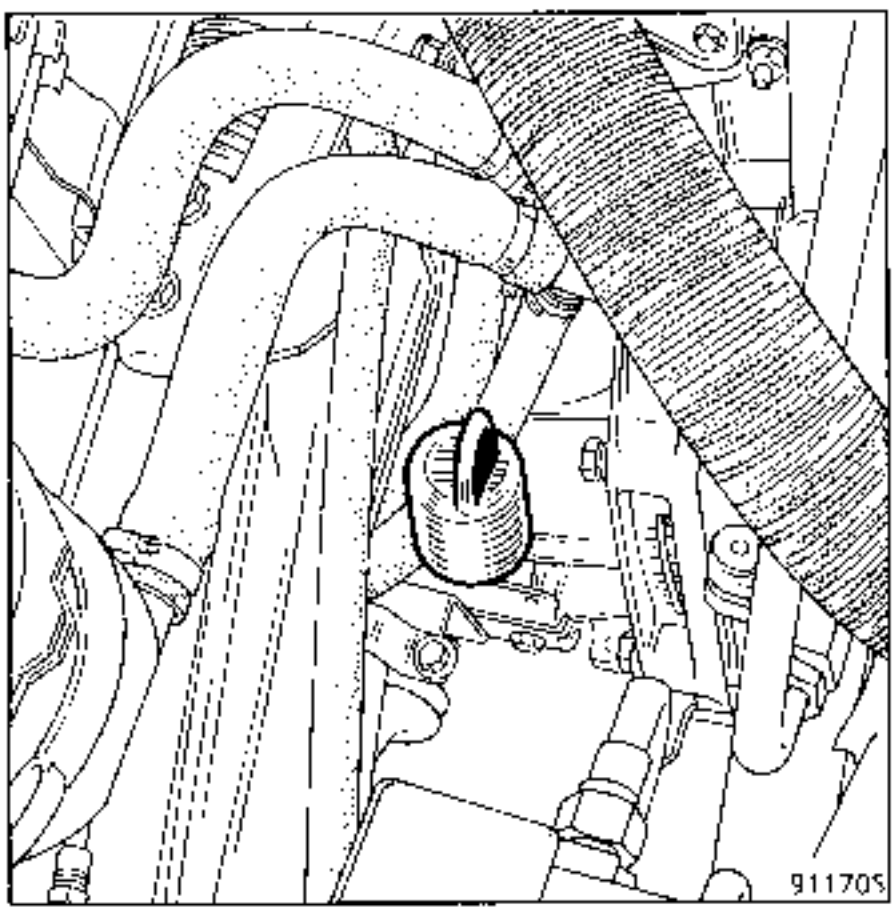
The level should not be below mark (1) **"MINIMUM COLD"** (risk of damage) and should not exceed mark (2) **"MAXIMUM COLD"** (risk of damage).

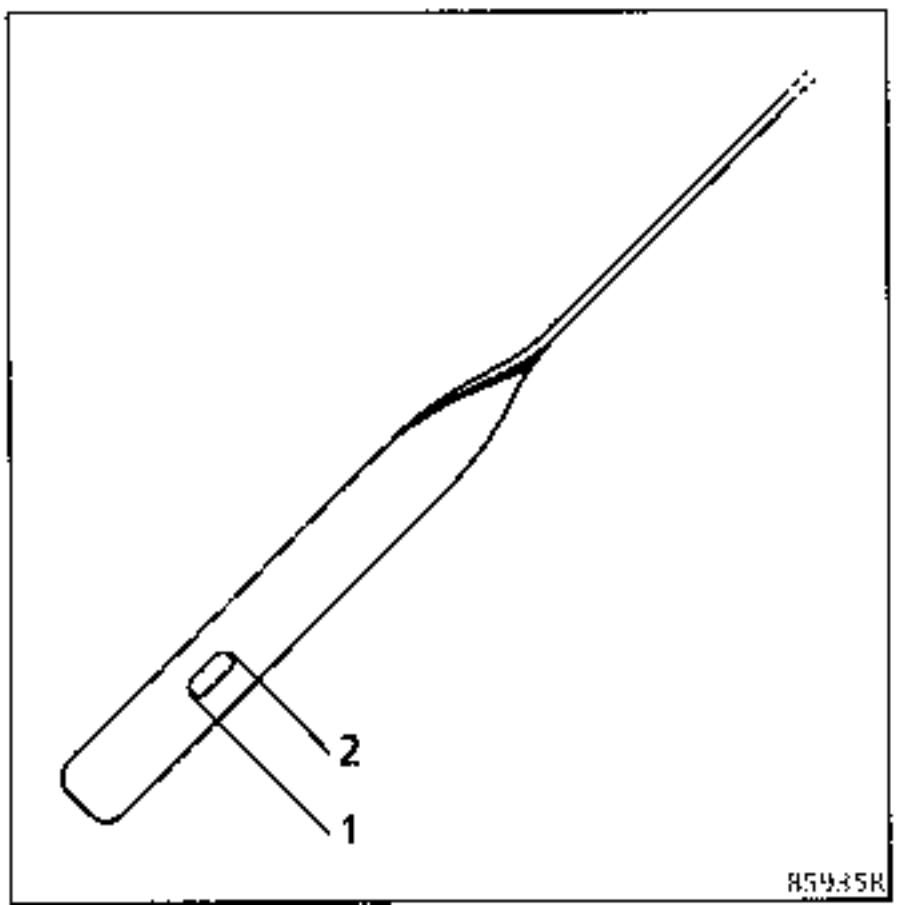
Never fill beyond the mark "MAXIMUM COLD".

IMPORTANT:

If there is too much oil, this will cause:
- abnormal overheating of the oil,
  leaks.

Too little oil will cause the mechanism to be damaged.





AUTOMATIC TRANSMISSION AR4

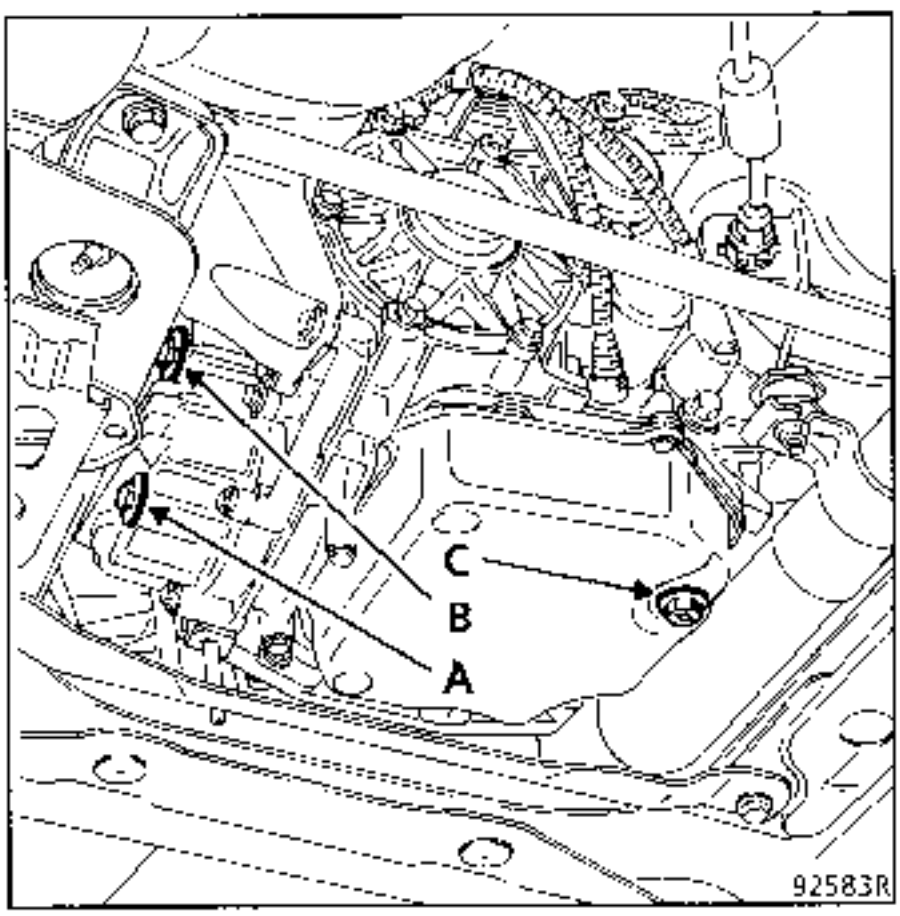
FINAL DRIVE

The final drive is drained via plug (**A**). It is filled and the level checked via plug (**B**) by overflow after injection **0.80 litres** of oil (see previous page).

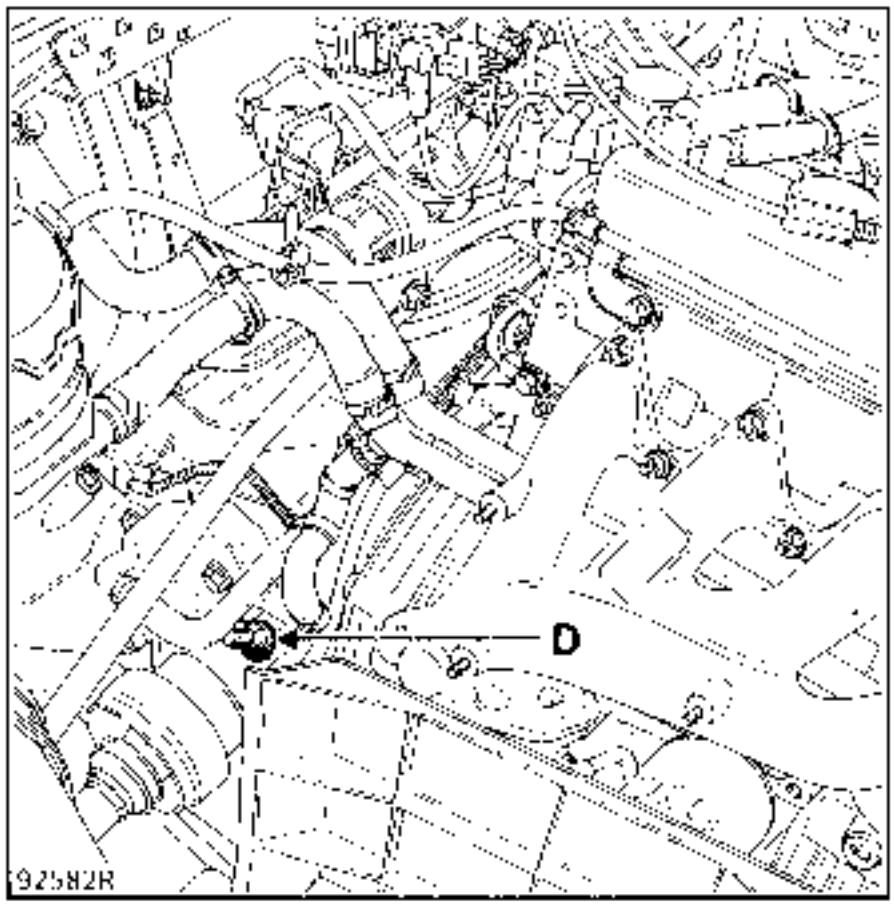
MECHANISM

There is no drain plug for the mechanism housing.

The oil is drained by removing the level checking plug (**C**) (some oil will run out) and removing the sump.



It is filled via tube (D).



Use a funnel fitted with a 15/**100** filter, to prevent foreign bodies from entering the transmission.

Use the recommended oil.

If the transmission has been drained, add **4 litres** of oil.

If only the level is being checked or the transmission is new, add **0.5 litres** of recommended oil.

The level **MUST** be checked by following the method below:

1. Vehicle on a **four post lift**, transmission at ambient temperature.
2. Start the engine, selector lever in Park.
3. Connect the **XR25**, then enter:

D	0	4	then	#	0	4

4. Lift the vehicle.
5. Let the engine run until it reaches a temperature of **60 °C**.

When the required temperature has been reached, with the engine running, open the level checking plug, allow the excess oil to run out (which must be greater than **0.1 litres**) for approximately **20 seconds**. A thin stream of oil should continue to run out.

Refit the plug.

If the volume of oil collected is less than **0.1 litres**, the level is incorrect and the operation must be repeated.

In this case, add another **1 litre** of recommended oil.

Allow the transmission to cool and then repeat the operations in sequence.

SPECIAL TOOLING REQUIRED		
B.Vi.	1213	Transmission drain spanner
M.S.	1019-10	XR25 test kit

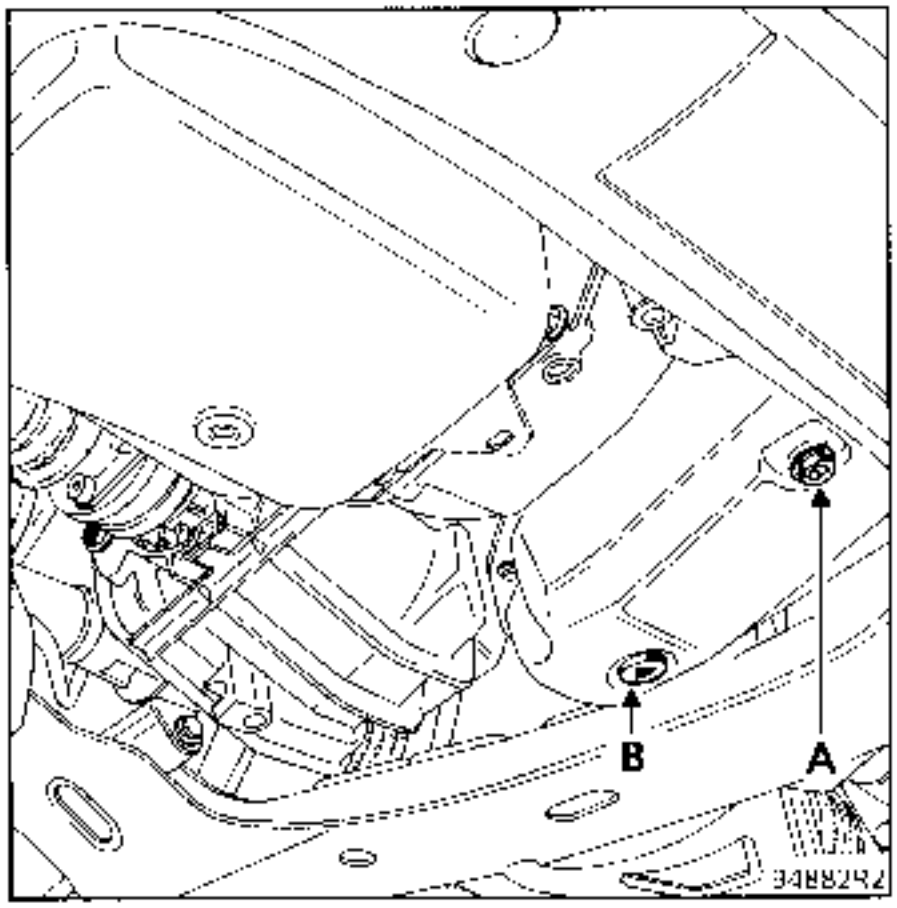
DRAINING

- **Mechanism:**

The mechanism housing has two plugs:

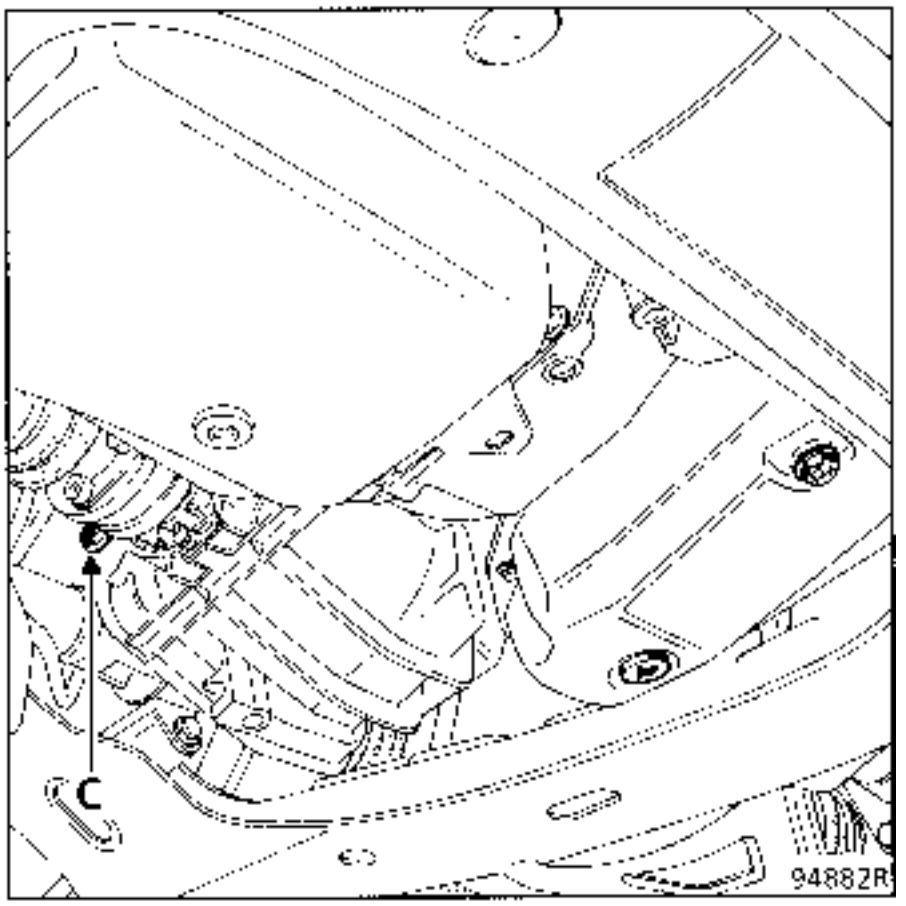
- **A** : level checking plug,
- **B** : drain plug (triangular mark).

The mechanism is drained by removing plug **(B)**.



- **Final drive:**

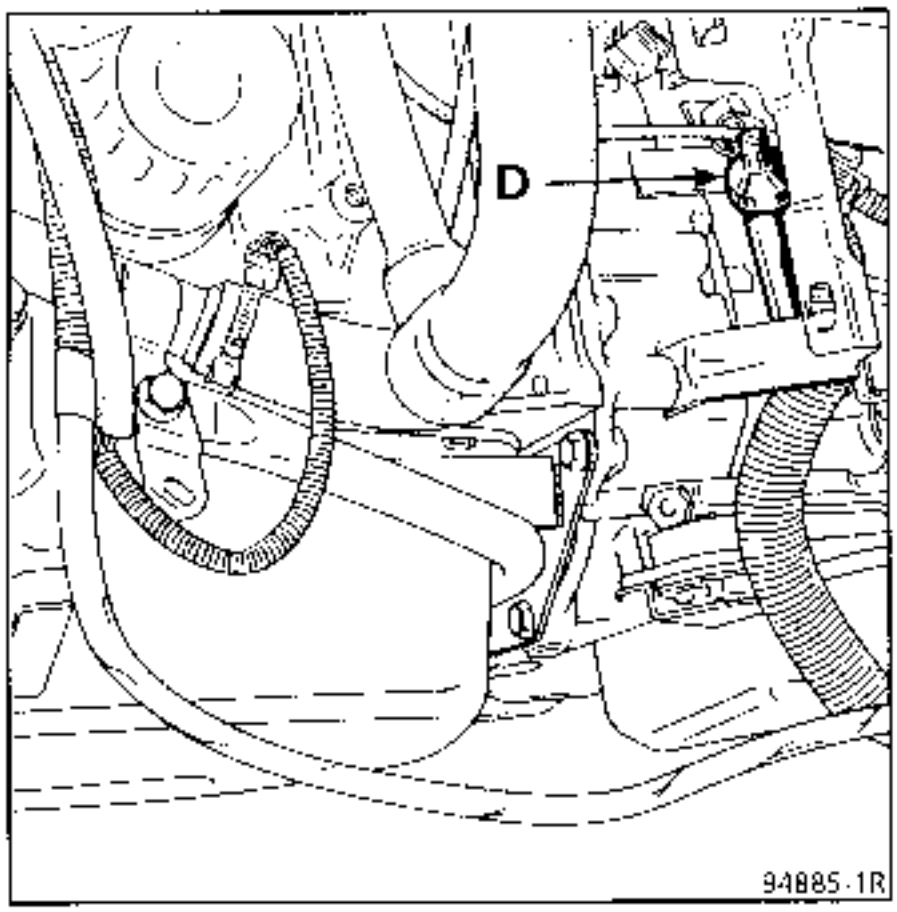
The final drive is filled and the level checked via plug **(C)** by overflow, after injecting oil.



REMINDER: The final drive is not drained it is filled for life.

FILLING - LEVELS

The transmission is filled via tube (**D**).



Use a funnel fitted with a **15/100** filter, to prevent foreign bodies from entering the transmission.

The level **MUST** be checked by following the method below:

Before this:
- if the transmission has been drained, add **3.5 litres** of oil,
- if the level is just being checked, add **0.5 litres** of recommended oil.

1. Vehicle on a **four post lift,** transmission at ambient temperature.

2. Start the engine, selector lever in Park.

3. Connect the **XR25**, then enter:

D	0	4	then	#	0	4

4. Lift the vehicle and let the engine run until it reaches a temperature of **60 °C**.

5. When the required temperature has been reached, with the engine running, open the level checking plug, allow the excess oil to run out (which must be greater than **0.1 litres**) for approximately **20 seconds**. Refit the plug.

6. If the volume of oil collected is less than **0.1 litres**, the level is incorrect and the operation must be repeated.

   In this case, add another **1 litre** of recommended oil. Allow the transmission to cool and then repeat the operations in sequence.

MESSAGE FROM ELECTRONIC FAULT WARNING LIGHT

Operation with no fault present

- When the ignition is turned on, vehicle stationary and engine not running, lever in **P** or **N**, warning light il luminates.
- When the starter is activated, warning light remains illuminated.
- When the key is released, ignition on, engine running, it extinguishes approximately **3 seconds** after the engine starts.

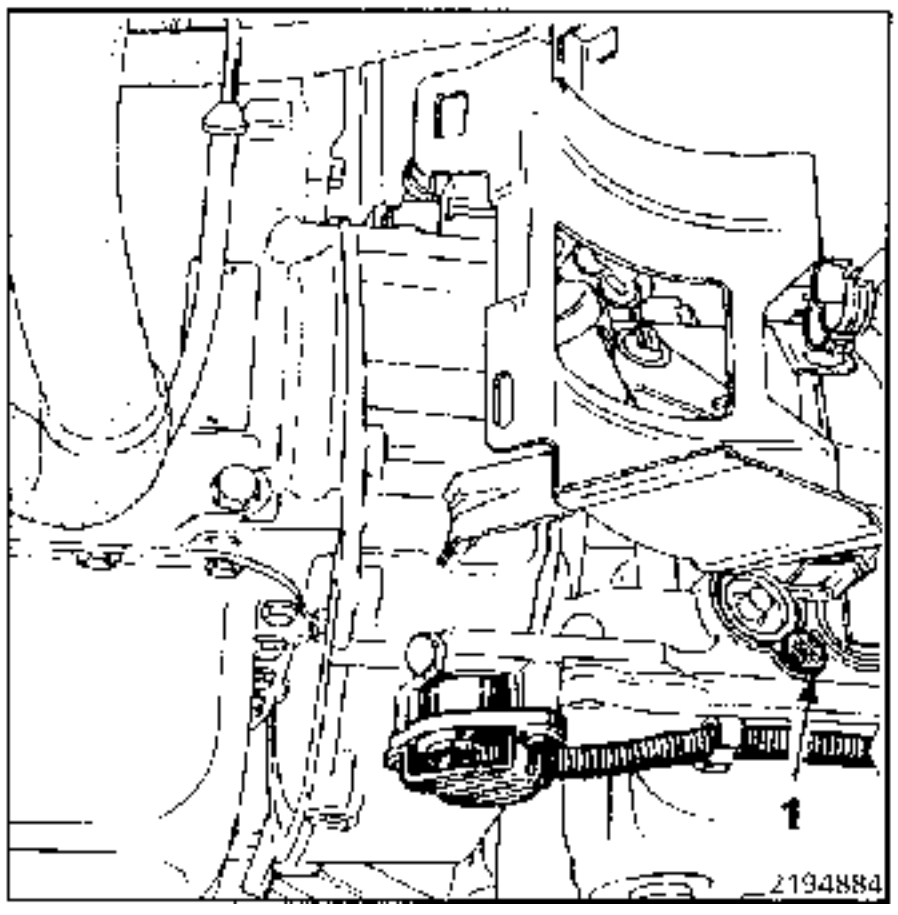
Fault present

- Vehicle stationary, engine running or when driving, warning light illuminated permanently.
- Vehicle moving, warning light illuminates and extinguishes with no action at the ignition key.
- Vehicle moving, warning light illuminates briefly.

Oil temperature < - 20 °C or > + 140 °C

- Vehicle moving or stationary, warning light flashes **approximately once a second**. In this case, reduce the requirement for performance by moderating acceleration.

Oil pressure (1)



The transmission has an oil pressure socket. Connect tool **B.Vi. 1215** to check the automatic transmission pressure sensor only.

The oil pressure cannot be adjusted.

Its value is determined by the computer.

The strainer is used to filter the oil and guarantee that the automatic transmission operates correctly.

AUTOMATIC TRANSMISSION MJ

TIGHTENING TORQUES (in daN.m)	▽
Distributor mounting bolt (strainer mounting bolt)	0.9
Sump mounting bolt	0.6

REMOVAL

Drain and remove:

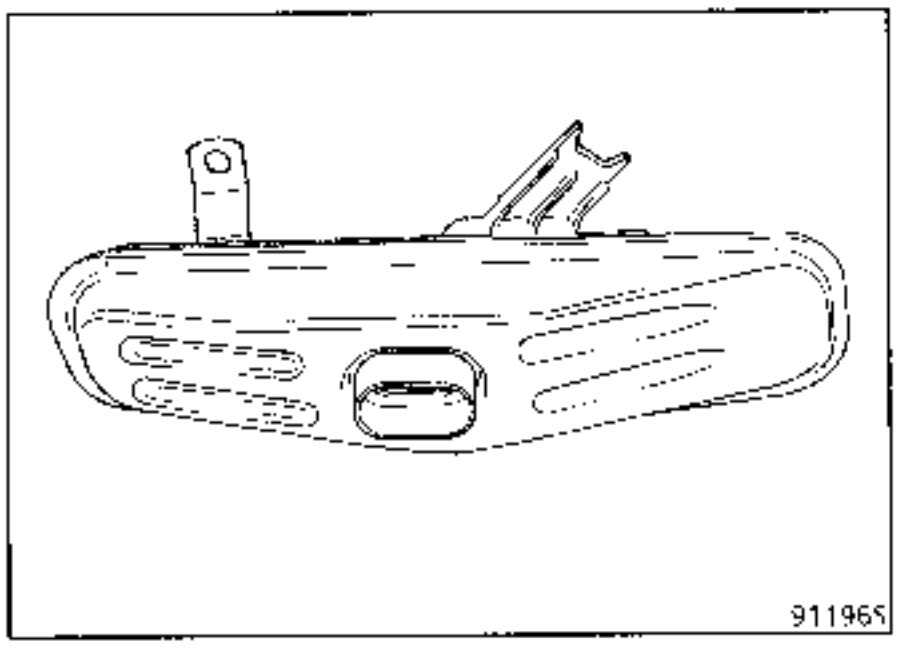
- the sump,
- the strainer and its seal.

Before refitting, clean the sump and the magnets.

REFITTING

Refit:

- the new strainer fitted with its seal and torque tighten to **0.9 daN.m**,
  the sump, and top up the oil.



AUTOMATIC TRANSMISSION AR4

TIGHTENING TORQUES (in daN.m)	▽
Strainer mounting bolt	0.5
Sump mounting bolt	1 ± 0.1

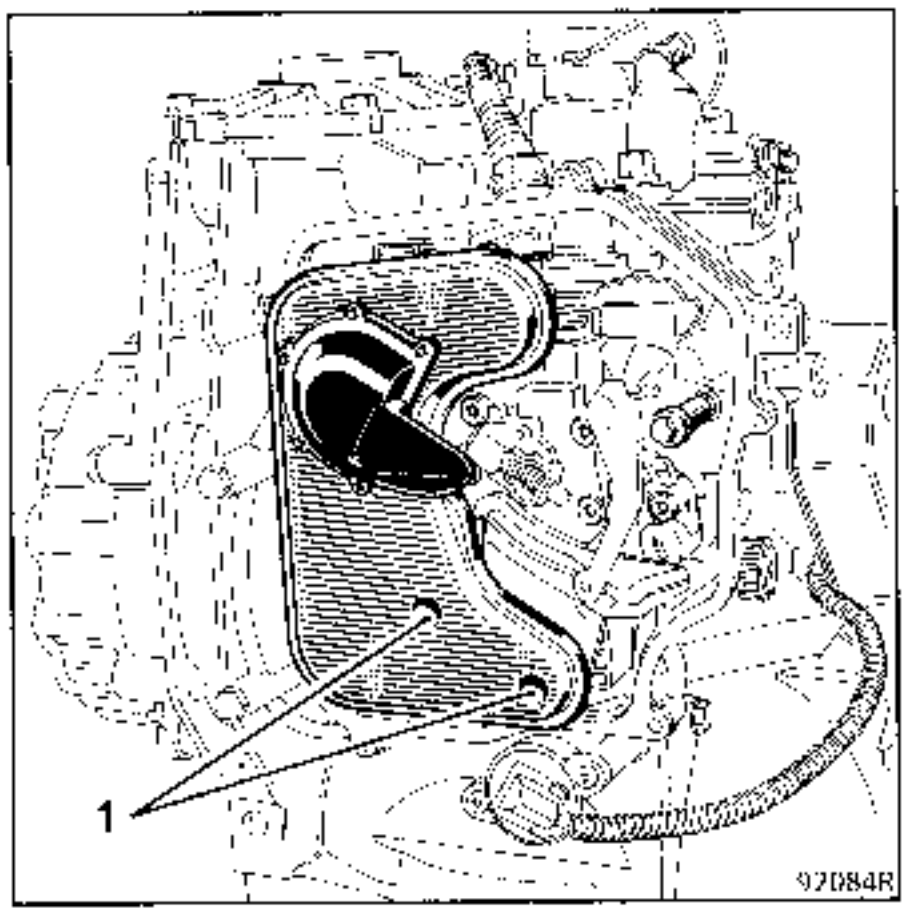
IMPORTANT: the strainer is no longer replaced during servicing on this type of transmission.

REMOVAL

Drain the transmission (mechanism section).

Remove:

- the sump,
- the strainer and its seal (bolts 1).

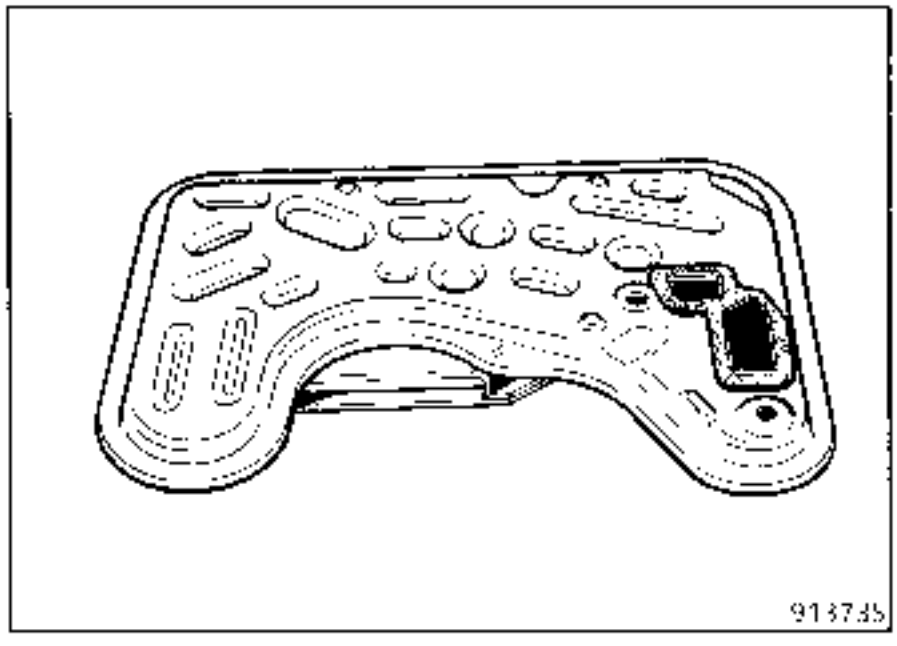


Before refitting, clean the sump and the magnet.

Check the condition of the sump seal and the topping up plug.

REFITTING

Refit the strainer and the seal.

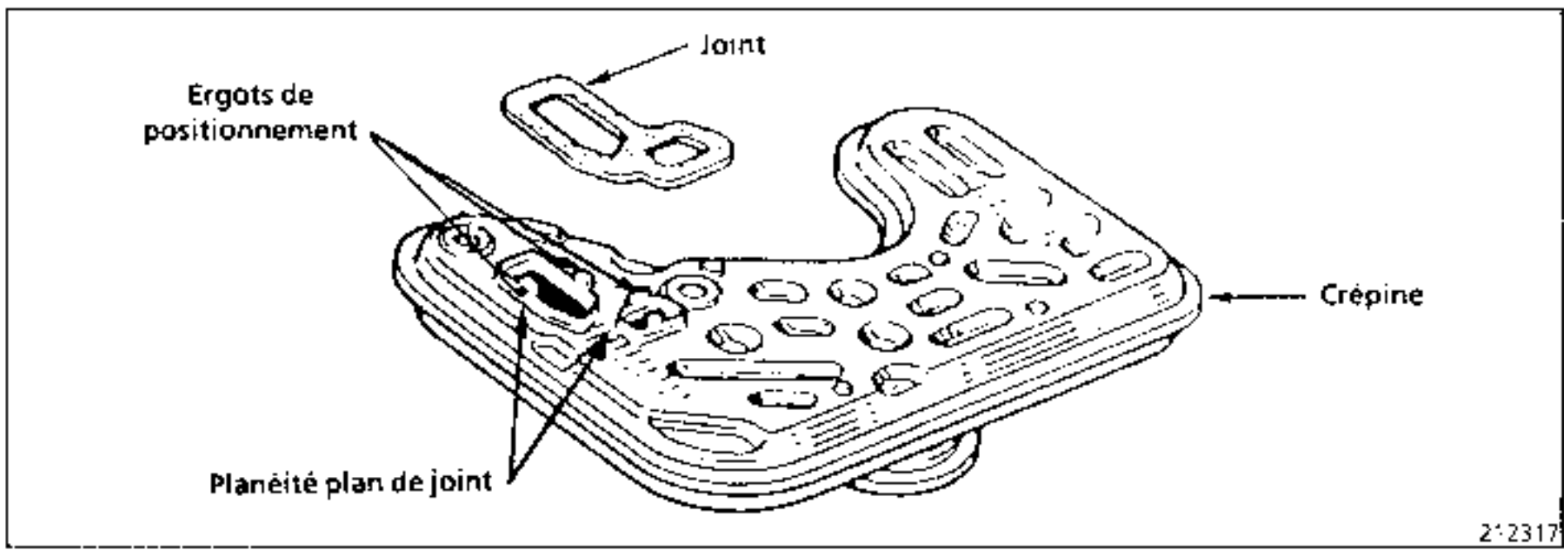


Tighten the bolts to a torque of **0.5 daN.m**.
Fit the sump and tighten the bolts to a torque of **1 ± 0.1 daN.m**.
Fill the transmission with oil.
Check the level (see section "**Oil drain - Refilling**").

IMPORTANT:

If the following faults:
- delay in engaging forward gears and reverse engages with jerks,
- slip in 1st gear and reverse,

appear especially when cold and immediately after servicing the automatic transmission when the strainer was replaced, check:
- the strainer seal is present and is in good condition,
- the flatness of the seal bearing face on the strainer - check using a straight edge,
- that the strainer is correctly positioned in the hydraulic distributor aperture.



Even when performed by a professional who is used to the operation, replacing the strainer on **AR4** or **AD4** transmissions is still a difficult operation.
Before refitting the strainer it is necessary to check:
- the flatness of the sealing face on the strainer at the intake openings (there should be no deformation),
- that the seal is in good condition and is correctly positioned on the strainer.

Align the strainer under the distributor: the positioning lugs should enter the distributor openings.
Tighten the mounting bolts and then torque tighten them to **0.5 daN.m**.

IMPORTANT: the strainer is no longer replaced during servicing on this type of transmission.

TIGHTENING TORQUES (in daN.m)	▽
Strainer mounting bolt	0.5
Sump mounting bolt	1 ± 0.1
Front mounting pad mounting nut	4
Bolt for rear mounting	6.5
Bolt for transmission mounting pad	2
Wheel bolts	9

REMOVAL

Put the vehicle on a 2 post lift and fit the anti-tilt clamps to the pads.

Drain the transmission (mechanism section).

Remove:

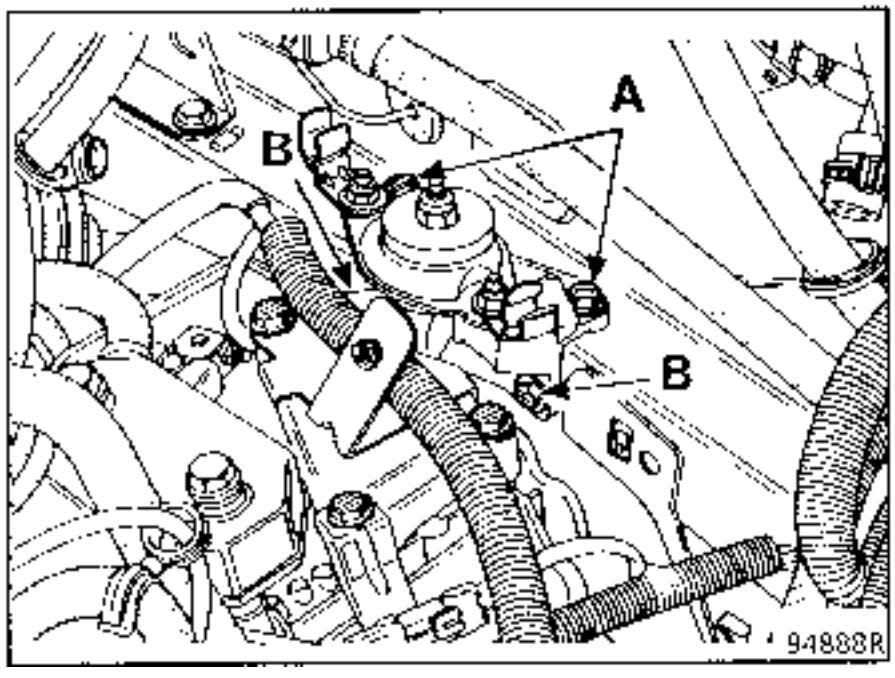
the expansion bottle,

- the power assisted steering fluid reservoir.

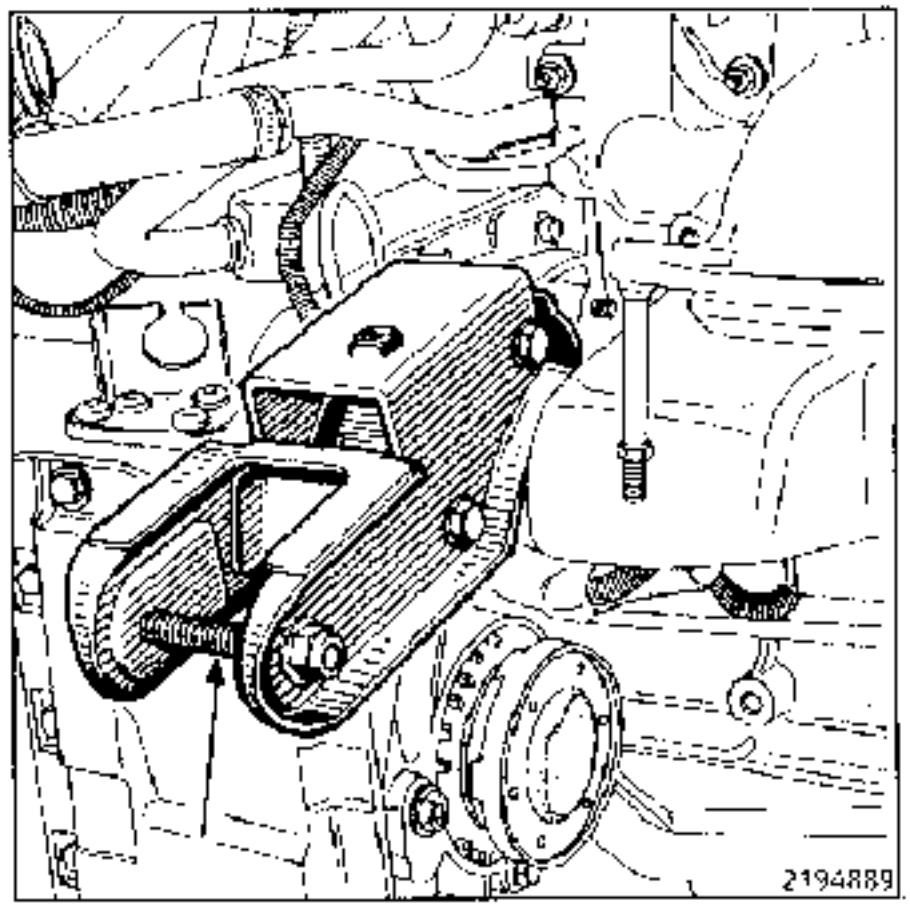
Remove the mounting bracket for the power assisted steering hoses.

Release the wiring to reach the four mounting bolts for the transmission mounting pad.

Remove the two upper bolts (A) for the mounting pad and slacken the two other bolts (B), without removing them.



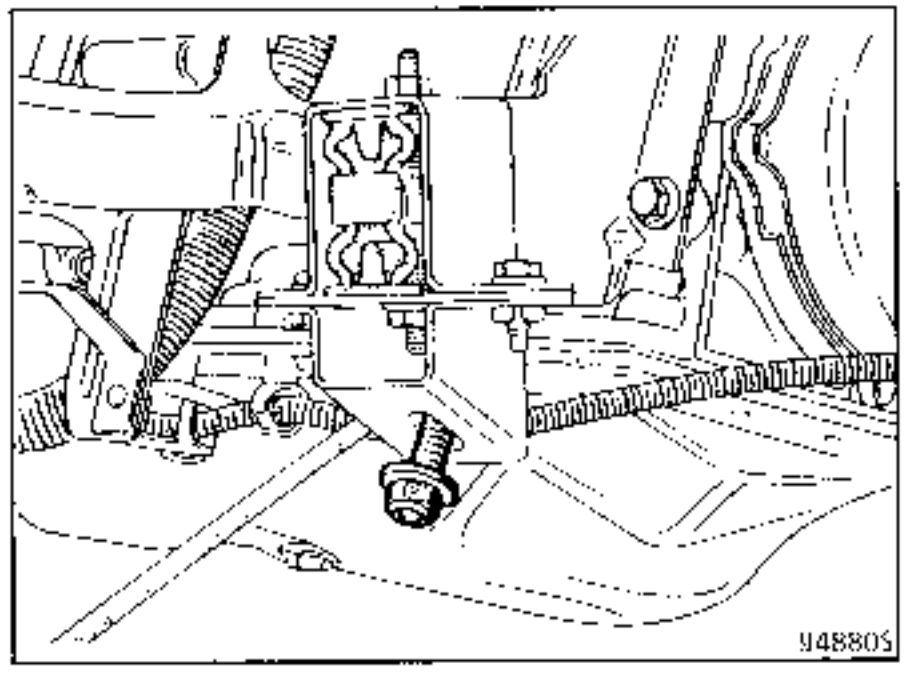
Slacken bolt (1) on the rear centre mounting.



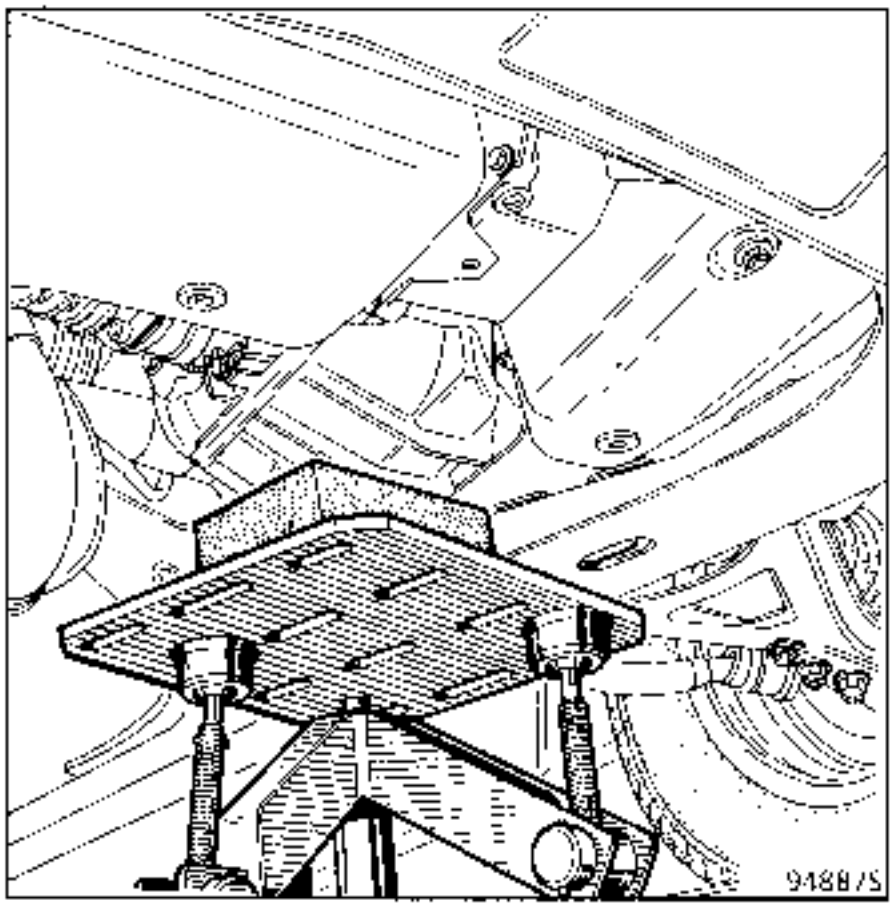
Remove the front left hand wheel.

Remove the side deflector (1 bolt and 3 rivets) and in preparation for later on, remove the mounting bolts for the transmission sump.

Remove the mounting nut for the front mounting.

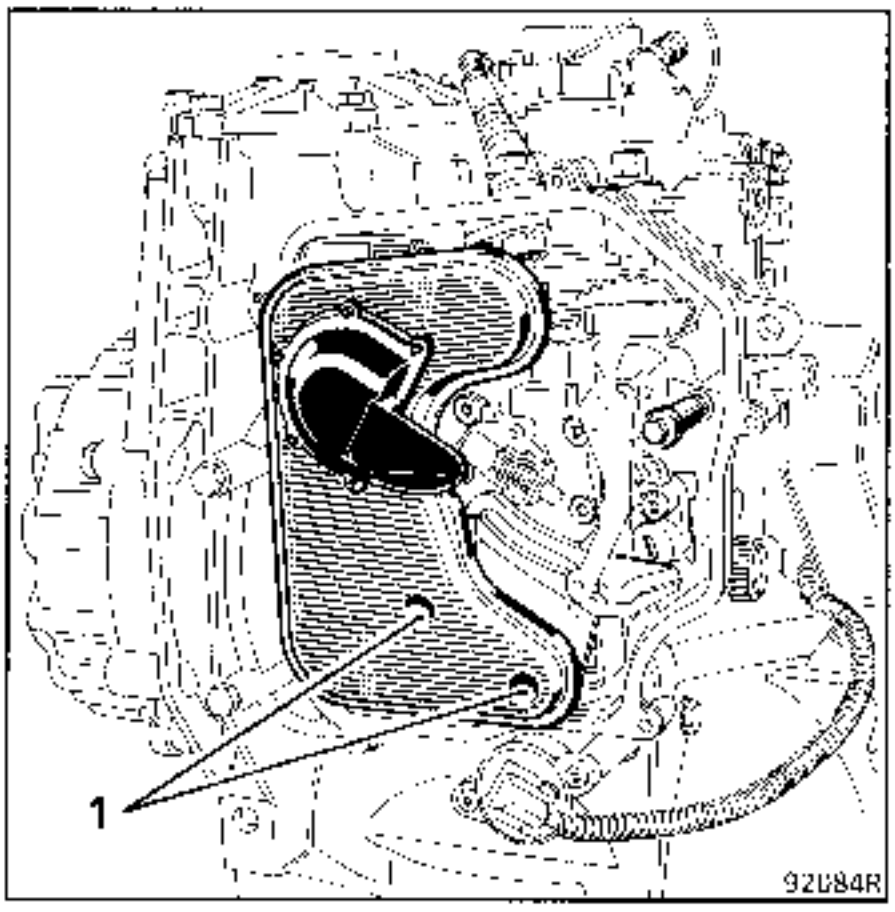


Lift the automatic transmission using a component jack.



Remove:

- the automatic transmission sump,
- the strainer and its seal (bolts 1).



Before refitting, clean the sump and the magnet.

Check the condition of the sump seal and the drain and level checking plugs.

REFITTING

Refit the new strainer and its seal. Tighten the bolts to a torque of **0.5 daN.m**.

Fit the sump and tighten the bolts to a torque of **1 daN.m**.

Refit the transmission mounting pad bolts.

Refit the rear centre mounting pad bolt and tighten it to a torque of **6.5 daN.m**.

Refit the wiring.

Refit the mounting bracket for the power assisted steering hoses.

Refit the power assisted steering reservoir and the expansion bottle.

Tighten the mounting nut for the front mounting to a torque of **4 daN.m**.

Refit the front left hand side deflector and the wheel.

Fill the transmission with oil and check the level.

The hydraulic distributor ensures the supply (and return) of oil to the clutches and brakes, depending on feed to the solenoid valves.

TIGHTENING TORQUES (in daN.m)	
Distributor mounting bolt	0.9
Sump mounting bolt	0.6
Cover plate mounting bolt	1.3

REMOVAL - CHECKING - REFITTING

REMOVAL

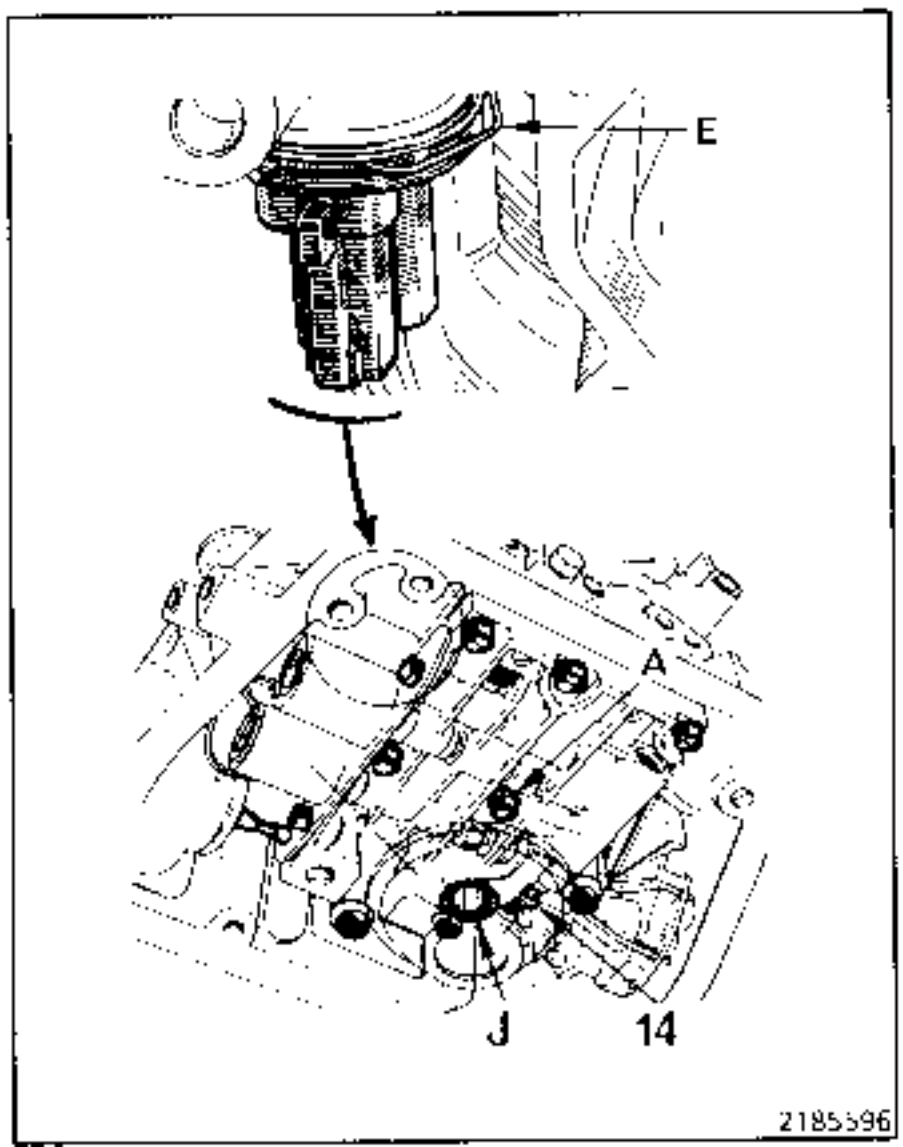
Drain and remove :

the sump,
- the strainer and retain its seal (**J**),
- all the distributor bolts except bolt (**A**).

When removing bolt (**A**), take care to prevent the following components falling out:

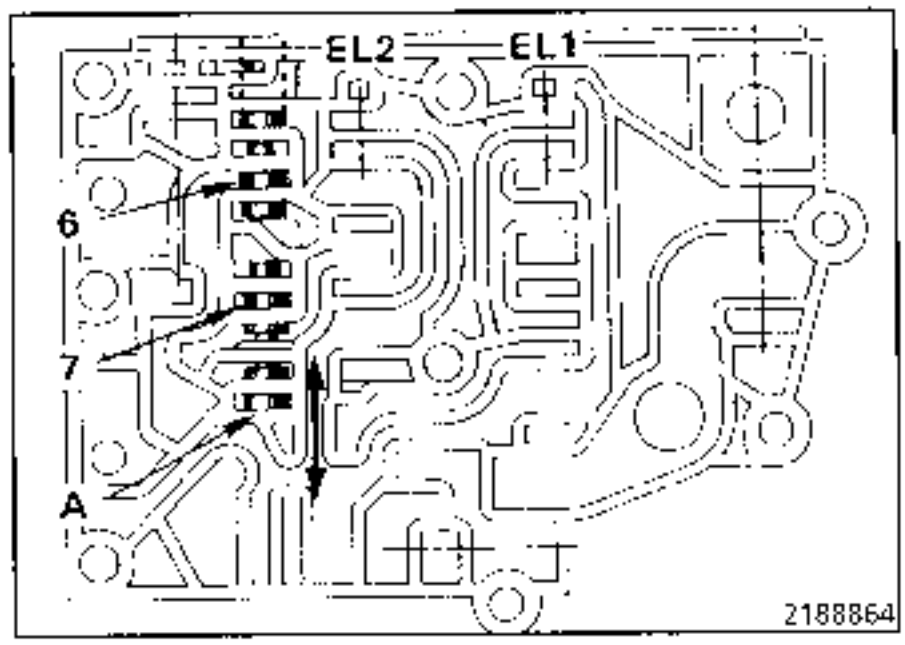
- the manual valve (**14**),
  the plate and the two seals located under the distributor.

Remove pin (**E**) from the sealed connector and remove the distributor / solenoid valves assembly.



CHECKING

Check that the sequence valves (**6**) and (**7**) slide freely at **A** using a small screwdriver and check the other valves. **TAKE CARE not to make scratches.**



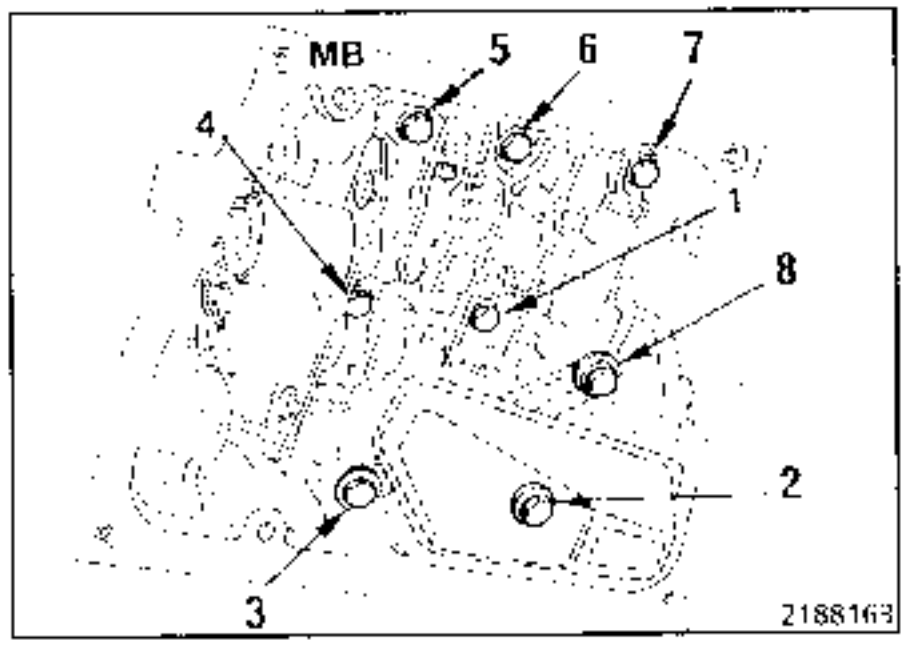
REFITTING

Fit pin (**E**) to the sealed connector socket and reconnect it.

Position the manual valve (**14**) in line with the toothed sector.

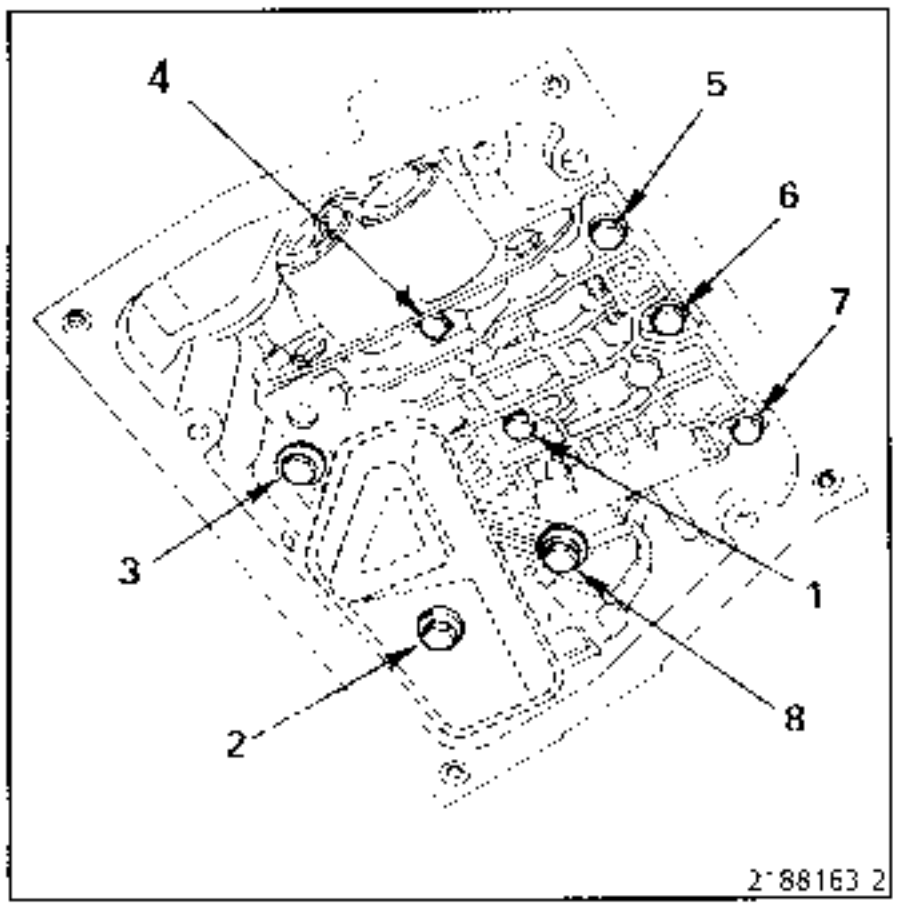
The vacuum capsule on the pressure regulation valve (**11**).

Tighten the bolts (**2**) and (**6**) on the distributor as far as possible since they determine its position when **all the bolts** are tightened.
Using a torque wrench (**0.3** to **2 daN.m**), tighten the hydraulic distributor bolts in the recommended order to a torque of **0.9 daN.m**.



REMOVAL - CHECKING - REFITTING (cont)

MJ

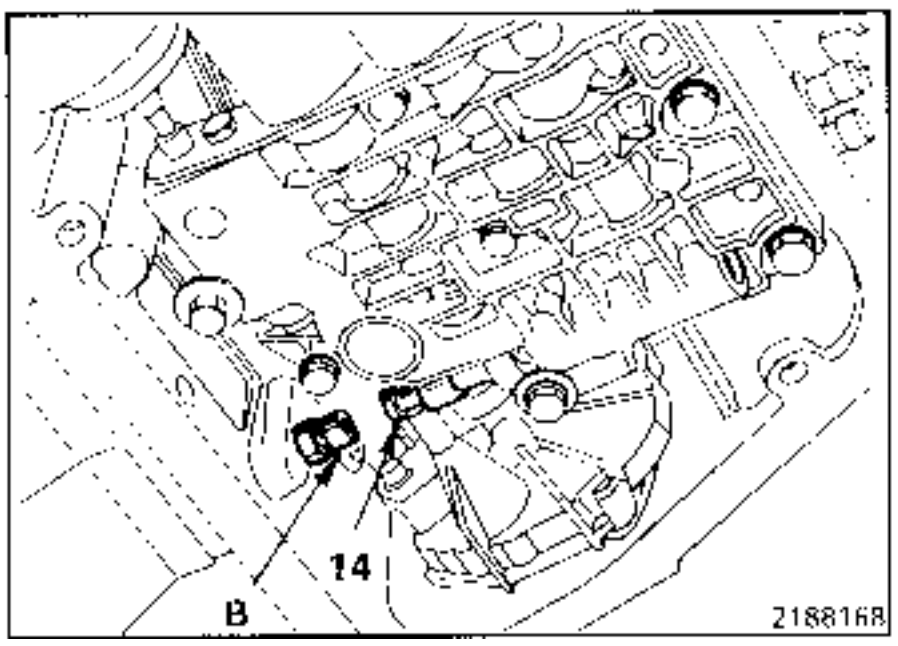


After tightening bolts **(1)** and **(2)**, fit the new strainer (as shown in the diagram) with its seal.

After fitting, check the manual valve moves correctly.

1st assembly

The stop bolt **(B)** prevents the manual valve **(14)** falling out at the end of its travel.

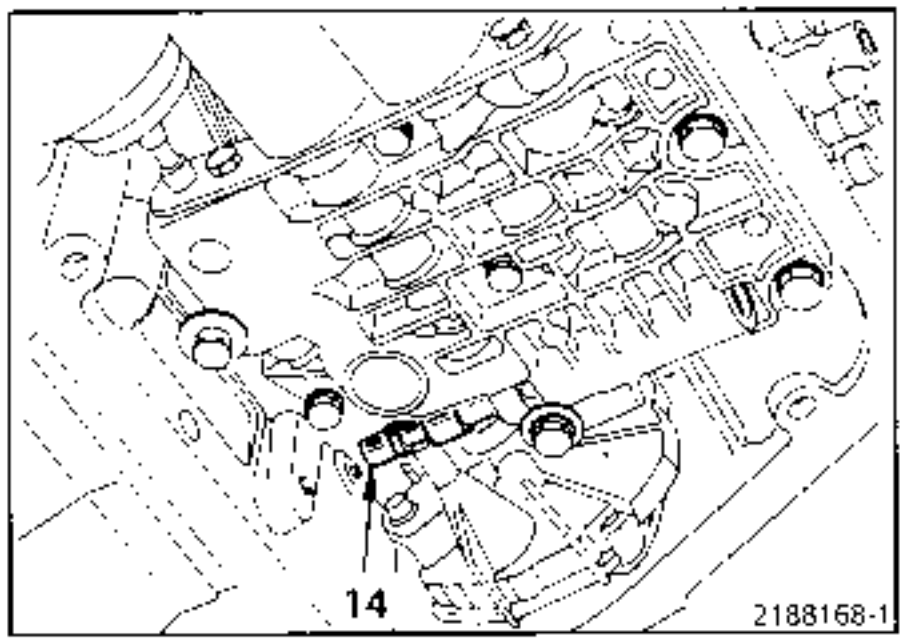


Adjusting the stop bolt (B) :

- Place the selector lever in "**Park**".
- Slacken the lock nut and bring bolt **(B)** to **1 mm** from the manual valve.
- Tighten the lock nut.

2nd assembly

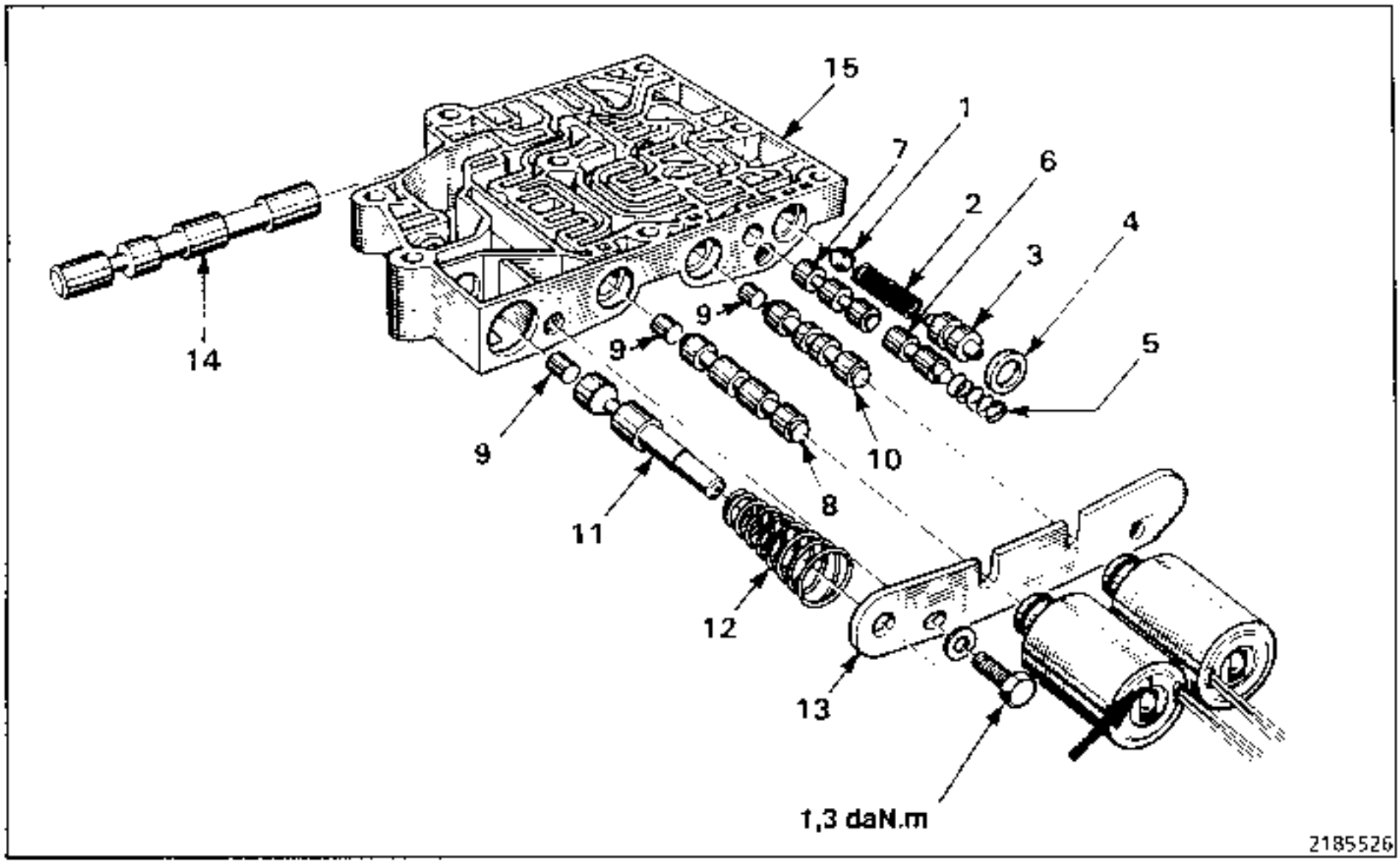
The Parts Department supplies distributors fitted with a manual valve (14), 2nd assembly (lengthened by 14 mm). In all cases, this distributor must be fitted by removing the stop bolt **(B)**.



Refit the sump with a seal which must be in perfect condition.

Top up the oil level and **check the oil pressure**.

DISMANTLING - REASSEMBLY



1 VLP ball
2 VLP spring (medium)
3 Pressure limiting valve (VLP)
4 VLP seal
5 VS spring (small)
6 Sequence valve (VS)
7 Sequence valve (VS)
8 1st gear valve (VP1)
9 Plungers
10 2nd gear valve (VP2)
11 Pressure regulating valve (VRP)
12 VRP spring (large)
13 Cover plate
14 Manual valve(VM)
15 Hydraulic unit

Plungers (9) are all identical.

Valves (3, 7, 8, 10) are symmetrical.

Valve (6) is not symmetrical.

Dismantle the hydraulic distributor in a clean, dust-free location.

DISMANTLING - REASSEMBLY

DISMANTLING

Progressively remove the two mounting bolts for the cover plate (**13**). **Take care not to lose the spring (12).**

Remove the other components by turning the unit and the manual valve over (**14**).

CLEANING

Use:

- **WHITE SPIRIT,**
- lint-free cotton wool for wiping out,
- compressed air to thoroughly blow out all the channels.

CHECKS

If any of the valves are scratched or worn, the complete hydraulic distributor must be replaced.

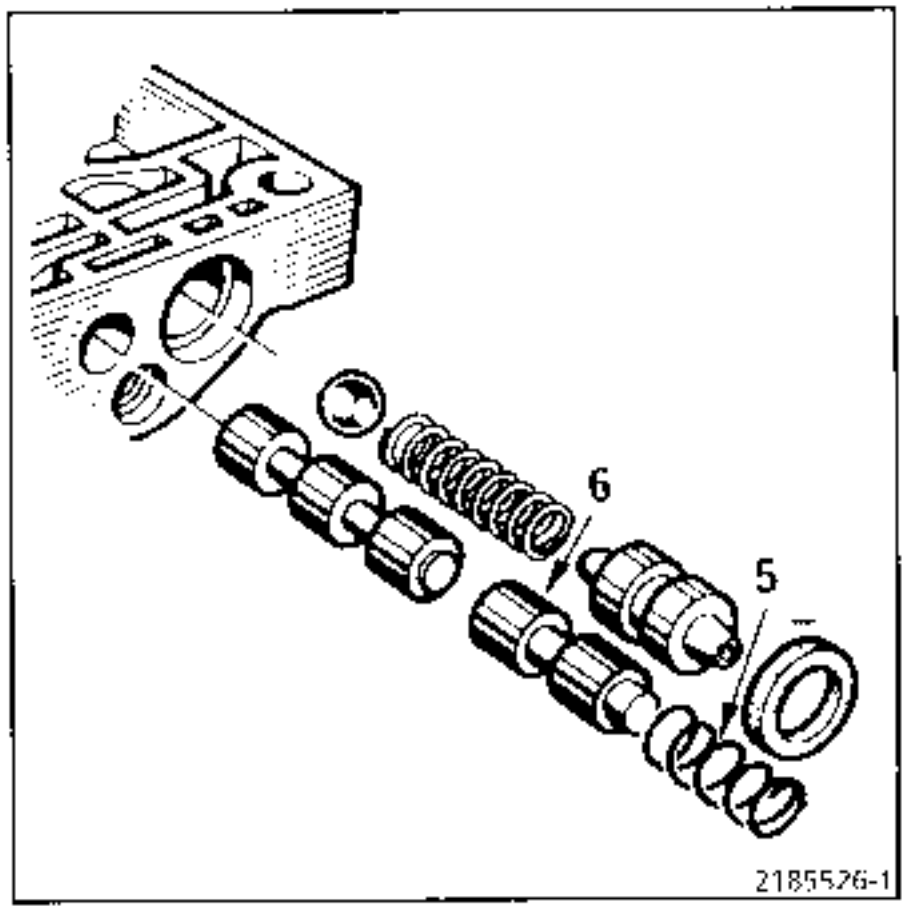
All the valves must move freely with no points of resistance.

Seal (4) and the seals for the solenoid valves must be in perfect condition.

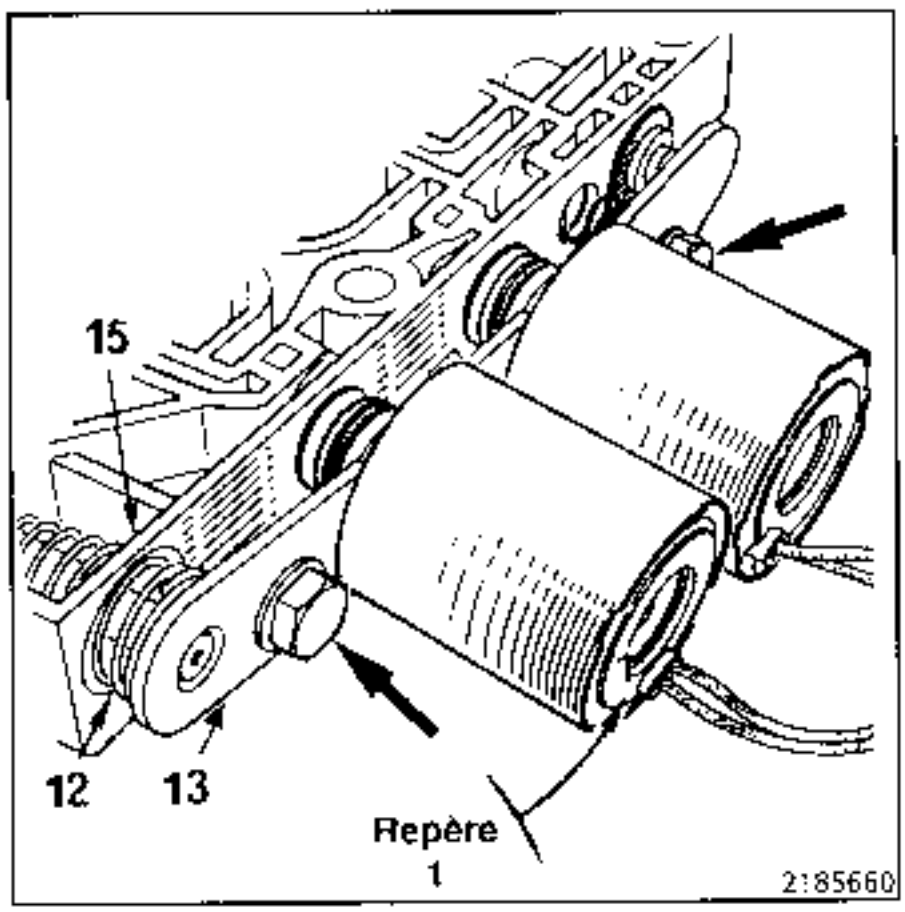
REASSEMBLY

Lubricate all the parts and refit according to the exploded diagram.

IMPORTANT: valve (**6**) (with the larger end) should be at the small spring end (**5**).



Fit the plate (**13**) with the two bolts and fit the solenoid valves marked (**1**) at the pressure regulating valve end (**V.R.P.**).



Progressively tighten the cover plate (**13**) so that the last coil of the spring (12) is not trapped between the plate (**13**) and the unit (**15**) and torque tighten to **1.3 daN.m**.

Check that all the valves move freely.

The solenoid valves, depending on how they are supplied, allow the movement of the gear change valves (V.P.1, V.P.2.) in the hydraulic distributor which determine the changes of the gears.

TIGHTENING TORQUES (in daN.m)	
Distributor mounting bolt	0.9
Sump mounting bolt	0.6
Cover plate mounting bolt (retains solenoid valves)	1.3

REMOVAL - REFITTING

REMOVAL

The hydraulic distributor must be removed to remove the solenoid valves (see section "**Hydraulic distributor**").

Slacken the two bolts until the solenoid valves may be released.

TAKE CARE NOT TO LOSE SPRING (12)

Before refitting, check:

- the seal (J) is in perfect condition,
- the O rings (T), the solenoid valves and the sealed connector are in perfect condition,
- the balls move freely and the solenoid valve channel is clean.

REFITTING

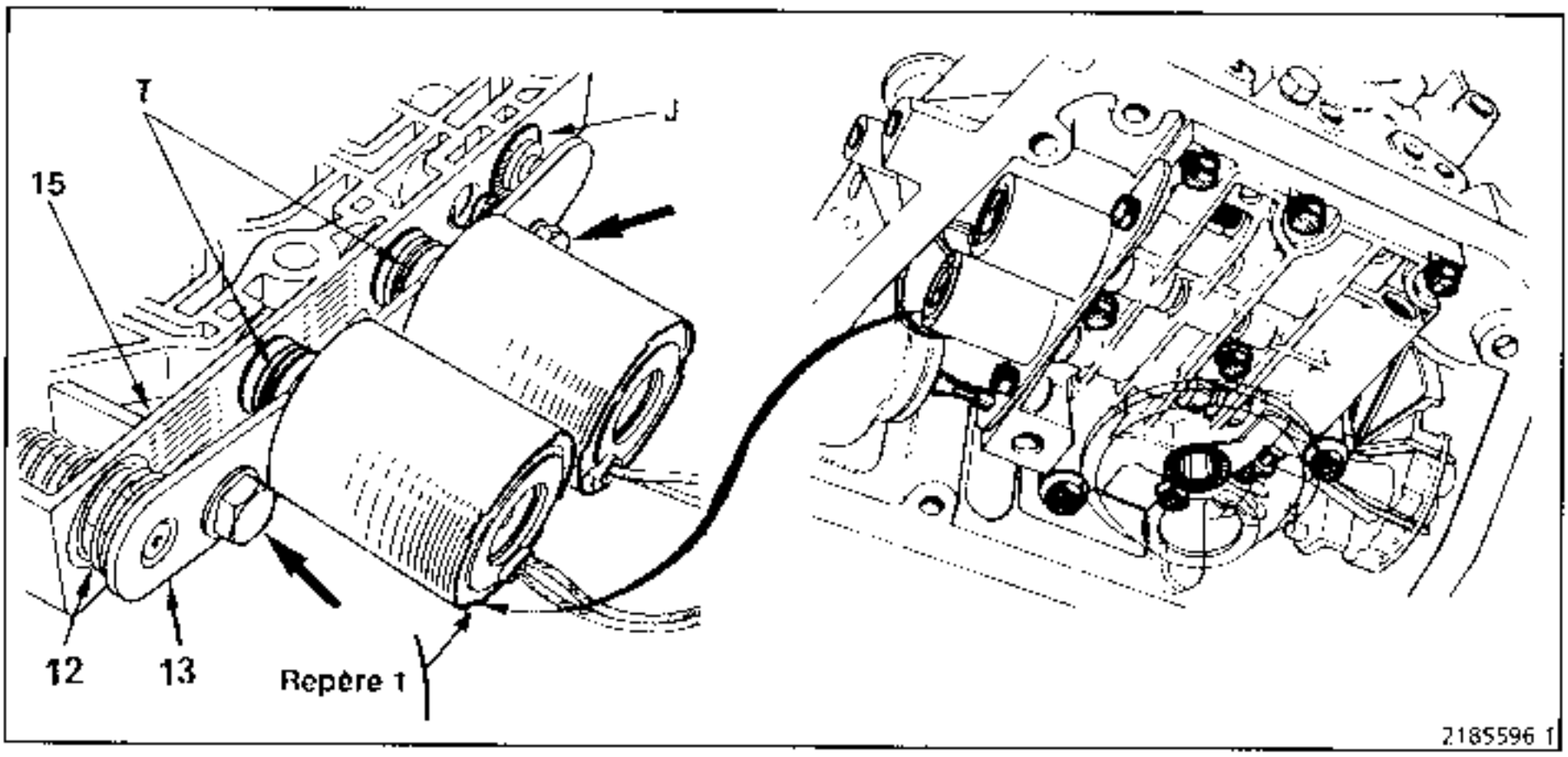
Lubricate the solenoid valves and fit the solenoid valve marked **1** at the regulation valve end (see diagram).

Progressively tighten the cover plate **(13)** so that the last coil of the spring **(2)** is not trapped between the plate **(13)** and the unit **(15)** and torque tighten to **1.3 daN.m**.

Fit the pin to the sealed connector socket and reconnect the connector.

Refit the hydraulic distributor (see **pages 92** to **95**).

Top up the oil level and check the oil pressure.



IMPORTANT: the vehicle will lose 1st gear if the solenoid valves are incorrectly connected.

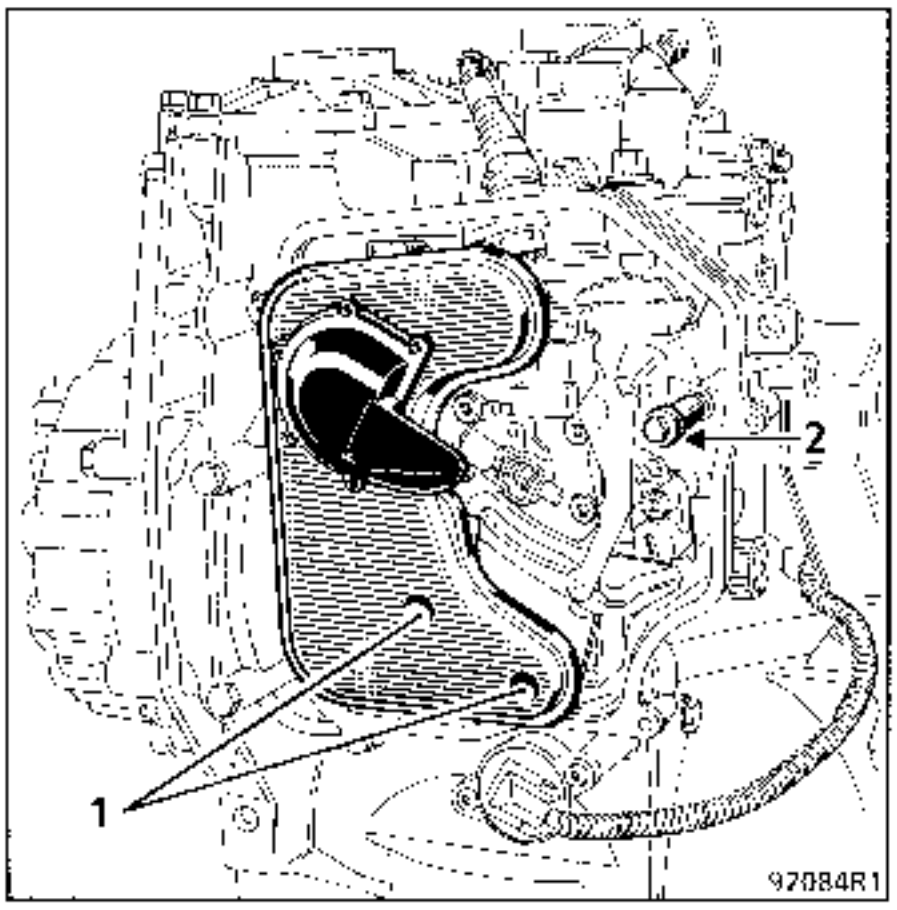
TIGHTENING TORQUES (in daN.m)	
Strainer mounting bolt	0.5
Distributor mounting bolt	0.5
Sump mounting bolt	1 ± 0.1
Control sector stop	0.3

REMOVAL

THIS OPERATION IS CARRIED OUT WITH THE LEVER IN "P".

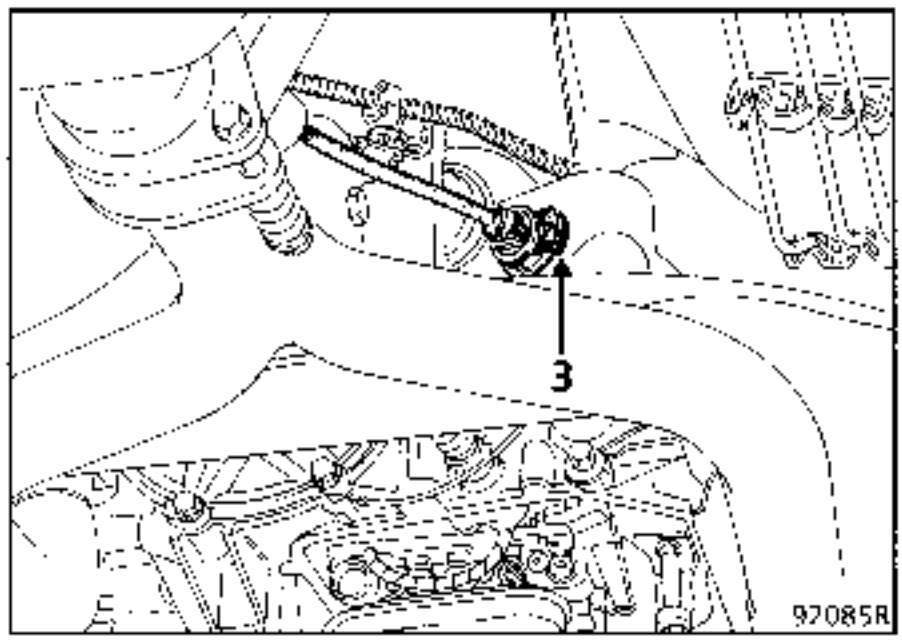
Drain the transmission.

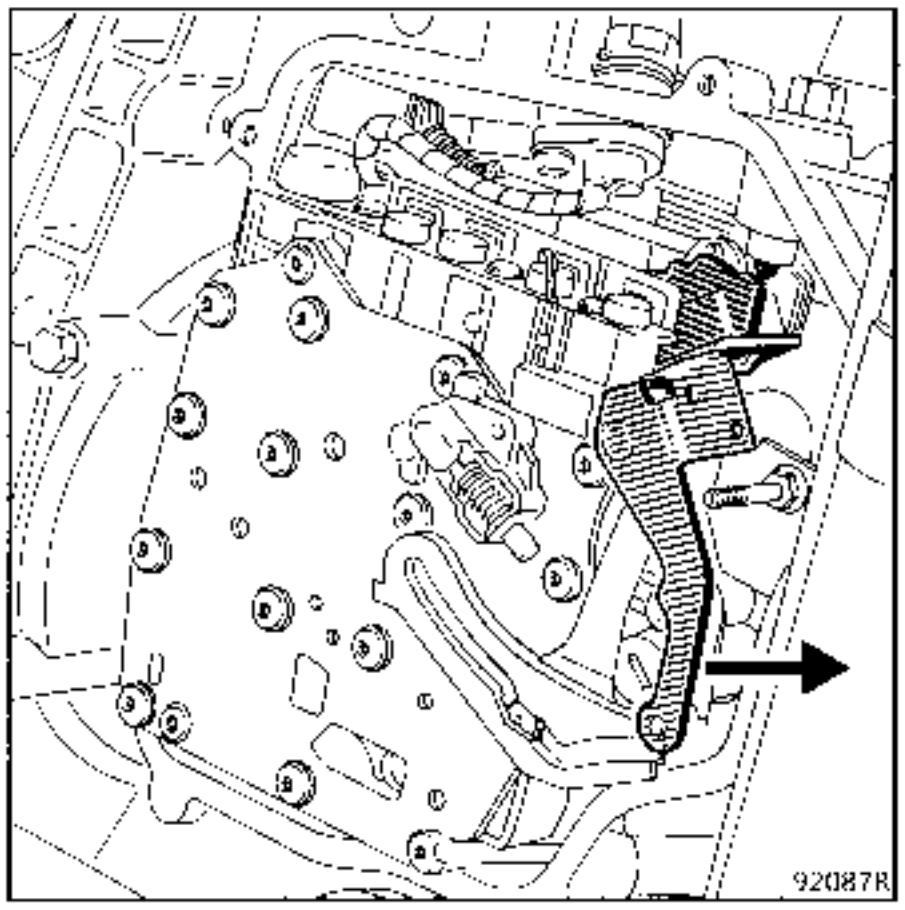
Remove:
- the sump,
- the strainer (bolts 1),



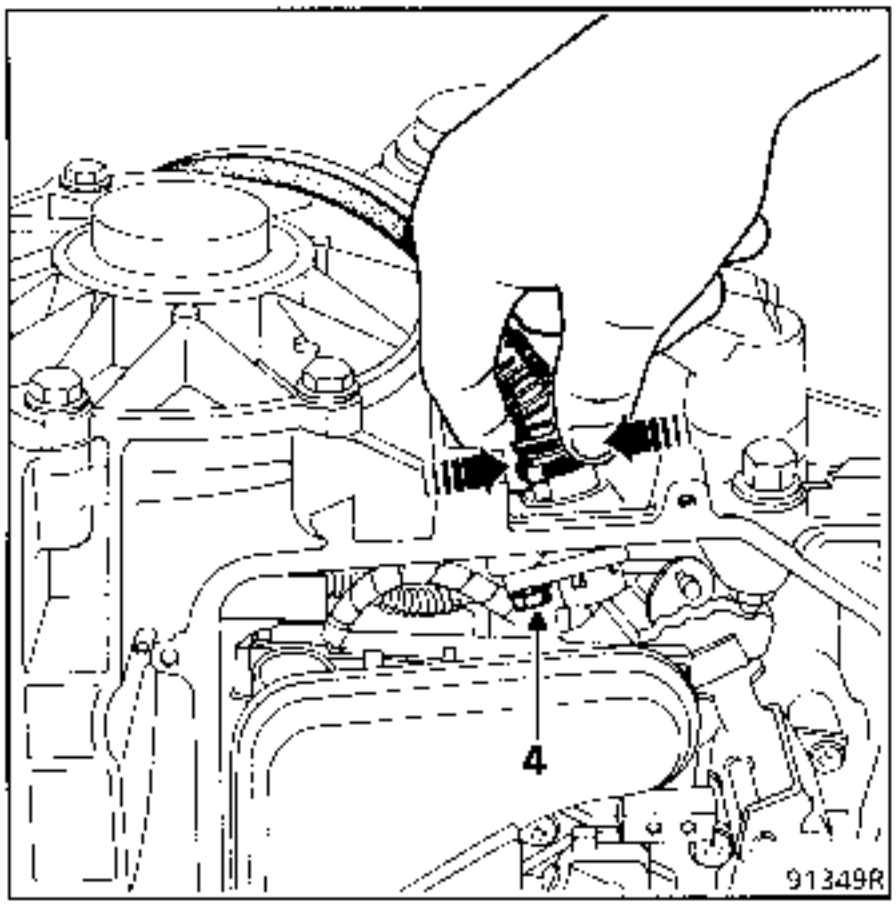
- the control sleeve adjustment key (**3**),
- the control sector stop (**2**) to allow the lever to move beyond the "**Park**" position.

This additional travel is needed to release the drive from the manual valve control sector.



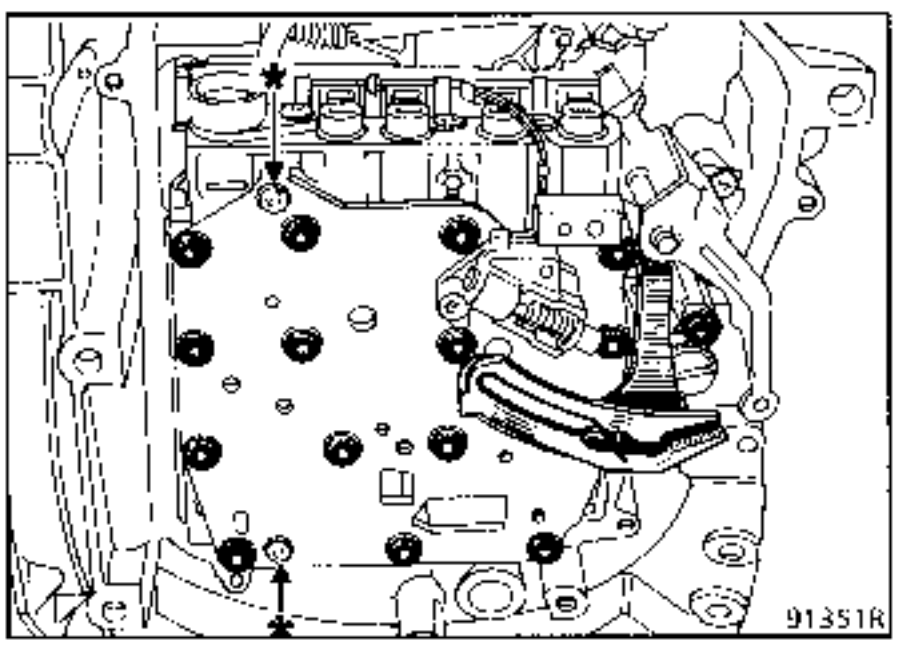


Disconnect the sealed connector cable by pressing on the locking ring.

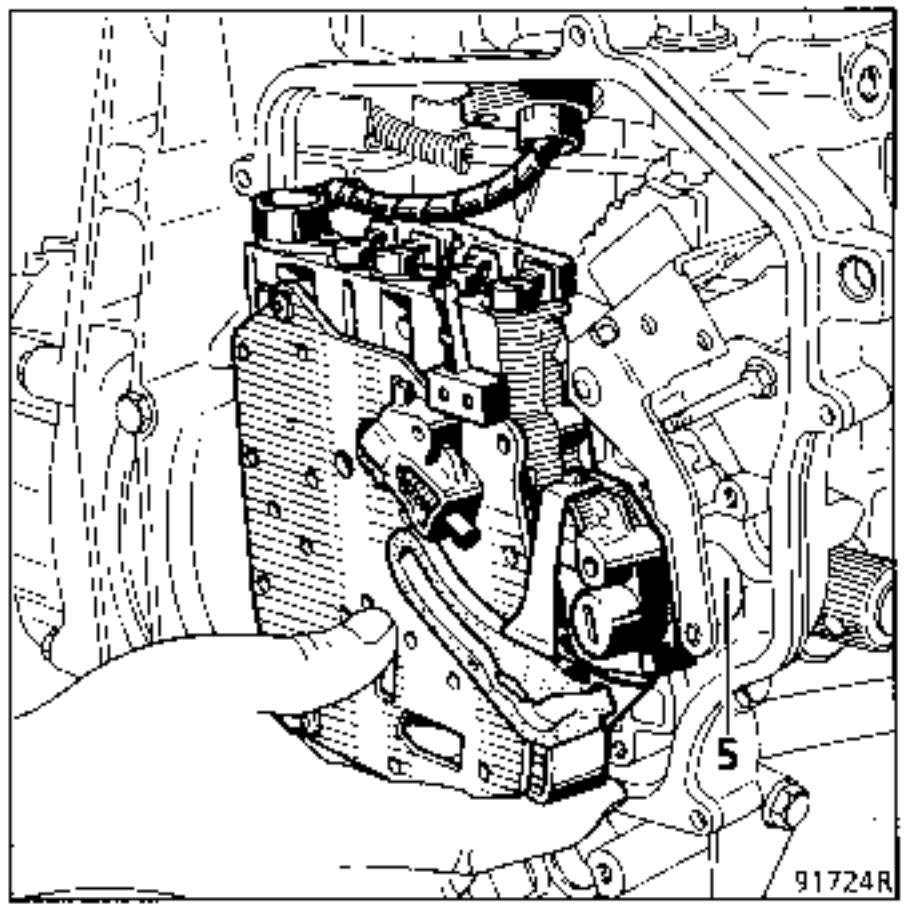


Remove the sealed connector mounting bolt (4), remove the connector and retain the O ring.

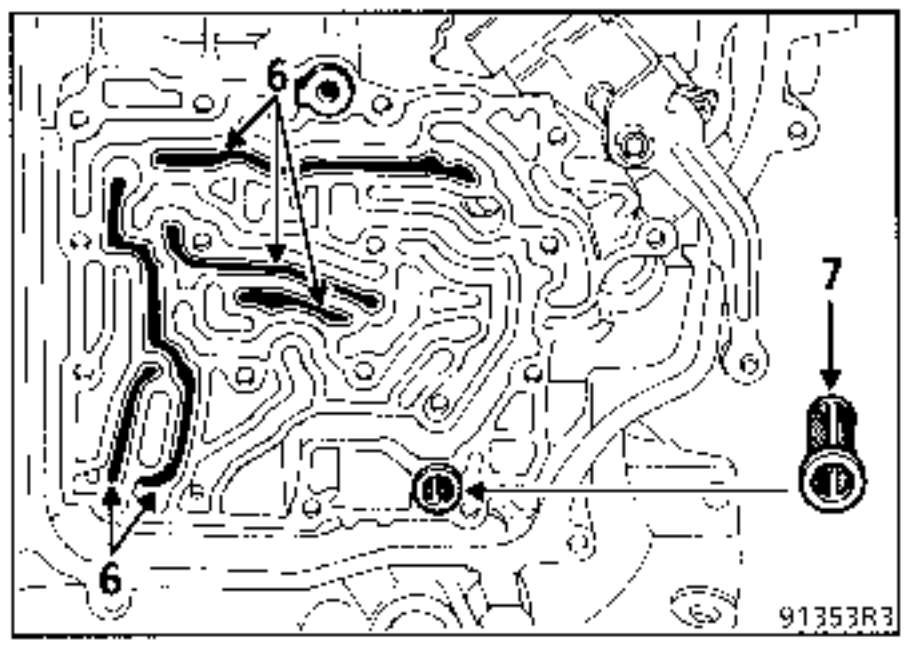
Remove the 16 bolts mounting the distributor to the housing. The bolts marked (*) remain in place and secure the cover plate to the distributor.



Release the hydraulic distributor , releasing the modulating solenoid valve (5) from the housing.



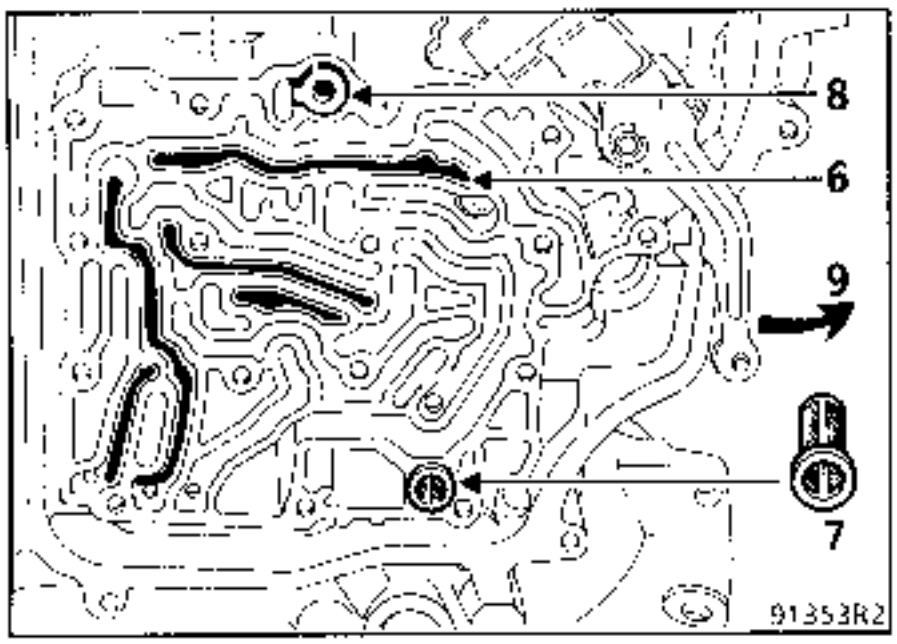
Ensure the inserts (6) and the filter (7) remain in position in the hydraulic network on the housing.



When removing the hydraulic distributor, do not remove the manual valve or the control sector.

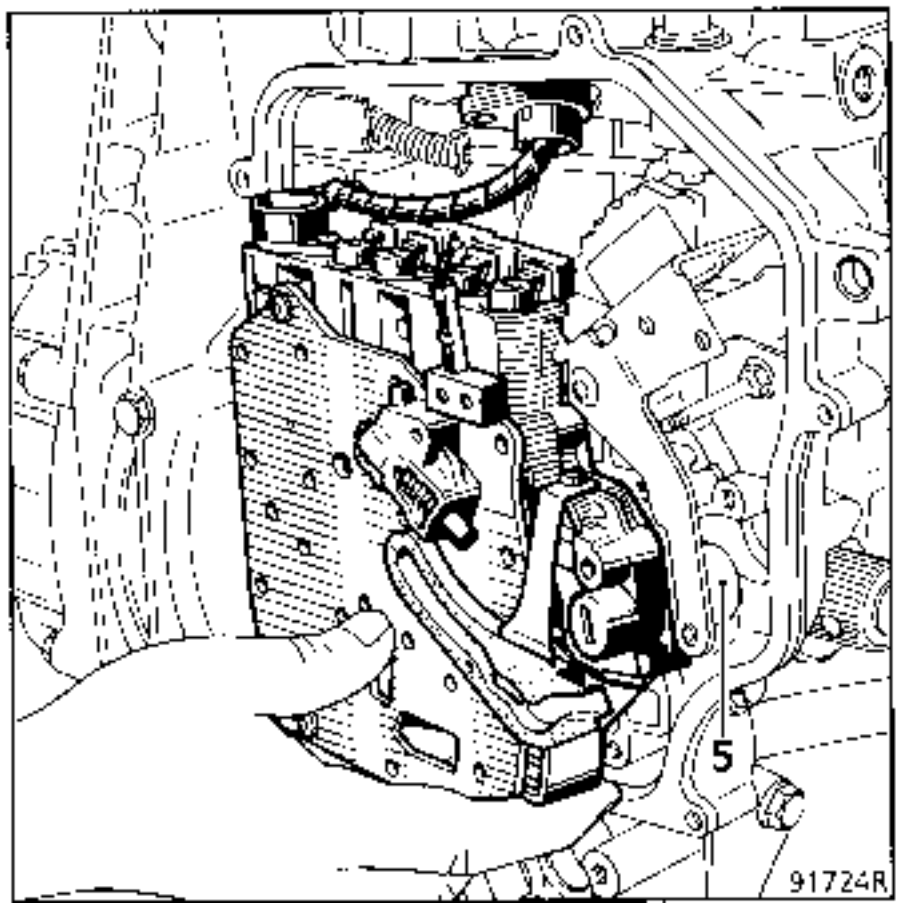
REFITTING

Ensure the supply pipe for **F1 (8)** the filter for the modulating solenoid valve **(7)** and the inserts in the network **(6)** are present and check the selector lever is in the excess travel position **(9)**.

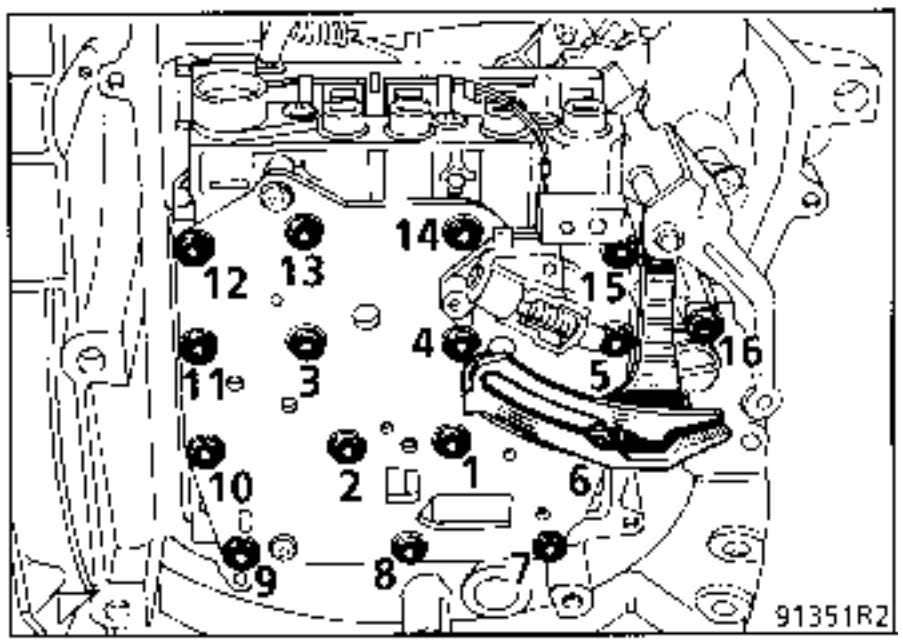


Fit the hydraulic distributor into position.

Ensure the modulating solenoid valve **(5)** is refitted correctly.



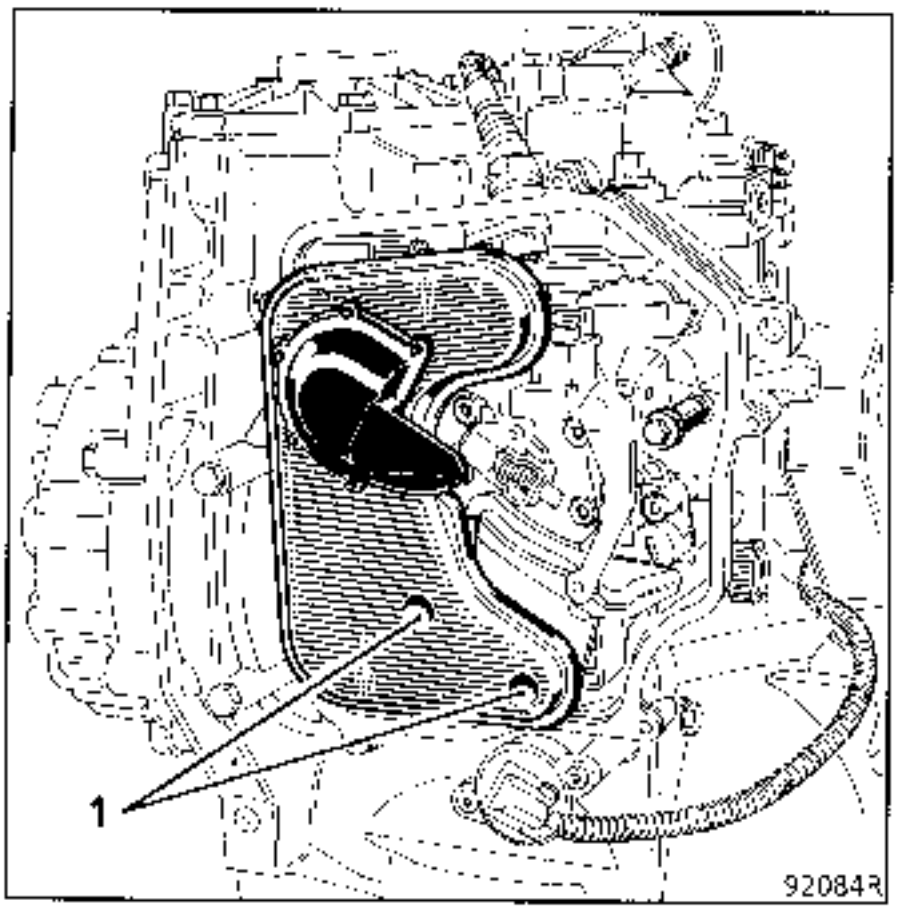
Fit the 16 distributor mounting bolts on the housing and torque tighten them to **0.5 daN.m**.



Engage the control lever in the manual valve sector and return to the "**Park**" position.

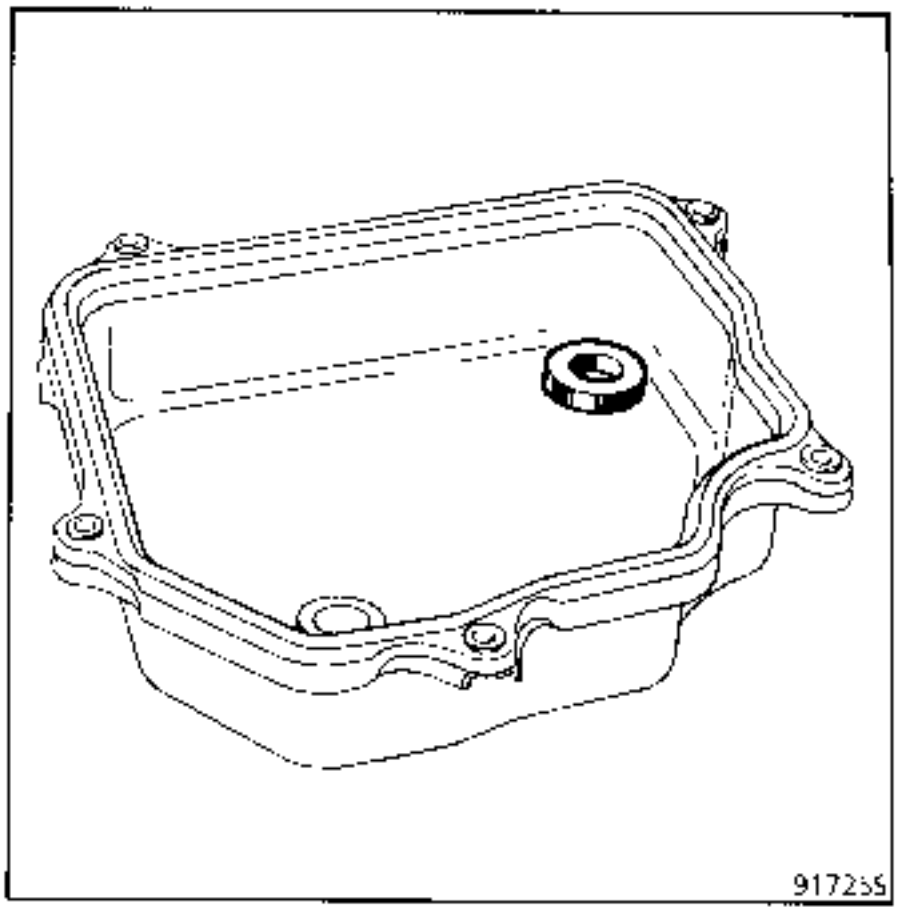
Fit the control sector stop; tighten it to **0.3 daN.m**.

Fit a new strainer and seal; tighten the bolts to a torque of **0.5 daN.m (1)**.



Adjust the gear control and refit the cable locking key (see Technical Note for the vehicle).

Fit the sump (ensure the seals, the level plug and the magnet are all present and in good condition).



Tighten the sump mounting bolts to a torque of **1 ± 0.1 daN.m**.

Fill the transmission with oil.

Check the level (see section "**Filling**").

NOTE : each time the hydraulic distributor is replaced or removed, renew the filter for the modulating solenoid valve, the strainer and its seal.

TIGHTENING TORQUES (in daN.m)	
Sump mounting bolt	1 ± 0.1
Strainer mounting bolt	$0.5^{+\ 0.1}_{\ 0}$
Hydraulic distributor mounting bolt	$0.5^{+\ 0.1}_{\ 0}$

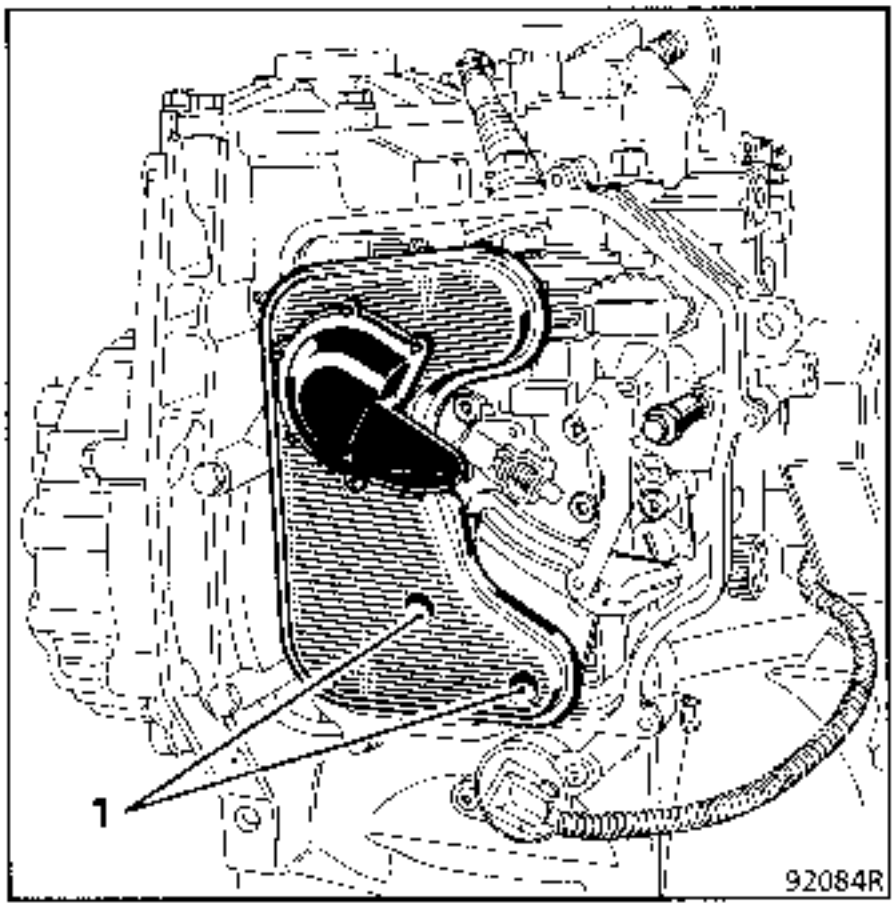
REMOVAL

This operation is carried out with the lever in position "**P**" (Park).

Drain the transmission.

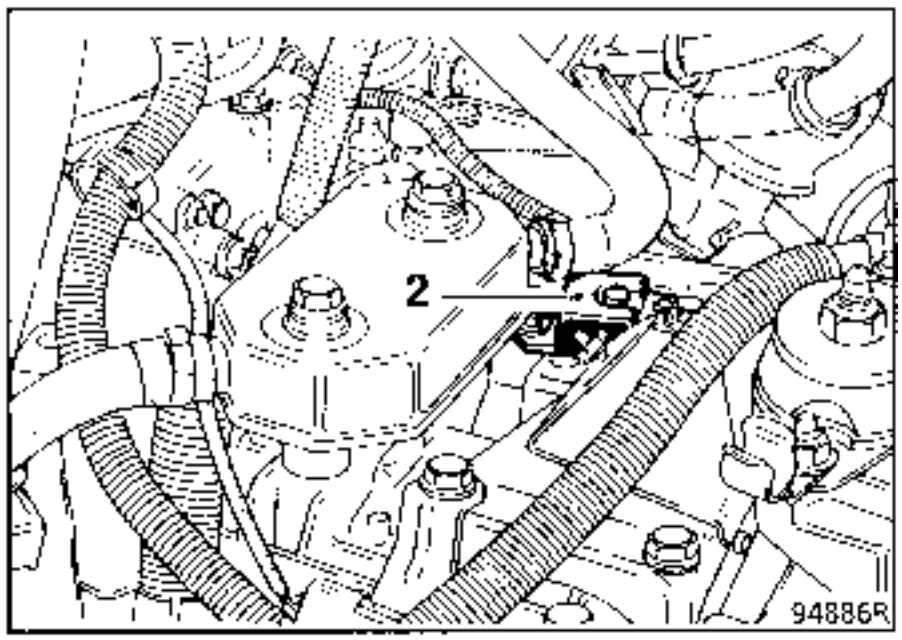
Remove the sump (see section "**Replacing the strainer**").

Remove the strainer (bolts 1).

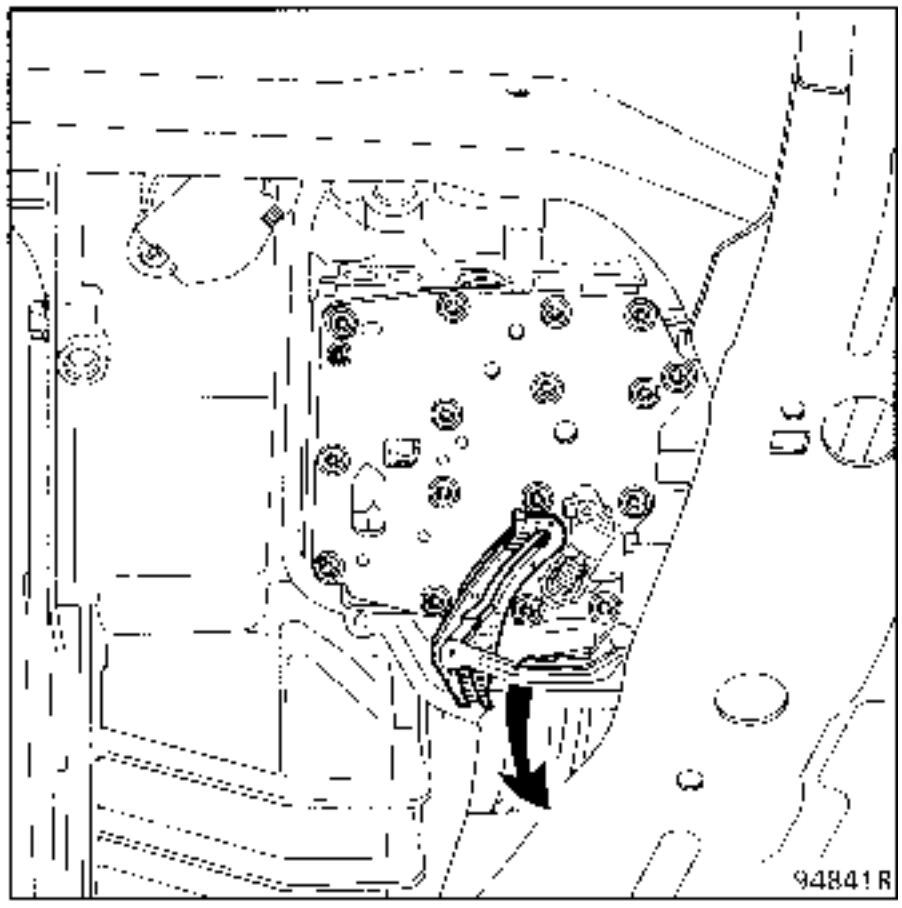


Remove the gear control cable.

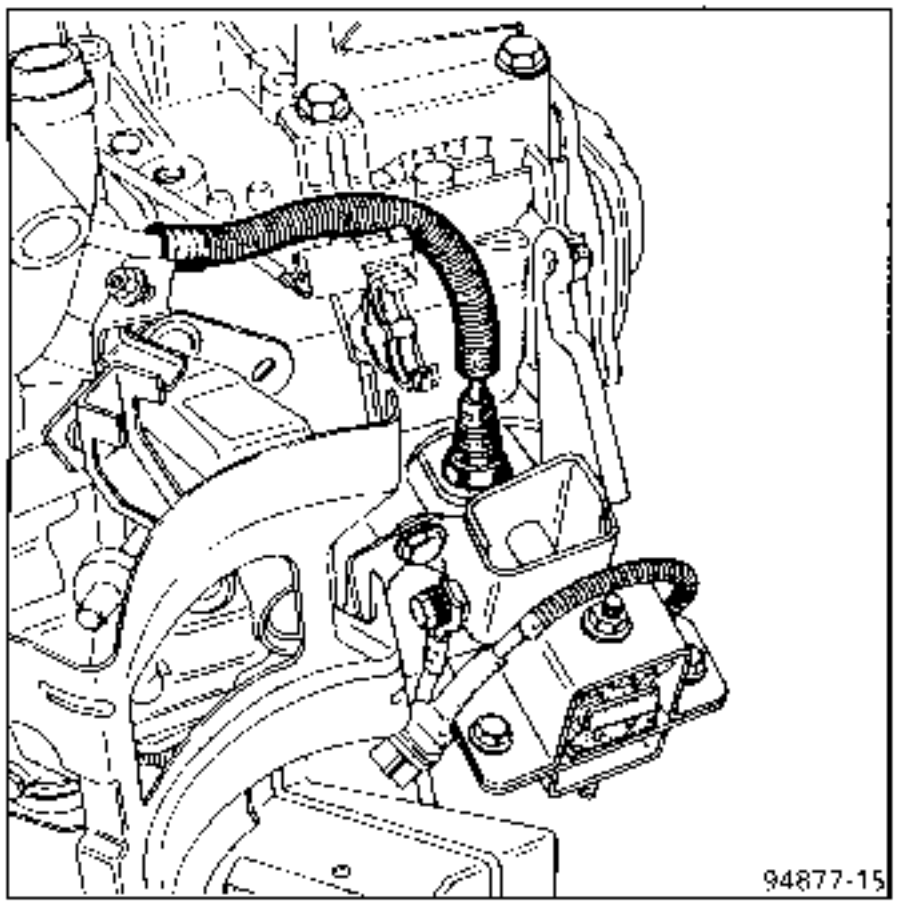
Remove the selector (2) to allow the lever to move beyond the "**Park**" position.



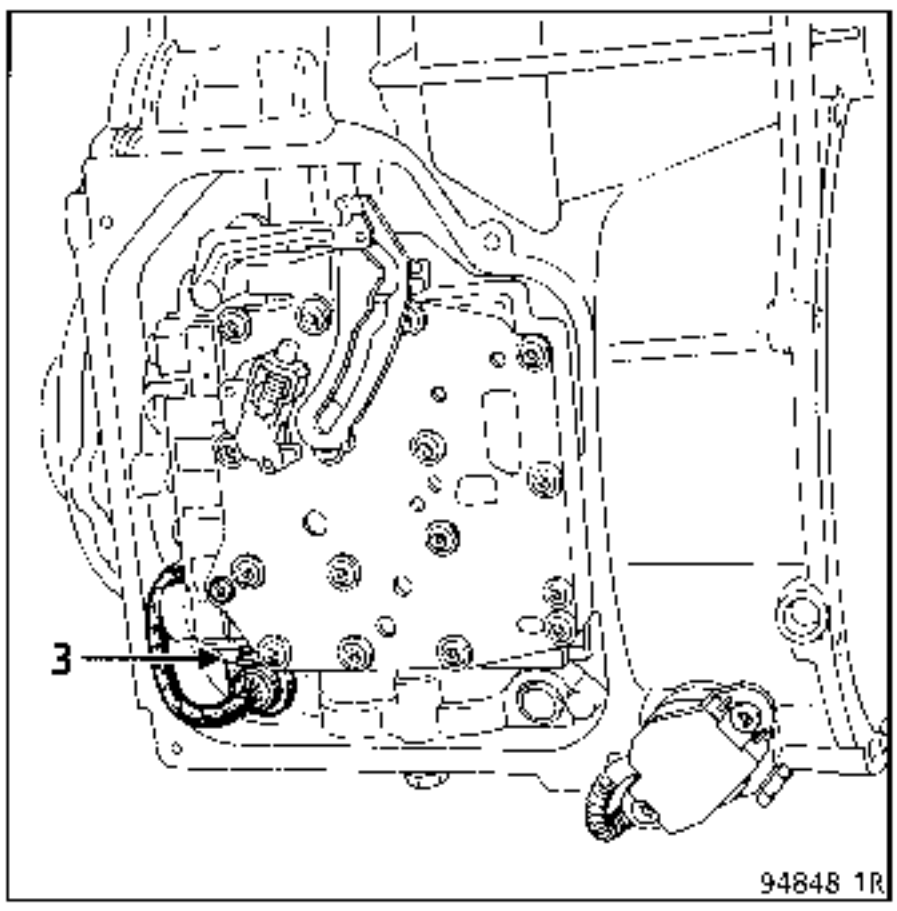
This additional travel is needed to release the drive from the manual valve control sector.



Disconnect the sealed connector cable by pressing on the locking ring.

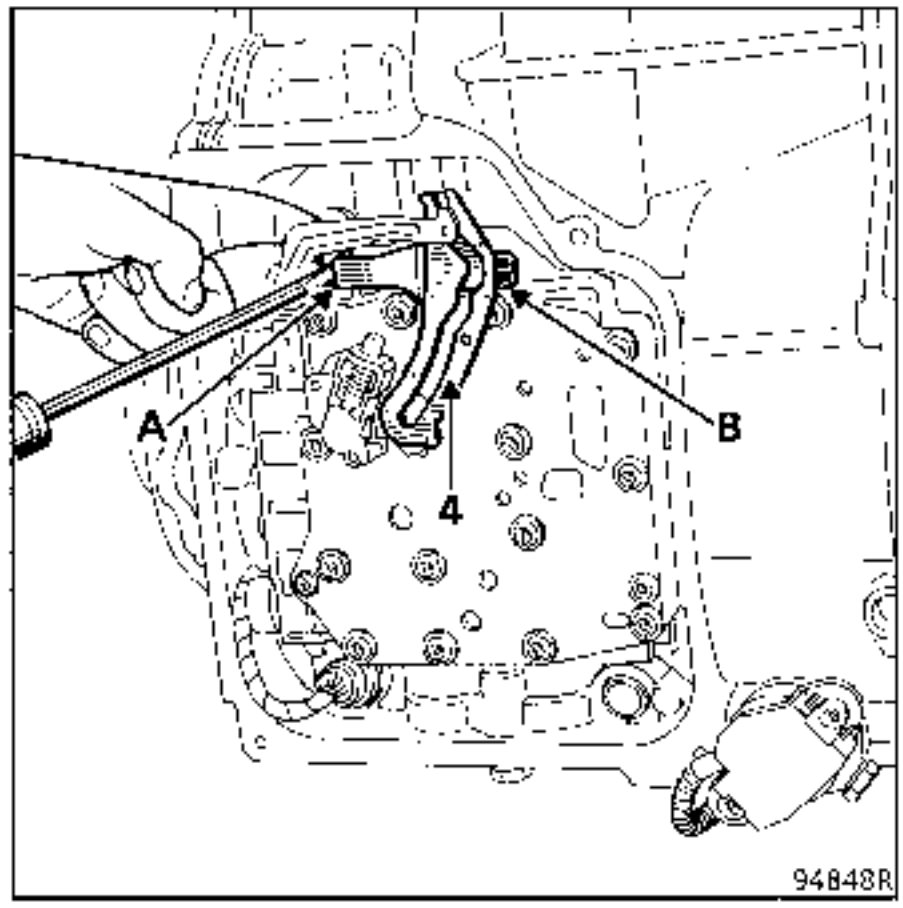


Remove the sealed connector after removing the bolt (3).

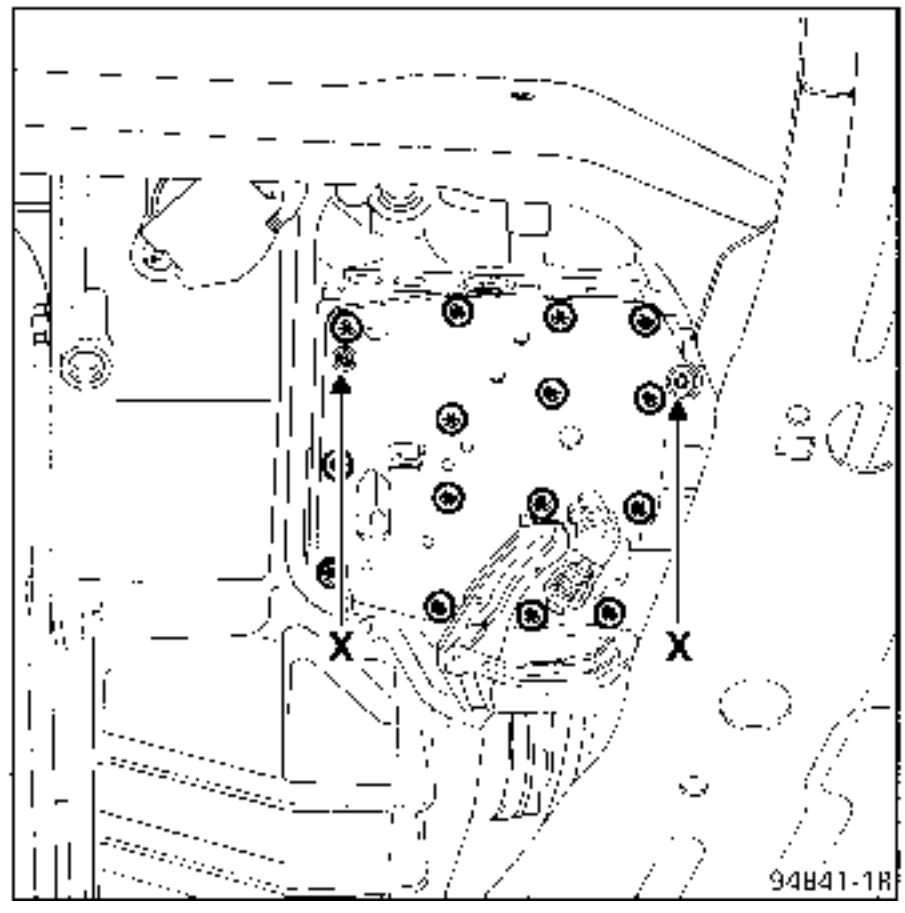


Remove the manual valve selector (4), releasing first at (A) then at (B).

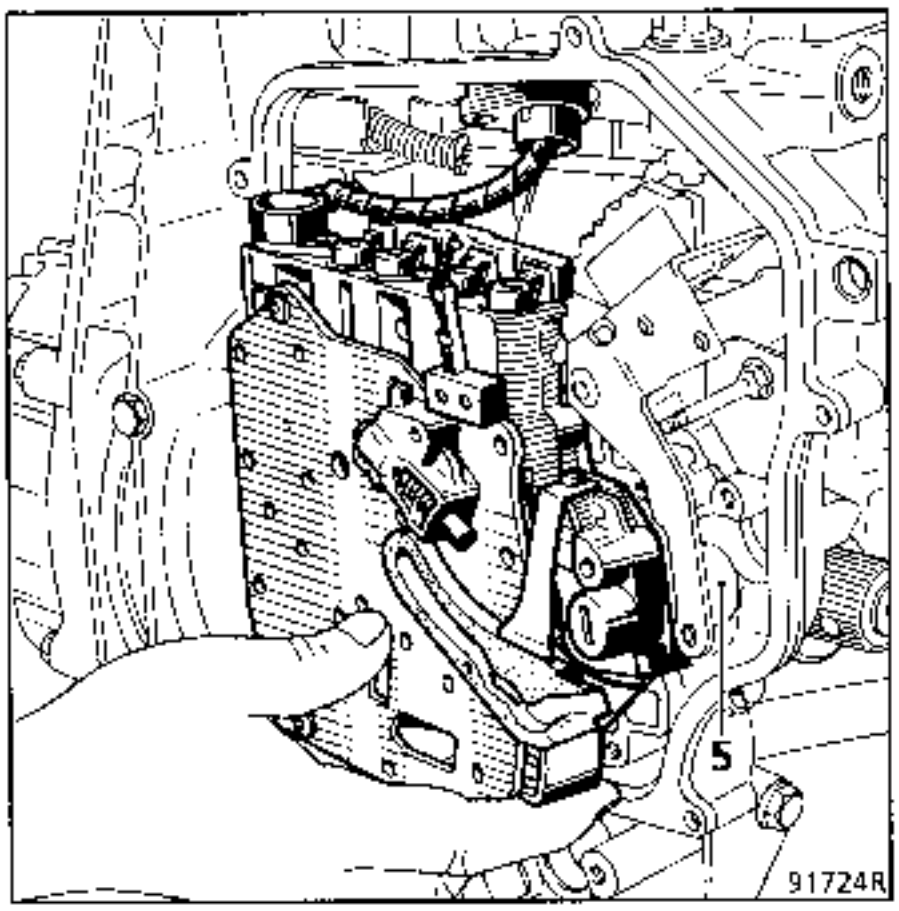
Remove the manual valve from the hydraulic distributor.



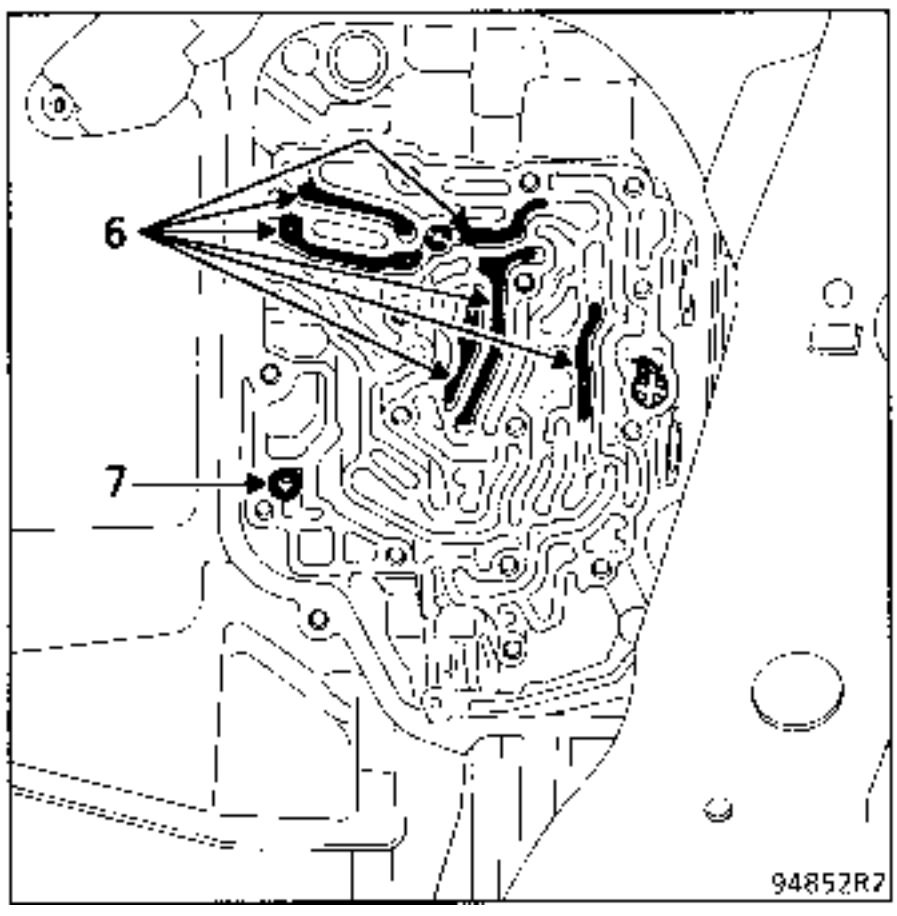
Remove the 16 bolts mounting the distributor to the housing. The bolts marked (X) remain in place and secure the cover plate to the distributor.



Push the gear control selector to the stop and release the hydraulic distributor, removing the modulating solenoid valve from the housing (5).

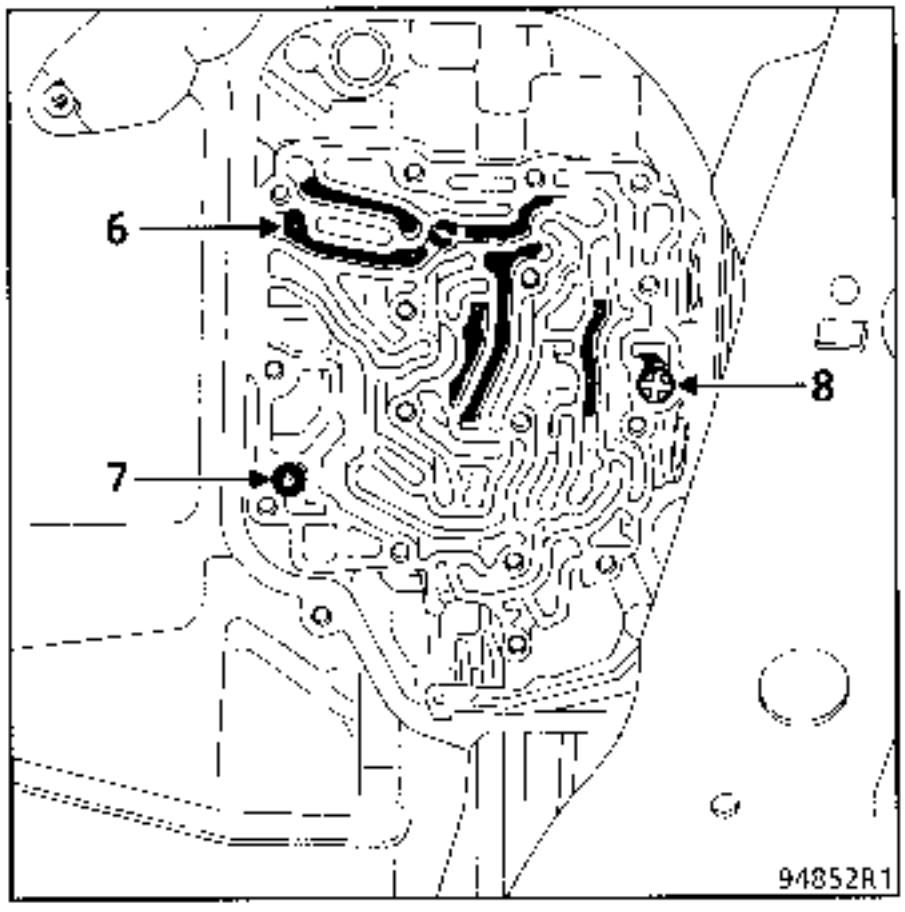


Ensure the inserts (6) and the filter (7) remain in position in the hydraulic network on the housing.



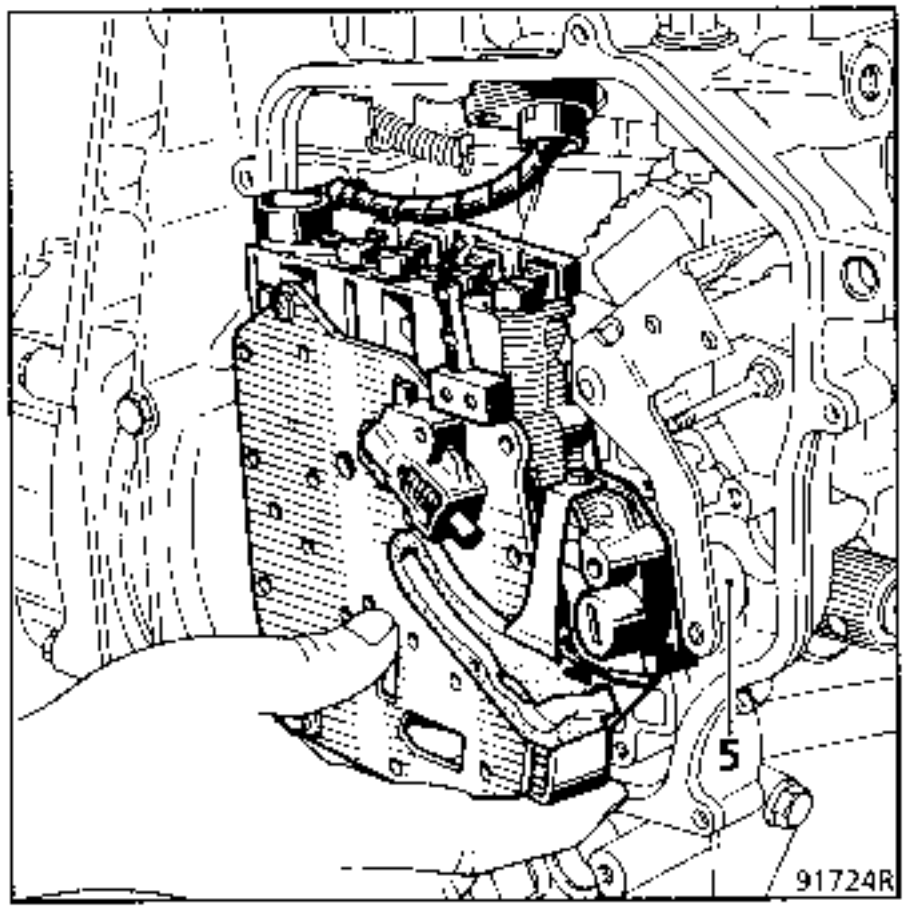
REFITTING

Ensure the supply pipe for F1 (8) the filter for the modulating solenoid valve (7) and the inserts in the network (6) are present.

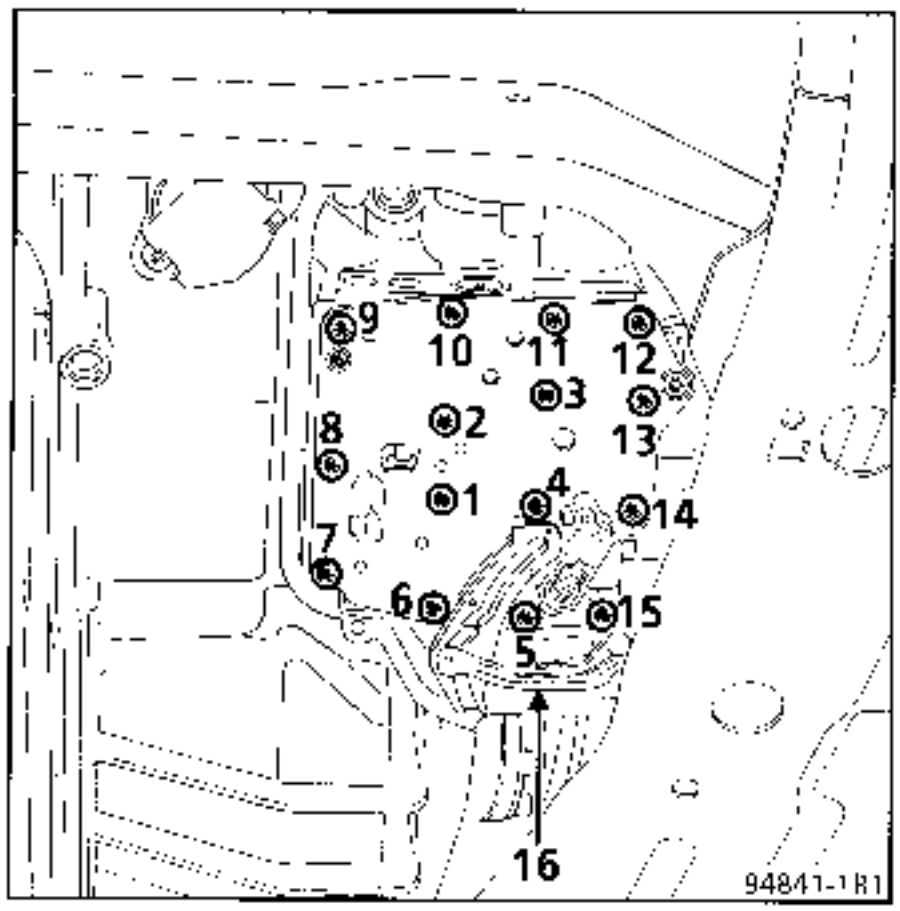


Fit the hydraulic distributor.

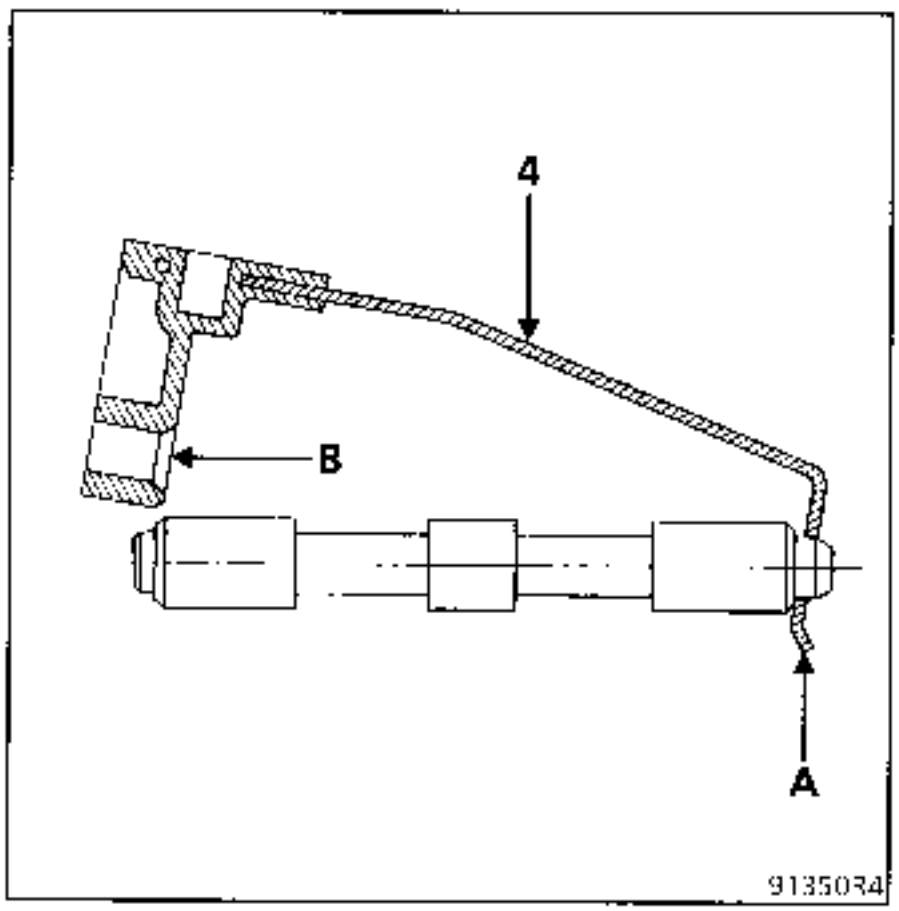
Push the gear control selector to the stop, taking care to correctly fit the modulating solenoid valve into the housing (5).



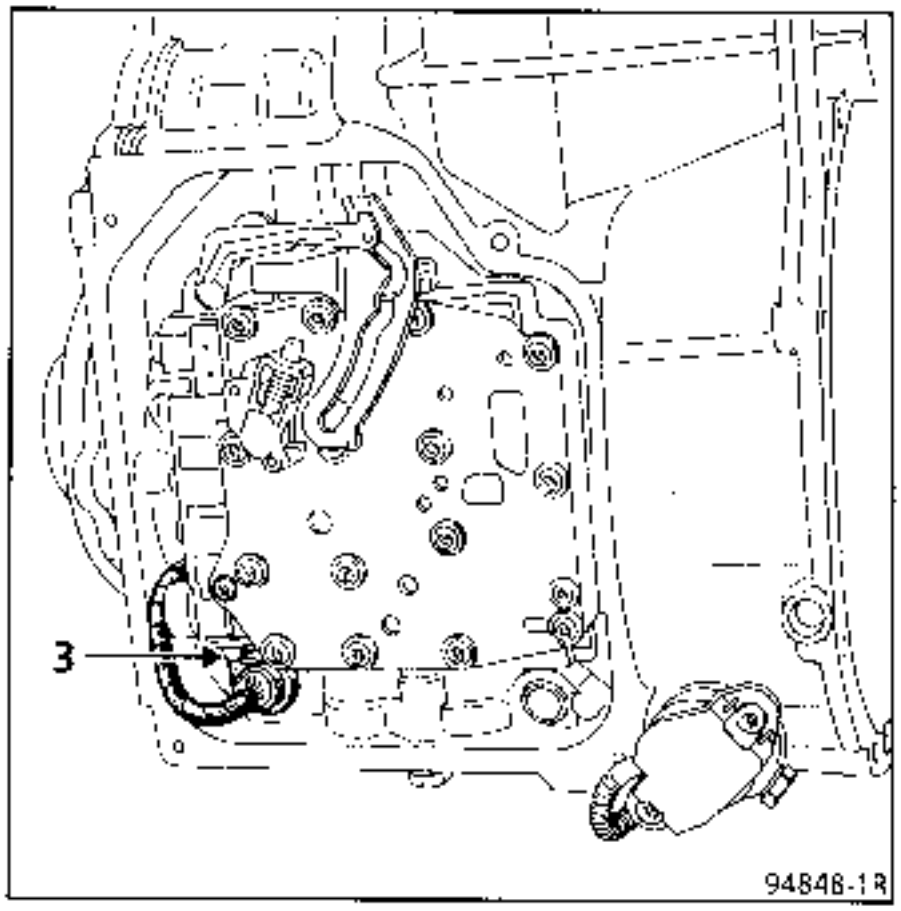
Fit the 16 distributor mounting bolts on the housing and torque tighten them to **0.5 daN.m** in the order shown.



Fit the manual valve and the selector (**4**) fitting it first at (**A**) then at (**B**).

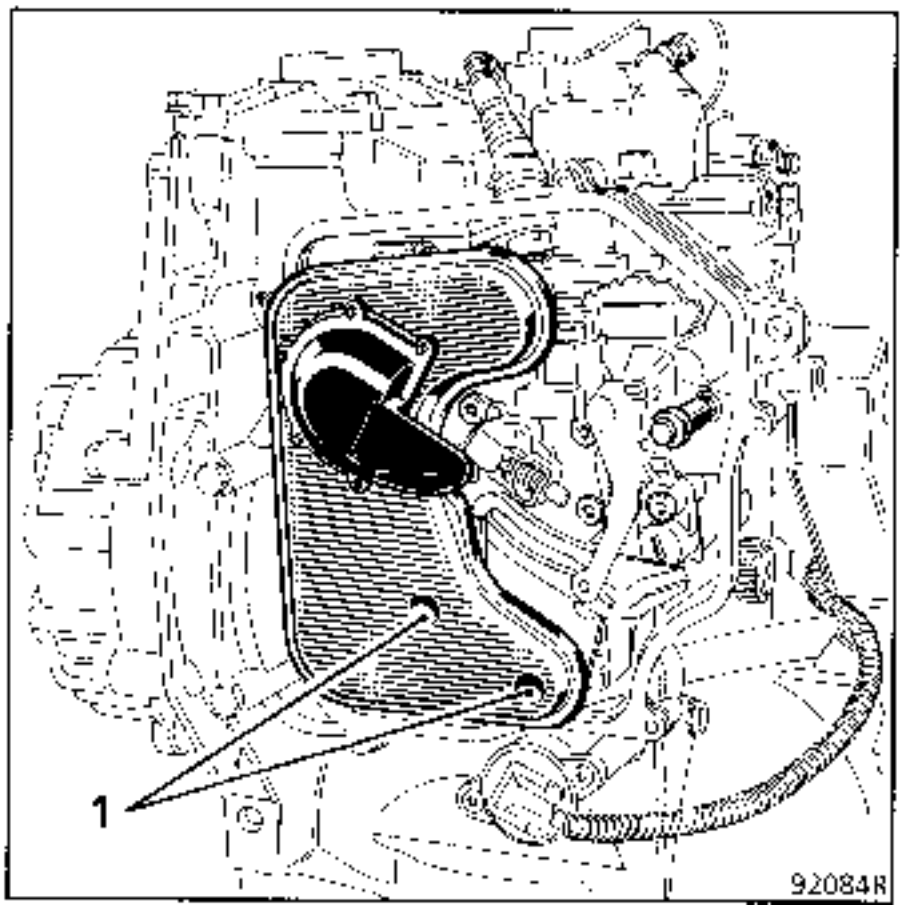


Refit the sealed connector with its O ring and bolt (**3**).



Fit a new strainer and seals.

Torque tighten to **0.5 daN.m.**



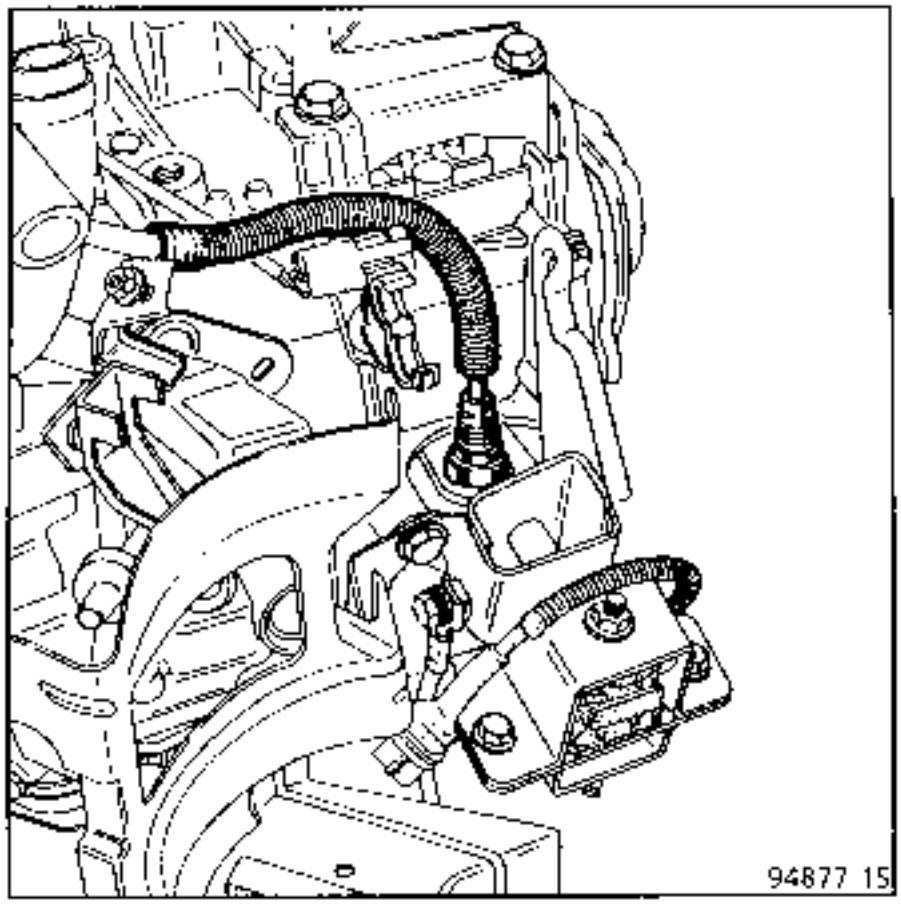
Fit the sump (check the seals are in good condition and the magnet is present).

Tighten the bolts to a torque of **1 daN.m**.

Refit the automatic transmission (see section "**Replacing the strainer**").

Reconnect the sealed connector.

Refit the gear selector.



Refit the control cable.

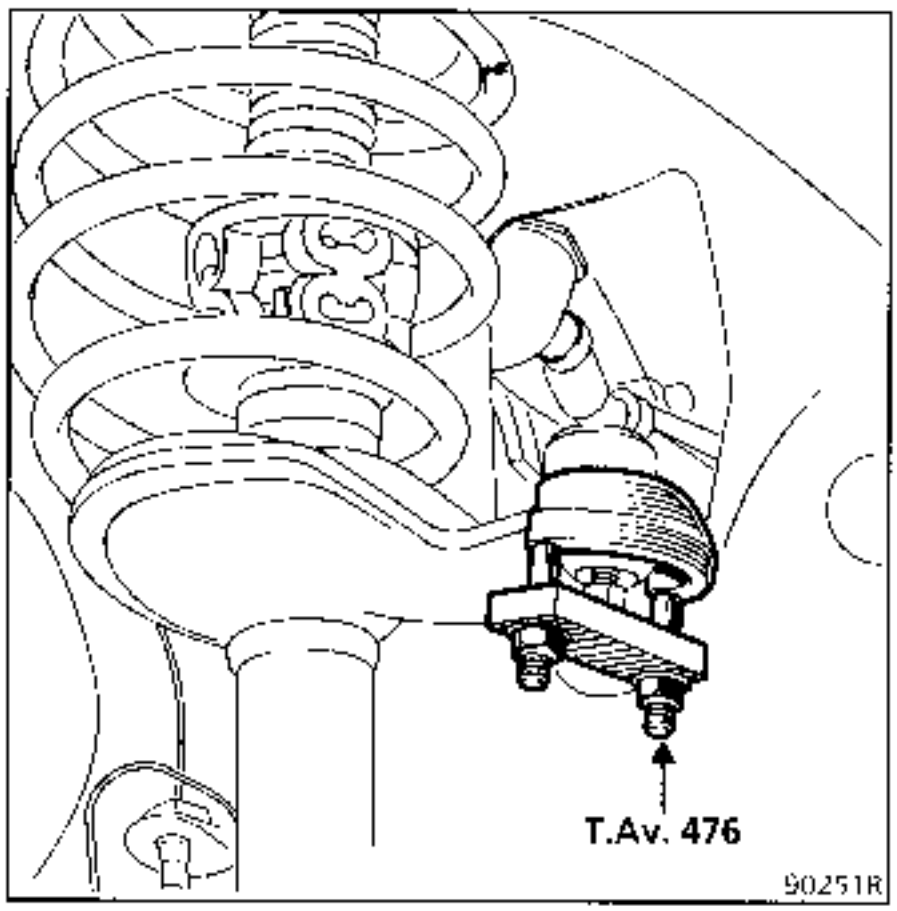
Fill the transmission with oil and check the level.

NOTE : each time the hydraulic distributor is replaced or removed, renew the modulating solenoid valve filter.

TIGHTENING TORQUES (in daN.m)	
Wheel bolts	9
Shock absorber mounting nut	20
Track rod end nut	4

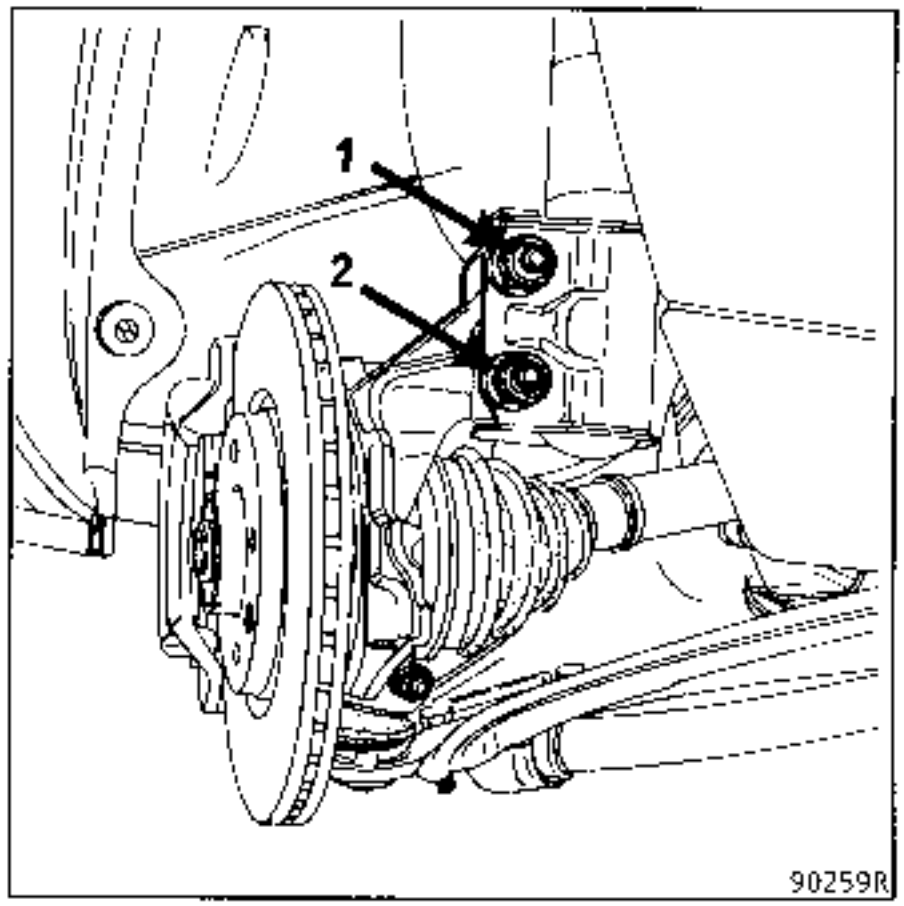
Drain the final drive section then, depending on the side in question:

- remove the front wheel,
- remove the driveshaft roll pin using tool **B.Vi. 31-01.**
- disconnect the track rod end (tool **T.Av. 476**).

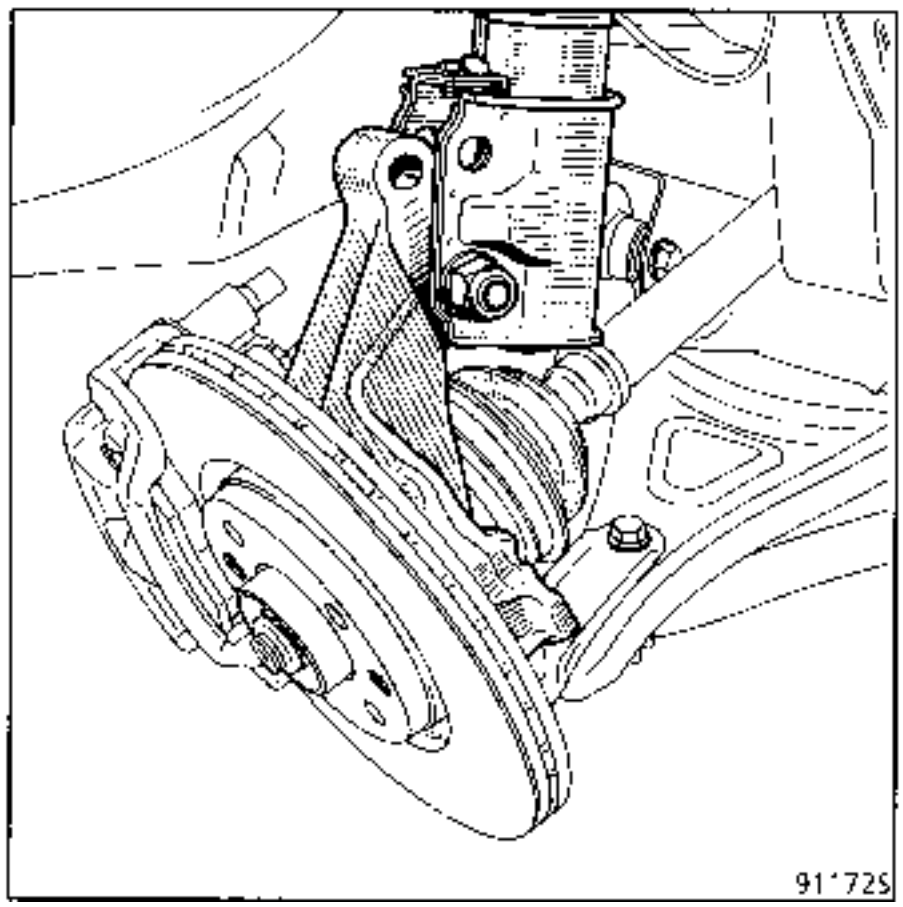


On the right or left hand side, slacken the lower shock absorber base mounting bolts (**2**) and remove the upper bolts (**1**).

NOTE : the bolts have a splined section so a mallet must be used to remove them.



Tilt the stub axle carriers and release the driveshaft from the sunwheel.



SPECIAL TOOLING REQUIRED		
B.Vi.	951	Tool for fitting differential seal

TIGHTENING TORQUES (in daN.m)	
Cover plate bolt	2

REMOVAL

Remove the O rings for the sunwheels and the differential cover plate bolts.

Using a small hammer, knock the right hand sunwheel in order to remove the cover plate.

Take care not to let the differential fall during this operation.

Remove the two deflectors and the two lip seals.

REFITTING

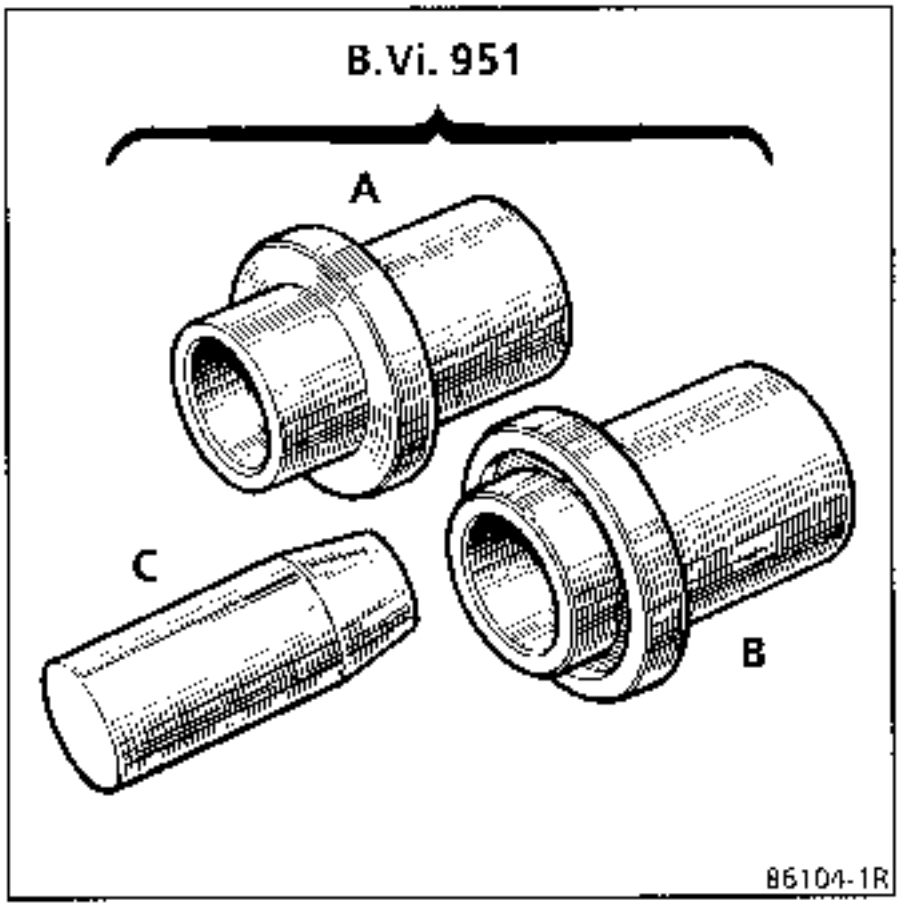
Refit:
- the two deflectors,
- the differential,
- the cover plate with a new O ring; torque tighten the cover plate bolts.

The lip seals are refitted using tool **B.Vi 951** which comprises:

A Tool for fitting the seal at the cover plate end.

B Tool for fitting the seal at the end opposite to the cover plate.

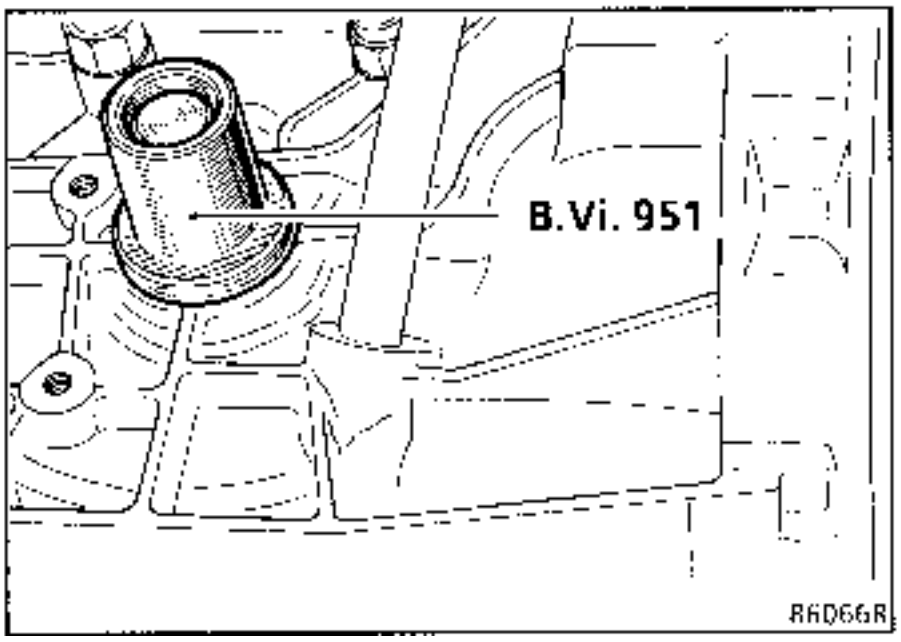
C Protective sleeve which must be lubricated before use.



METHOD

Plate end
Fit the sleeve (**C**) to the sunwheel, fit the seal to the sleeve and position the seal using tool (**A**).

Opposite end to plate
Proceed in the same manner, but use tool (**B**) to position the seal.



NOTE : on automatic transmissions **MJ3-800** and **801**, the right and left hand differential output seals have been modified.

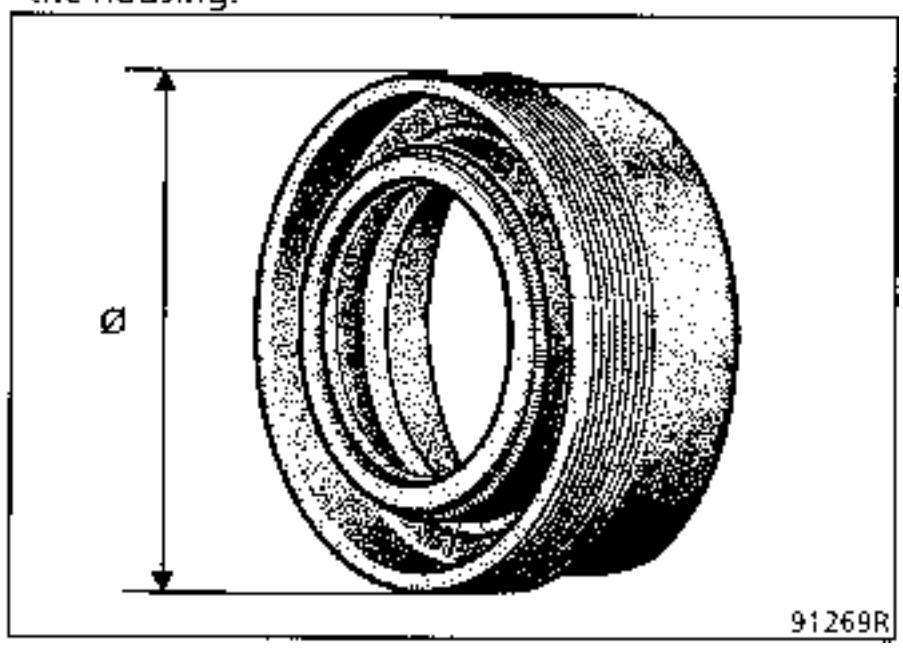
Marks on the lip of each of the seals identify the right and left hand sides.

They are marked according to the outer diameter (∅).

The right hand seal measures **43.7 mm**, the left hand seal measures **45.2 mm**.

This new assembly only applies to the transmissions specified above. Other transmissions have right and left hand seals which are identical, with an external diameter of **42.2 mm**.

Seals of diameter **42.2 - 43.7 - 45.2** are fitted using tool **B.Vi. 951** which positions them correctly in the housing.



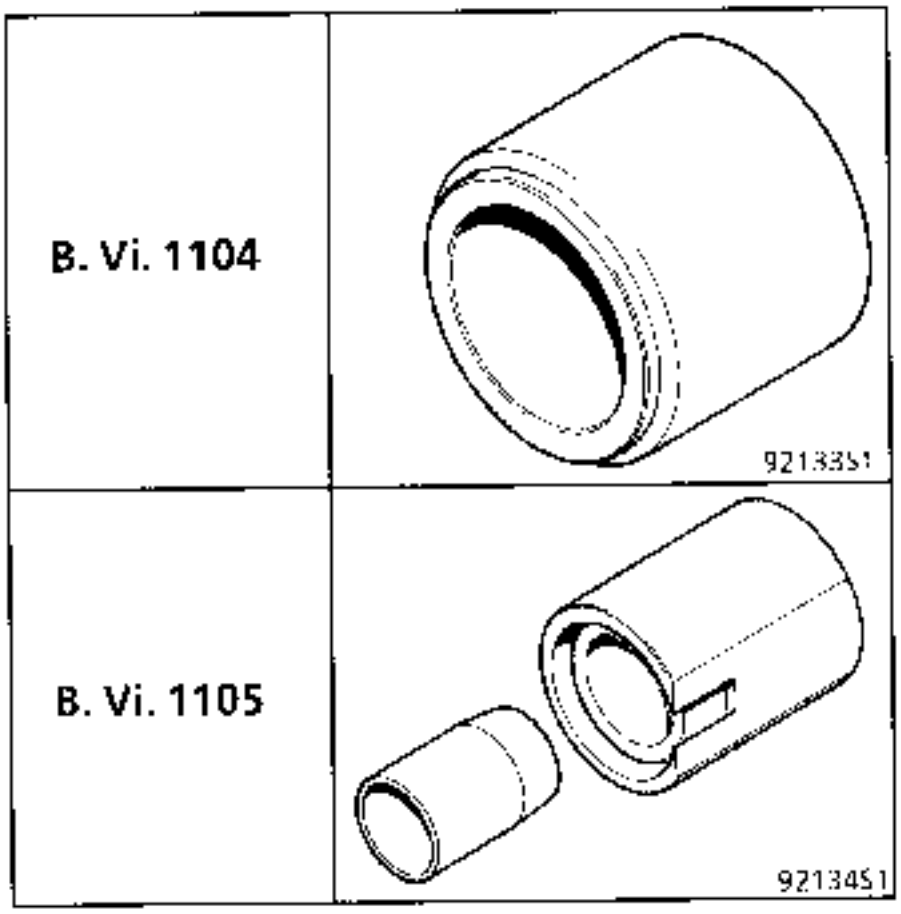
SPECIAL TOOLING REQUIRED	
B.Vi. 1104	End piece for fitting left hand seal
B.Vi. 1105	End piece for fitting right hand seal

Remove the driveshaft O ring and the lip seal from the differential output using a screwdriver.

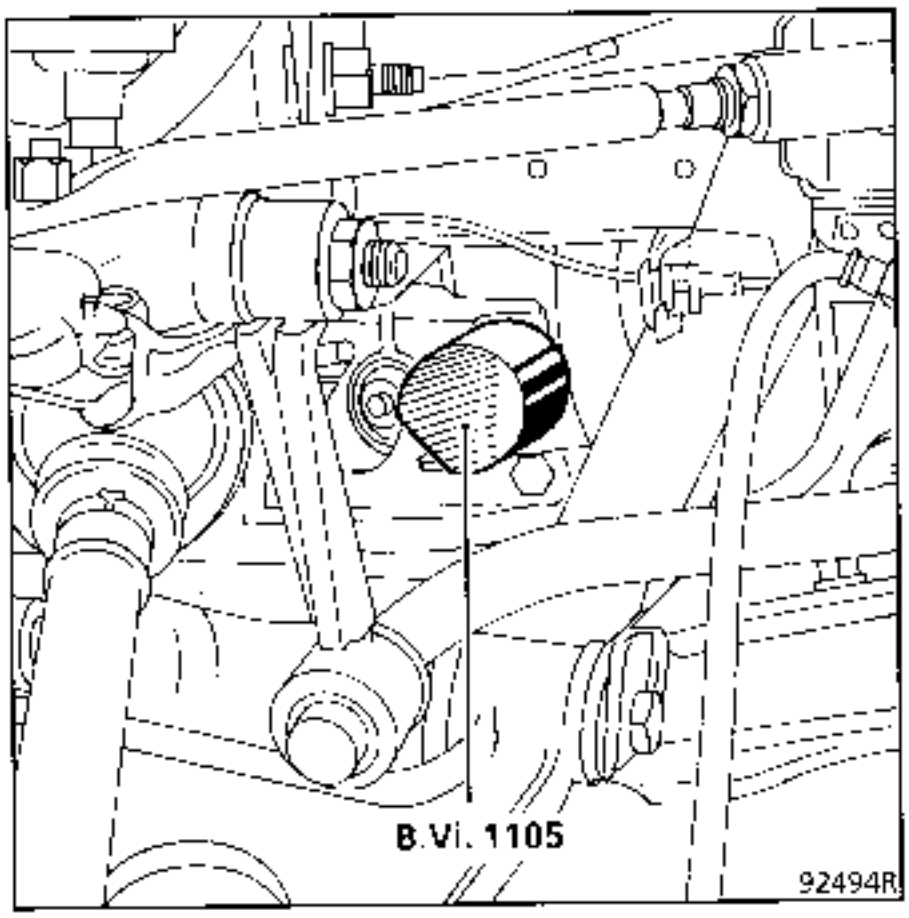
Carefully clean the sunwheel before fitting a new seal.

To fit the left hand seal, use tool **B.Vi. 1104** and push it into position until it is right up against the housing.

To fit the right hand seal, use tool **B.Vi. 1105** and its protective nose and push it into position until it is right up against the housing.



Each of the seals should be lubricated before fitting.



Refit the driveshaft O ring using the protective nose from tool **B.Vi. 1105**.

Coat the splines of the seal at the gearbox end with **MOLYKOTE BR2**.

Position the driveshaft in relation to the sunwheel and engage it. Check its position using the angled pin from tool **B.Vi. 31-01.**

Fit two new roll pins using tool **B.Vi. 31-01**. Seal the roll pin holes using **RHODORSEAL 5661**.

An inlet chamfer on the sunwheels makes fitting the new roll pins easier.

Refit the various components of the front axle assembly.

Fill the final drive section with the recommended oil.

1) **Replacing a left or right hand seal**

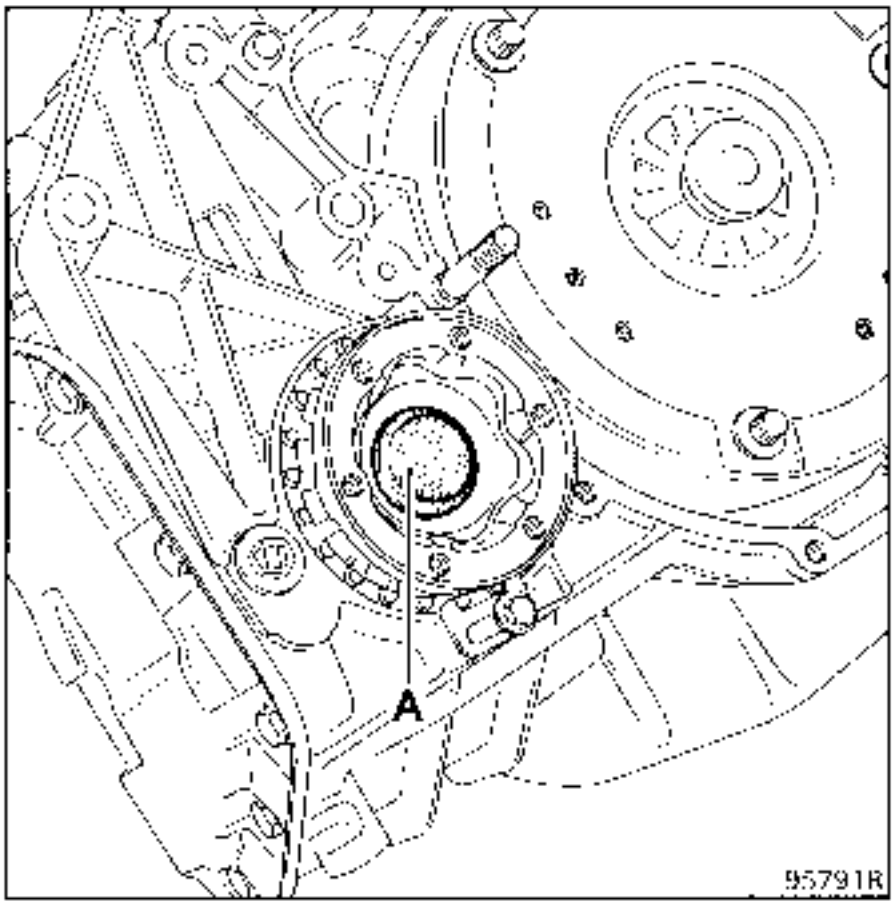
SPECIAL TOOLING REQUIRED		
B.Vi.	1255	Tool for removing sunwheel output flanges
B.Vi.	1322	Tool for fitting differential output seal

Left hand side

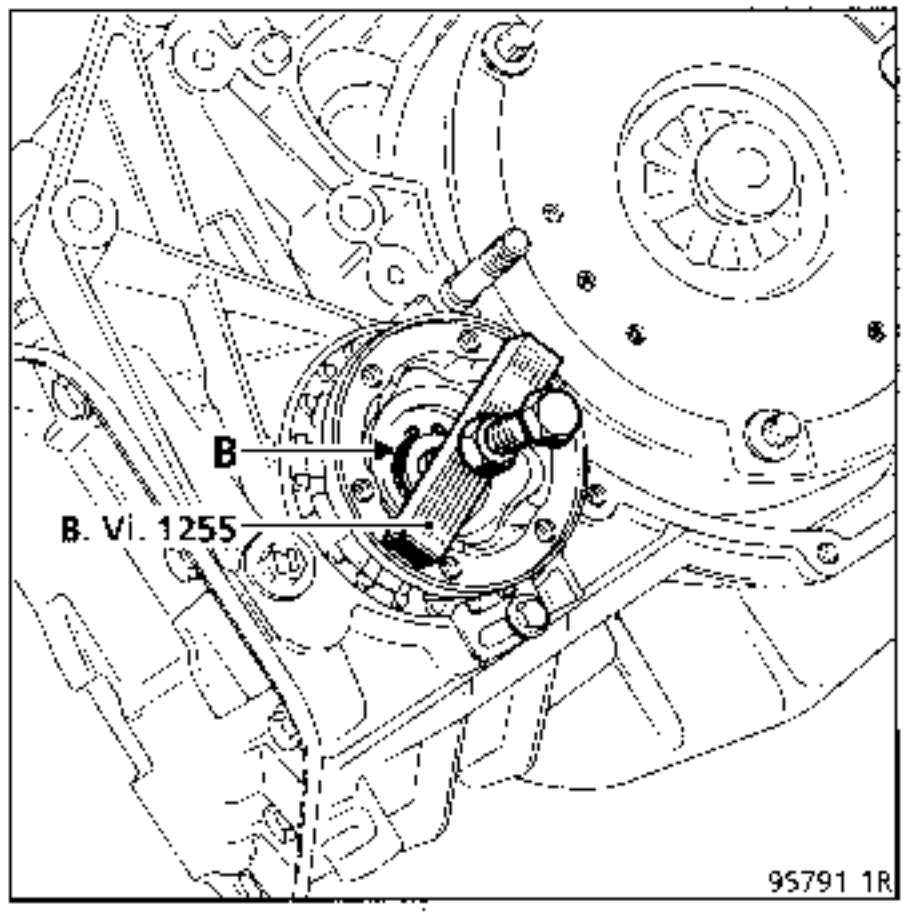
REMOVAL

Remove the grease from the flange.

Using a screwdriver, remove plug (**A**).



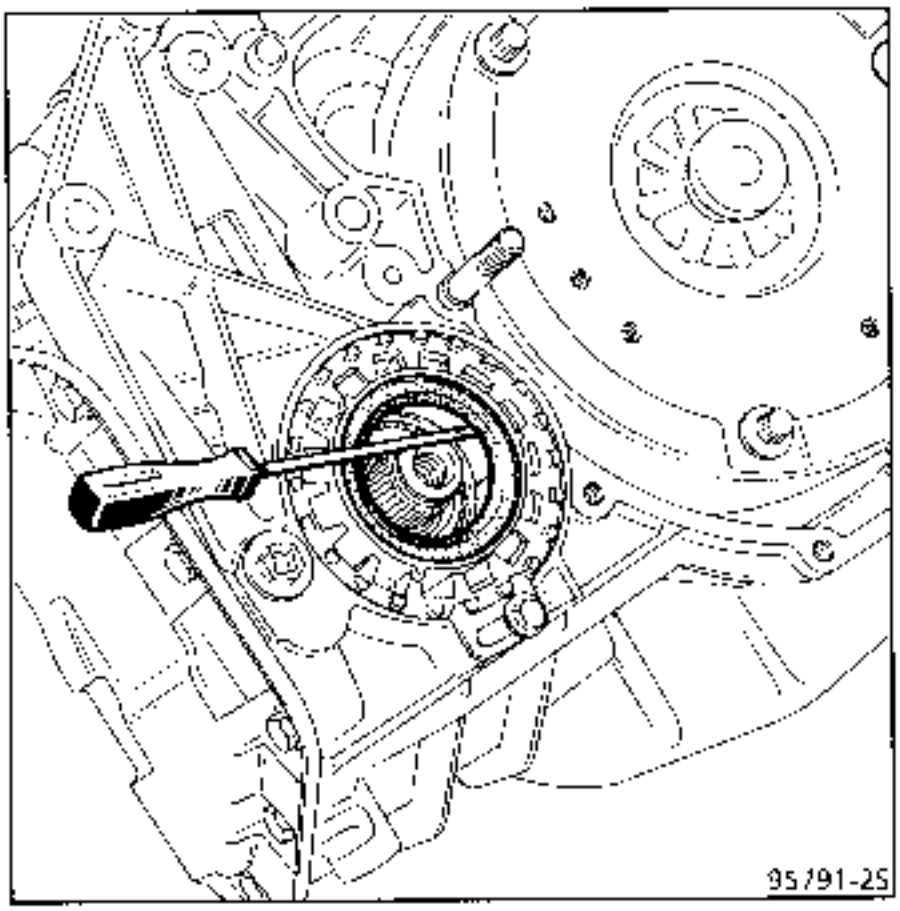
Position tool **B.Vi. 1255** on the flange and compress it until the clip (**B**) is released.



Remove the clip (**B**).

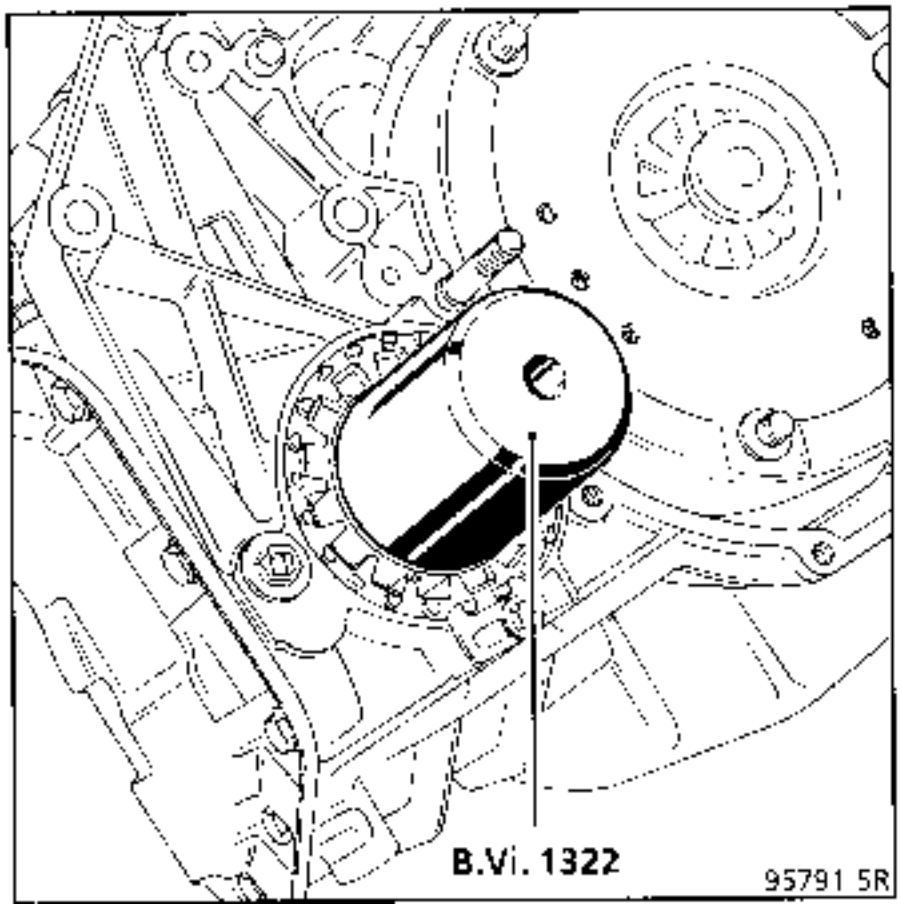
Decompress tool **B.Vi. 125** and release the flange from the sunwheel.

Using a screwdriver, remove the seal, taking care not to damage the housing.

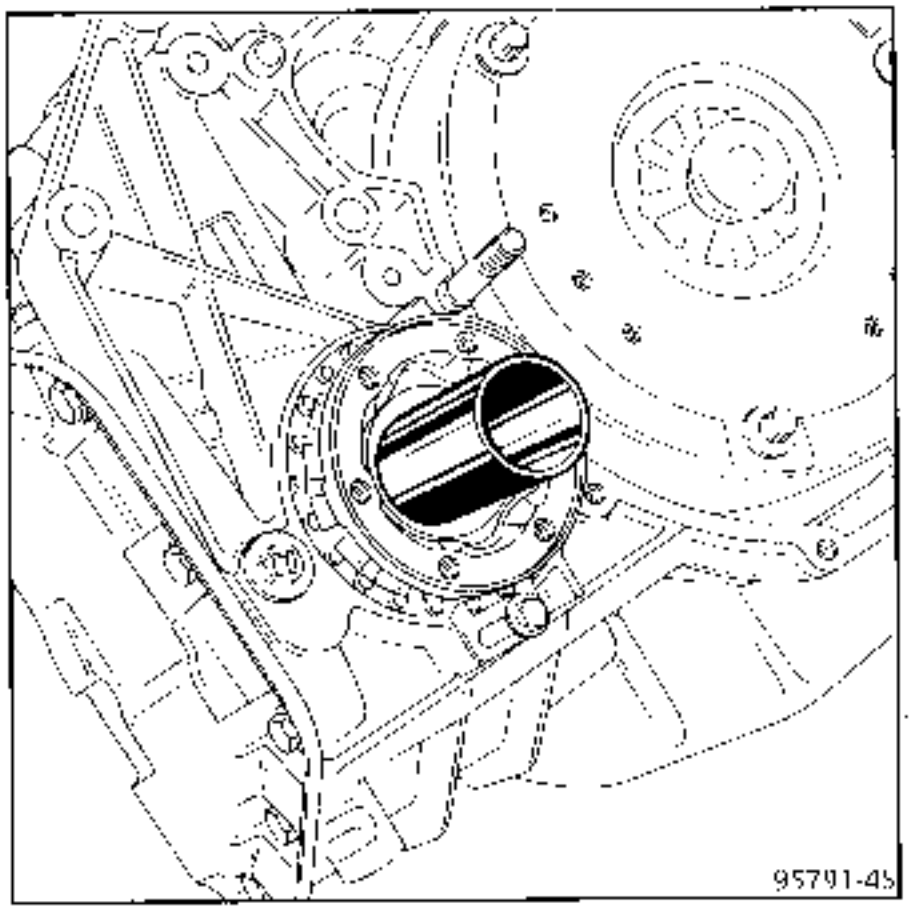


REFITTING

The lip seal (lubricated) is fitted with tool **B.Vi. 1322** (this ensures the seal is correctly located).



Refitting is the reverse of removal:
- the flange with its spring and the cup,
- the clip,
- the plug (new) using a tube of diameter **40 mm**.



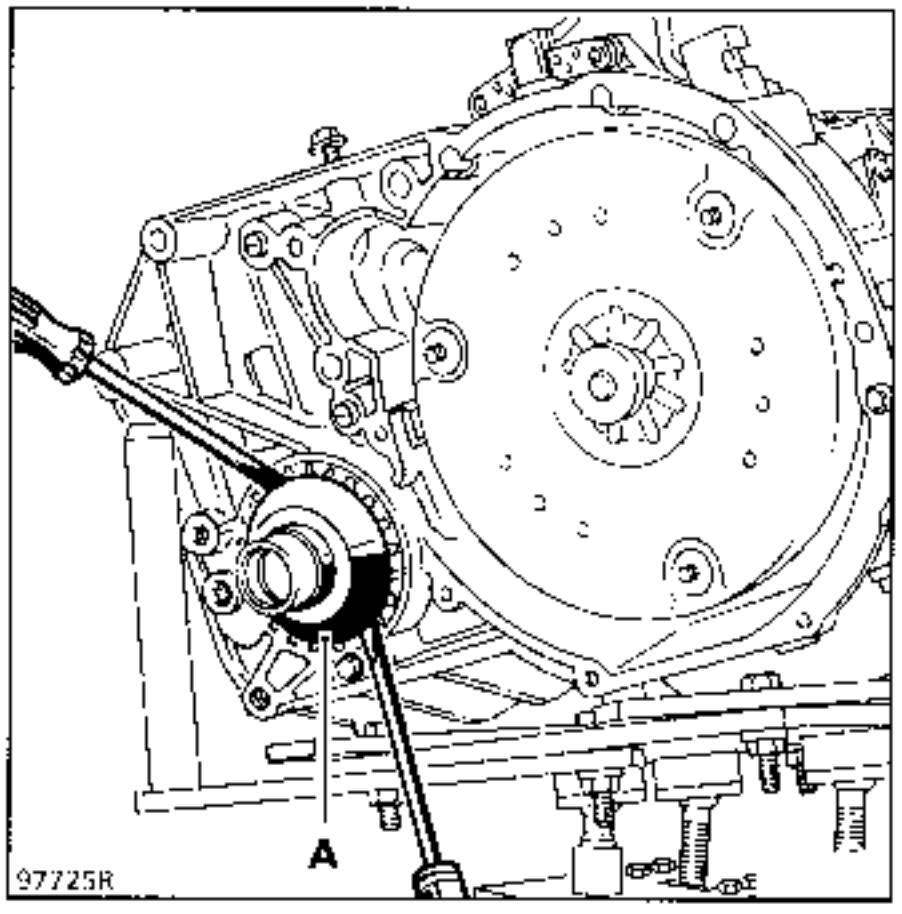
Top up the automatic transmission oil level (final drive section).

SPECIAL TOOLING REQUIRED		
B.Vi.	1322	Tool for fitting differential output seal

Right hand side

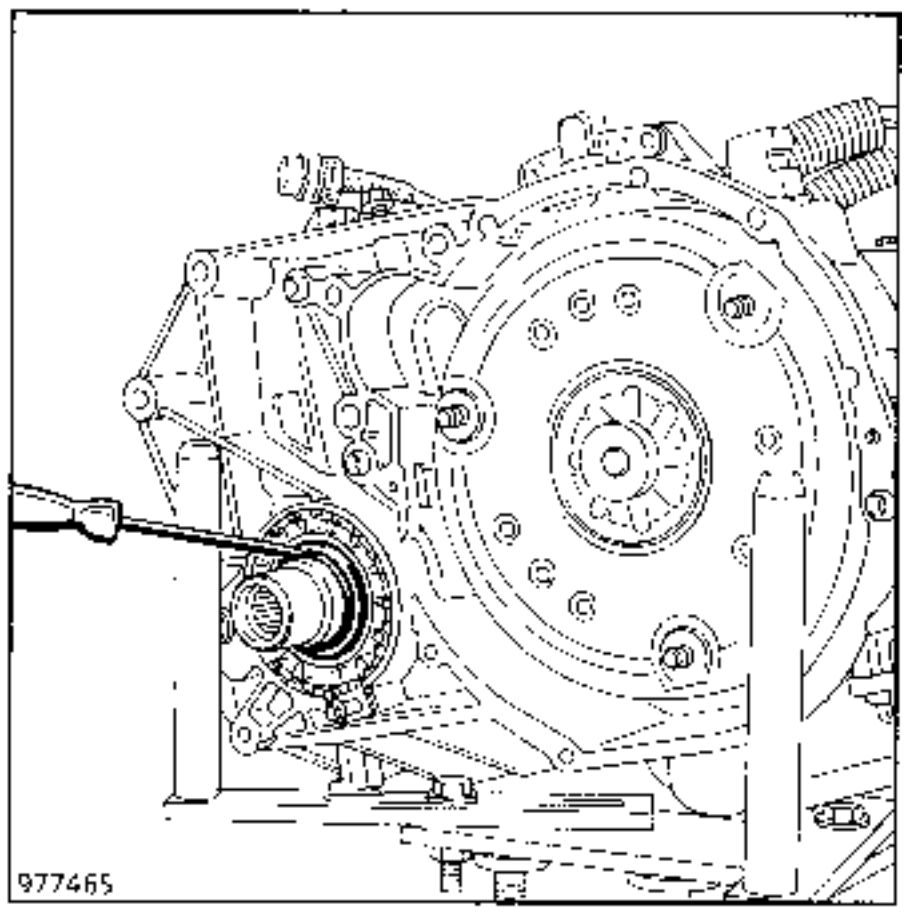
REMOVAL

Using a screwdriver, remove the protective shield (**A**).



The shield is press fitted.

Using a screwdriver, remove the seal, taking care not to damage the differential bolt or the transmission output shaft.



2) Replacing an O ring

The principle is the same for both sides, **but only one side should be removed at a time.**

The operation to replace the O ring is the most delicate, as the operating affects the differential bearings adjustment. To avoid unnecessary removals, try to locate the leak by cleaning the component then carrying out a road test.

SPECIAL TOOLING REQUIRED	
B.Vi. 1323	Tool for fitting differential output seal

a) Drain the final drive and remove the flange.

b) Mark the position of the nut (F) in relation to the housing by making a mark on one tooth and opposite on the housing.

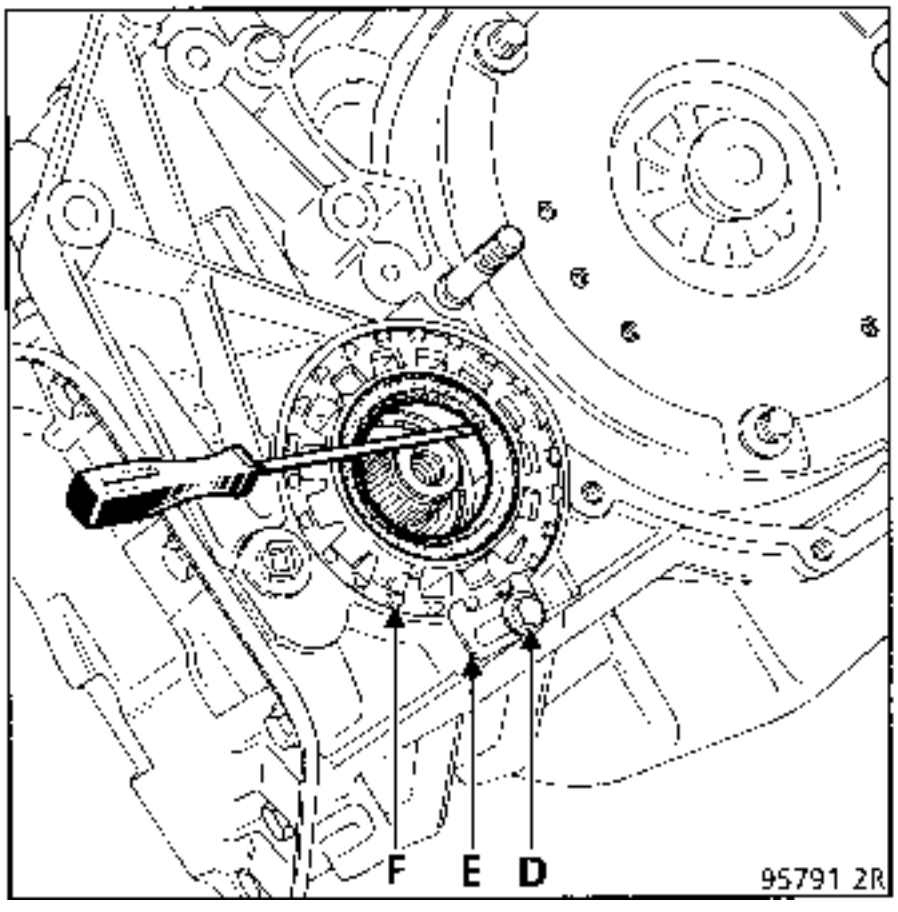
c) Remove bolt (D) and the locking bracket (E) for the nut using tool B.Vi. 1323, remove the nut, counting the number of turns used.

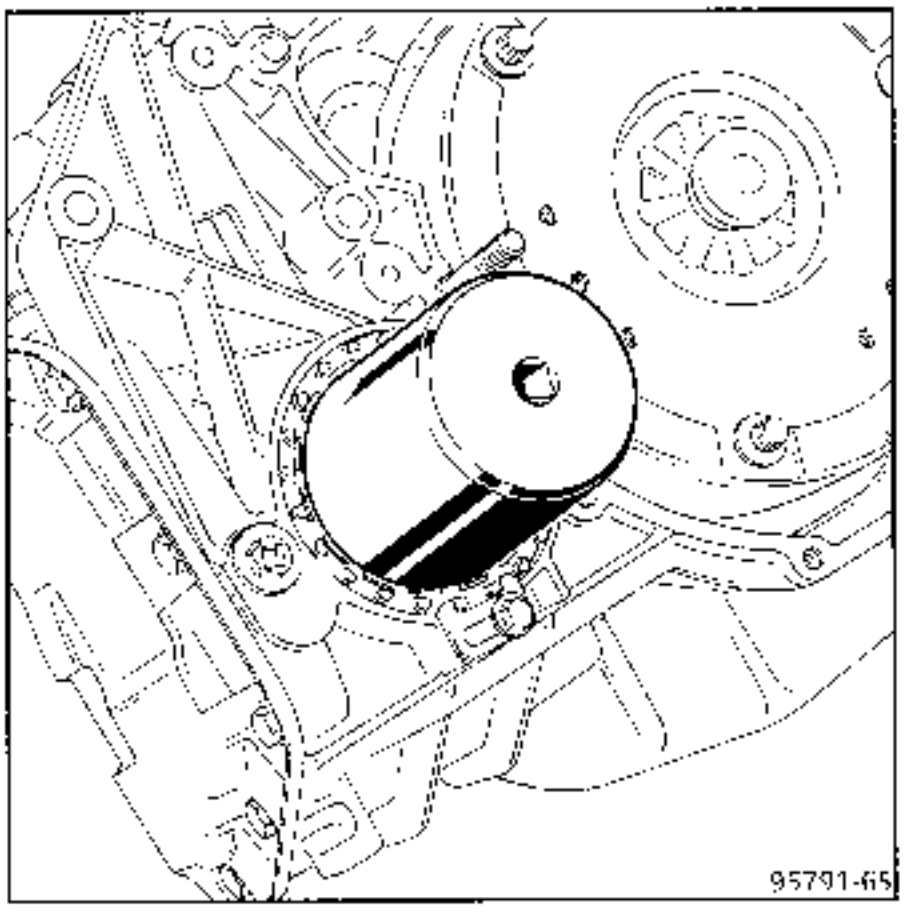
d) Replace the O ring on the nut, after cleaning the seal bearing face and lubricating the new seal with final drive oil.

e) Refit the nut, using the same number of turns counted on removal. Align the reference marks made on the nut and the housing. Refit bolt (D) and the locking plate (E).

f) Refit the flange after replacing the lip seal if necessary.

g) Fill the final drive with oil.





POTENTIOMETER FAULT

The kickdown switch is integral in the load potentiometer.

The computer provides load potentiometer fault information.

A fault with the load potentiometer is indicated by fixed gear change thresholds, irrespective of the position of the accelerator pedal.

1 ↗ 2 ↘ 1		2 ↗ 3 ↘ 2	
38	25	65	45

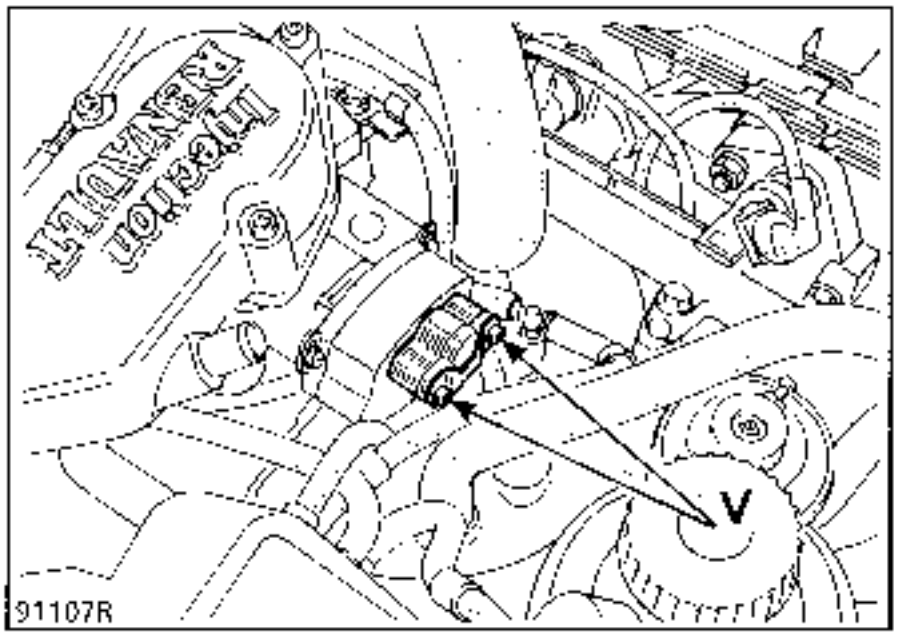
SPECIAL TOOLING REQUIRED		
B.Vi.	958	Test kit

INSTRUCTION

Vehicle stationary, ignition off.

Check the accelerator cable is correctly adjusted.

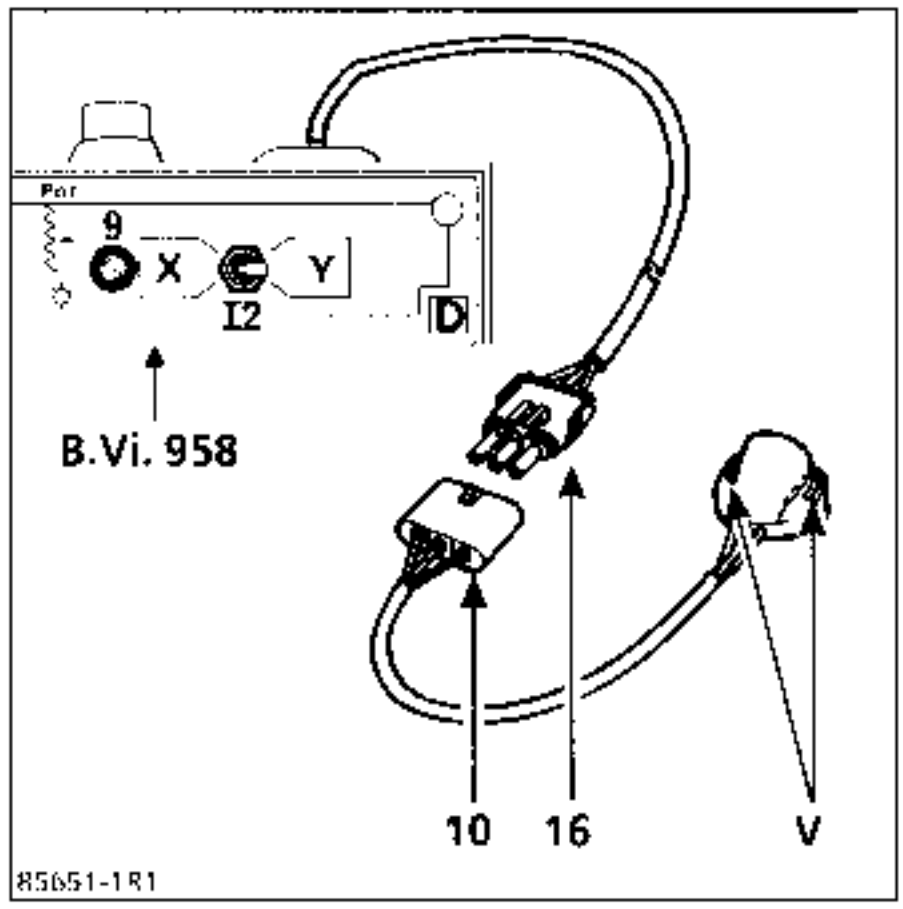
Disconnect the 3 track connector (**10**) for the wiring connecting the computer to the potentiometer.



Connect connector (**10**) for the potentiometer to that for tool **B.Vi. 958 (16)**.

Supply tool **B.Vi. 978** from the battery.

Switch (**12**) on (**Y**).



CHECKING

Depress accelerator pedal fully	WARNING LIGHT 9
CORRECT	
INCORRECT or badly adjusted	

ADJUSTMENT

Slightly slacken the two potentiometer mounting bolts (**V**).

Keep the throttle held open by the accelerator pedal and turn the potentiometer slowly to illuminate the warning light (**9**) then retighten the two bolts (**V**).

If the warning light (**9**) cannot be illuminated by this adjustment, check its wiring and if the potentiometer is faulty, replace it.

The potentiometer must be be adjusted whenever it is replaced or removed.

NOTE : the potentiometer must be fitted to the throttle body when the engine is running at idle speed. In any other position there is a risk of damaging the injection full load switch.

Connect the **XR25** to the vehicle's diagnostic socket.

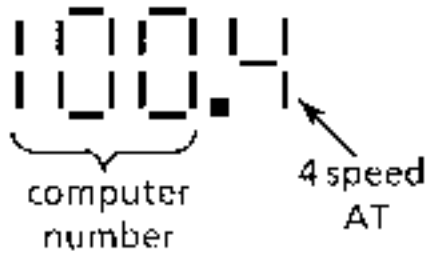
Turn the ignition on but do not start the engine.

Enter the code for the transmission

"**A**" : D 0 4

The display shows the number of the computer.

Example :



Enter: # 0 2

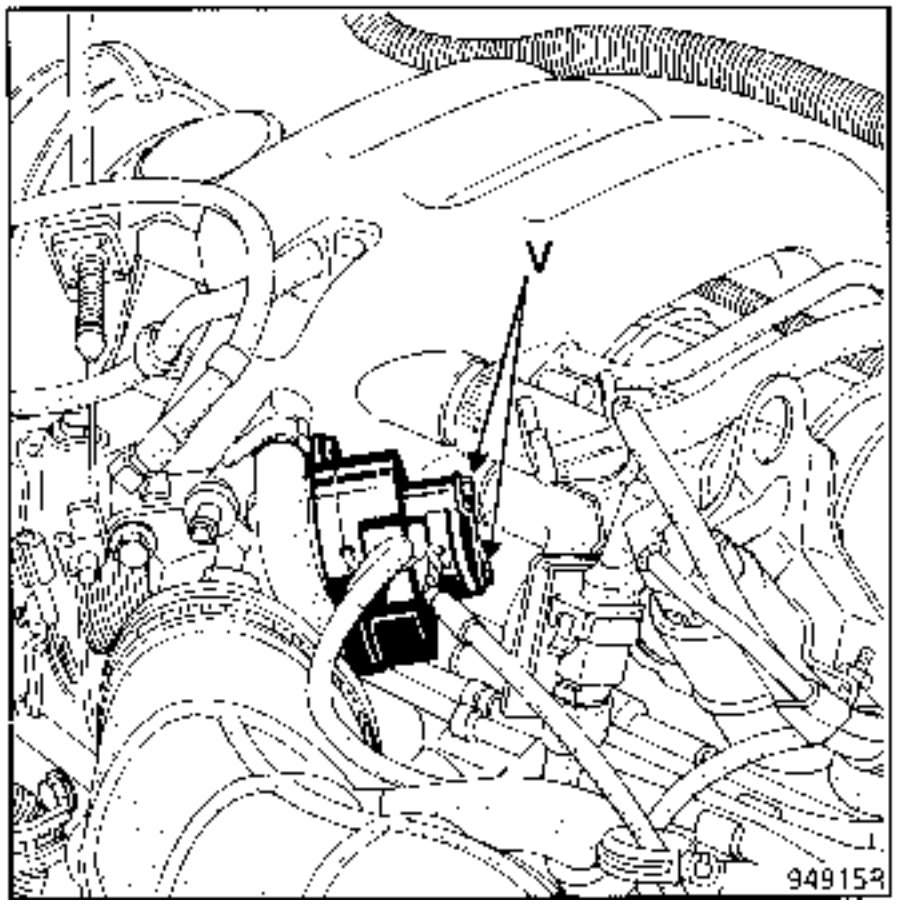
The display shows the value in **%** of the potentiometer adjustment.

Example : 89.2

ADJUSTMENT

- **Engine**

Slacken the potentiometer mounting bolts (**V**).



Accelerator pedal not depressed, rotate the potentiometer body until the display shows a value between **89.7** and **92.1**.

Tighten the mounting bolts (**V**) (if adjustment is impossible, check the drive).

VERY IMPORTANT

NOW ERASE THE MEMORY AND PROGRAMME THE "FULL LOAD" VALUE.

Adjustment values:

Vehicle type	AT type	Potentiometer type	Adjustment values (check using XR25)	
			No load	Full load
X48 C/K X48 3 (BOSC injector)	AR4	**BENDIX** single track potentiometer	89.7 % to 92.1 % (# 02) (no correspondence with injection)*	Value < 6 % for # 12
X48 3 (BENDIX injector) X48 2/E	AR4 AD4	**BENDIX** single track potentiometer	89.7 % to 92.1 % (# 02) (no correspondence with injection)*	- Kickdown switch on accelerator cable (value 0 for # 22) - Value < 6 % en # 12

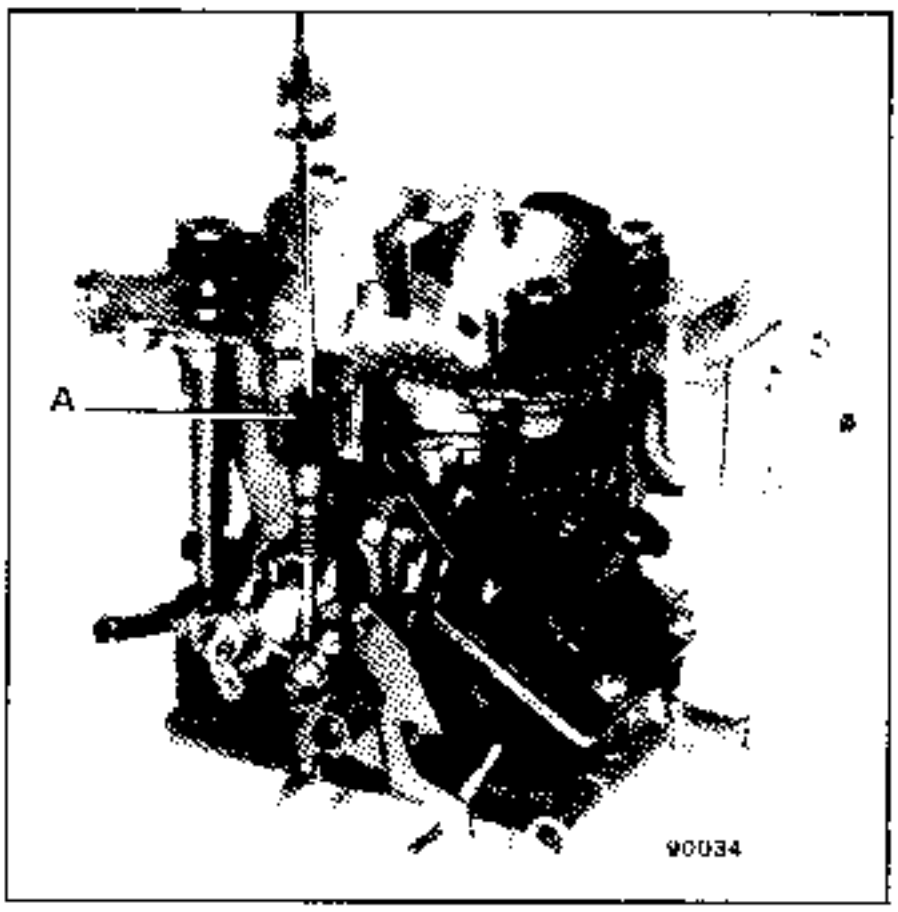
* Note that the automatic transmission computer only declares the potentiometer faulty if the no load value is less than **89 %** and greater than **98 %** for **# 02**.

- **F2N engine**

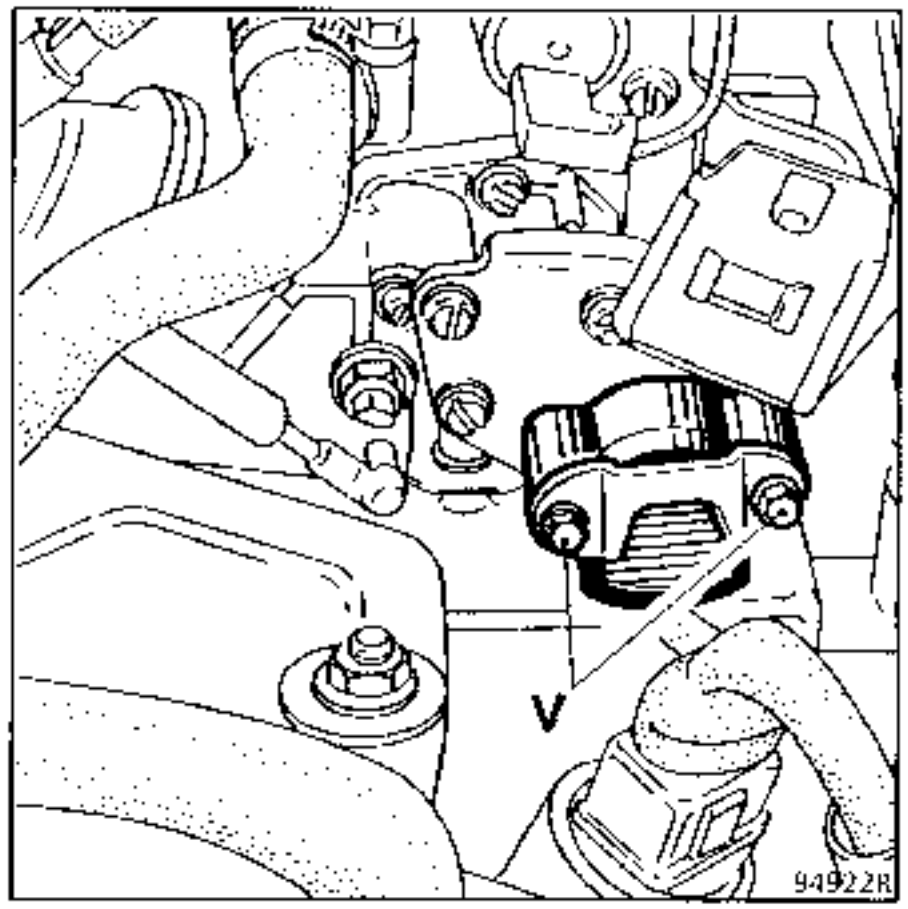
THE LOAD POTENTIOMETER IS SPECIFIC TO THIS ENGINE. IT HAS A LONGER TRACK. IT IS NOT INTERCHANGEABLE WITH ANY OTHER TYPE OF POTENTIOMETER.

Remove the carburettor cover.

Completely slacken the idle screw (A) until the butterfly shuts completely.



Slacken the potentiometer mounting bolts (V).



Rotate the potentiometer body until the display shows a value between **89.7** and **92.1**.

Retighten the mounting bolts (V) (if adjustment is impossible, check the drive).

Refit the carburettor cover.

Adjust the idle speed to **800 ± 50 rpm**, lever in Neutral.

NOW ERASE THE MEMORY AND PROGRAMME THE "FULL LOAD" VALUE.

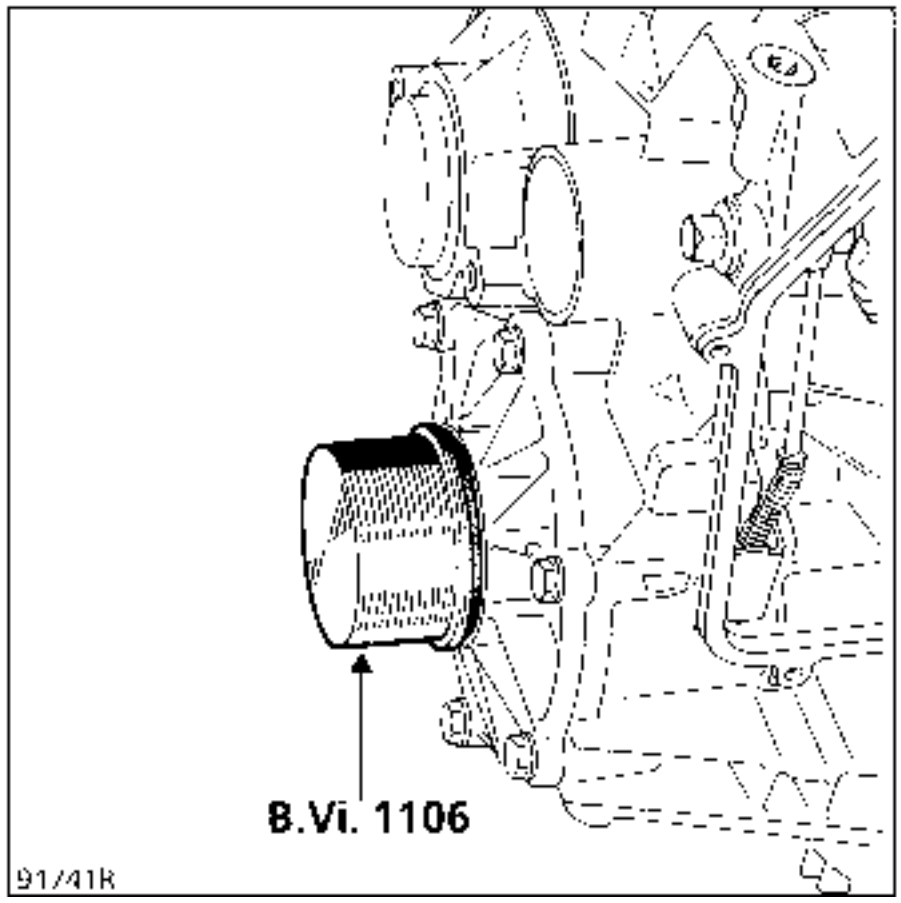
REPLACEMENT

If any oil leaks from the transmission rear plugs (primary and secondary line plugs), they may be replaced without removing the transmission.

Use a screwdriver to remove the plugs.

When refitting, grease the plug (follow the method for replacing a lip seal) and use tool **B.Vi. 1106.**

Push the seal on until it is up against the casing.



SPECIAL TOOLING REQUIRED
B.Vi. 1215-01 Oil pressure gauge

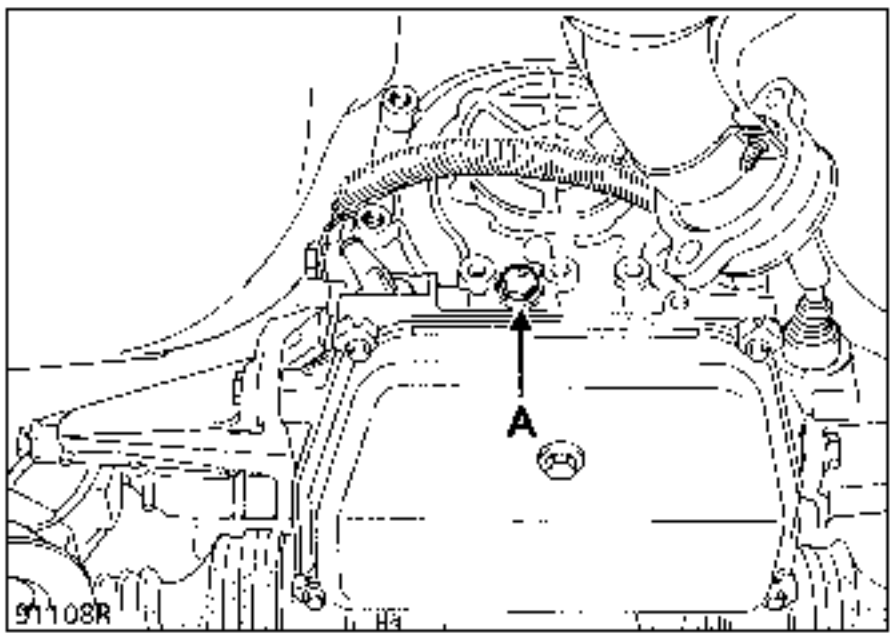
CHECKING

Measuring conditions:

The normal operating temperature is **80 °C**.

Ensure that the accelerator cable is correctly adjusted.

Connect the oil pressure gauge to the end piece at **(A)**.



Measure :

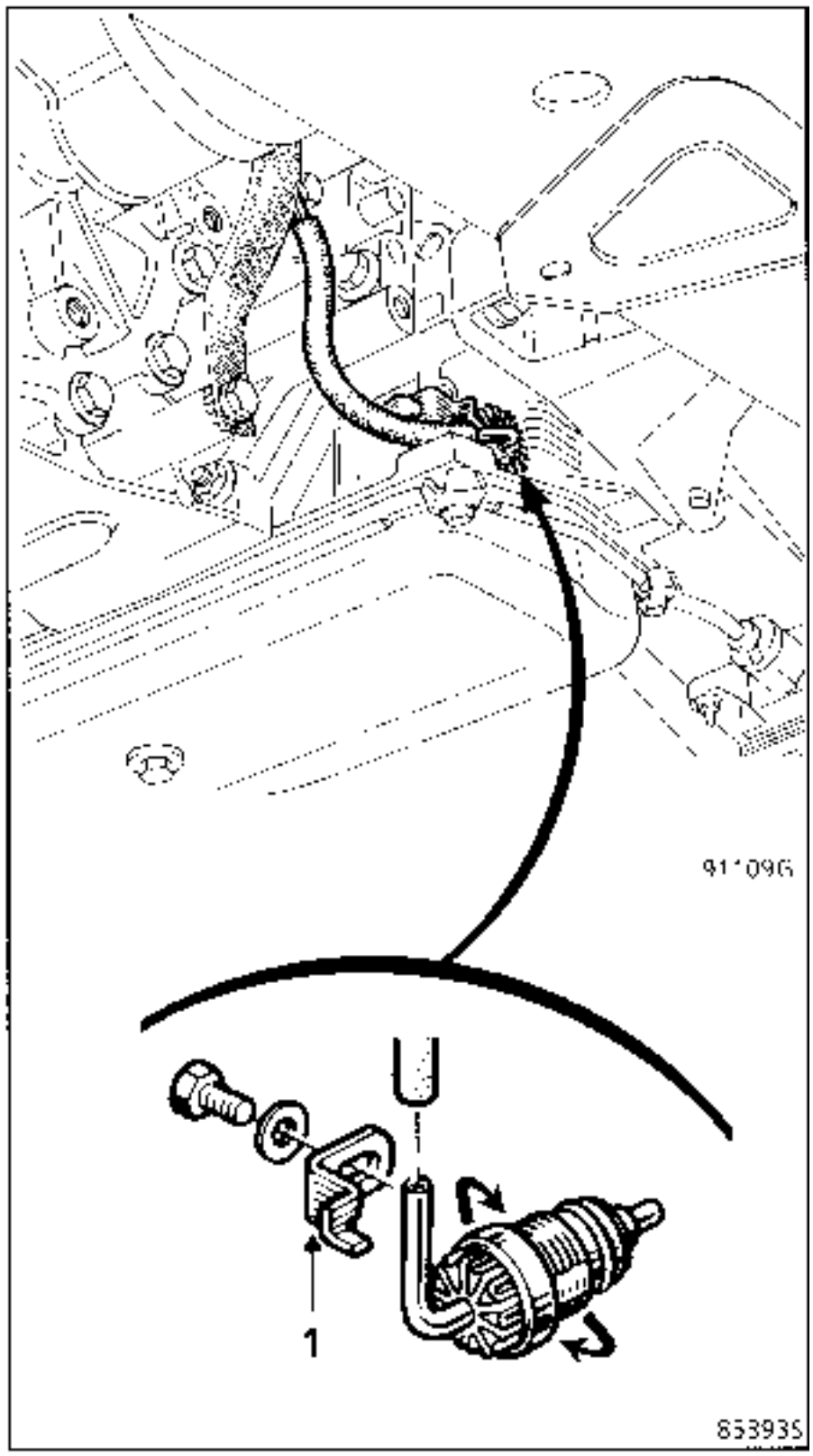
Put the selector lever in **2nd gear hold**.

Accelerate fully and brake at the same time to stabilise the speed at **50 mph** (80 km/h).

The pressure should be : **4.7 ± 0.1 bar**.

ADJUSTMENT

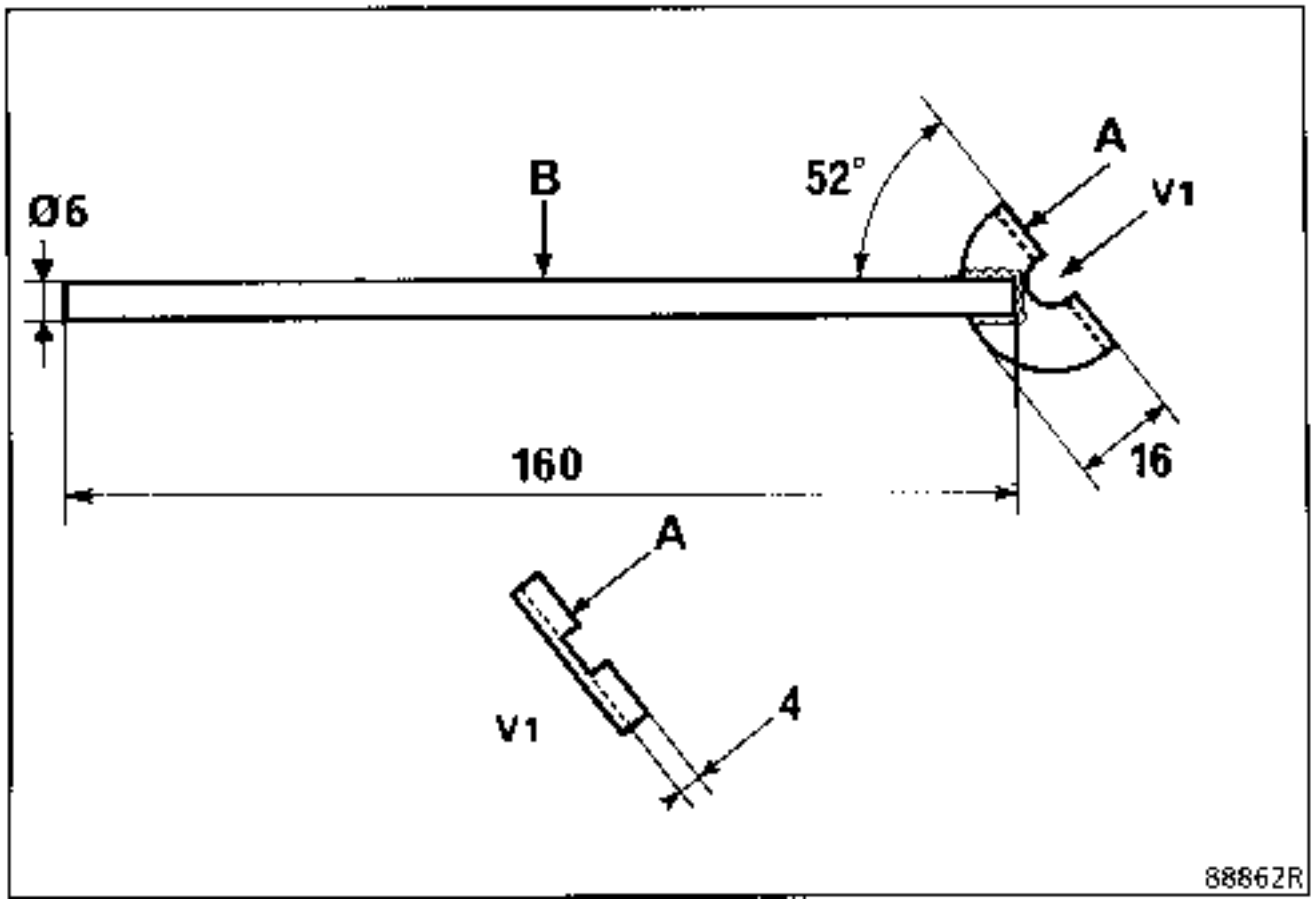
Remove catch (1) and turn the capsule over. The pressure is increased by tightening up the capsule and vice versa.



NOTE : 2 notches ≈ approximately **0.08 bar**.

A tool may be made to facilitate this operation.

A : washer, diameter **8/30 mm**, thickness **1.5 mm**.
B : round rod, diameter **6 mm**.



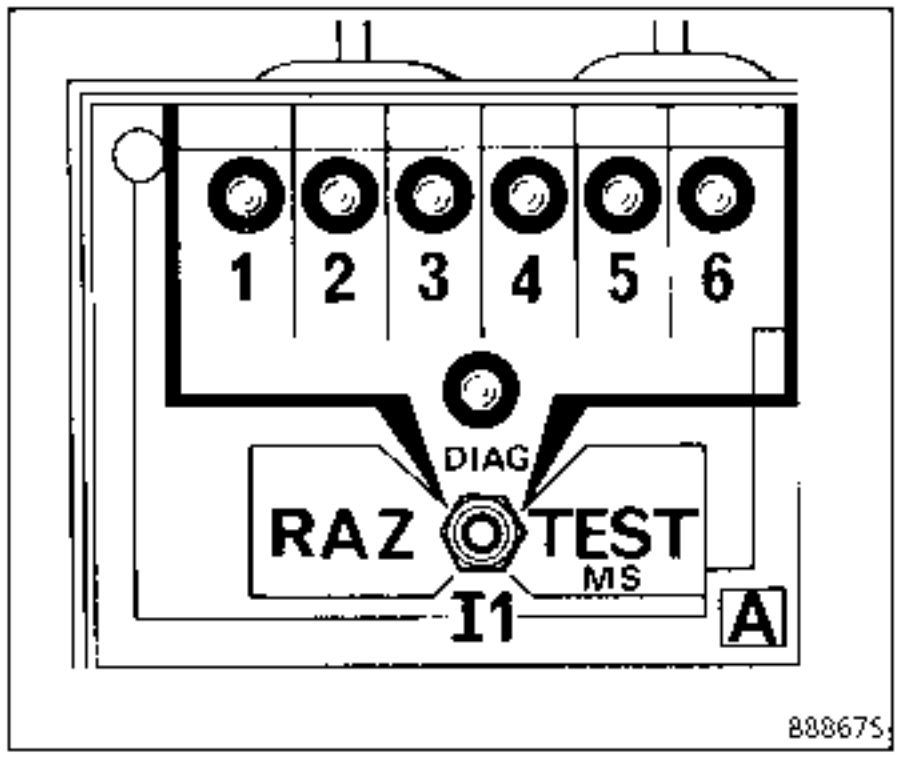


879705

The electronic fault warning light detects faults of an electrical and electronic nature in the automatic transmission and injection systems.

CONSEQUENCE FOR FAULT FINDING USING THE B.Vi. 958

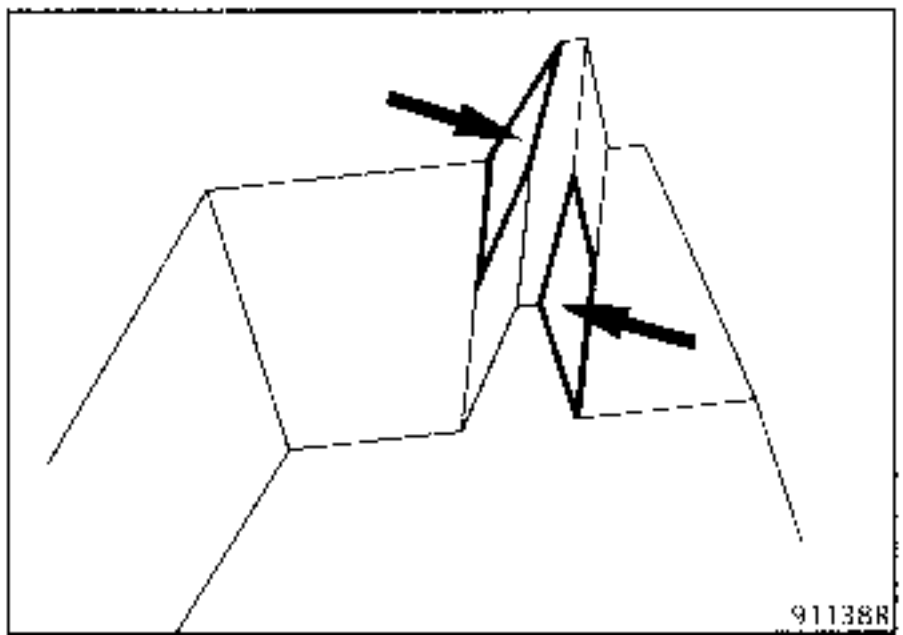
The kickdown switch is adjusted by adjusting the load potentiometer. The warning light (6) of tool **B.Vi. 958** is no longer used to show the correct operation of the kickdown switch, but to show the correct operation of the multifunction switch, with the starter function in position "P" and "N" and the ignition on.



888675

MODIFICATION

The secondary shaft nut on the **MJ** final drive is slackened using tool **B.Vi. 953**, modified by grinding following a change in the helix angle of the secondary pinion.



91138R

ELECTRONIC FAULT WARNING LIGHT MESSAGE



The electronic fault warning light detects faults of an electrical and electronic nature in the automatic transmission and injection systems.

Operation with no fault present

- When the ignition is turned on, vehicle stationary and engine not running, lever in **P** or **N**, warning light illuminates.
- When the starter is activated, warning light remains illuminated.
- When the key is released, ignition on, engine running, it extinguishes approximately **3 seconds** after the engine starts.

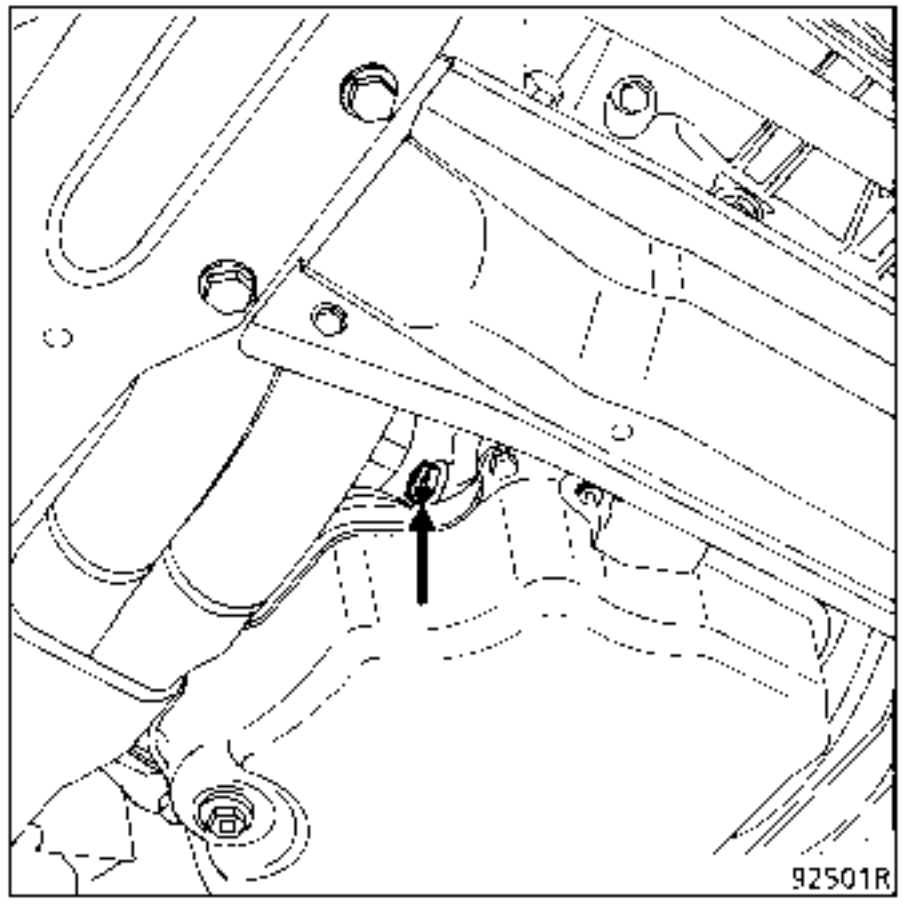
Fault present

- Vehicle stationary, engine running or when driving, warning light illuminated permanently.
- Vehicle moving, warning light illuminates and extinguishes with no action at the ignition key.
- Vehicle moving, warning light illuminates briefly.

Oil temperature < - 25 °C or > + 145 °C

- Vehicle moving or stationary, warning light flashes **approximately once a second.** In this case, reduce the requirement for performance by moderating acceleration.

OIL PRESSURE



The transmission has an oil pressure take-off. Connect tool **B.Vi. 1215-01** to this point to check the transmission pressure sensor only.

The oil pressure cannot be adjusted.

Its value is determined by the computer.

SPECIAL TOOLING REQUIRED		
Mot.	582	Drive plate locking tool
B.Vi.	31-01	Set of punches, diameter 5 mm
B.Vi.	465	Converter retaining bracket
T.Av.	476	Ball joint extractor

TIGHTENING TORQUES (in daN.m)	
Wheel bolts	9
Shock absorber base mounting nut	20
Track rod end nut	4
Converter mounting bolt	3
Oil union nut	2
Brake caliper guide bolt	3.5
Automatic transmission mounting pad bolt	4

REMOVAL

The transmission does not have to be drained for this operation if it is not to be dismantled.

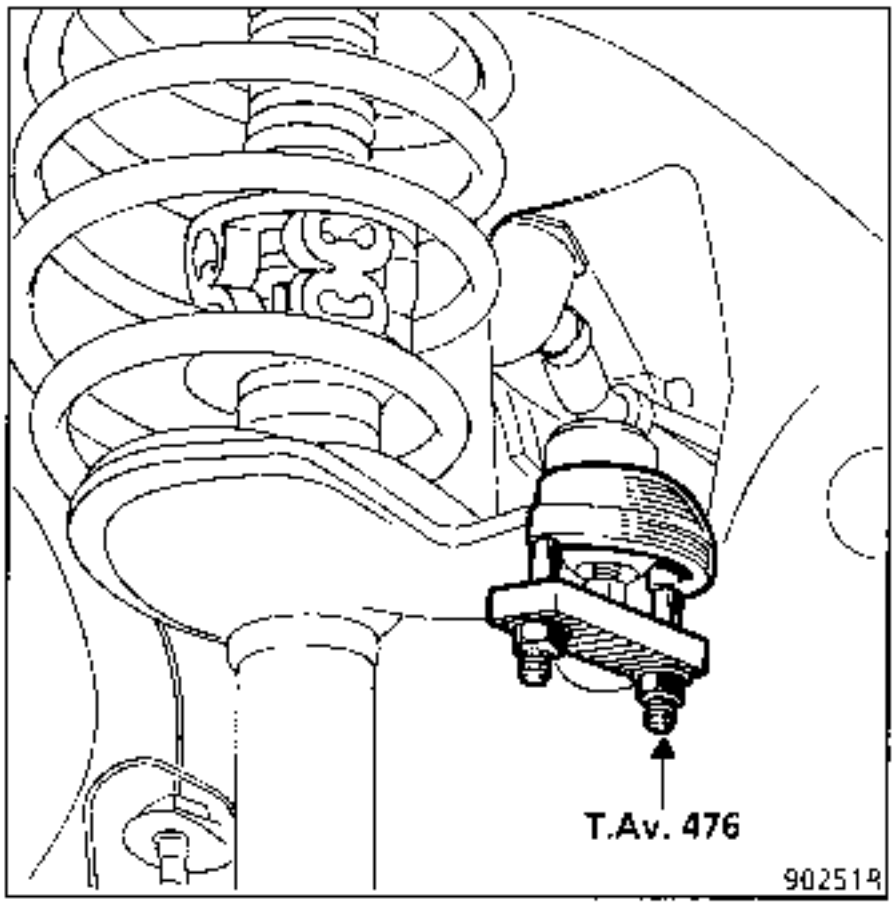
Place the vehicle on a lift.

Disconnect the battery.

Remove the front wheels.

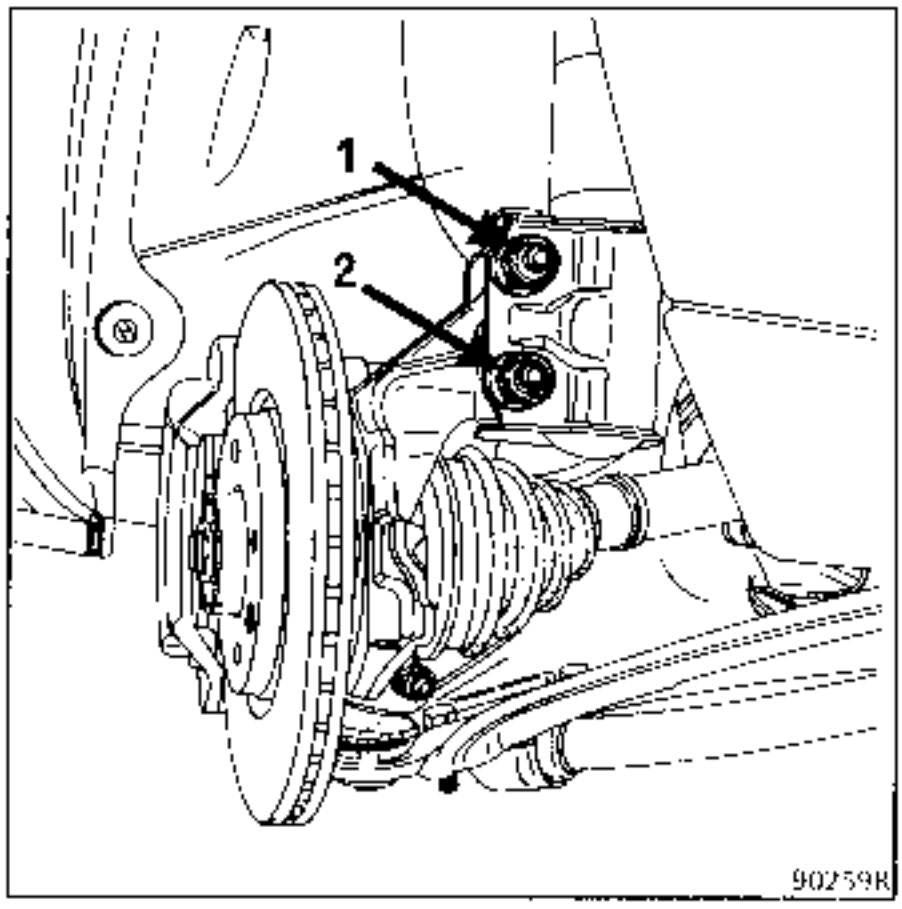
Remove the driveshaft roll pins (tool **B.Vi. 31-01**).

Disconnect the track rod end (tool **T.Av. 476**).

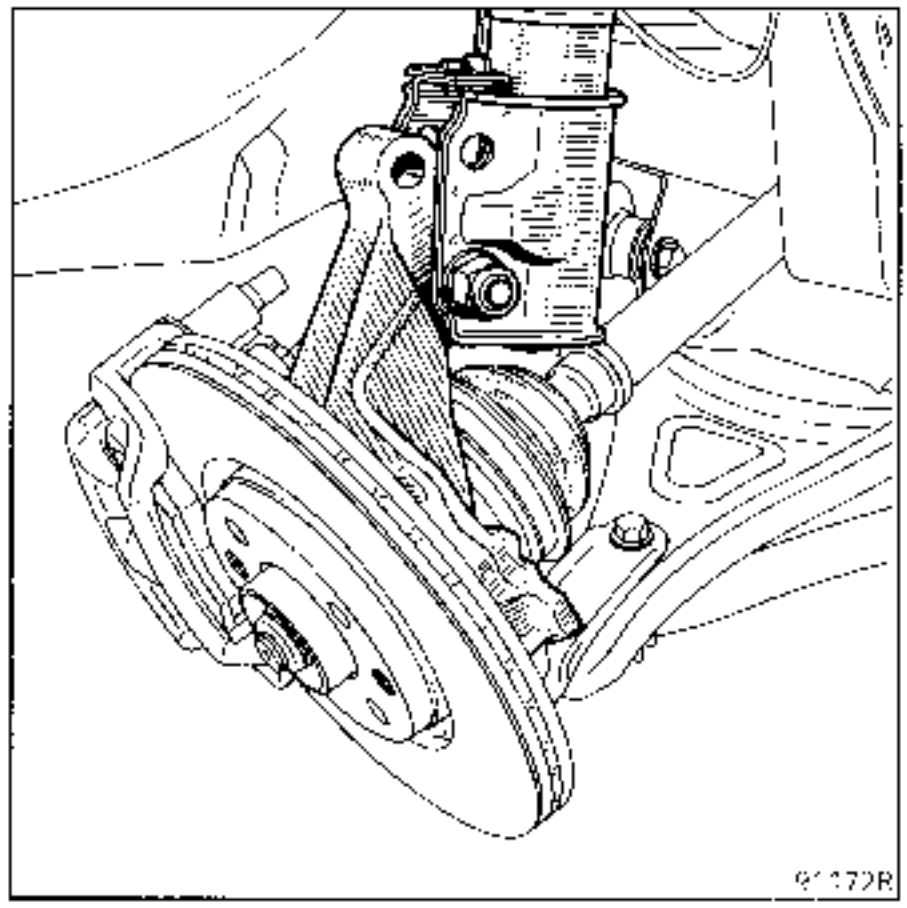


On the right and left hand sides, slacken the lower shock absorber base mounting bolts (**2**) and remove the upper bolts (**1**).

NOTE : the bolts have a splined section so a mallet must be used to remove them.



Tilt the stub axle carriers and release the driveshafts.



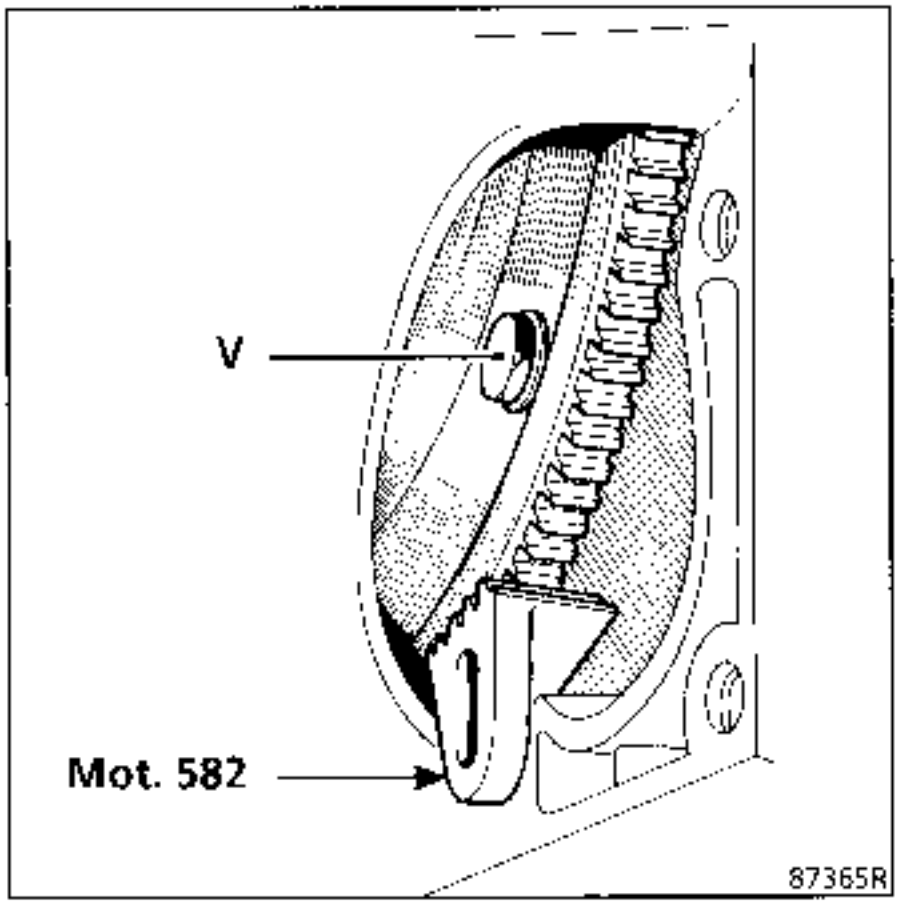
Disconnect the **A.E.**I. sensor.

Free the acress to the starter motor.

Remove the starter motor.

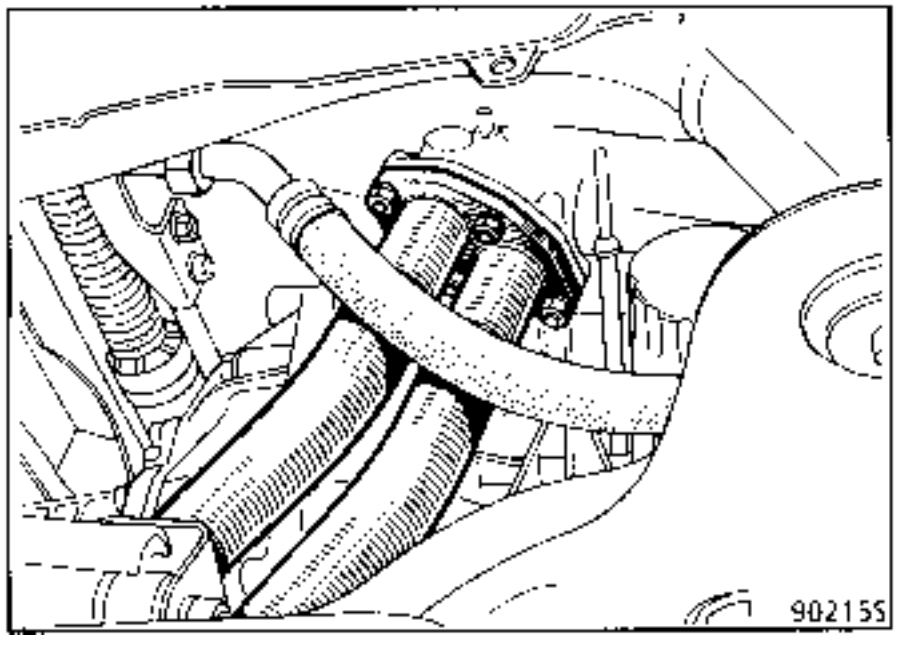
Fit tool **Mot. 582** for locking the starter motor ring gear.

Remove the three converter mounting bolts (**V**) via the hole in the starter motor.



Remove the upper mounting bolts from the edge of the transmission.

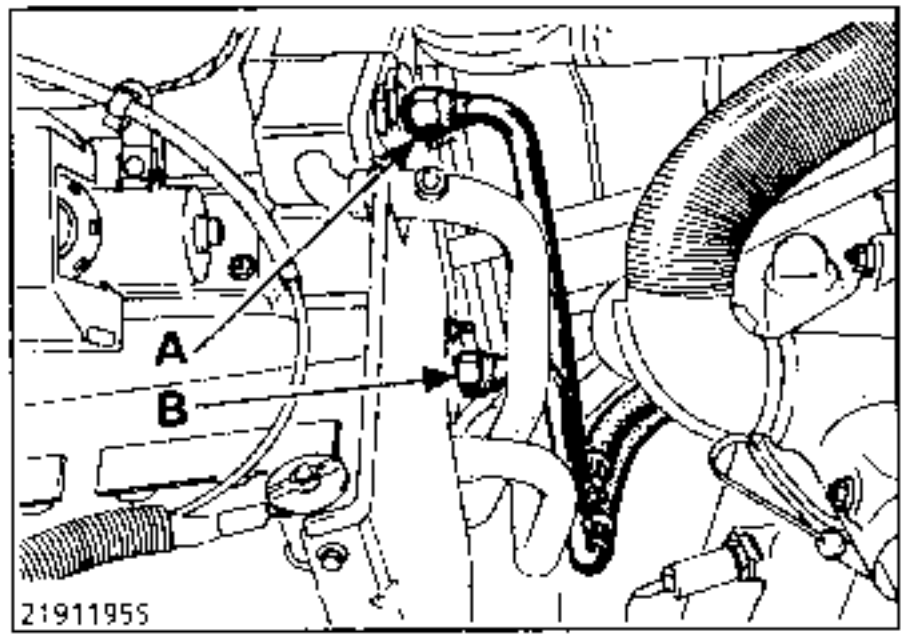
Remove the primary exhaust pipe (flange on manifold - ball joint and mounting on right hand transmission mounting).



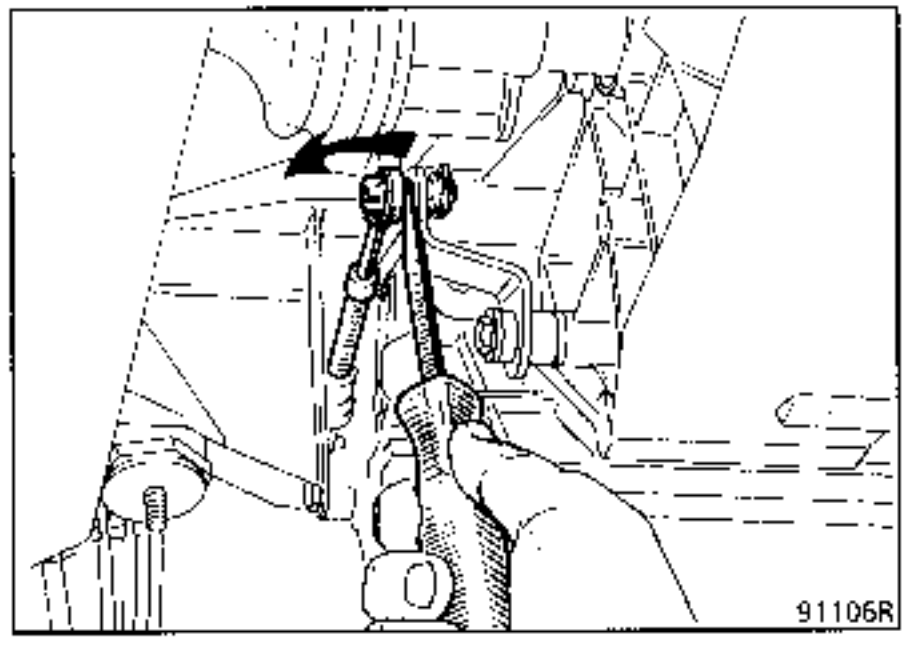
Disconnect the computer from the vehicle harness and release it, leaving it attached to the transmission.

Disconnect the capsule vacuum pipe near the starter motor flange.

Disconnect the oil cooler unions at the exchanger (**A**) and remove their mountings on the right hand side member (**B**).

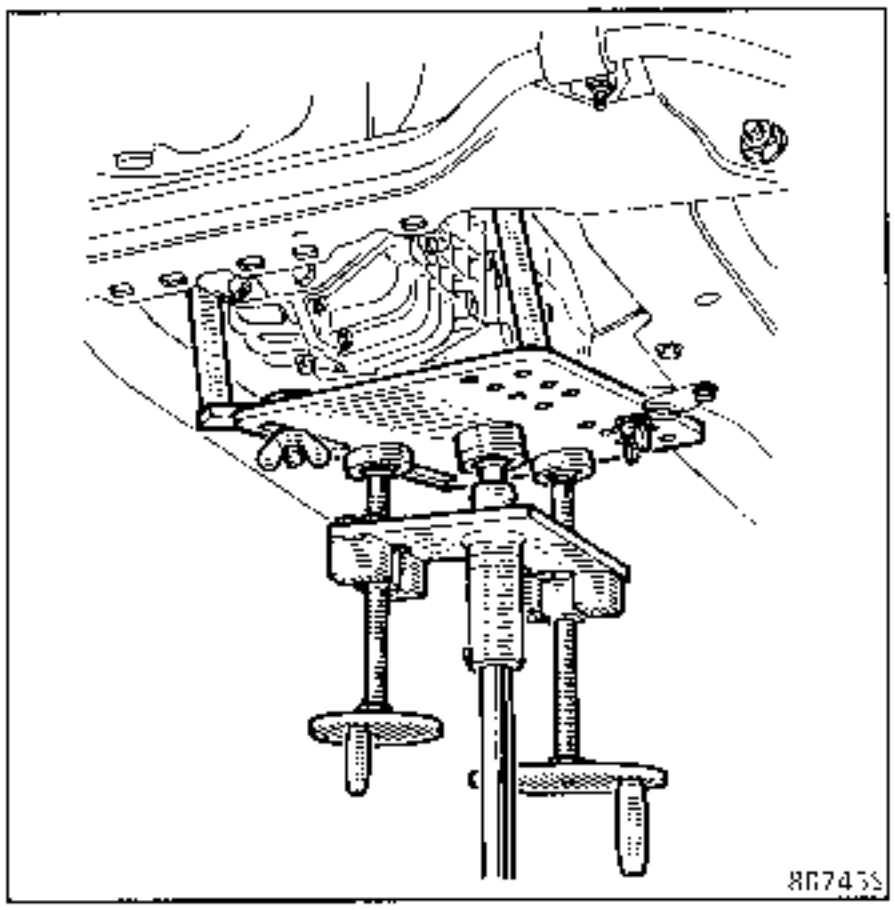


Disconnect the gear control, releasing the outer ball joint using a screwdriver.



Disconnect the earth strap from the transmission.

Put a component jack into position.



Slacken the rear mounting bolts for the engine / transmission cradle to lower it by **15 mm**.

Remove the left hand mounting pad and the transmission mounting.

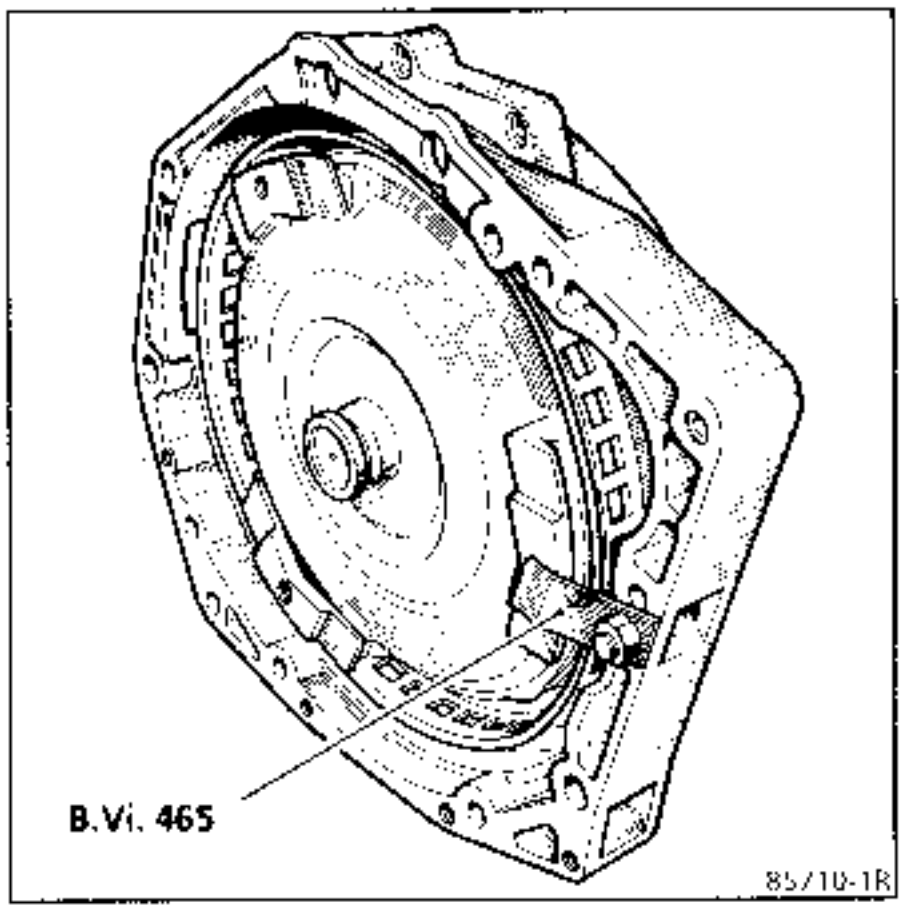
Slacken the three mounting bolts for the right hand mounting on the transmission.

Slacken the mounting nut for the right hand rubber mounting pad and leave the assembly in place with the control cable.

Slacken the lower engine - transmission mounting bolts.

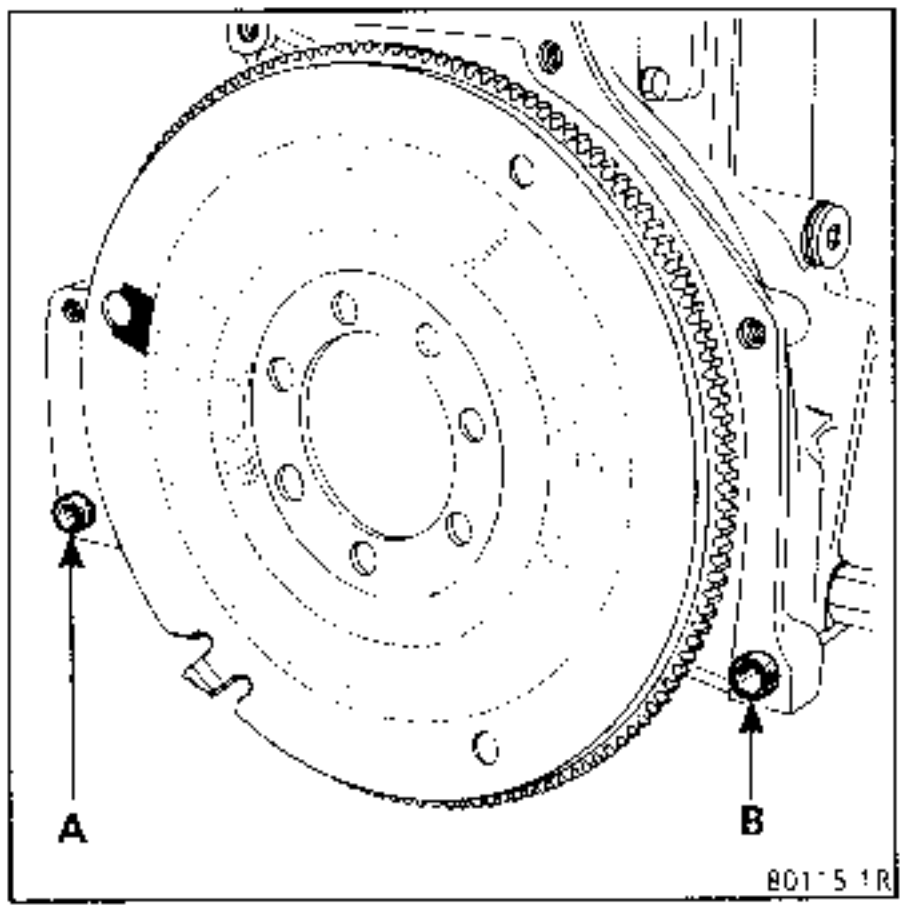
As the automatic transmission is lowered, follow it with the computer and the oil cooler pipes.

As soon as the parts have been released, fit the retaining bracket **B.Vi. 465** to prevent the converter from coming apart.



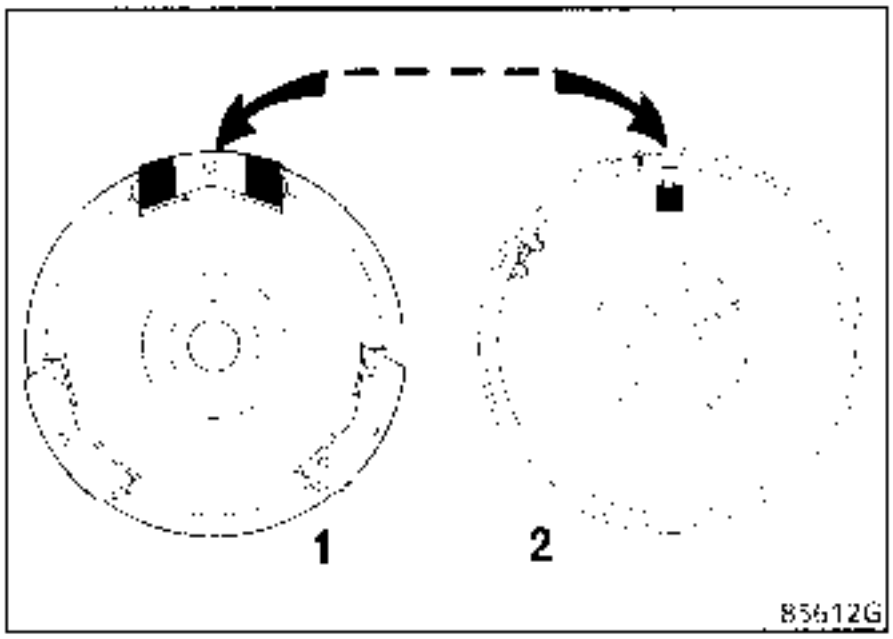
REFITTING

Before refitting the automatic transmission to the vehicle, check the centring dowels (A) and (B) are present on the engine block.



Lubricate the device centring the converter on the crankshaft and the sunwheel splines using **MOLYKOTE BR2**.

Place the converter in its initial position in relation to the drive plate.



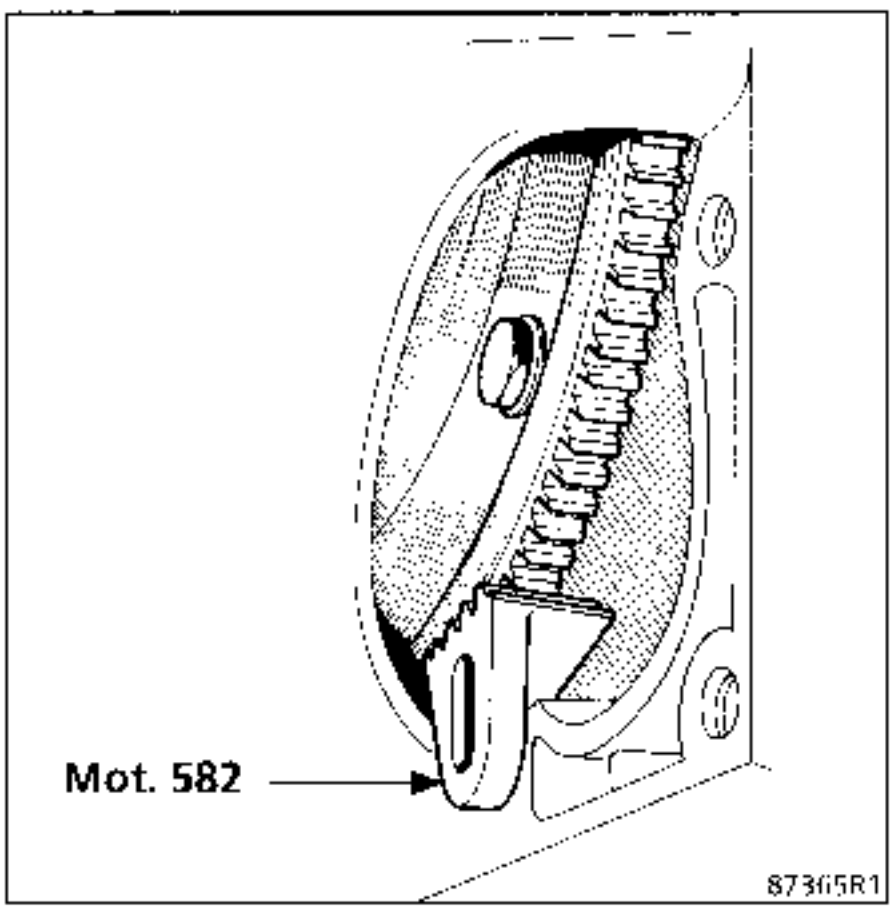
1 Converter
2 Drive plate

Assemble the engine and transmission and refit the side mountings.

Tighten the drive plate mounting bolts on the converter to a torque of **3 daN.m**.

DO NOT USE THE IGNITION SENSOR TARGET TO IMMOBILISE THE DRIVE PLATE / CONVERTER ASSEMBLY.

Use tool **Mot. 582**.



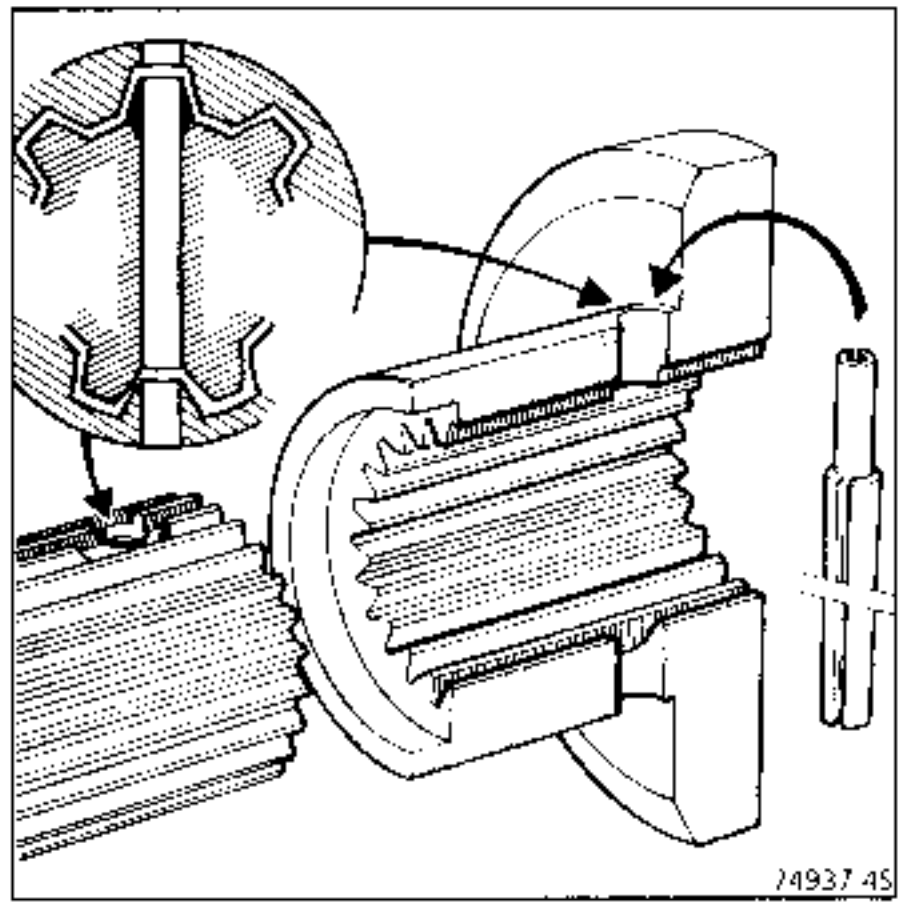
Ensure the starter motor centring pin is present.

Refit the starter motor.

Ensure the rubber washer is present which should be fitted between the end of the sunwheel and the bottom of the driveshaft yoke.

Position the driveshaft in relation to the sunwheel, tilt the stub axle carriers and engage the driveshafts into the sunwheels using the angled pin **B.Vi. 31-01** to align the holes.

Fit new roll pins and seal the ends (**RHODORSEAL 5661**).



NOTE : An inlet chamfer on the sunwheels makes fitting the new roll pins easier.

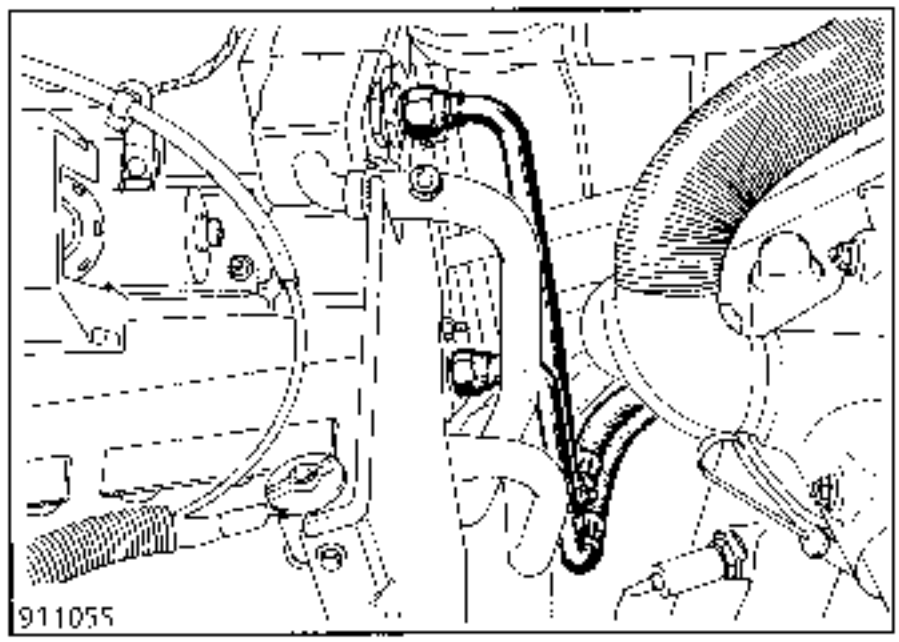
Reconnect the **A.E.I.** sensor.

Refit:
- the shock absorber base bolts to the stub axle carriers and torque tighten them,
- the track rod end, then tighten it to the correct torque.

Reconnect the gear control. Adjustment is not necessary if the control assembly has not been removed.

Connect the speedo cable.

Fit the oil cooler pipes into position and torque tighten the unions.



Refit:
- the exhaust flange,
- the wiring and the computer (check the wiring is correctly routed and secured),
- the earth strap.

Connect the vacuum pipe.

Fill the transmission with oil.

Check the oil level.

Test drive the vehicle.

SPECIAL TOOLING REQUIRED		
Mot.	453-01	Hose clamp pliers
Mot.	582	Drive plate locking tool
B.Vi.	31-01	Set of punches, diameter 5 mm
T.Av.	476	Ball joint extractor
M.S.	583	Hose clamp pliers

TIGHTENING TORQUES (in daN.m)	
Wheel bolts	9
Shock absorber base mounting nut	20
Track rod end nut	4
Converter mounting bolt	3.5
Brake caliper guide bolt	3.5
Automatic transmission mounting pad bolt	4

REMOVAL

The transmission does not have to be drained for this operation if it is not removed.

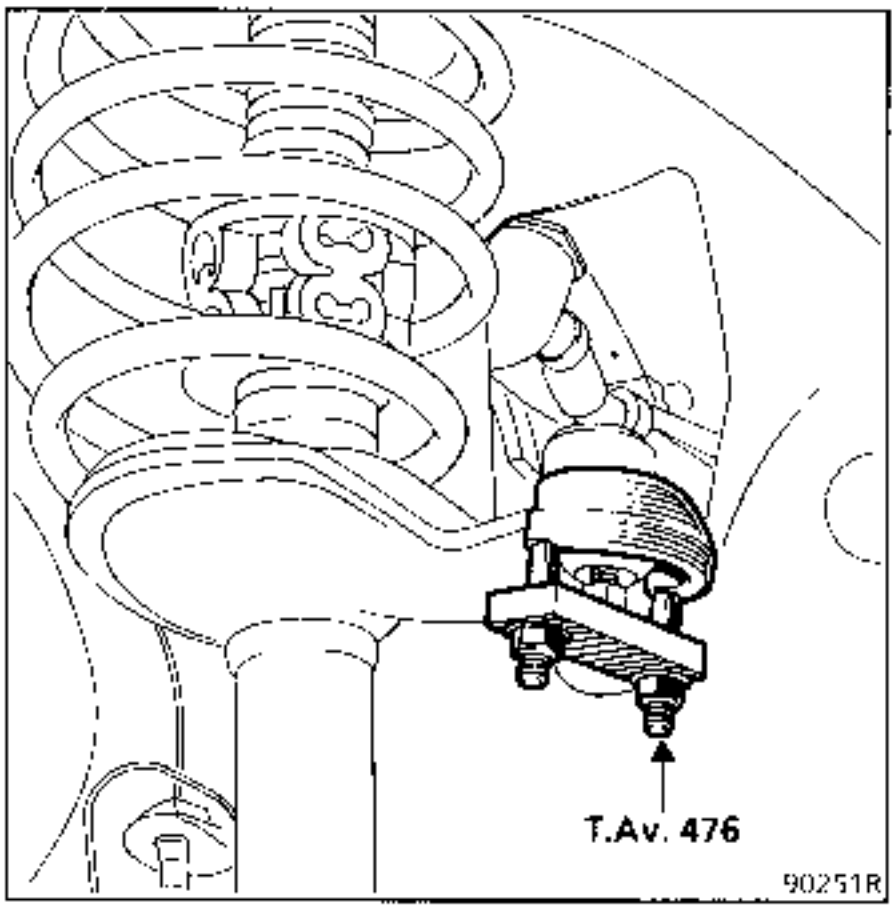
Place the vehicle on a lift.

Disconnect the battery.

Remove the front wheels.

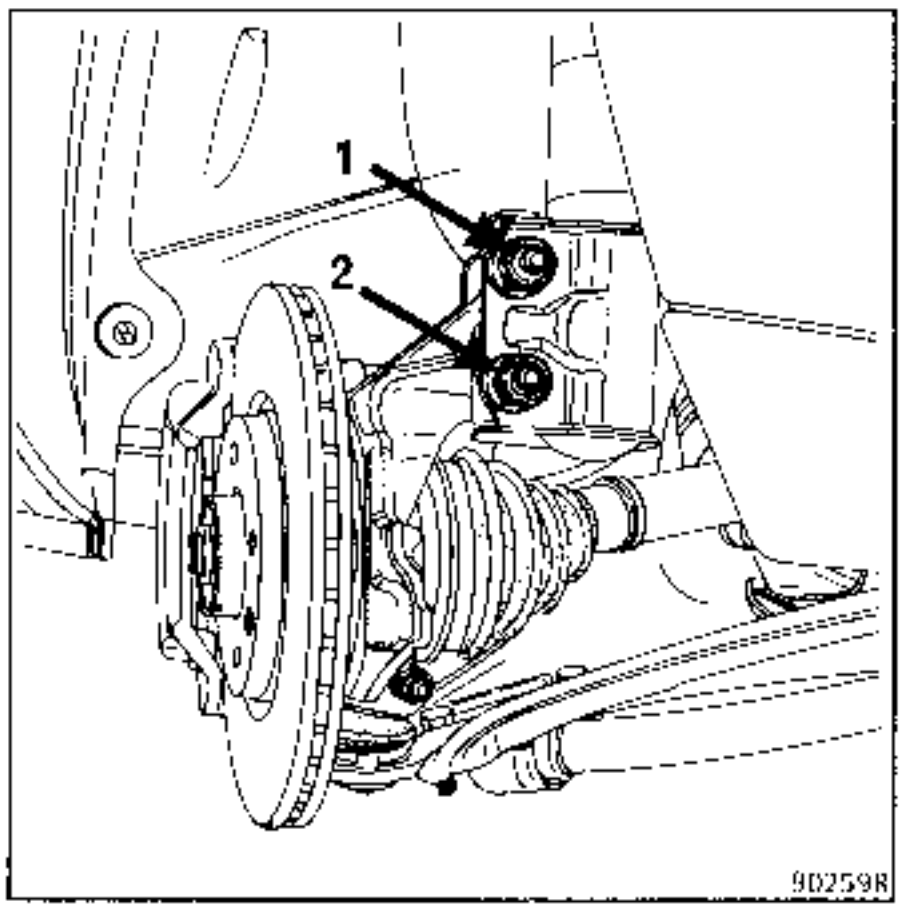
Remove the driveshaft roll pins (tool **B.Vi. 31-01**).

Disconnect the track rod end (tool **T.Av. 476**).

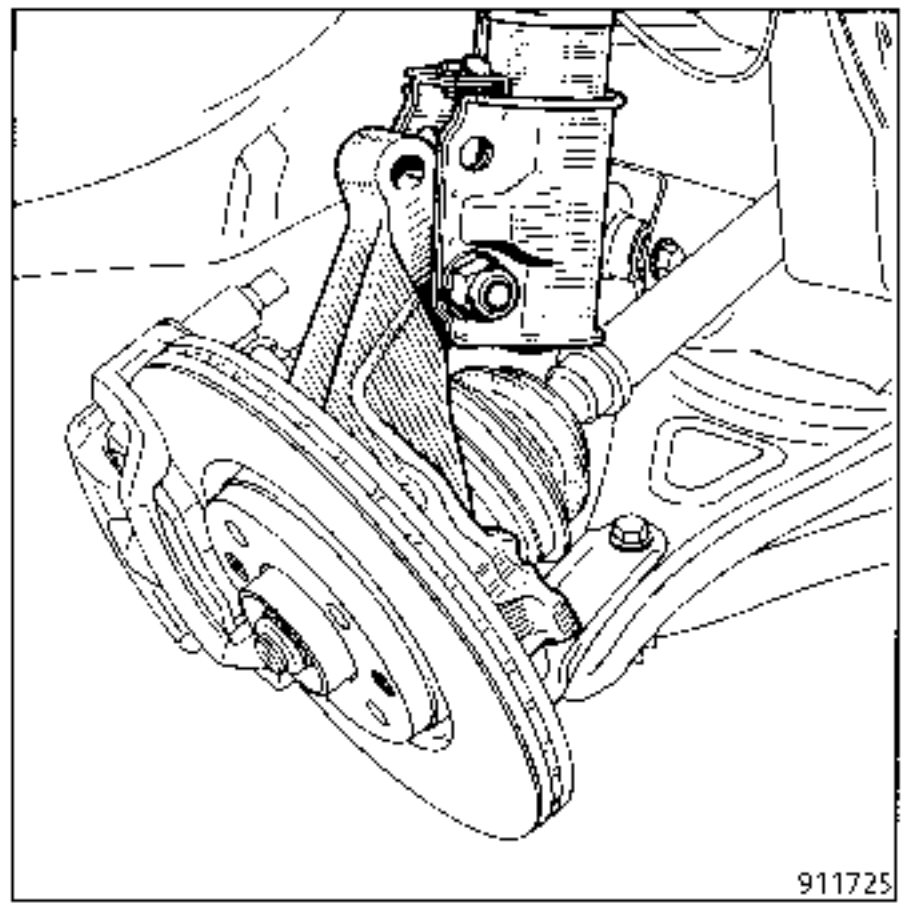


On the right and left hand sides, slacken the lower shock absorber base mounting bolts (**2**) and remove the upper bolts (**1**).

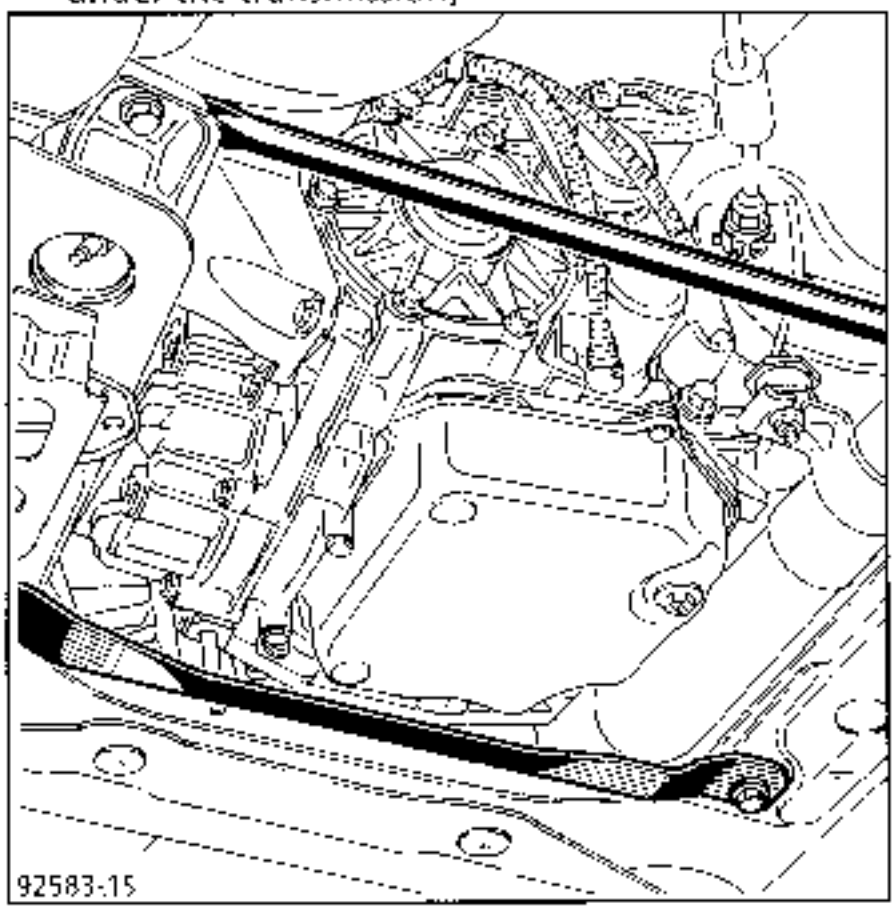
NOTE : the bolts have a splined section so a mallet must be used to remove them.



Tilt the stub axle carriers and release the driveshafts.

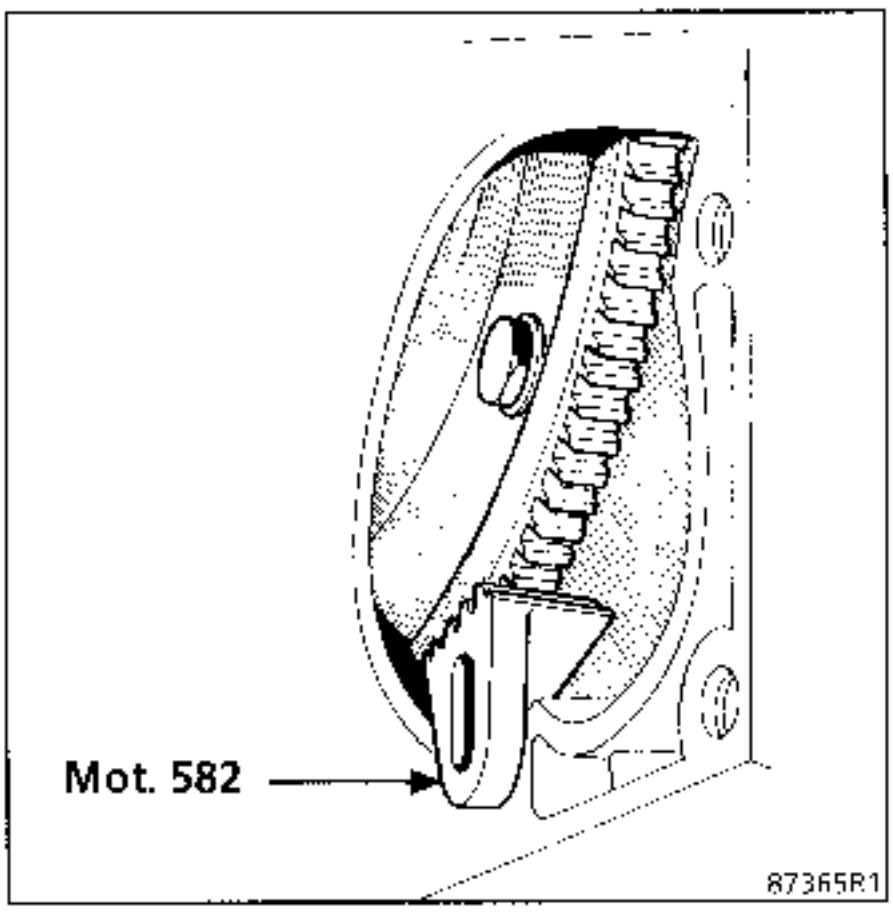


Remove:
- the two cross members, one at the rear and one under the transmission,



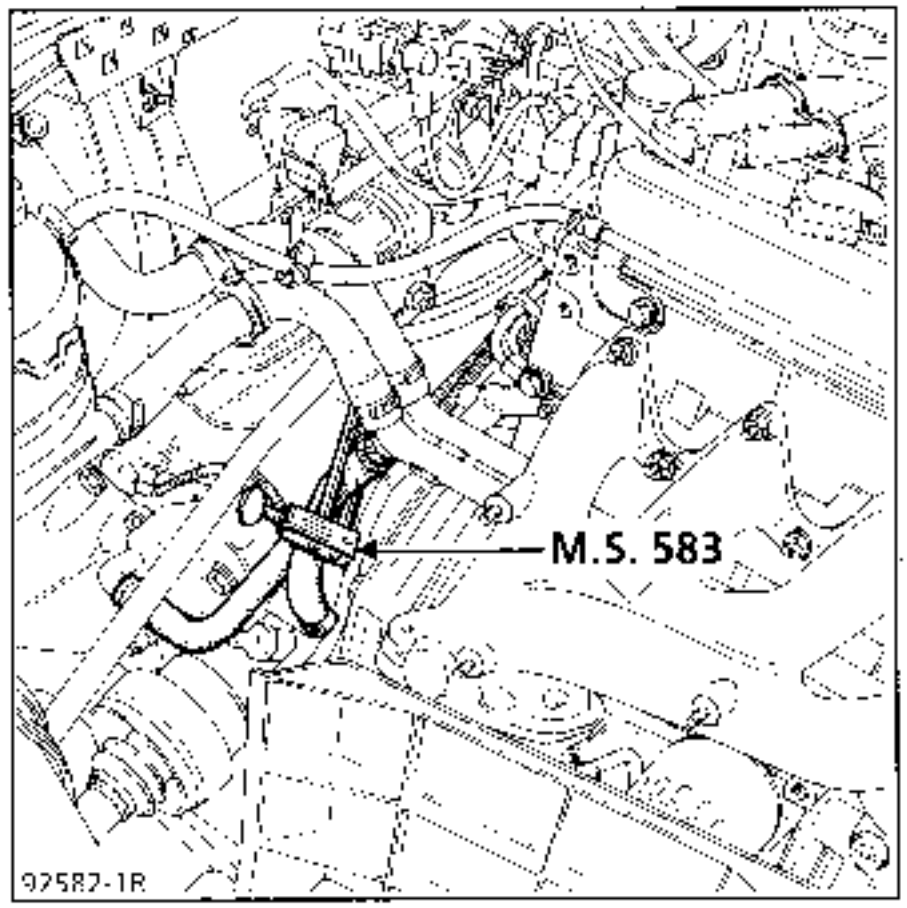
- the primary exhaust pipe,
- the starter motor.

Remove the three bolts securing the converter / drive plate assembly (tool **Mot. 582**).



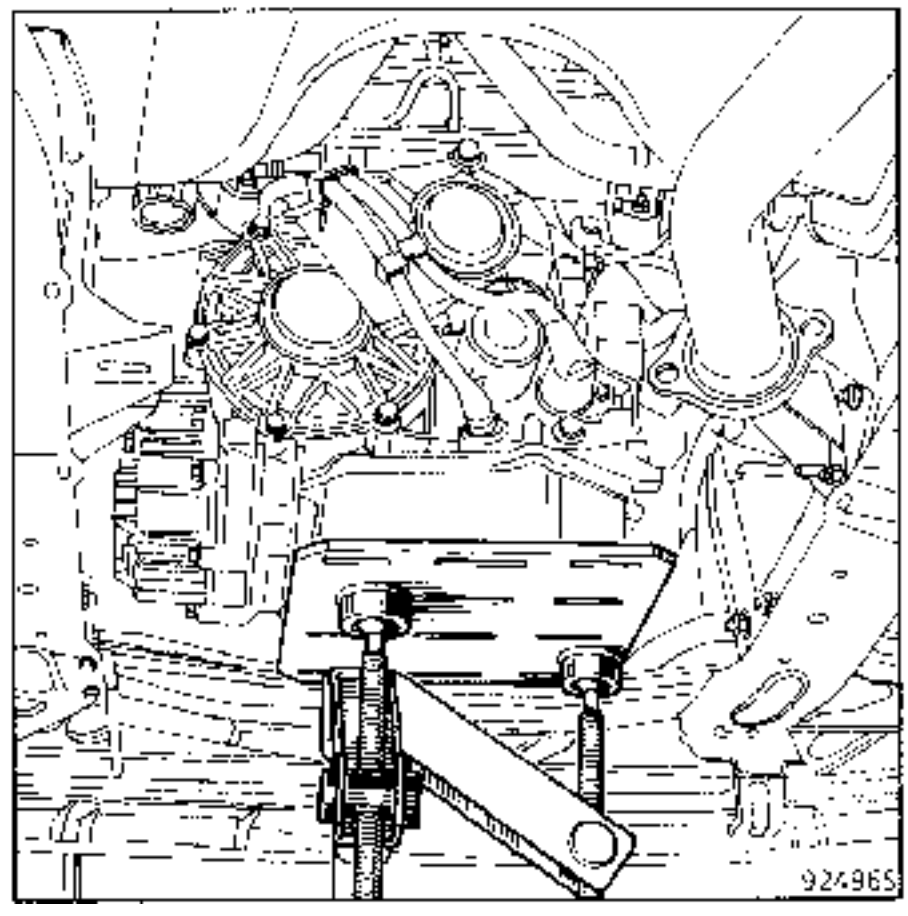
Remove:
- the engine speed sensors,
- the speedo cable.

Disconnect:
- the oil cooler water pipes, using tool **Mot. 43-01** or **M.S. 583**,



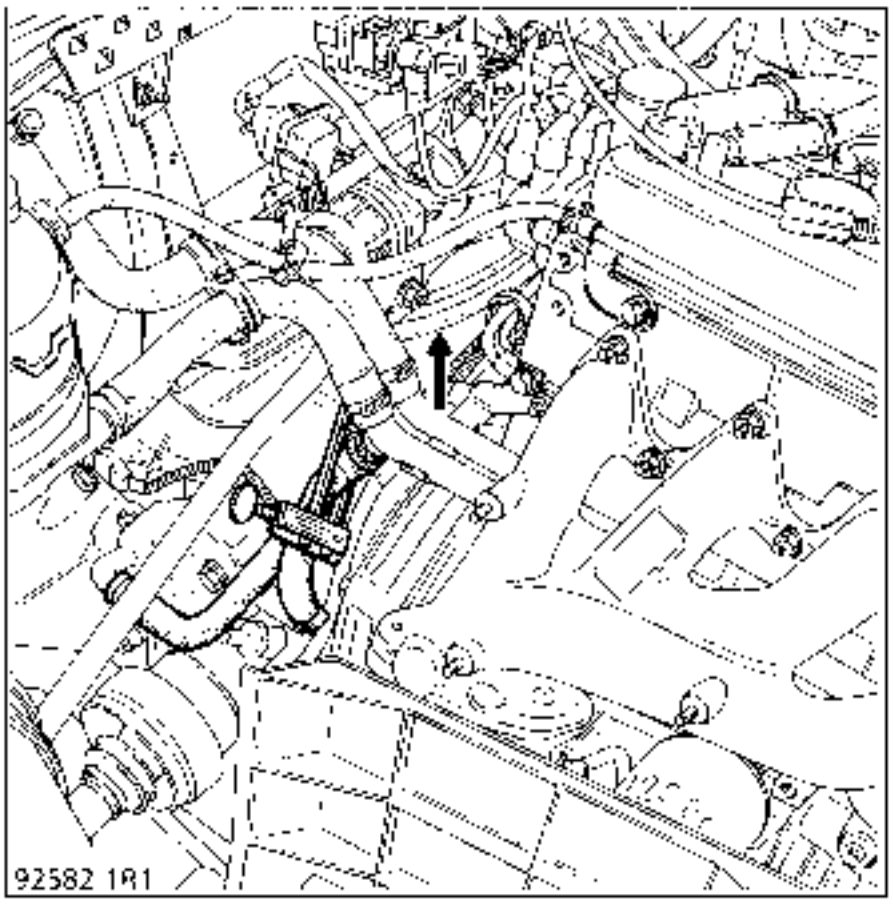
the earth strap,
- the gear control cable (ball joint).

Fit the transmission support.



Remove:
- the left and right hand transmission mounting pads (the right hand mounting remains attached to the control cable; do not alter the adjustment of the control),
- the bolts mounting the transmission to the engine (at the edge).

Disconnect:
- all the computer connectors from the transmission and release the wiring
  the breather pipes.

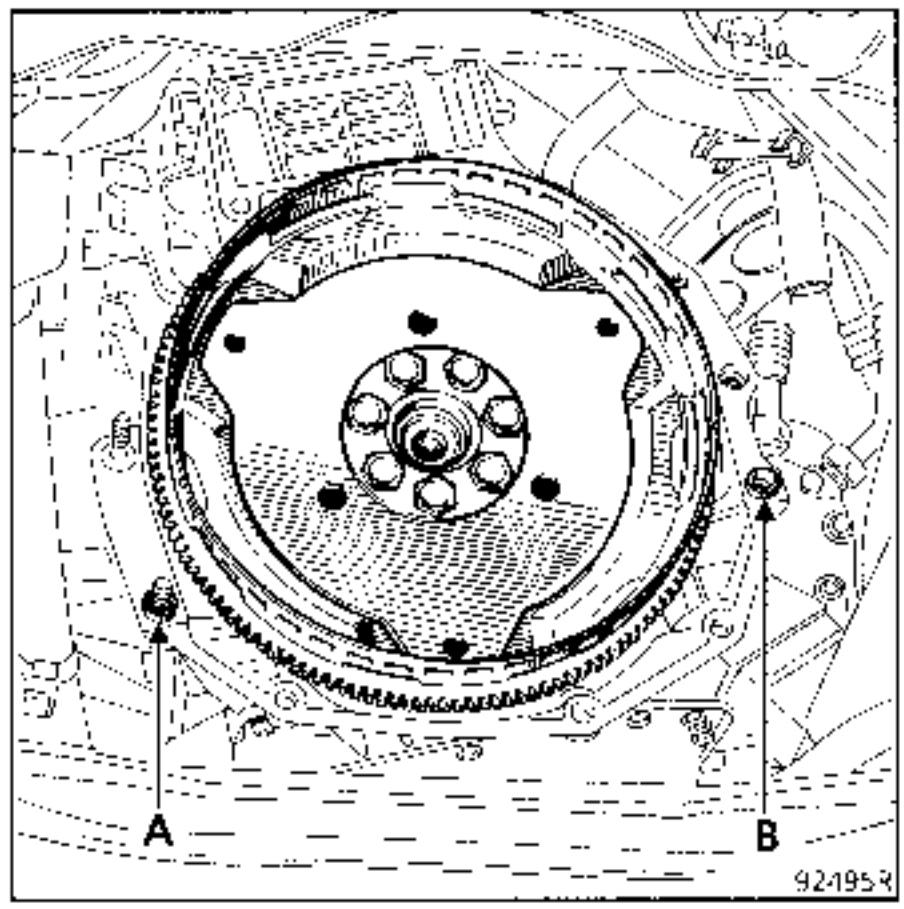


Push the converter back as far as it will go at the transmission end and release the driveshaft by moving it back straight along the engine centre line.

Fit the converter locking tool.

REFITTING

Before refitting the automatic transmission to the vehicle, check the centring dowels (**A**) and (**B**) are present on the engine block.



Lubricate the device centring the converter on the crankshaft and the sunwheel splines using **MOLYKOTE BR2**.

Place the converter in its initial position in relation to the drive plate.

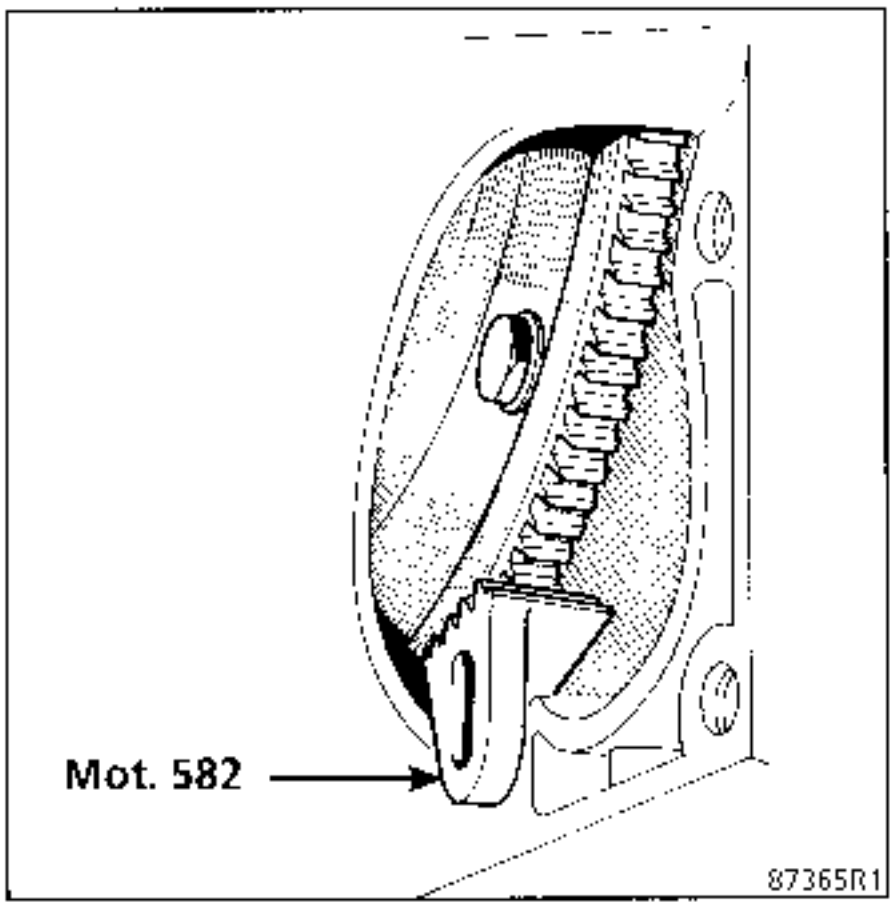
The converter and the drive plate are not marked, but if they are not fitted correctly, it will be very difficult to rotate one in relation to the other.

Assemble the engine and transmission.

Tighten the drive plate mounting bolts on the converter to a torque of **3.5 daN.m**.

DO NOT USE THE IGNITION SENSOR TARGET TO IMMOBILISE THE DRIVE PLATE / CONVERTER ASSEMBLY.

Use tool **Mot. 582**.



Refit:
- the starter motor (ensure the locating pin is present),
- the rear mounting pads and the transmission supports,
- the two cross members, one at the rear and one under the transmission,
  the exhaust, before fitting the right hand driveshaft as assembly is easier.

Ensure the rubber washer is present which should be fitted between the end of the sunwheel and the bottom of the driveshaft yoke.

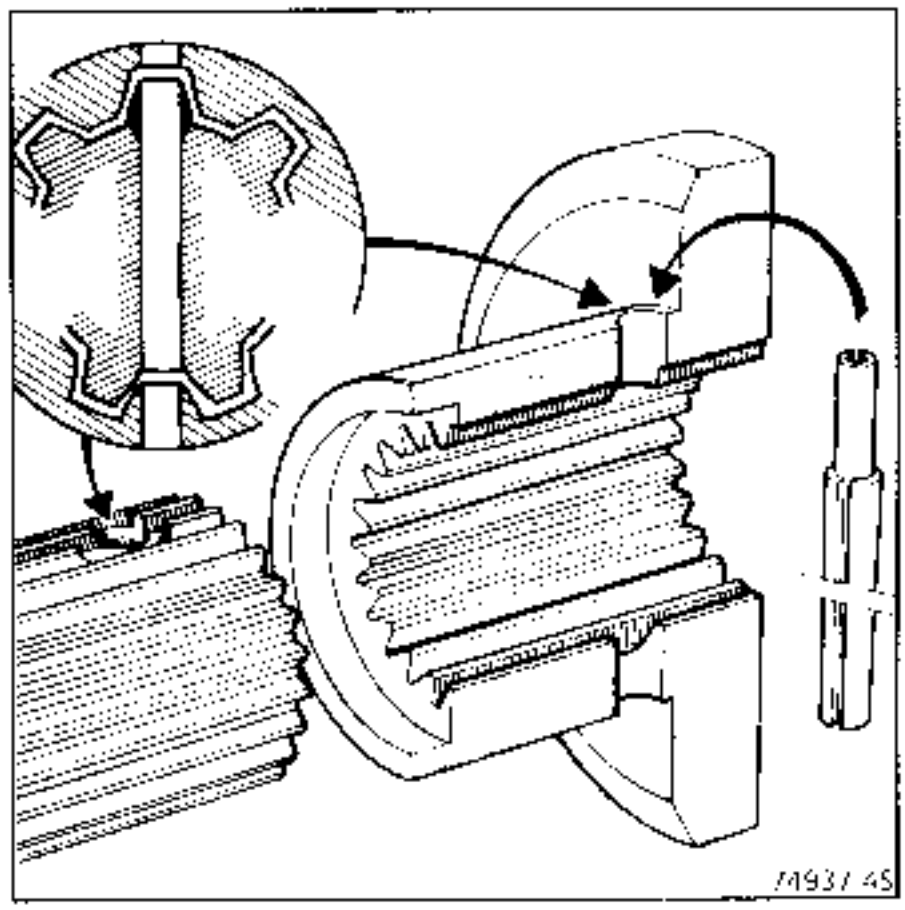
Position the driveshaft in relation to the sunwheel.

Tilt the stub axle carriers and engage the driveshafts into the sunwheels.

Using the angled pin **B.Vi. 31-01** to align the holes.

Fit new roll pins and seal the ends (**RHODORSEAL 5661**).

Refit the front driveshafts and tighten the nuts to the recommended torques.



NOTE : An inlet chamfer on the sunwheels makes fitting the new roll pins easier.

Reconnect:
- the engine speed sensor and speedo sensor,
  the earth strap.

Refit and check the adjustment of the control (see corresponding section).

Reconnect:
- all the electrical connections,
- the oil cooler and the breather.

When refitting the wiring, pay particular attention to the correct routing of each of the leads to ensure that none of them interferes with a rotating or hot part (for example the exhaust).

Top up the engine cooling system.

After starting the engine, check the automatic transmission oil level.

REMOVAL - REFITTING

SPECIAL TOOLING REQUIRED		
Mot.	582	Locking tool
Mot.	1202	Hose clamp pliers

TIGHTENING TORQUES (in daN.m)	
Shock absorber base mounting bolt	11
Driveshaft mounting bolt	3.5
Wheel bolts	9
Front support mounting nut	4
Rear support mounting bolt	6.5
Transmission mounting pad mounting bolt	2
Oil cooler mounting bolt	2.5
Drive plate mounting bolt on converter	1.5
Bolt at edge of automatic transmission	4

Put the vehicle on a 2 post lift.

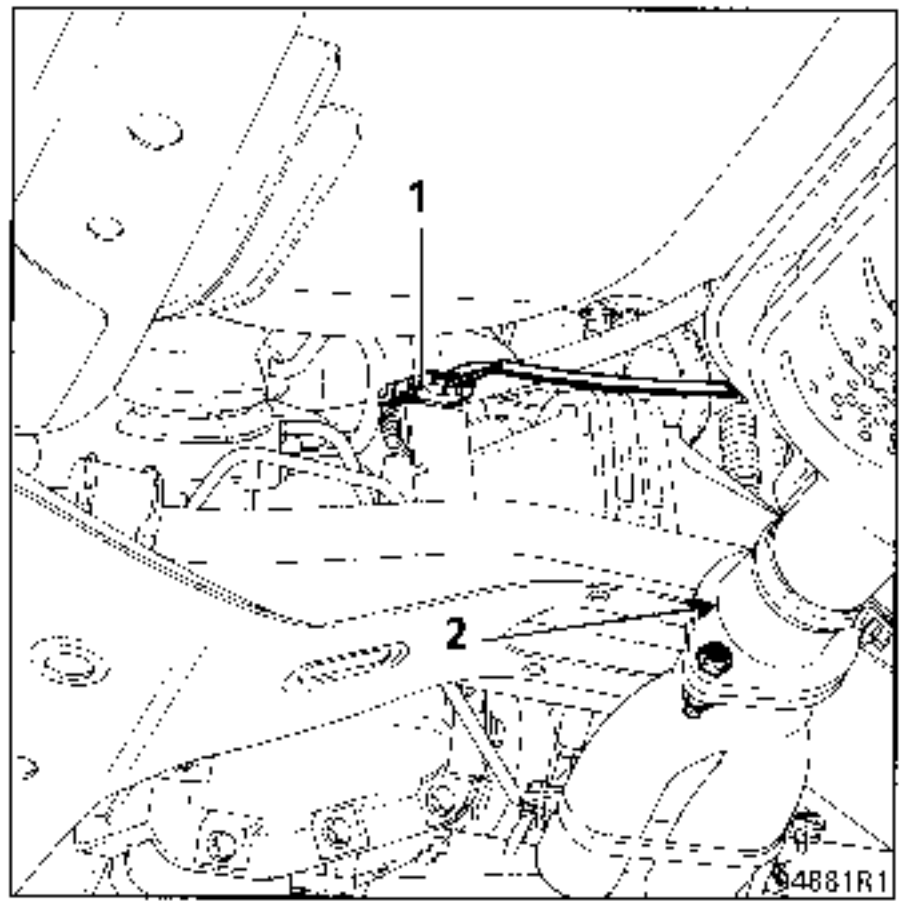
Remove:

- the bonnet,
- the front wheels,
  the left side deflector , (1 bolt and 3 rivets).

Disconnect the connector (1) for the oxygen sensor.

Remove the downpipe.

Retain the seal for the flange (2).



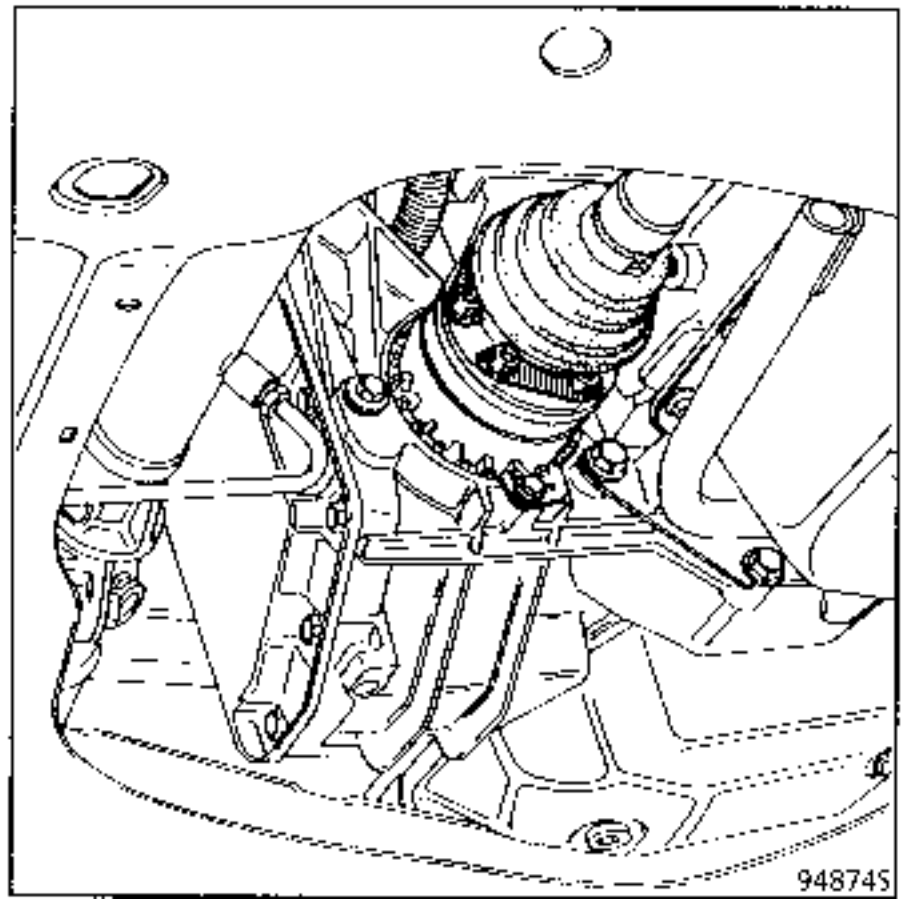
Remove the driveshaft mounting bolts on the sunwheel output flanges.

- **1st assembly:** hexagonal head bolts

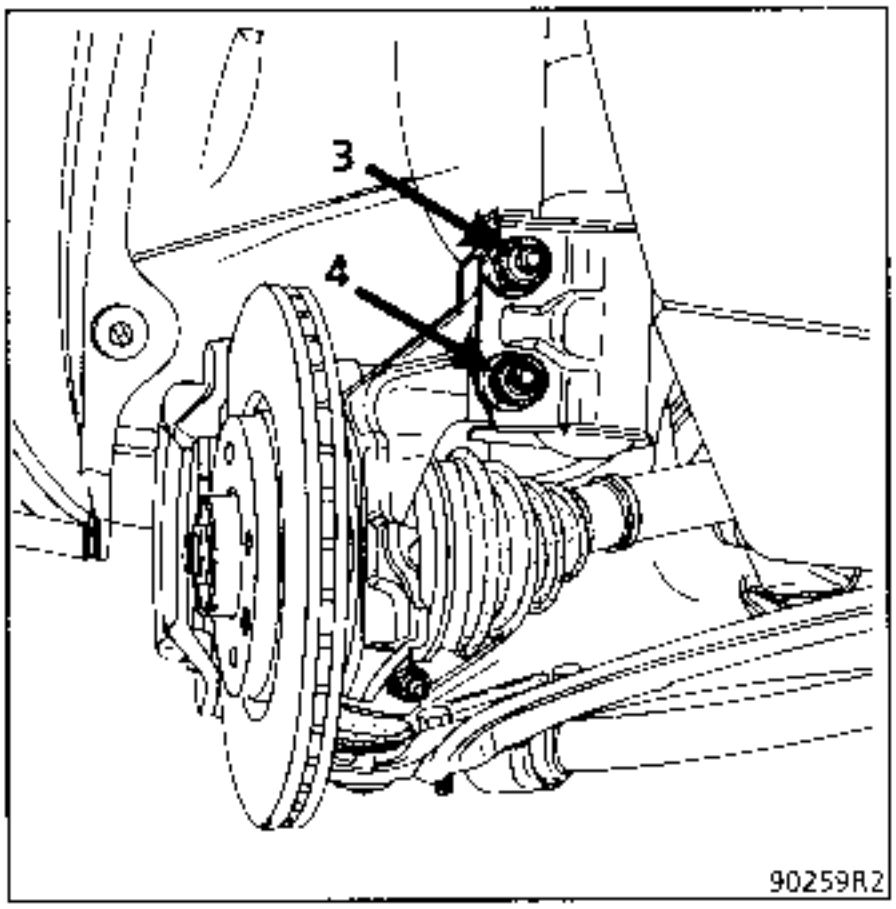
Use socket **FACOM J235** and a **6 mm** allen key end piece.

- **2nd assembly:** 12 sided head bolts

Use socket **FACOM SV.8L** 12 sided allen key.

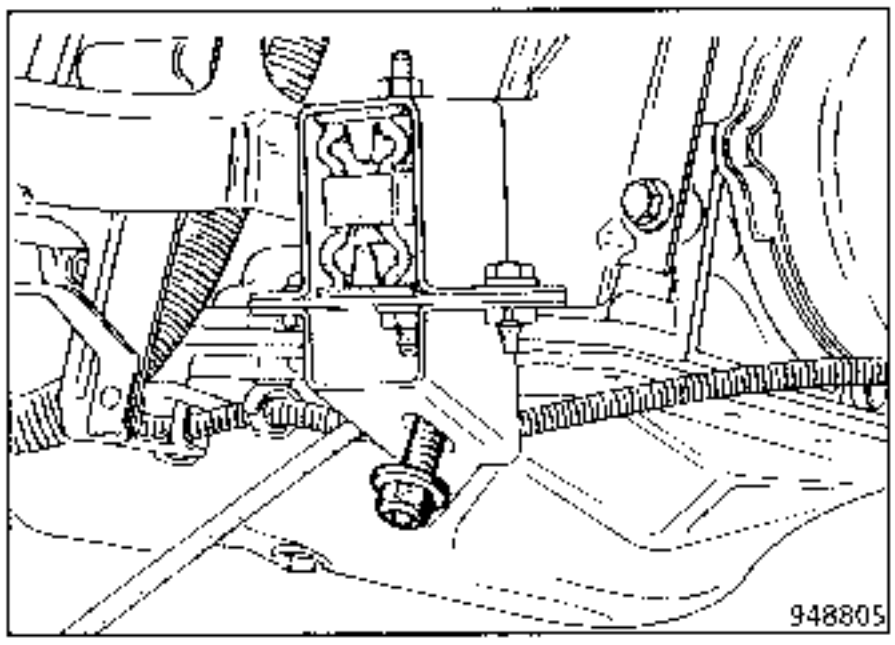


On each side of the vehicle, remove the upper **bolt** (**3**) and slacken the lower **bolt** (**4**).

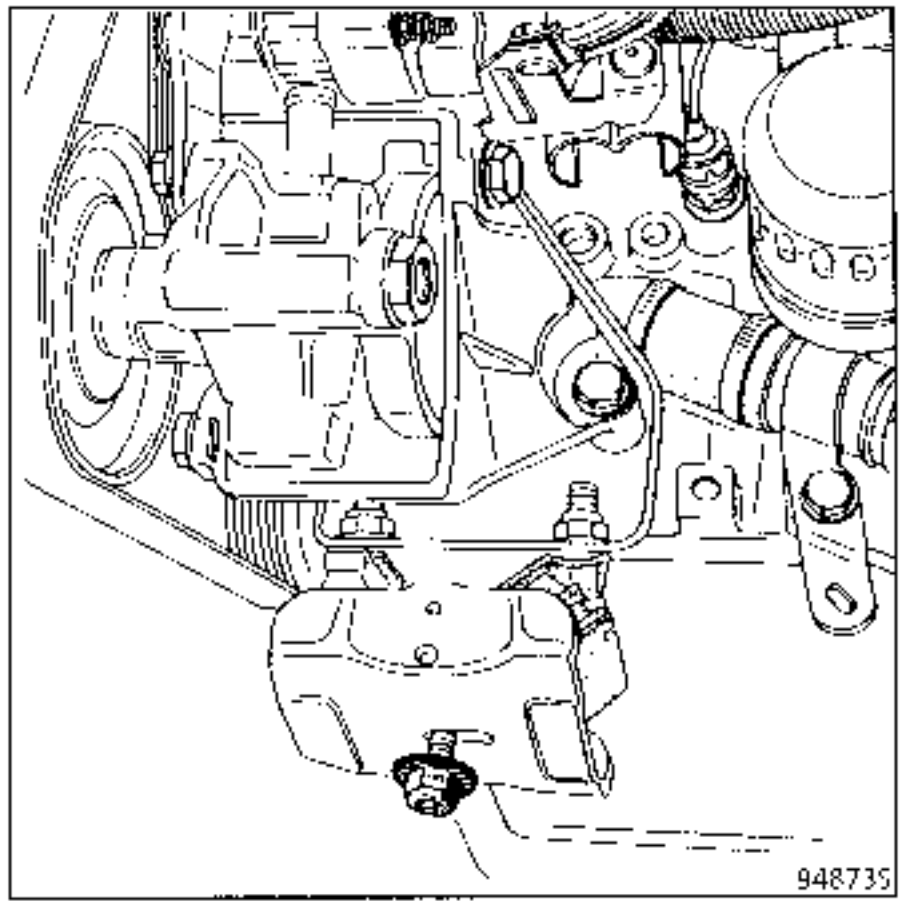


Release the driveshafts at the side.

Remove the mounting nut for the front automatic transmission mounting pad.

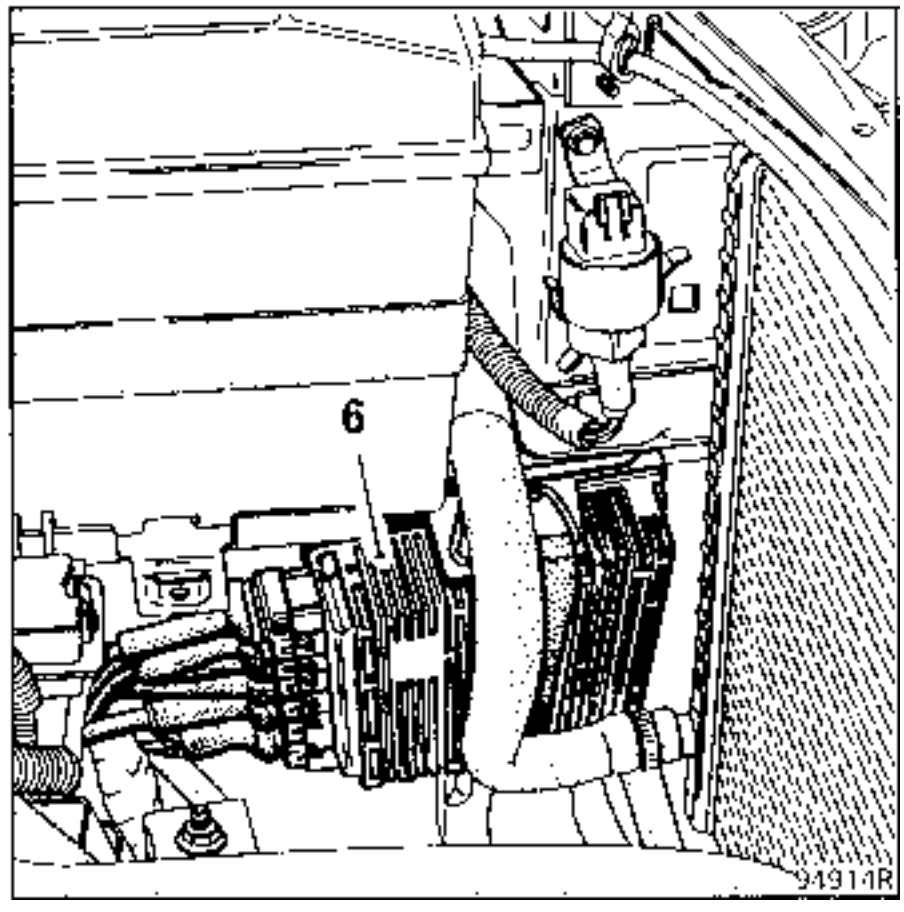


Remove the mounting nut for the front engine mounting pad.



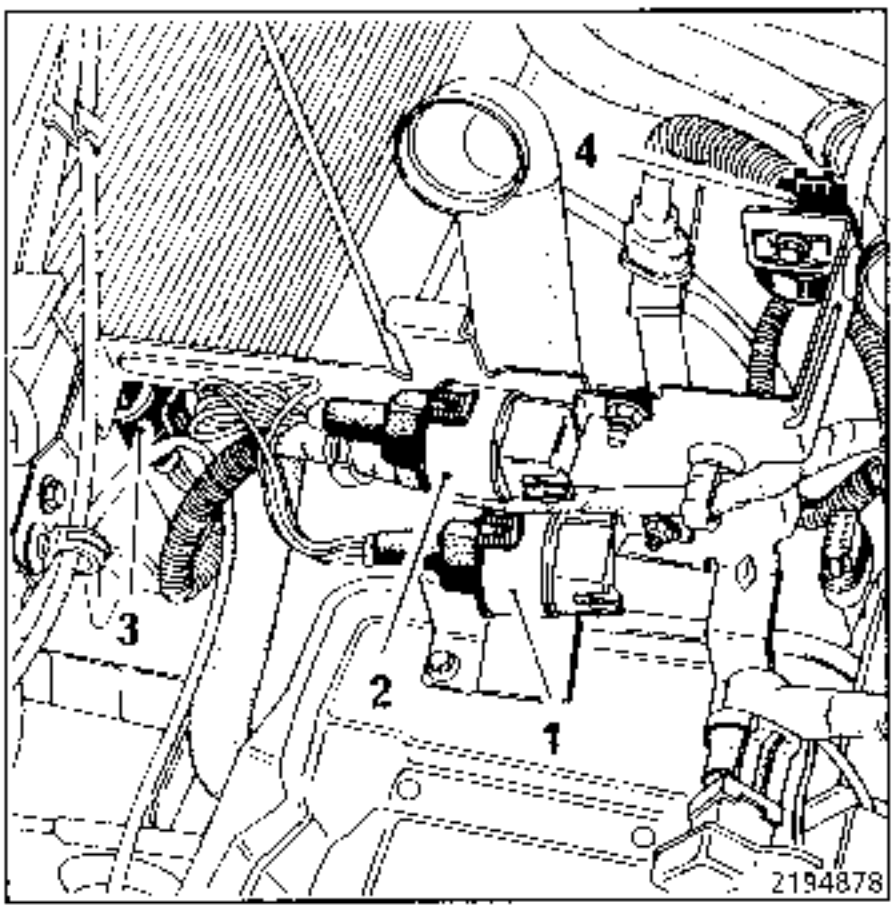
Remove:

- the battery,
- the air filter,
- the injection computer,
- the automatic transmission computer (**6**).



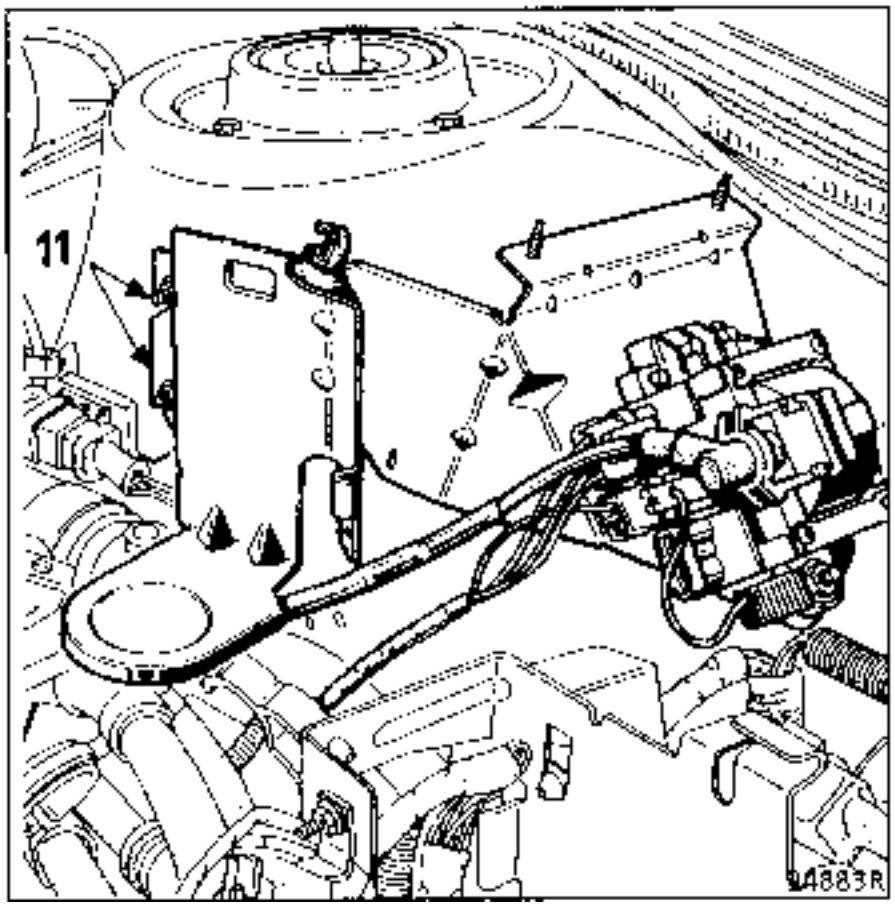
Remove the battery mounting, after disconnecting:

- the fuel pump relay (**1**),
- the injection locking relay (**2**),
  the **A.T.** prevention relay (**3**),
- the starting safety relay (**4**).



Remove the expansion bottle and the power assisted steering reservoir.

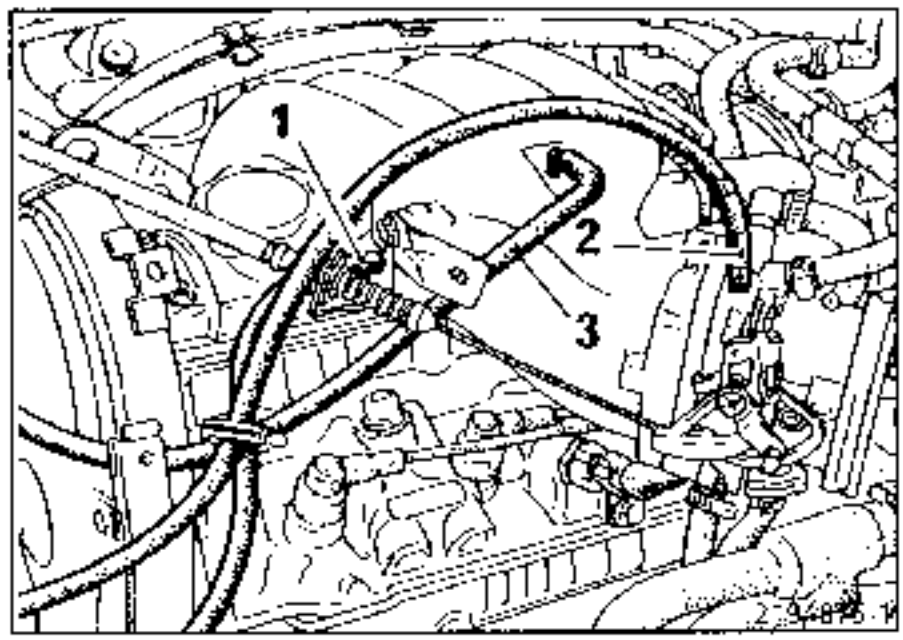
Remove the **M.P.A.** unit and the mounting bolts (**11**) for the expansion bottle mounting.



On the right hand side of the vehicle

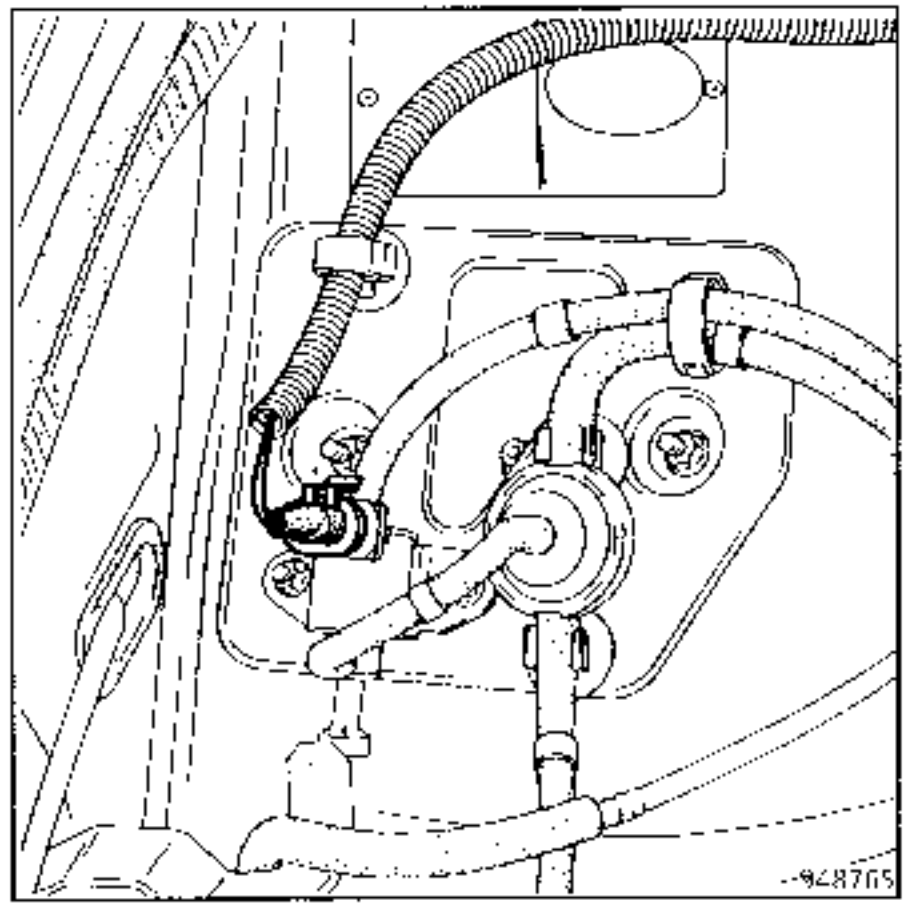
Remove:

- the accelerator cable,
  the vacuum pipes (**1**) and (**2**) for the solenoid valve and the canister bleed valve,
- the vacuum pipe (**3**) for the pressure sensor.

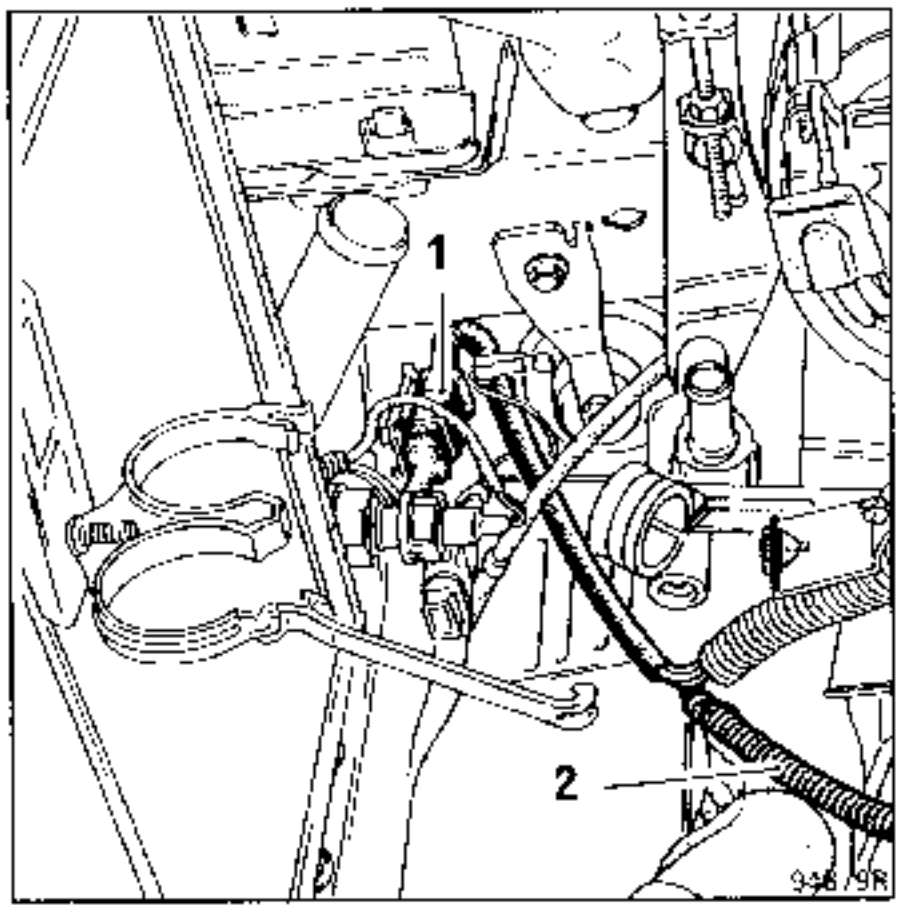


Disconnect the pressure sensor connector.

Disconnect the connector for the **EGR** solenoid valve.



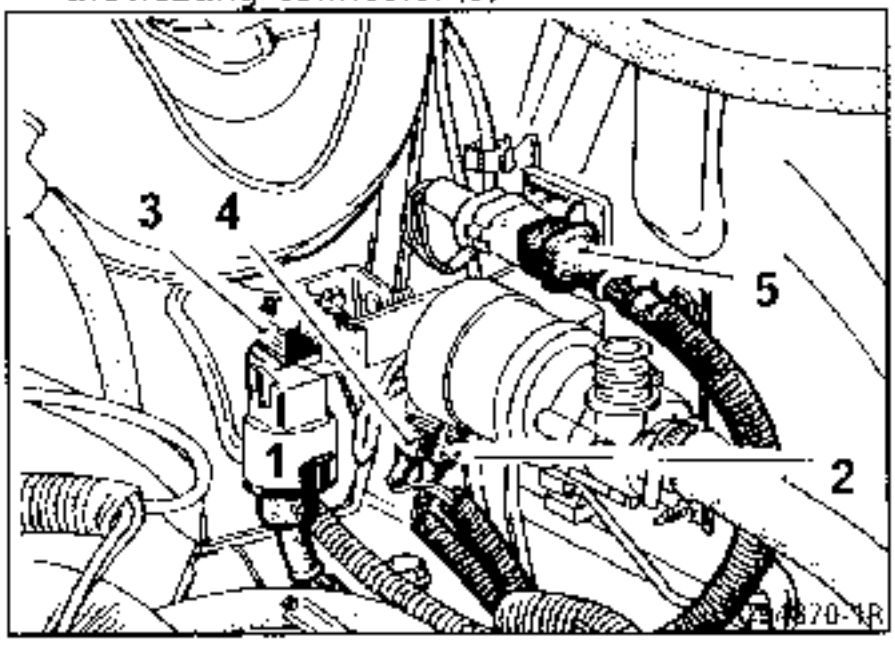
Disconnect the connector for the fan assembly wiring (1) and the oil level sensor connector (2).



On the left hand side of the vehicle

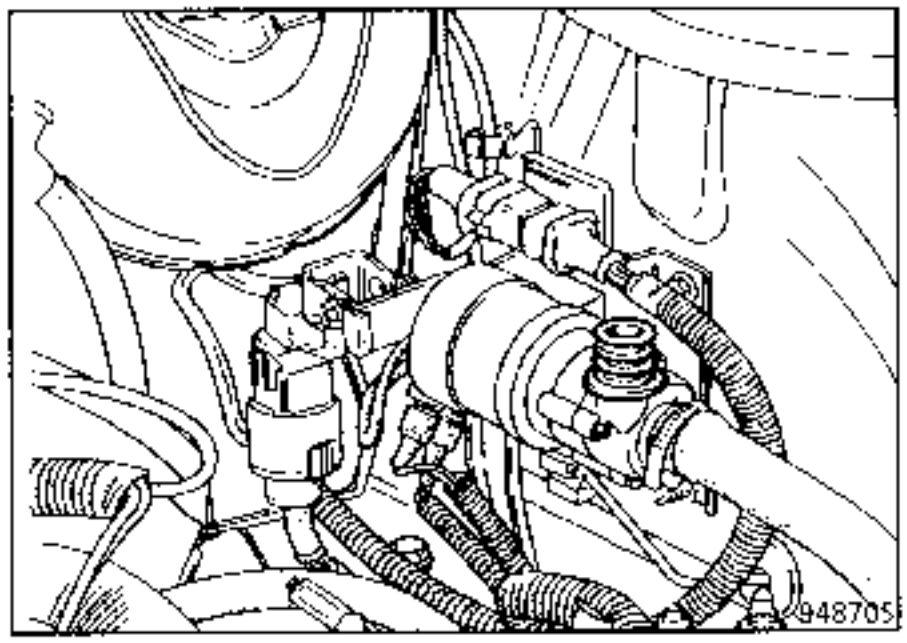
Disconnect:

- the connector for the connection on the side member,
- the water pump relay (1),
- the reversing lights relay (2),
- the water pump diodes unit (3),
- the connector (4) for the water pump,
- the heating connector (5).



Drain the cooling circuit by disconnecting the upper and lower radiator hoses.

Remove the upper hose from the water pump.



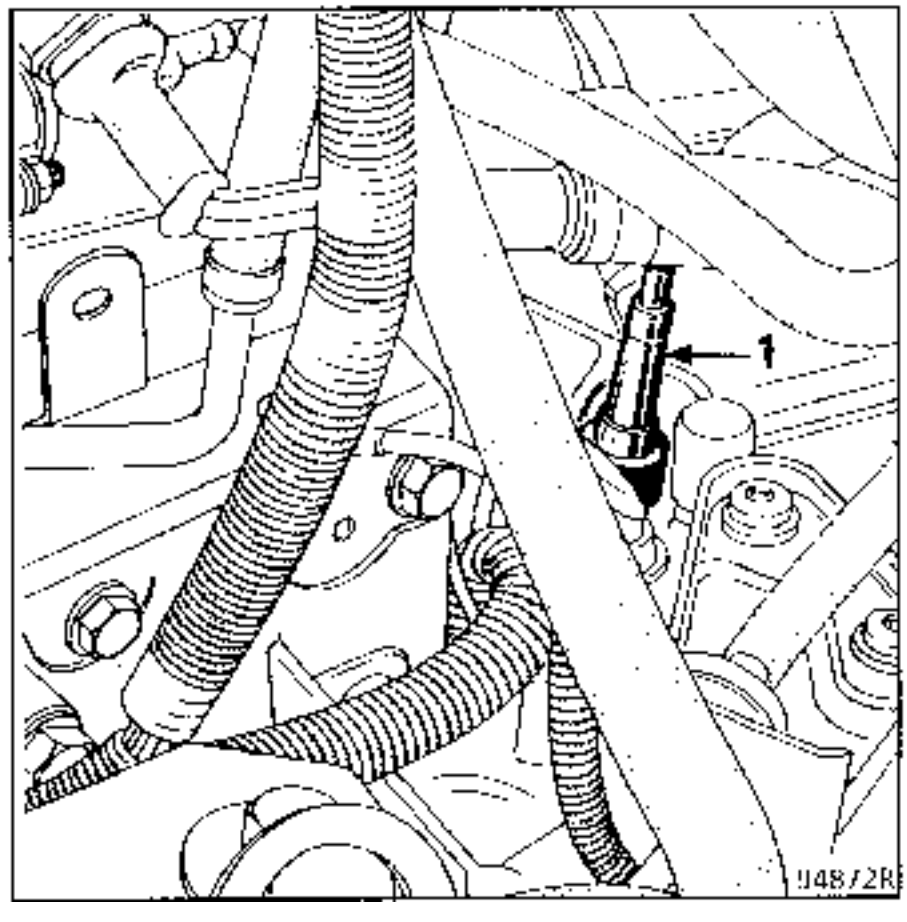
Remove the two heating hoses:

- on the engine connection,
- on the expansion bottle.

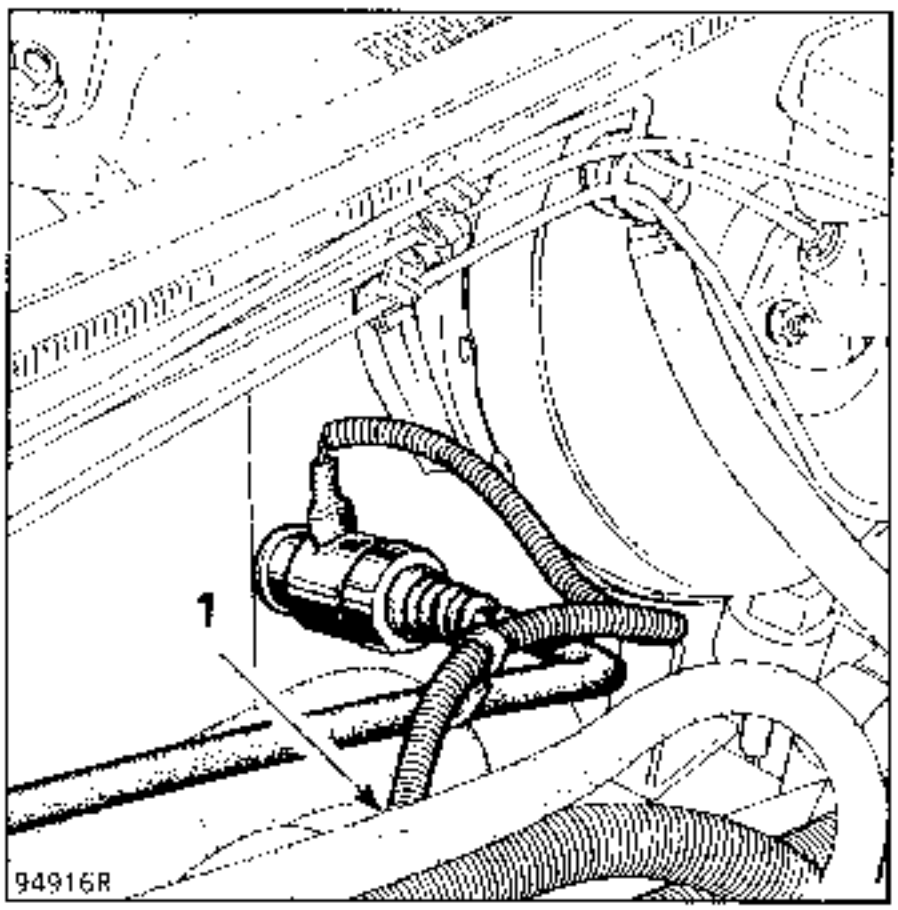
Remove the brake servo vacuum pipe.

Remove:

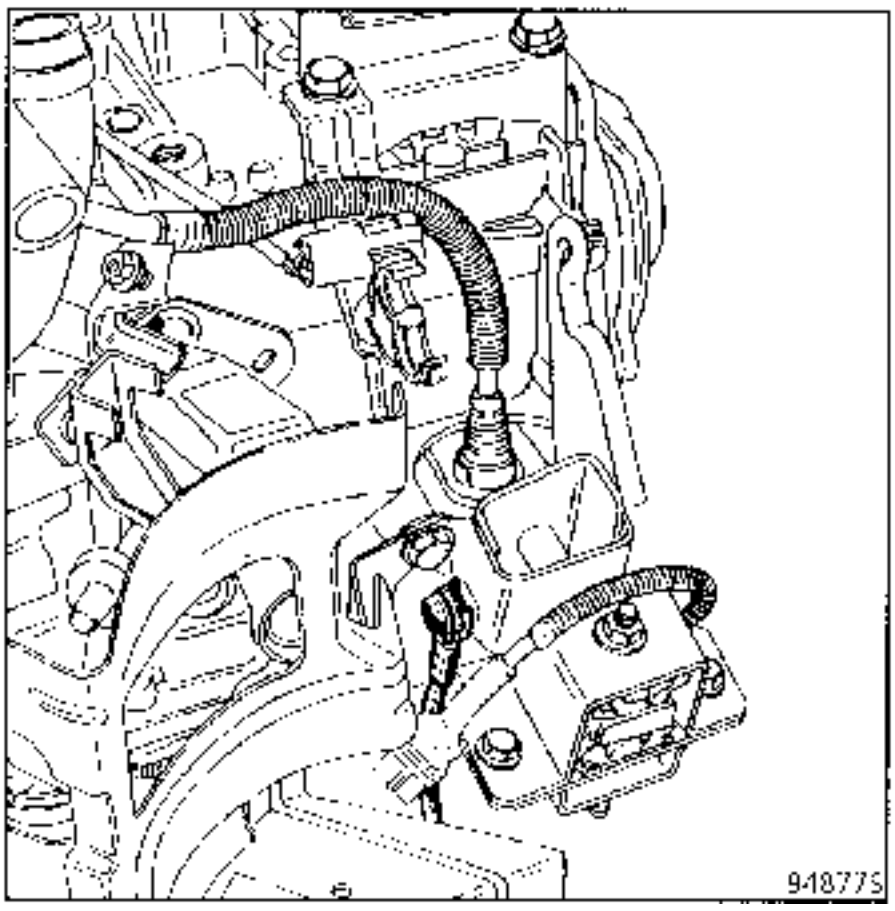
- the **A.T.** control cable.
- the speedo cable (1) after unscrewing it from the automatic transmission.



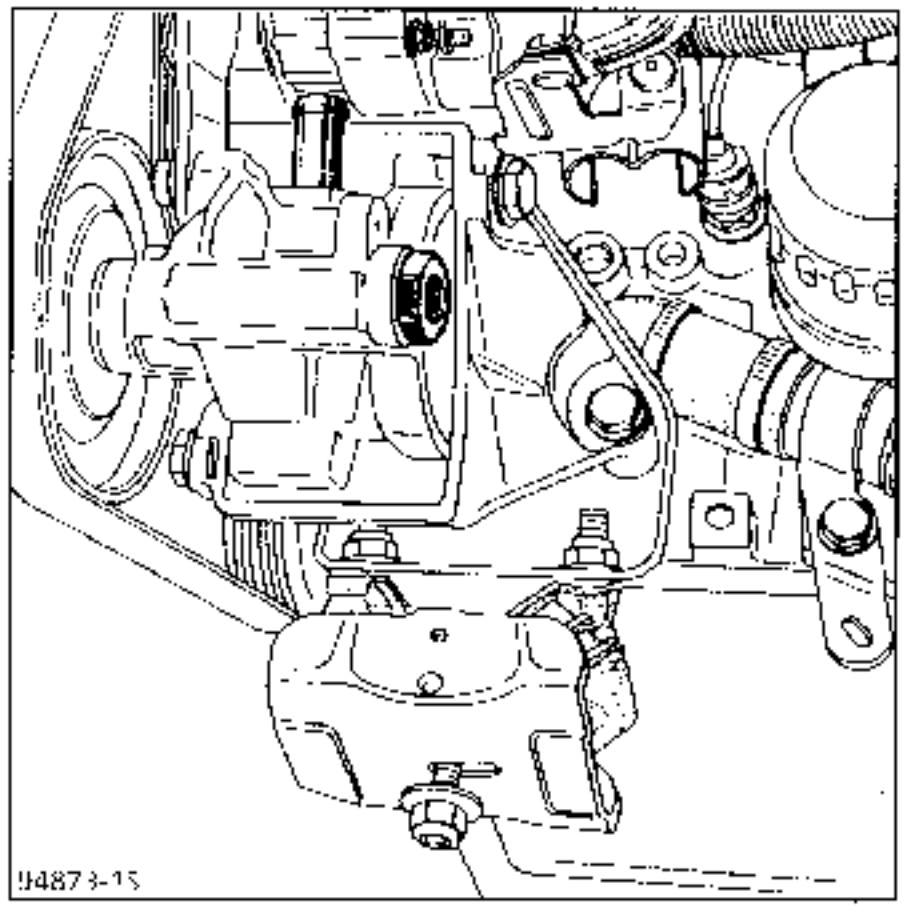
Remove the fuel pipes and the connector (1) for the kickdown switch.



Remove the earth wire on the automatic transmission.

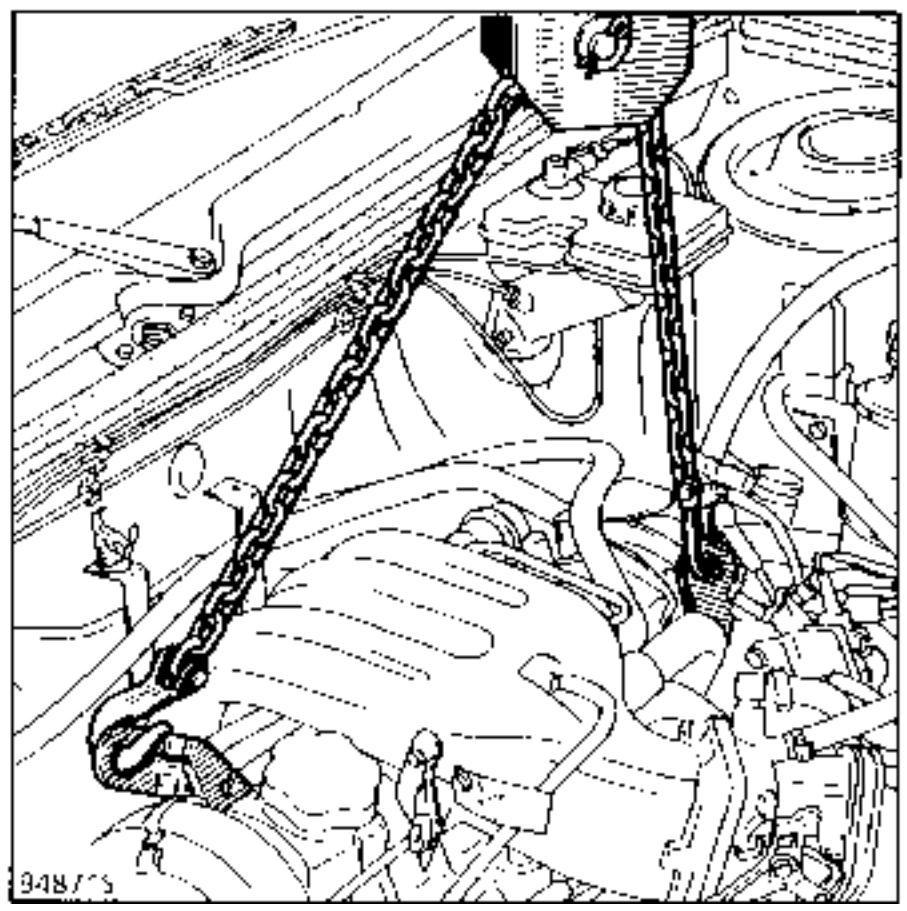


Remove the power assisted steering pipes.

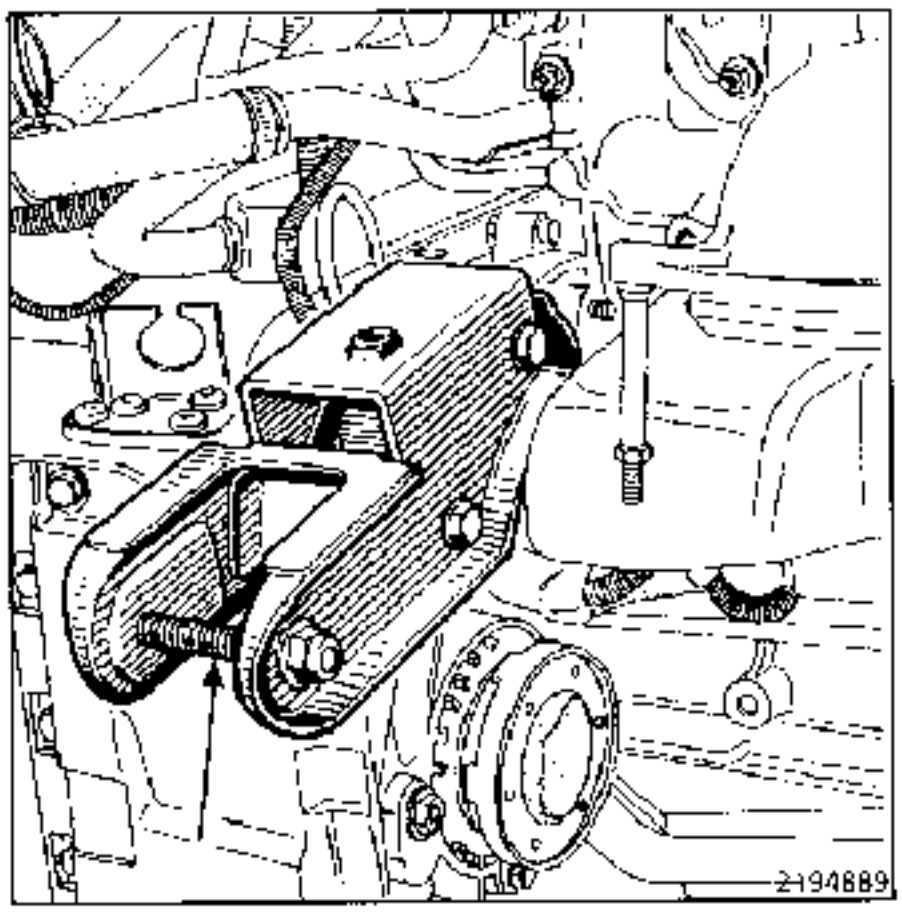


Fit the load positioning tool (eg- **NAUDER 1805**), and tension the lifting chains.

Take the weight of the engine and automatic transmission assembly.

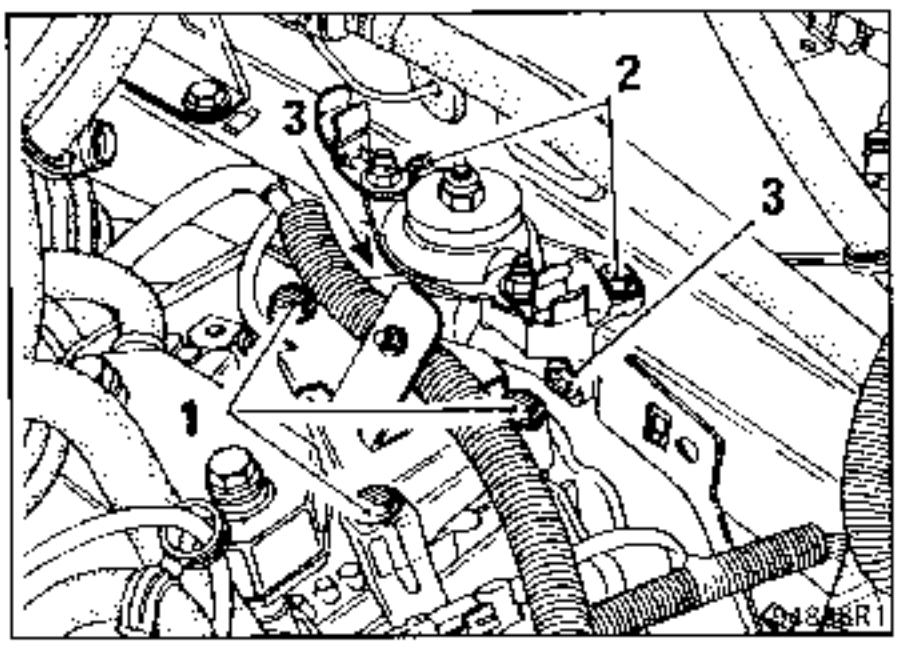


Remove the rear mounting bolt.



Remove the automatic transmission mounting pad. To do this, remove:

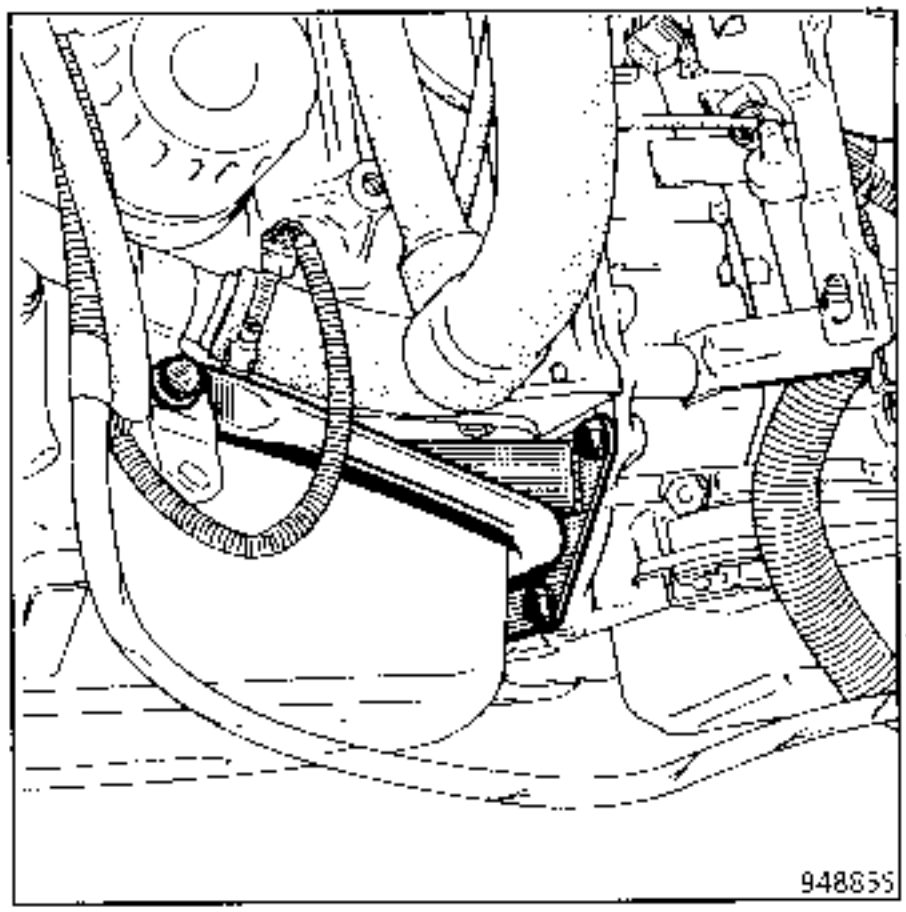
- the three bolts (1) on the automatic transmission,
- the two bolts (2) on the side member,
- slacken, but do not remove the two bolts (3) on the side member.



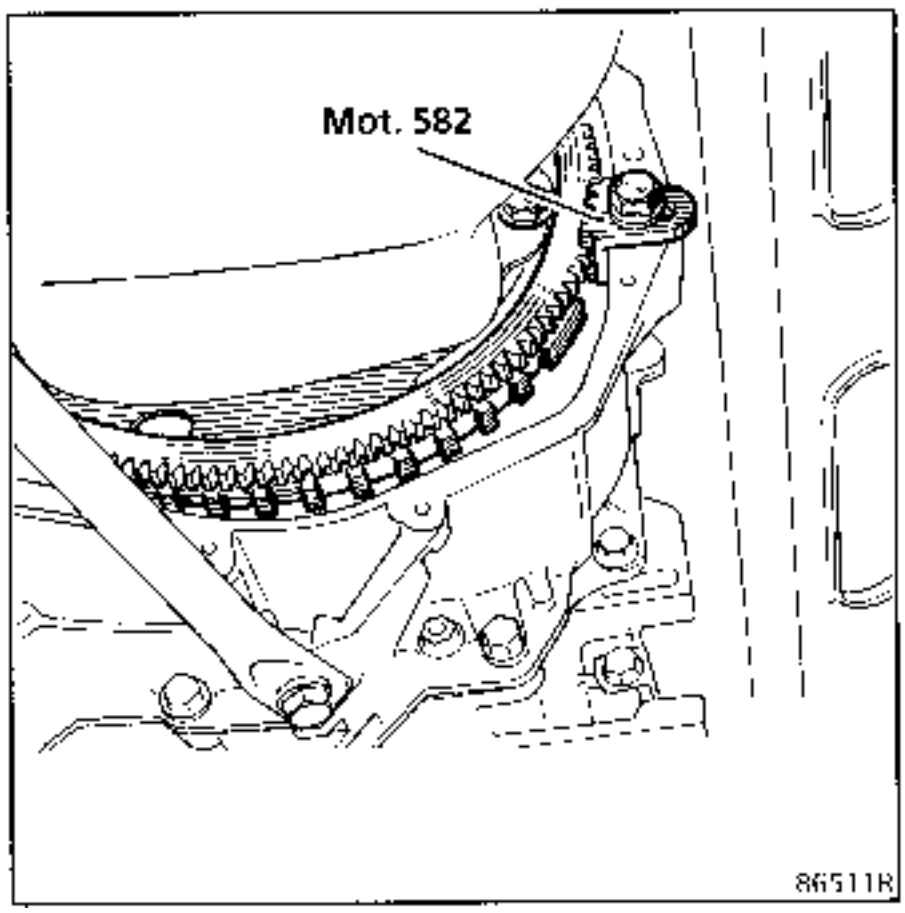
Remove the engine and automatic transmission assembly from the engine compartment.

Remove:

- the converter protective plate.

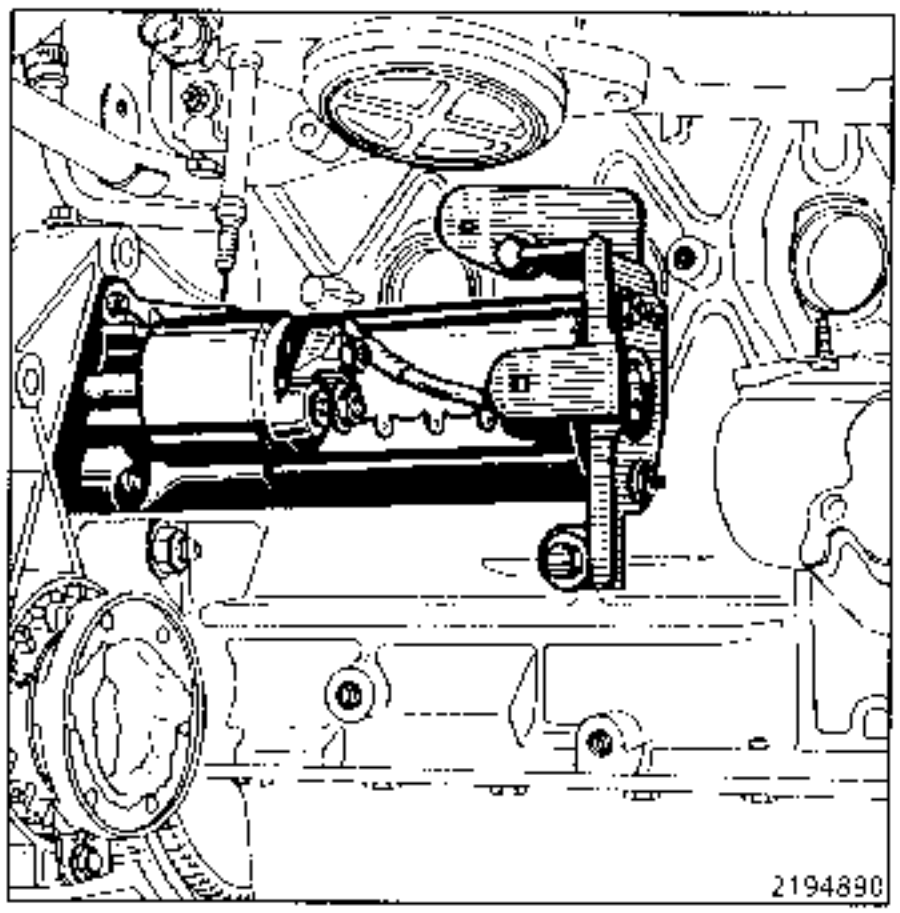


Fit the locking tool **Mot. 582** and remove the three nuts mounting the drive plate to the converter.

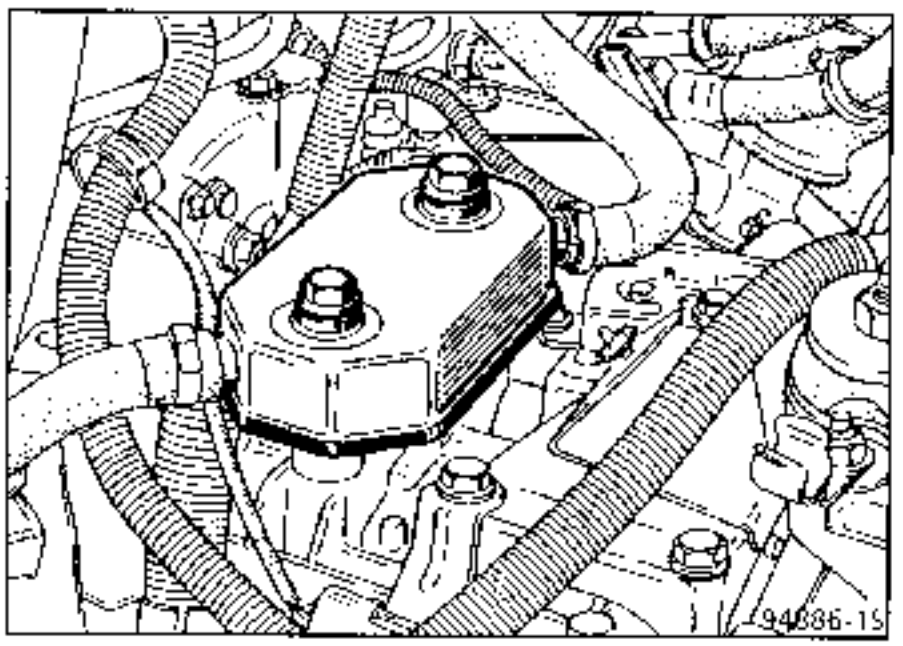


Remove:

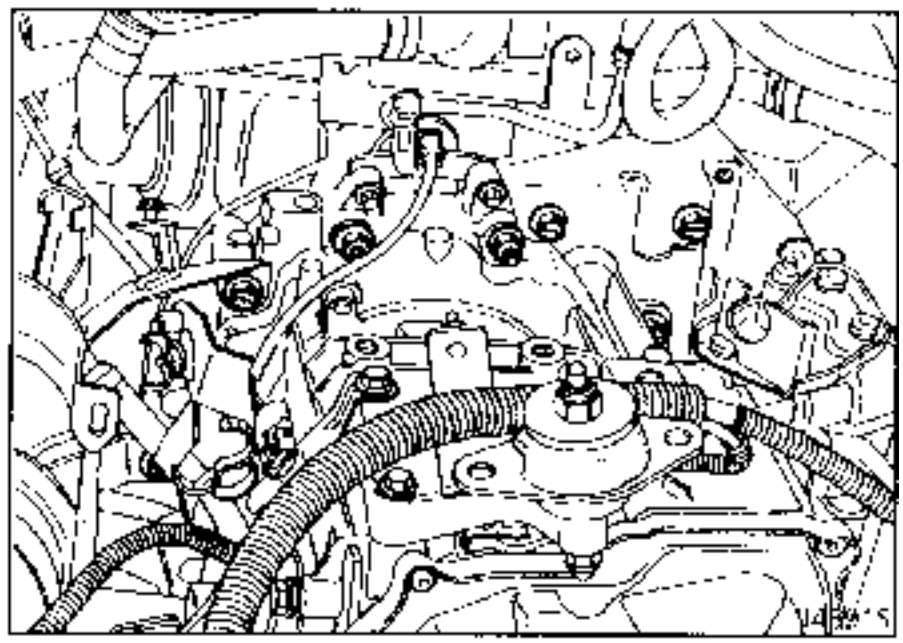
- the starter motor heat shield,
- the starter motor,



the oil cooler.

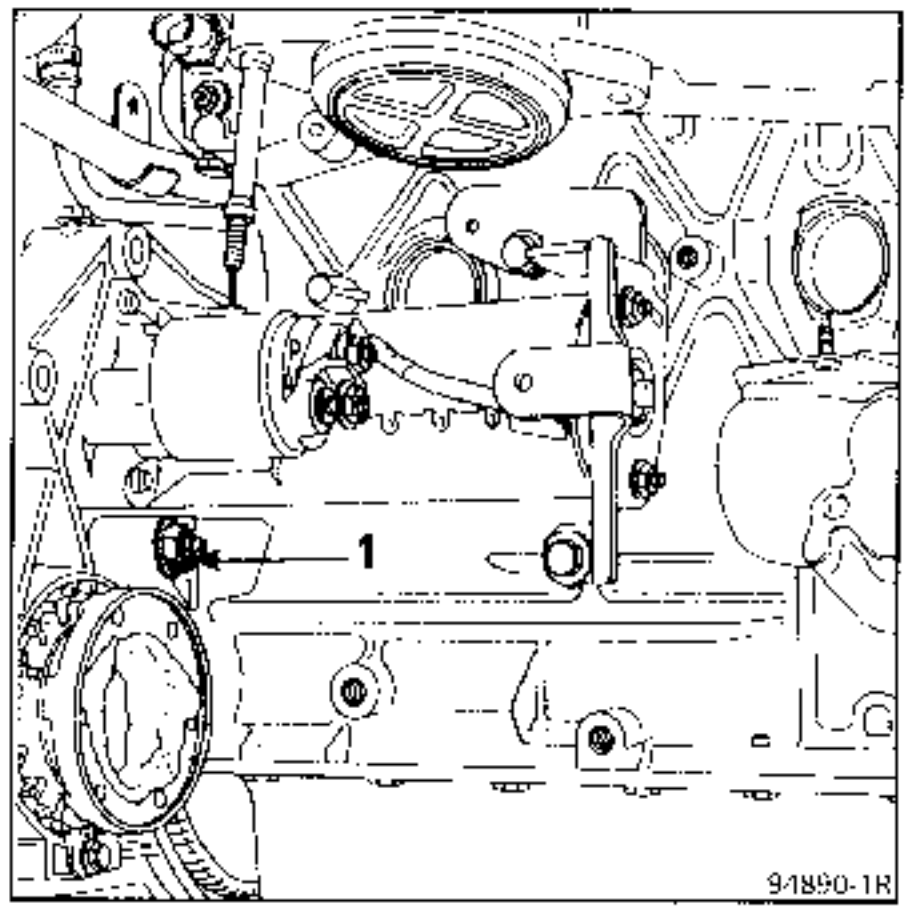


Release the wiring.



Remove the bolts mounting the automatic transmission to the engine.

Remove the engine mounting nut **(1)**.



Release the transmission from the engine taking care not to let the converter fall out.

REFITTING

Before refitting the automatic transmission to the vehicle, check the centring dowels (**A**) and (**B**) are present on the engine block.

Lubricate the device centring the converter on the crankshaft using **MOLYKOTE BR2**.

Fit the automatic transmission to the engine and tighten the nuts and bolts to a torque of **4 daN.m**.

Fit the drive plate nuts on the converter using **LOCTITE FRENBLOC** and tighten them to a torque of **1.5 daN.m**.

Refit:

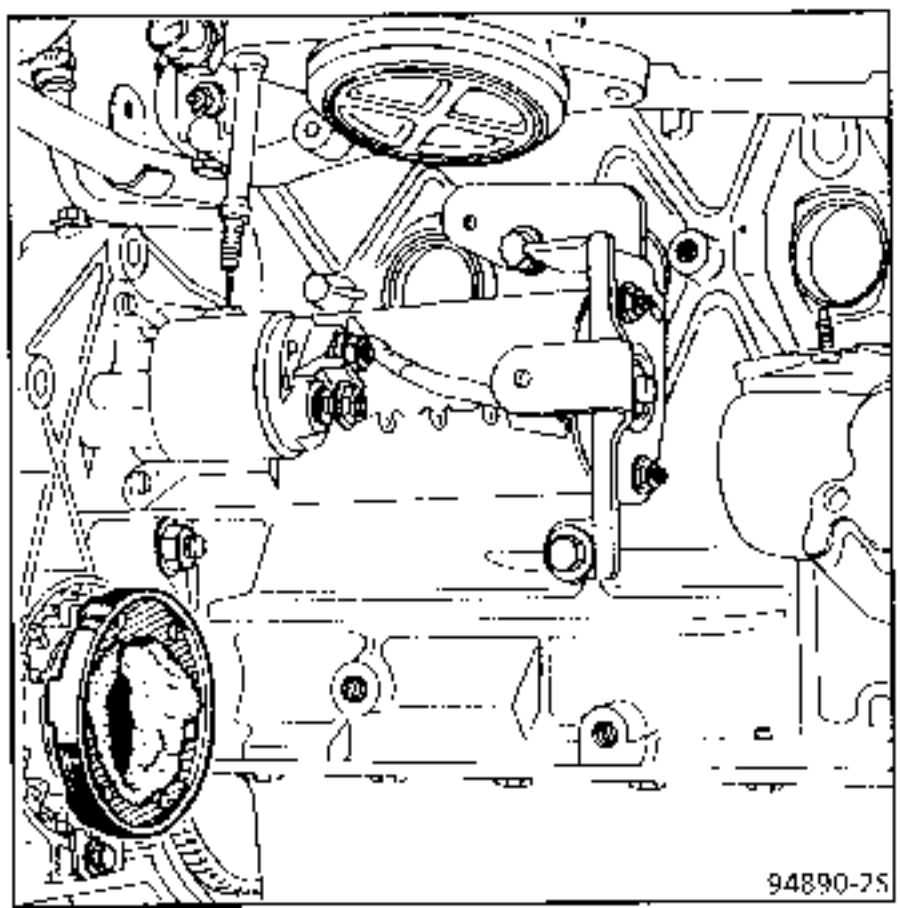
- the oil cooler and tighten the bolts to a torque of **2.5 daN.m**,
- the starter motor,
- the converter protective plate.

Refit the engine and automatic transmission assembly back into the engine compartment.

Refitting is then the reverse of removal.

Special notes:

Before repositioning the driveshafts, fill the sunwheel output flanges with **MOLYKOTE BR2** grease.



IMPORTANT : when refitting the accelerator cable, ensure the adjustment is correct as this affects the operation of the kickdown switch.

Refit the exhaust downpipe with a new gasket at the catalytic converter end and the sealing clip at the manifold end.

To ensure the exhaust pipe is correctly aligned, tighten the mountings at the manifold first and finish at the catalytic converter.

Carry out the following operations:

- fill and bleed the cooling circuit (**sub-section 19**),
- top up the level of the power assisted steering fluid,
- top up the level of the automatic transmission.

VERY IMPORTANT

REMEMBER TO VALIDATE FULL LOAD

to reprogramme the load potentiometer travel into the automatic transmission computer.

SPECIAL TOOLING REQUIRED	
Mot. 582	Locking tool
Mot. 1202	Hose clip pliers

TIGHTENING TORQUES (in daN.m)	
Shock absorber base mounting bolt	11
Driveshaft mounting bolt	3.5
Wheel bolts	9
Mounting nut for front mounting	4
Mounting bolt for rear mounting	6.5
AT mounting pad mounting bolt	2
Oil cooler mounting bolt	2.5
Drive plate mounting bolt on converter	1.5
Automatic transmission edge mounting bolt	4

Put the vehicle on a 2 post lift.

Remove:

- the bonnet,
- the front wheels,
- the left side deflector , (1 bolt and 3 rivets).
- the exhaust downpipe.

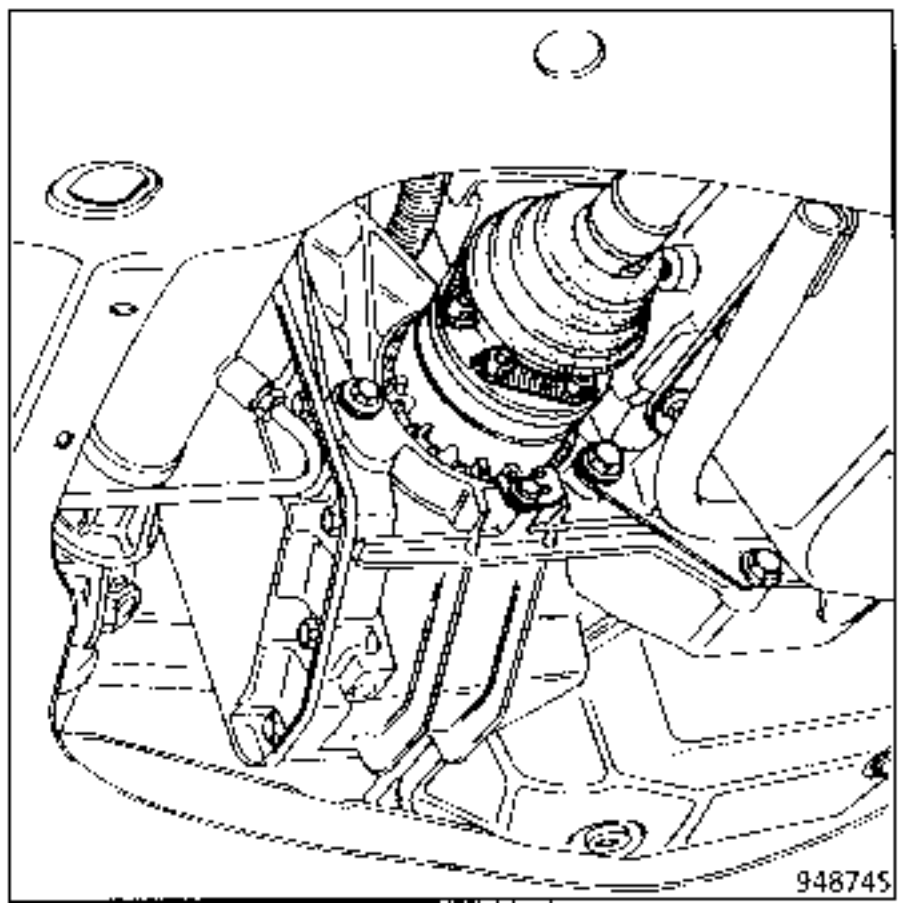
Remove the driveshaft mounting bolts on the sunwheel output flanges.

- **1st assembly**: hexagonal head bolts

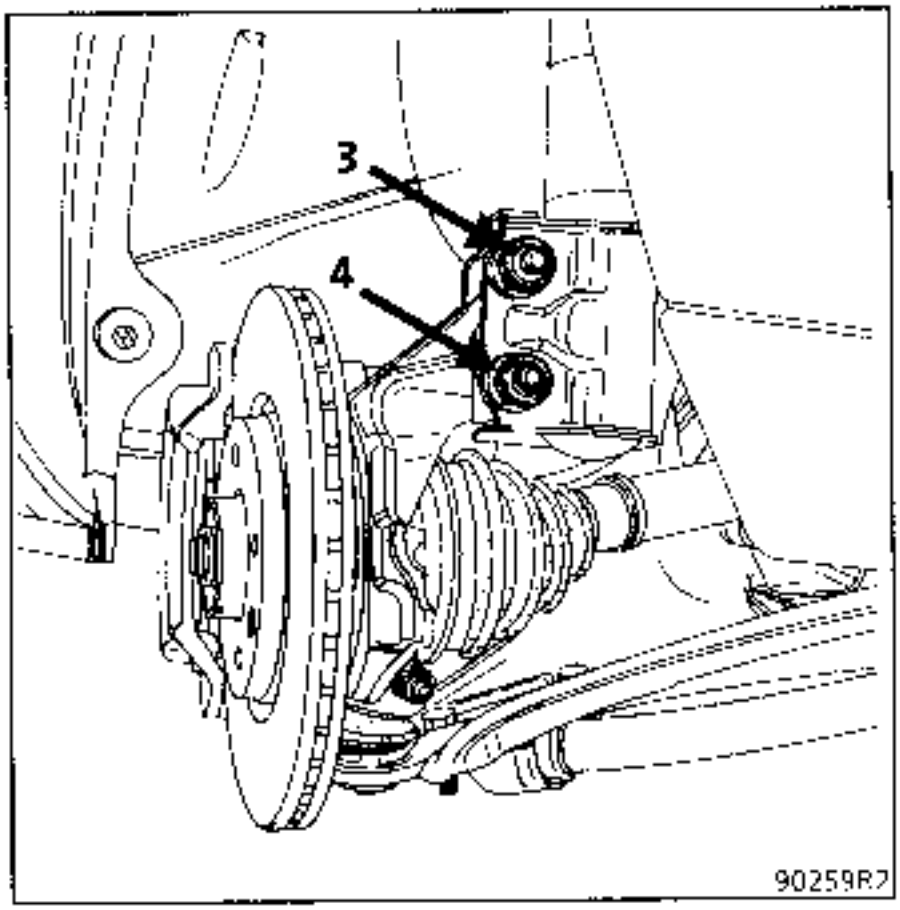
Use socket **FACOM J235** and a **6 mm** allen key end piece.

- **2nd assembly:** 12 sided head bolts

Use socket **FACOM SV.8L** 12 sided allen key.

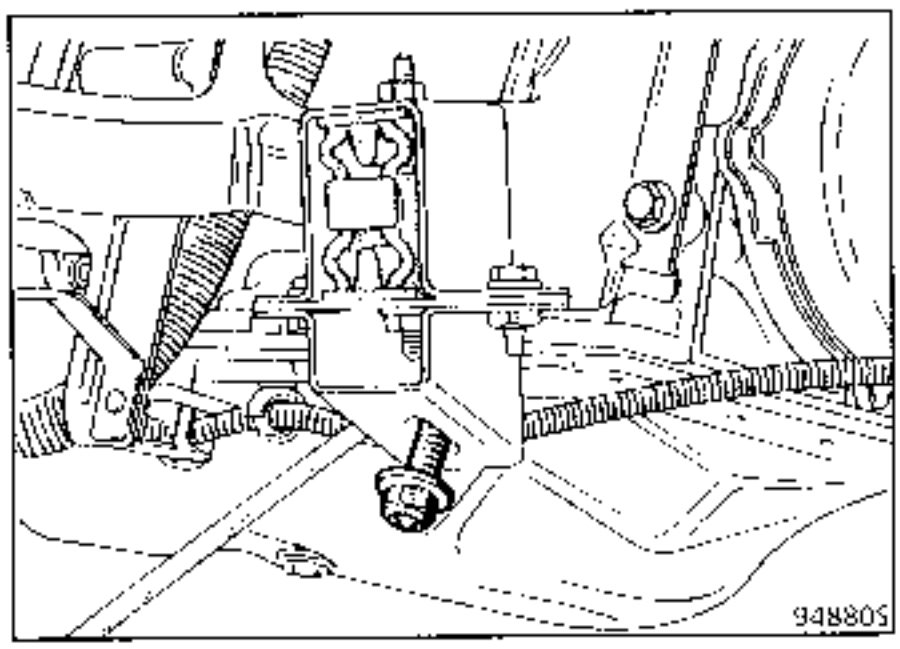


On each side of the vehicle, remove the upper bolt (3) and slacken the lower bolt (4).

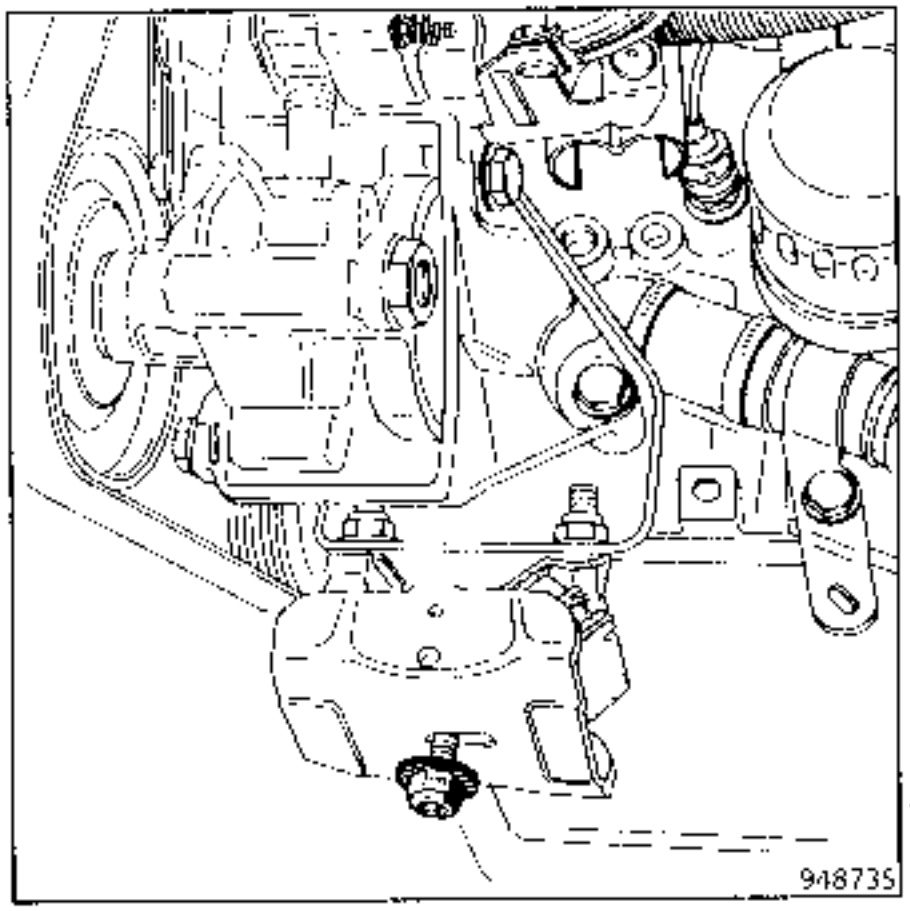


Release the driveshafts at the side.

Remove the mounting nut for the front automatic transmission mounting pad.

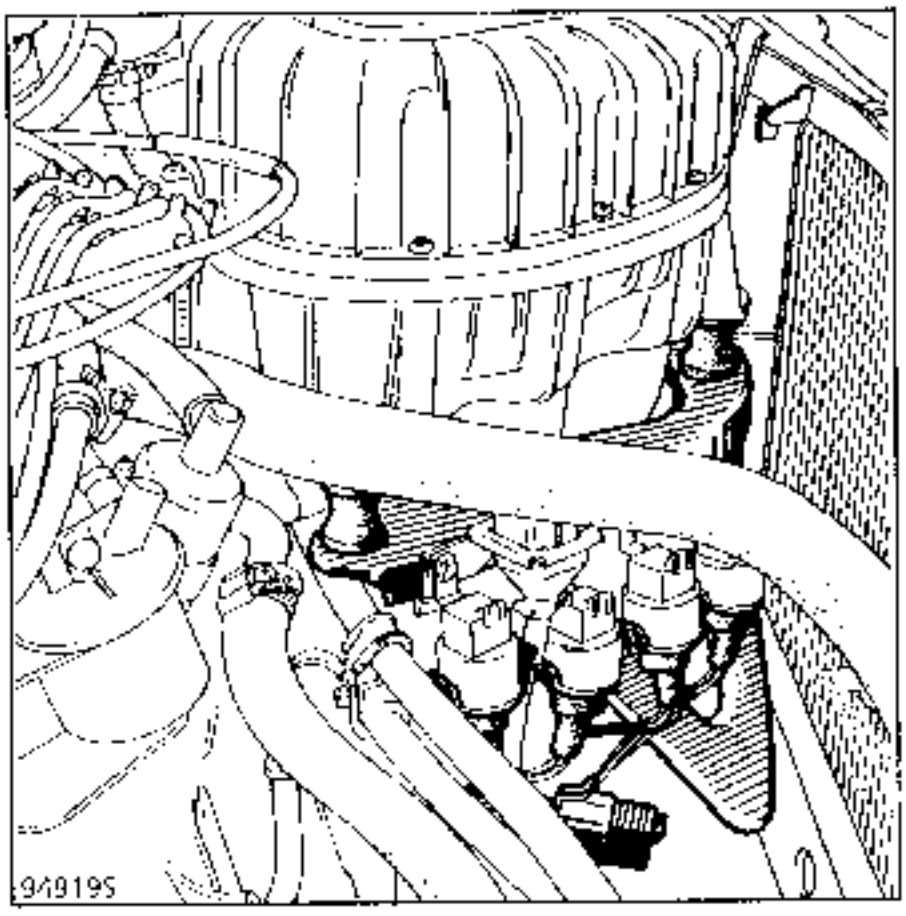


Remove the mounting nut for the front engine mounting pad.



Remove:

the battery,
- the air filter,
- the air filter mounting after disconnecting the relays,

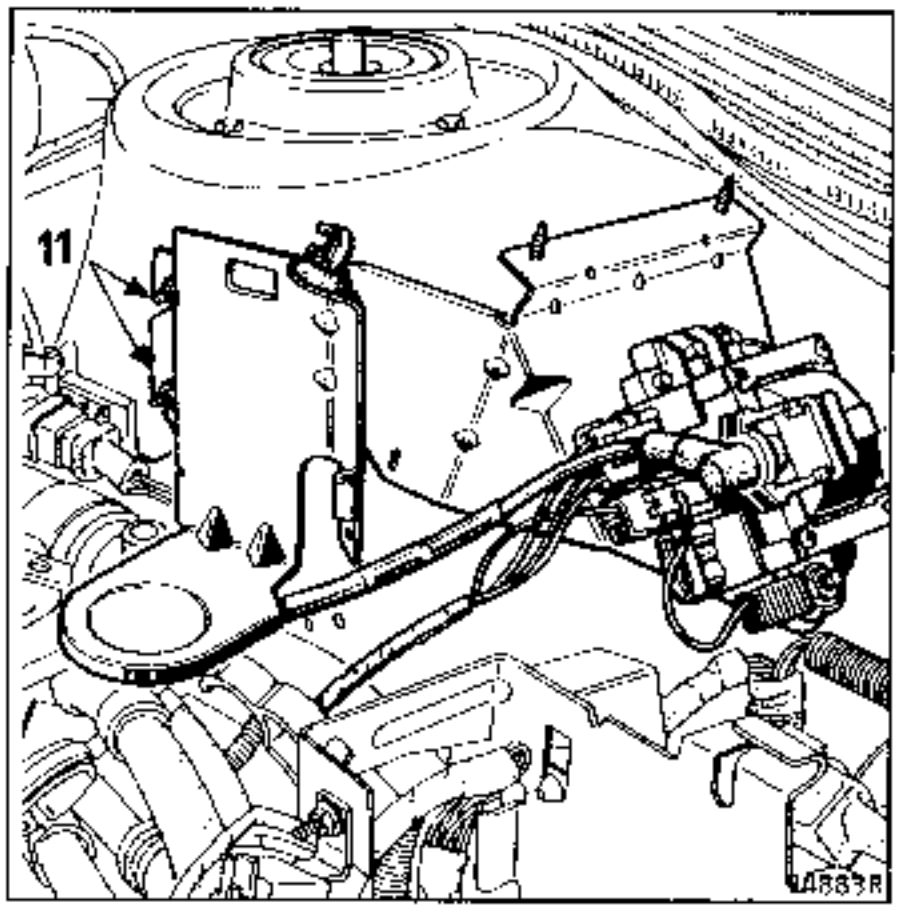


- the automatic transmission computer.

Remove the battery mounting.

Remove the expansion bottle and the power assisted steering reservoir.

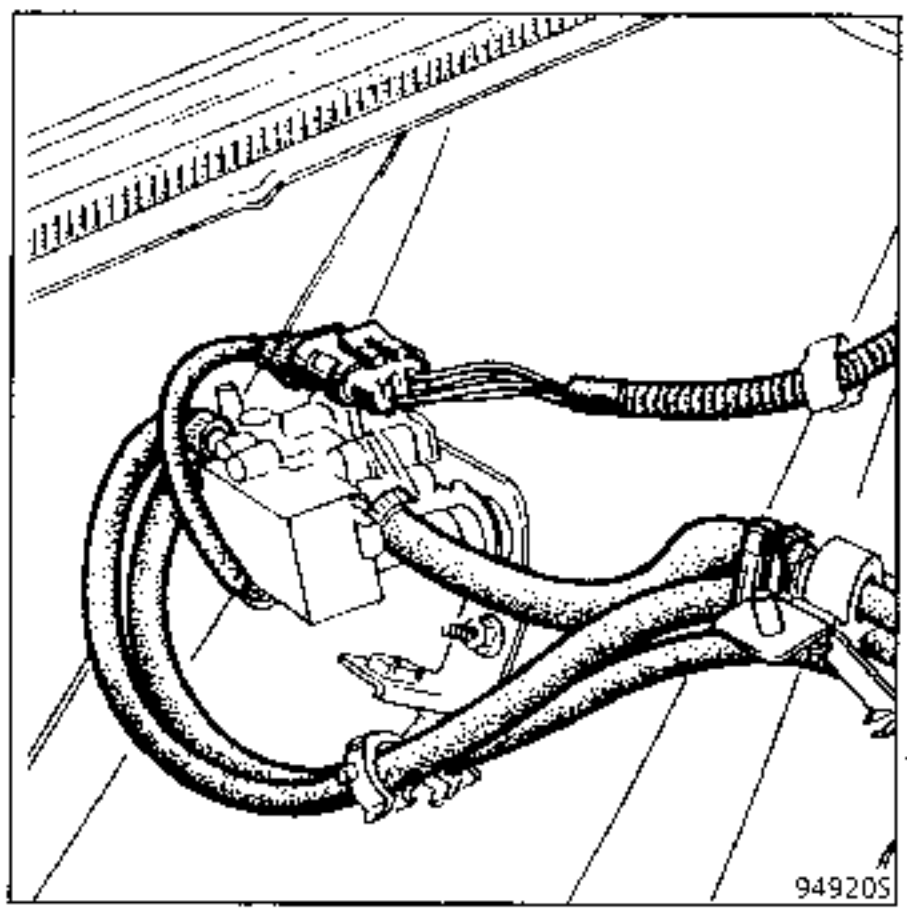
Remove the **AEI** unit and the mounting bolts (**11**) for the expansion bottle mounting.



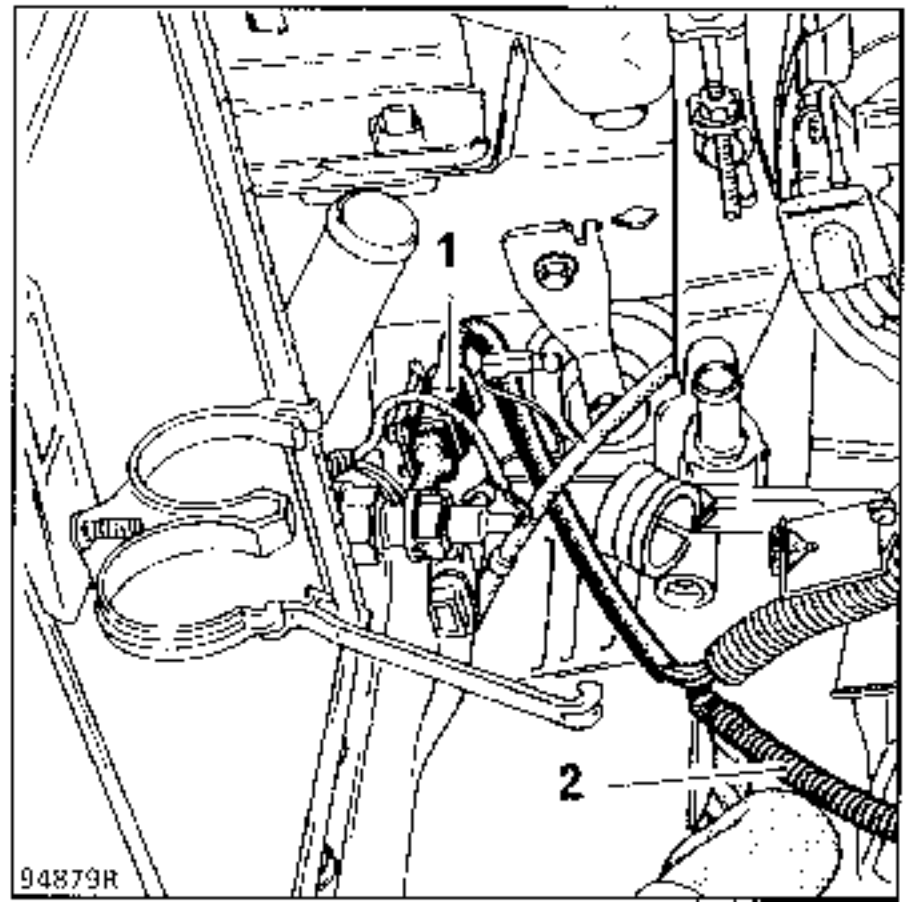
On the right hand side of the vehicle

Remove:

- the accelerator cable,
- the fuel pipes from the flowmeter.



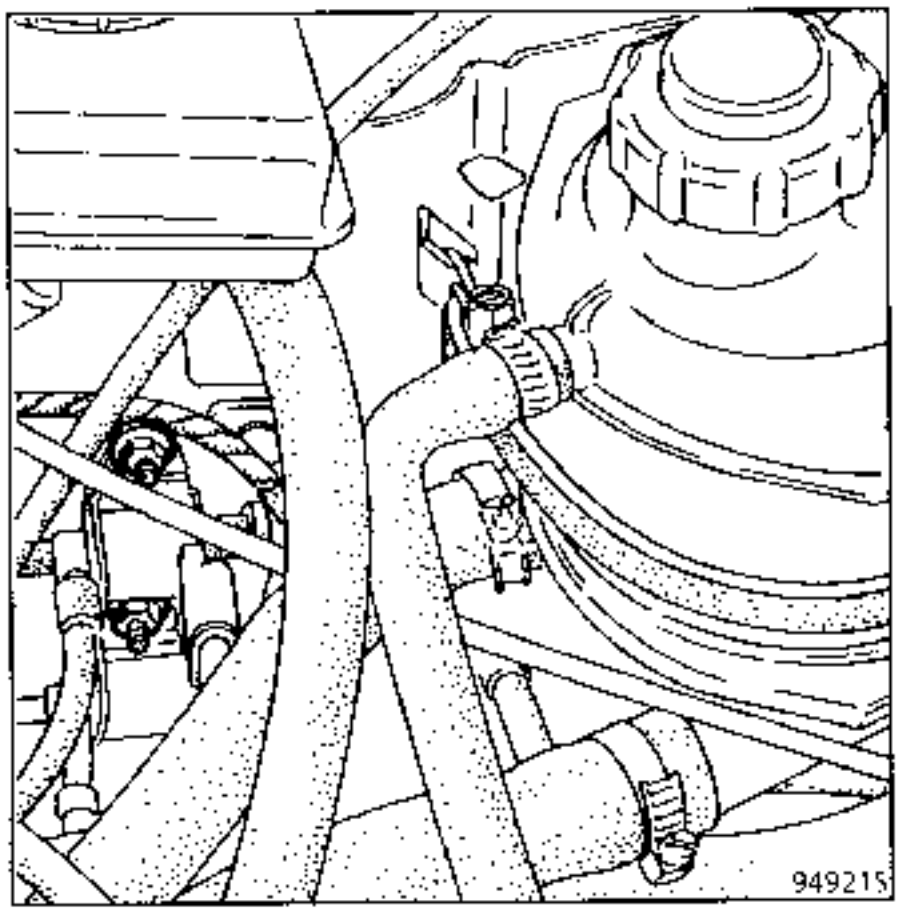
Disconnect the connector for the fan assembly wiring (**1**) and the oil level sensor connector (**2**).



On the left hand side of the vehicle

Disconnect the wiring.

Remove the pipes for the solenoid valves.



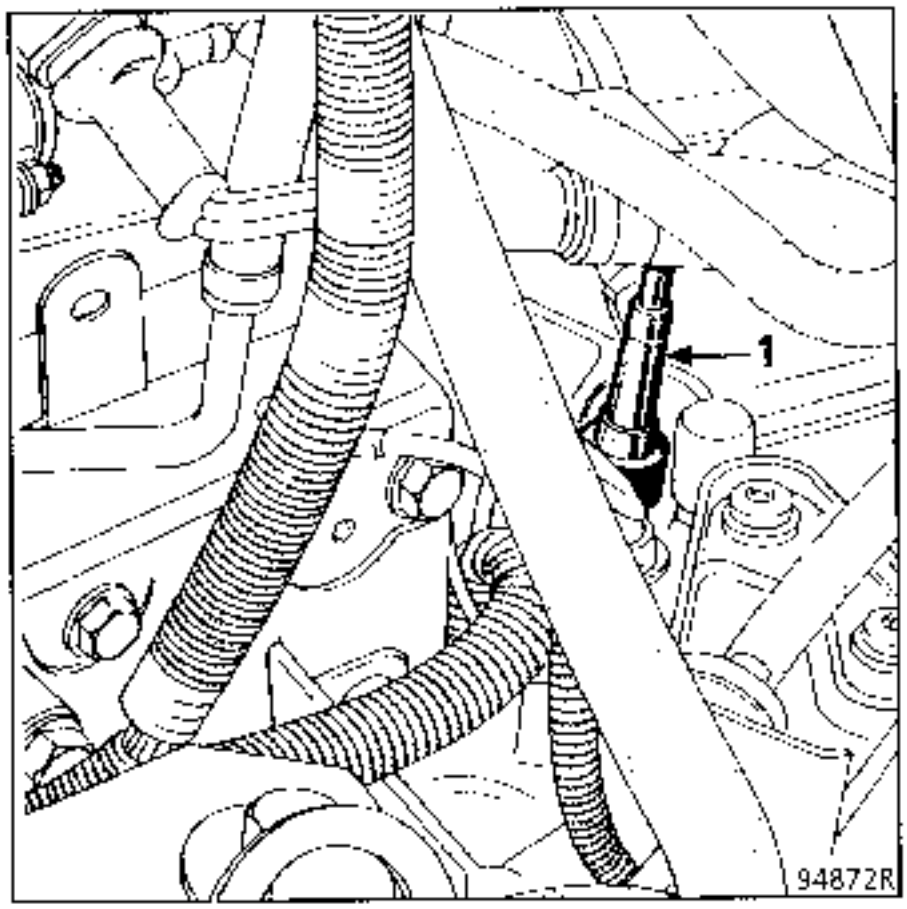
Drain the cooling circuit by disconnecting the upper and lower radiator hoses.

Remove the heating hoses.

Remove the brake servo vacuum pipe.

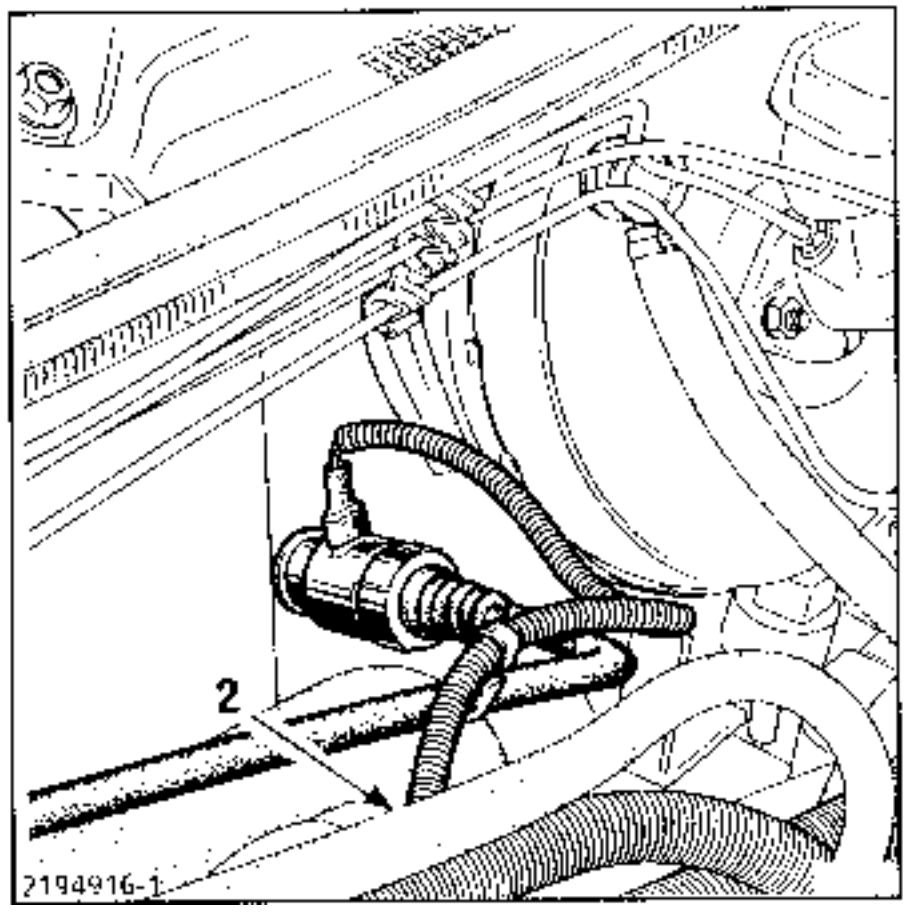
Remove:

- the **A.T.** control cable.
- the speedo cable (**1**) after unscrewing it from the automatic transmission.

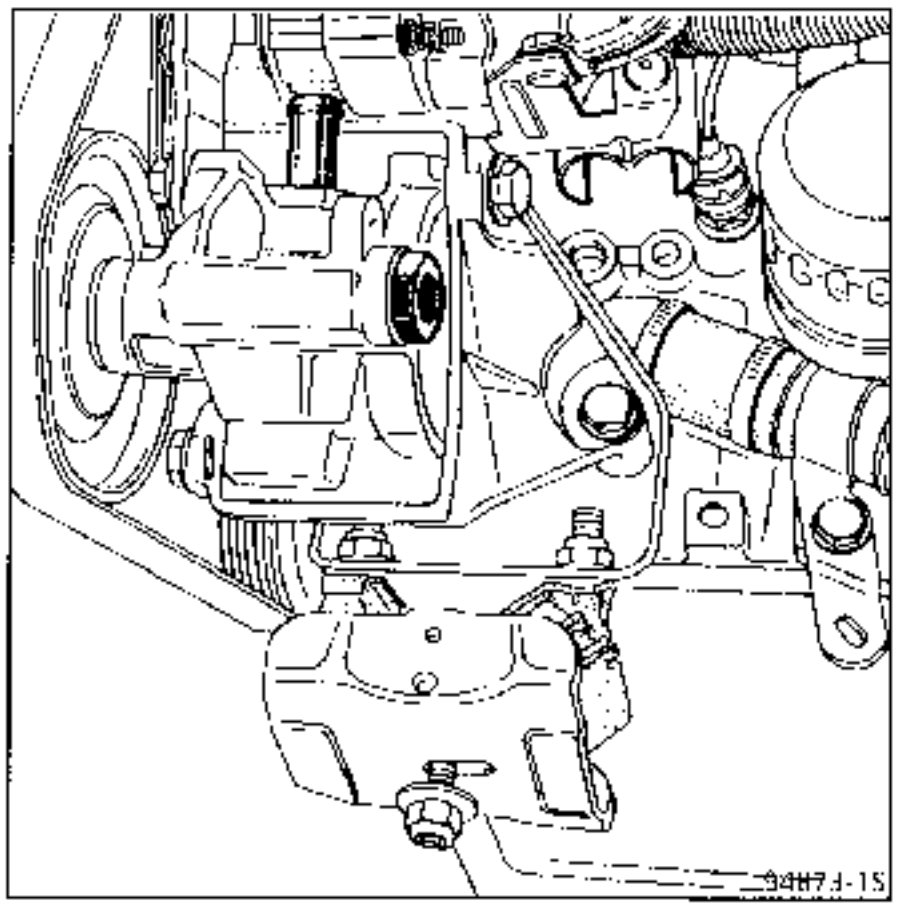


Remove the fuel pipes.

Remove the connector (**2**) for the kickdown switch.

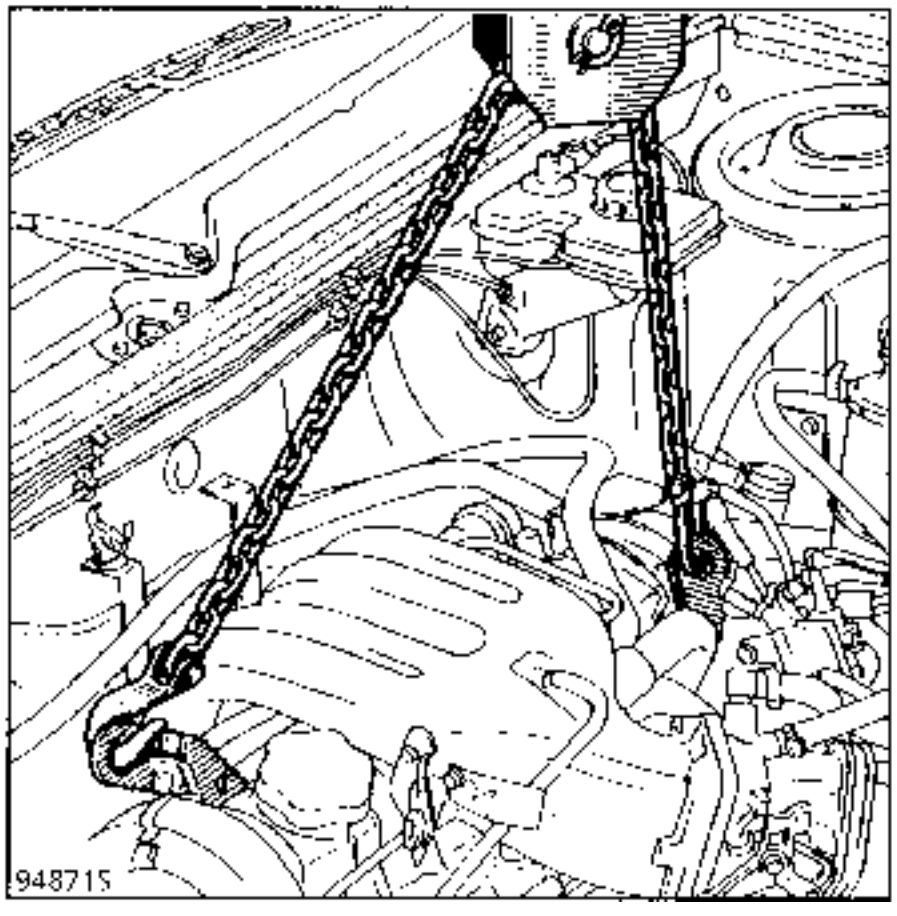


Remove the power assisted steering pipes.

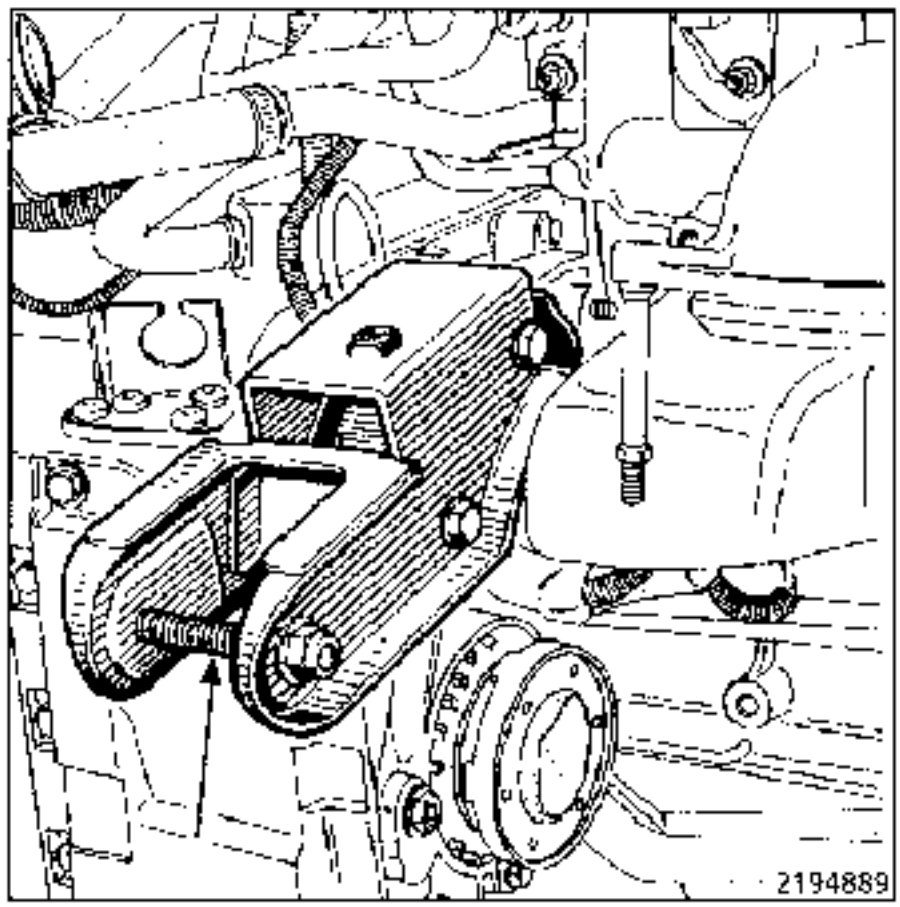


Fit the load positioning tool (eg- **NAUDER 1805**), and tension the lifting chains.

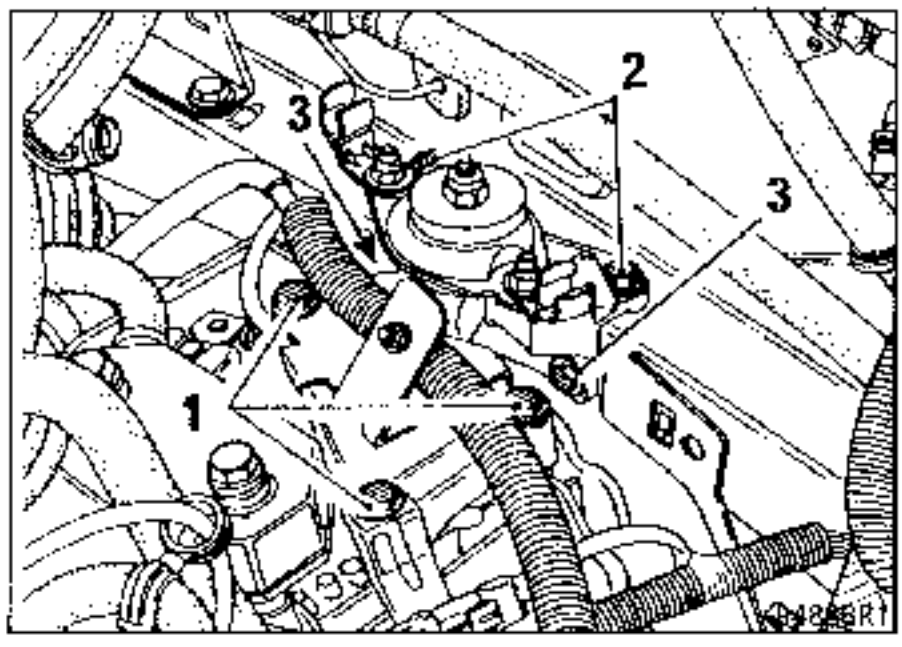
Take the weight of the engine and automatic transmission assembly.



Remove the rear mounting bolt.

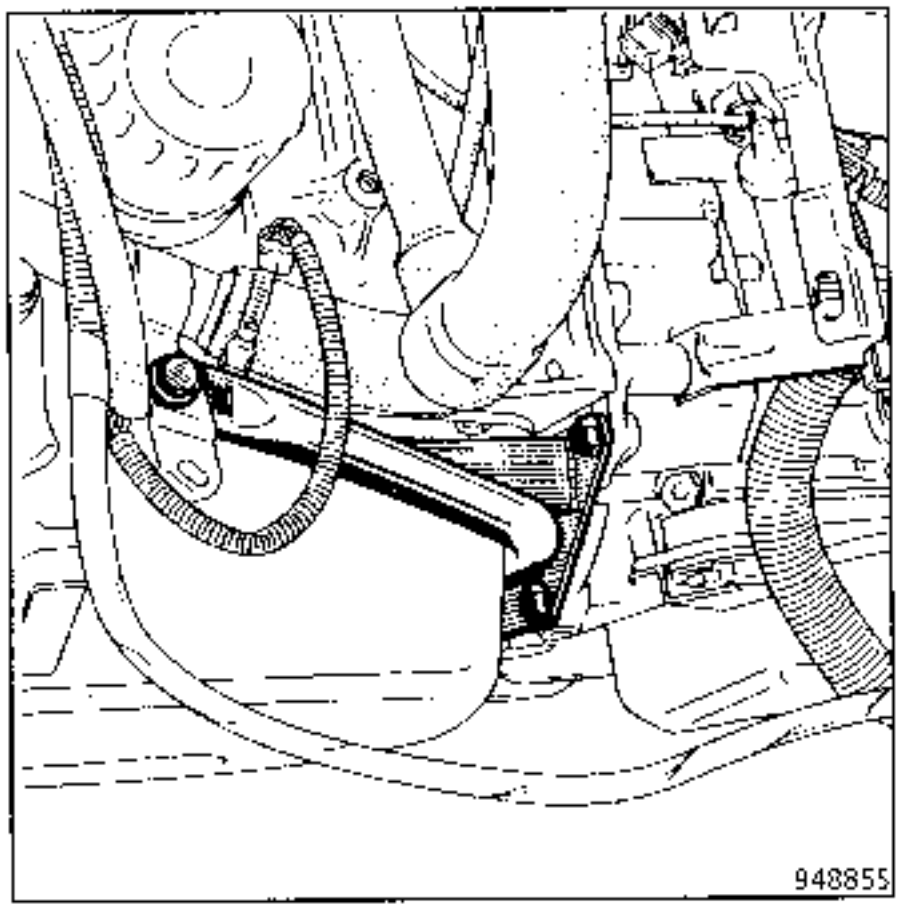


Remove the automatic transmission mounting pad.

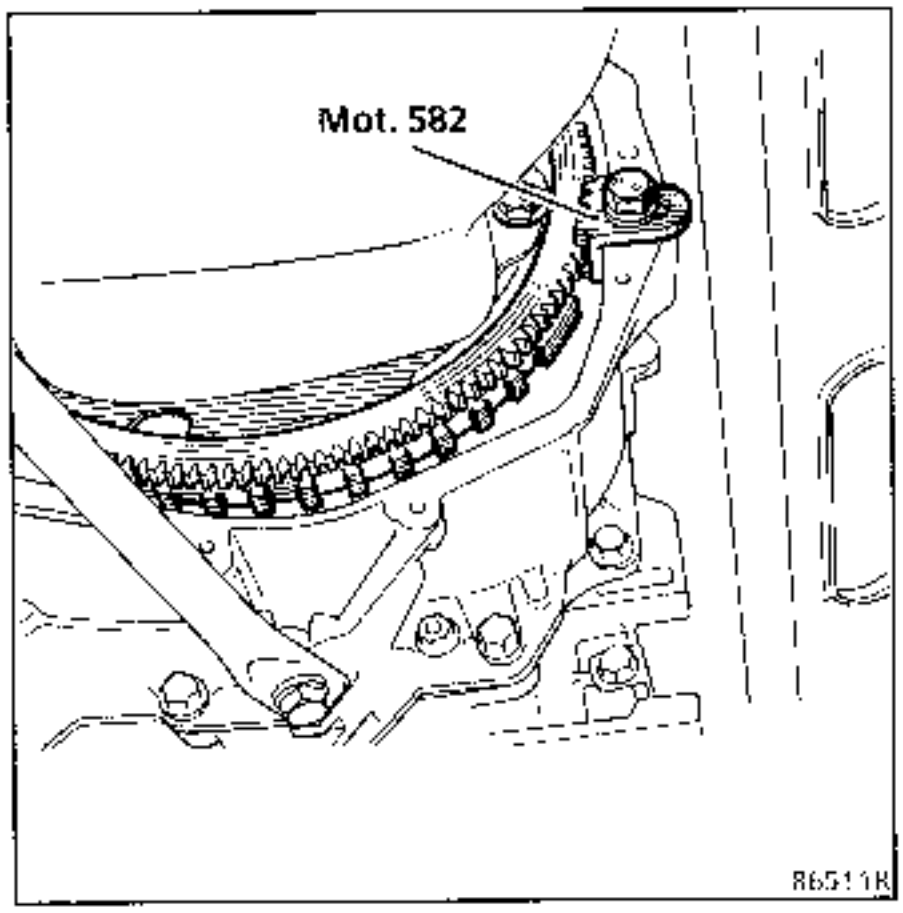


Remove the engine and automatic transmission assembly.

Remove:
- the converter protective plate.



Fit the locking tool **Mot. 582** and remove the three nuts mounting the drive plate to the converter.



Remove:
- the starter motor,
- the oil cooler.

Release the wiring.

Remove the bolts mounting the automatic transmission to the engine.

Release the transmission from the engine taking care not to let the converter fall out.

REFITTING

Before refitting the automatic transmission to the vehicle, check the centring dowels are present on the engine block.

Lubricate the device centring the converter on the crankshaft using **MOLYKOTE BR2**.

Fit the automatic transmission to the engine and tighten the nuts and bolts to a torque of **4 daN.m**.

Fit the drive plate nuts on the converter using **LOCTITE FRENBLOC** and tighten them to a torque of 1.**5 daN.m**.

Refit:

- the oil cooler and tighten the bolts to a torque of **2.5 daN.m**,

  the starter motor,

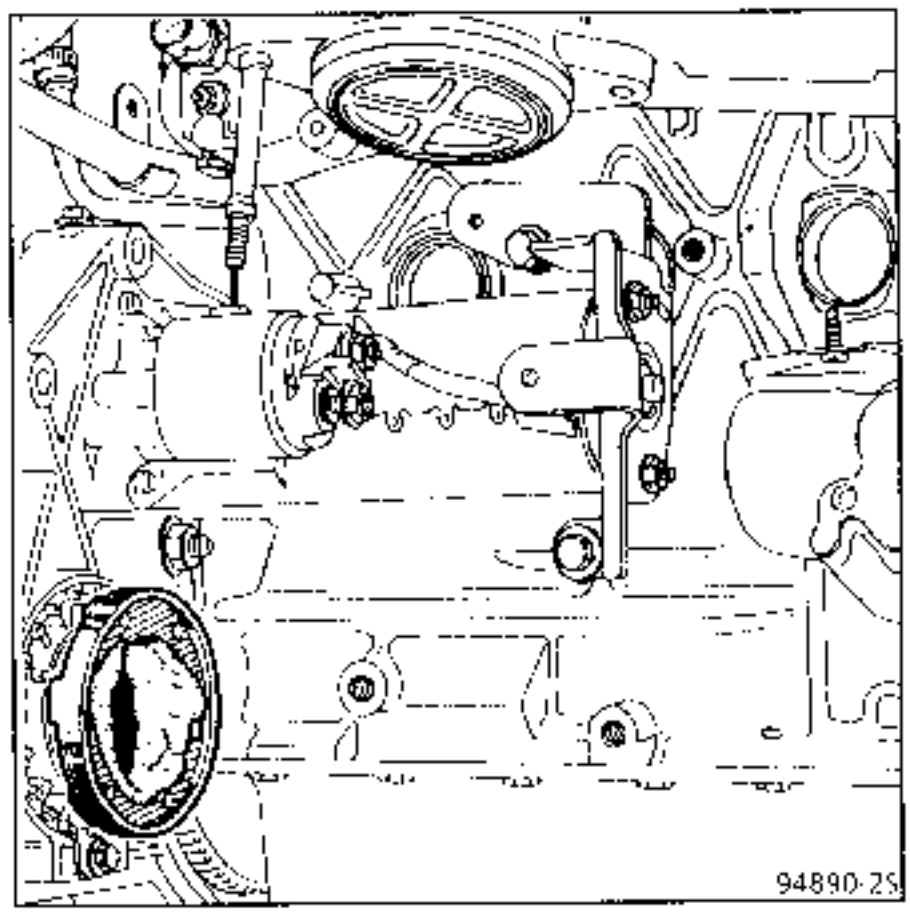
- the converter protective plate.

Refit the engine and automatic transmission assembly back into the engine compartment.

Refitting is then the reverse of removal.

Special notes:

Before repositioning the driveshafts, fill the sunwheel output flanges with **MOLYKOTE BR2** grease.



IMPORTANT : when refitting the accelerator cable, ensure the adjustment is correct as this affects the operation of the kickdown switch.

Refit the exhaust downpipe with a new gasket at the catalytic converter end and the sealing clip at the manifold end.

To ensure the exhaust pipe is correctly aligned, tighten the mountings at the manifold first and finish at the catalytic converter.

Carry out the following operations:

- fill and bleed the cooling circuit (**sub-section 19**),
- top up the level of the power assisted steering fluid,
- top up the level of the automatic transmission.

VERY IMPORTANT

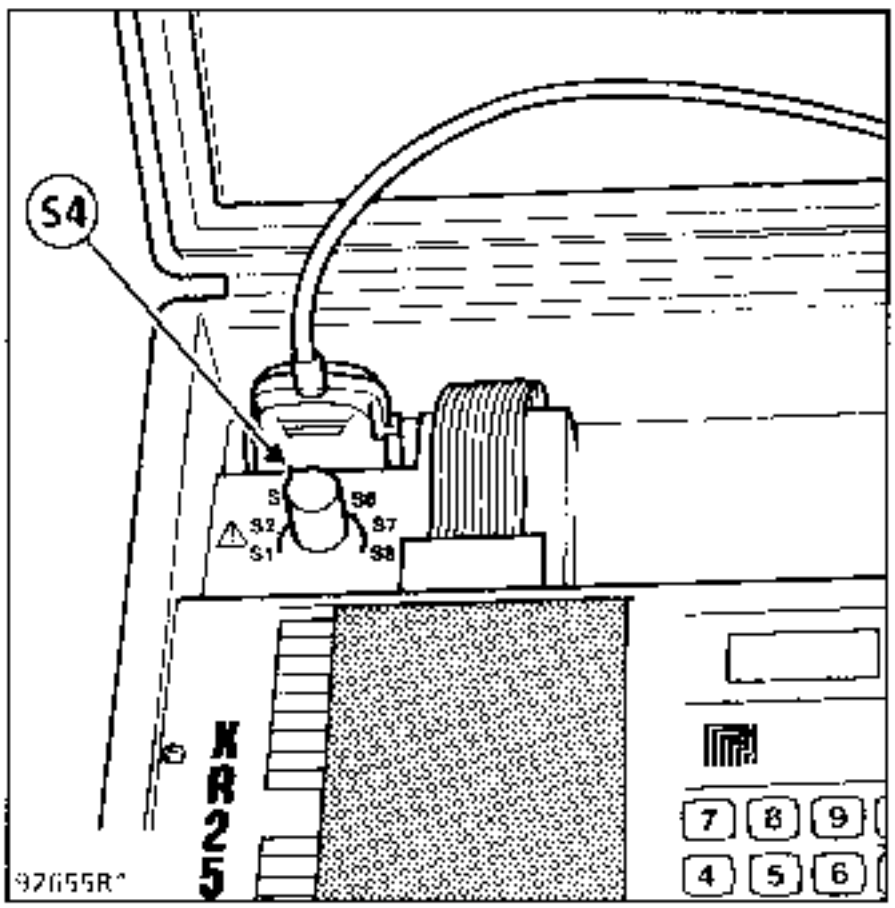
REMEMBER TO VALIDATE FULL LOAD

to reprogramme the load potentiometer travel into the automatic transmission computer.

Connect the **XR25** to the vehicle's diagnostic socket.

The socket is located on the battery mounting next to the injection computer.

Set the ISO selector on position **S4**.



Turn the ignition on but do not start the engine.

Enter the code for transmission

"**A**" : | D | | 0 | | 4 |

The bargraph display should only show the following bargraphs illuminated **1-3-4-5-6-11** either on the right or on the left hand side.

Validate full load by pressing the accelerator pedal for **5 seconds**:

- bargraph **2** illuminates,
  bargraph **6** extinguishes.

Only bargraphs **1-3-4-5-11** should be illuminated when the accelerator pedal is released.

VERY IMPORTANT : TURN THE IGNITION OFF.

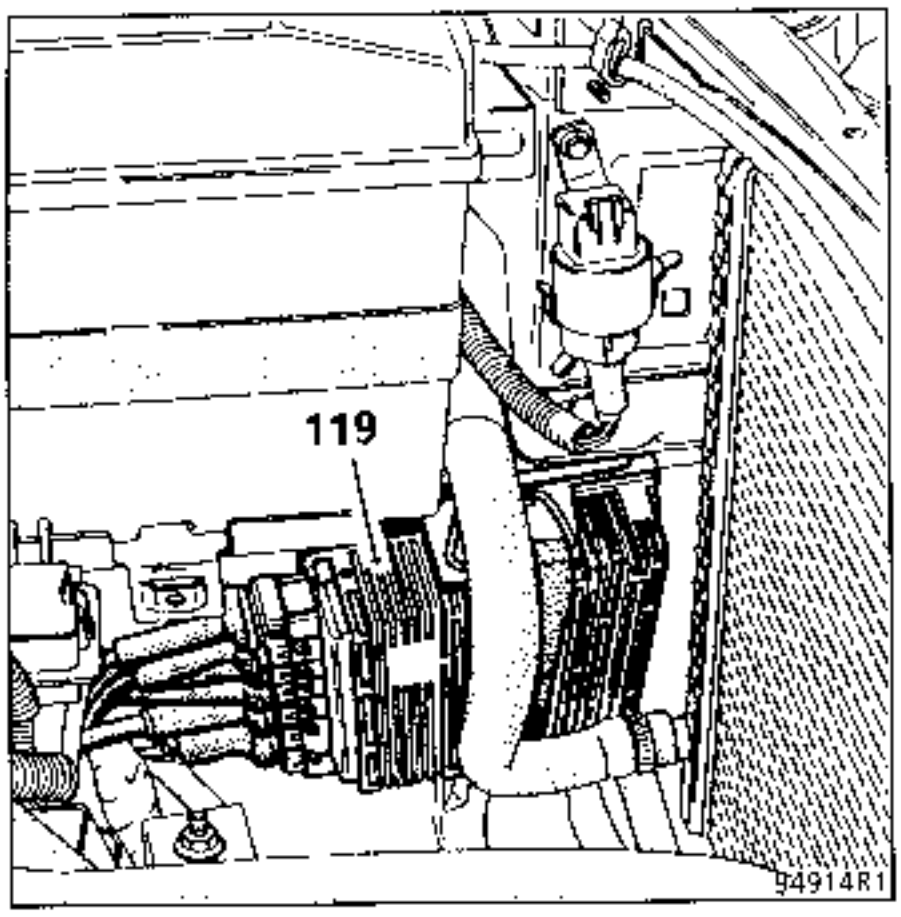
Turn the ignition on again and enter the code for transmission "**A**" to check the validation was carried out correctly.

Repeat the operation if necessary.

Turn the ignition off and disconnect the **XR25**.

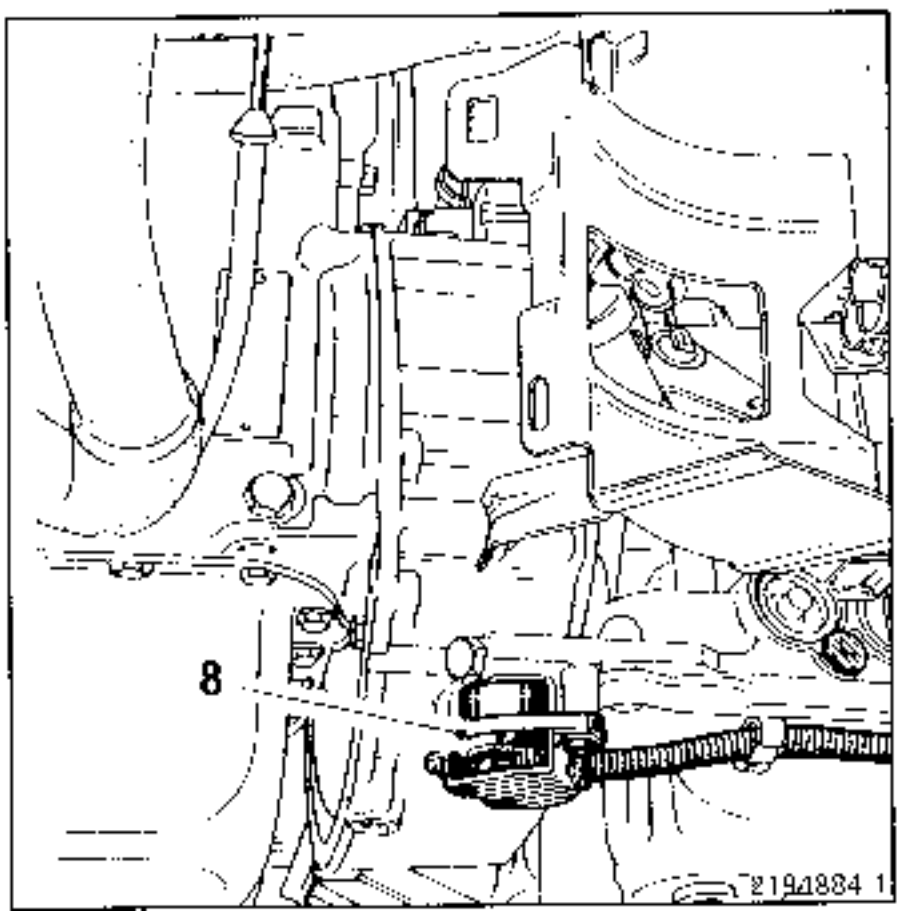
IMPORTANT: if the full load value is incorrectly validated this may cause:

- **permanent illumination of the warning light,**
- **faults when changing gear,**
- **incorrect gear change thresholds,**
- **difficulty in using the kickdown function,**
- **driving discomfort.**



When replacing the computer or erasing the memory, remember to validate "**full load**".

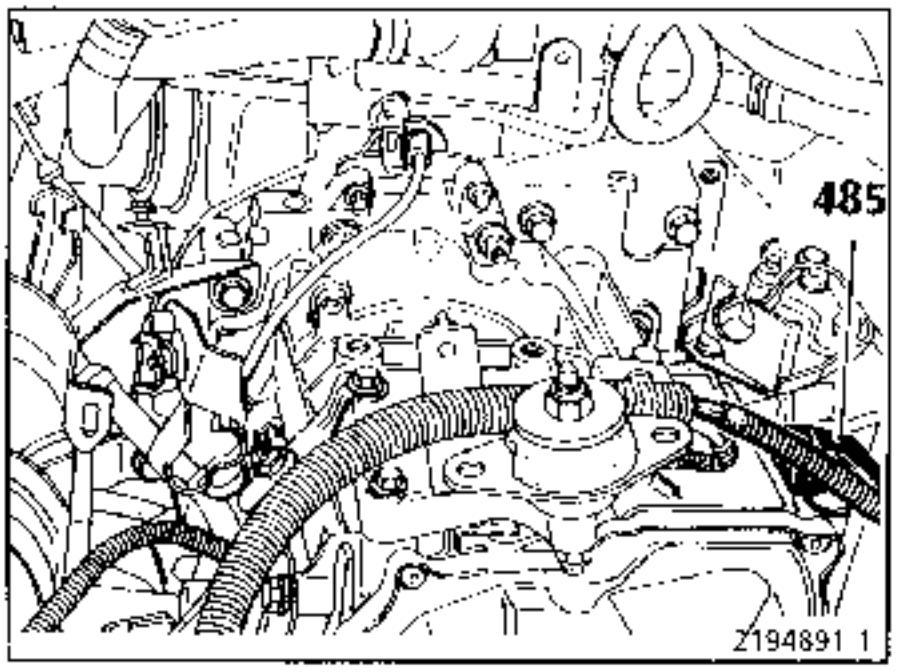
Line pressure sensor (8)



The line pressure sensor is mounted by two bolts on the automatic transmission housing.

It can be reached directly from under the vehicle, after releasing the protective sleeve.

AFTER REPLACING THIS COMPONENT, REMEMBER TO ERASE THE MEMORY AND VALIDATE "FULL LOAD".

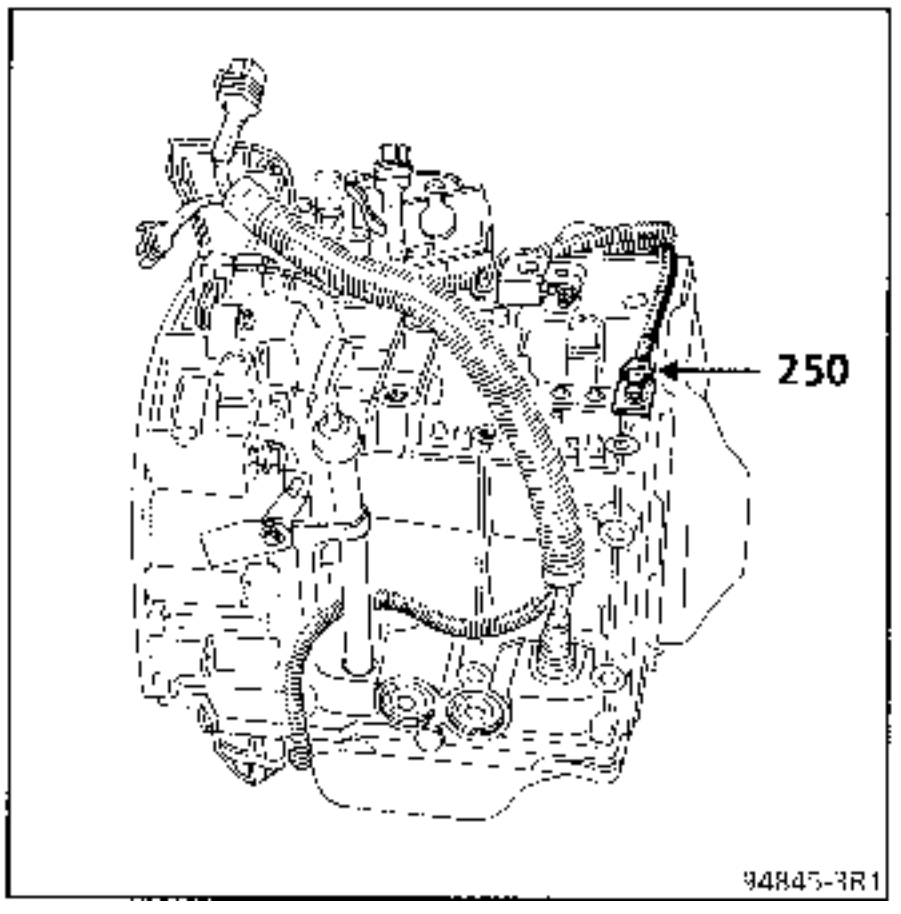


The switch is mounted on the automatic transmission housing.

It may be reached from above or below the vehicle, after removing the mounting bracket and the earth bolt.

AFTER REPLACING THIS COMPONENT, REMEMBER TO ERASE THE MEMORY AND VALIDATE "FULL LOAD".

Speed sensor (250)



The speed sensor is mounted on the top of the automatic transmission.

It may be reached after removing:
- the expansion bottle,
- the power assisted steering reservoir.

Release the wiring.

Remove the mounting pad.

AFTER REPLACING THIS COMPONENT, REMEMBER TO ERASE THE MEMORY AND VALIDATE "FULL LOAD".

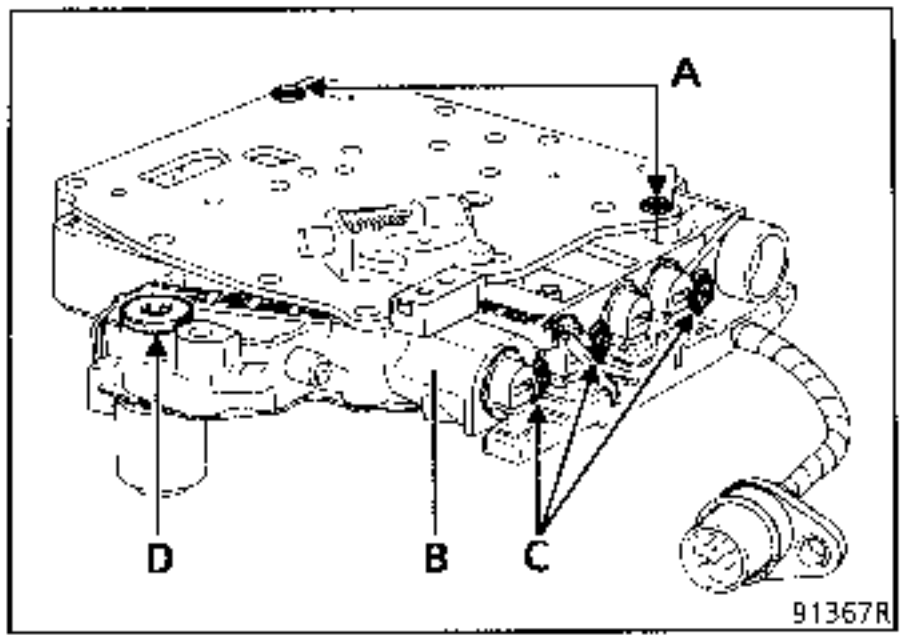
TIGHTENING TORQUES (in daN.m)	
Solenoid valve mounting bolt	0.9
Distributor plate mounting bolt	0.5
Hydraulic distributor mounting bolt	0.5

The hydraulic distributor must be removed to replace the sequence and modulating solenoid valves and the temperature sensor.

Remove bolts (**A**) mounting the distributor cover plate (**B**).

Remove the mounting bolts for the sequence (**C**) and modulating (**D**) solenoid valves.

Release the solenoid valves - sensor assembly from the distributor.



There are no special difficulties in replacing the assembly - refitting is the reverse of removal.

VERY IMPORTANT : THE BOLTS MUST BE TIGHTENED TO THE RECOMMENDED TORQUE.

NOTE : each sequence solenoid valve has its own mounting - do not refit them incorrectly.

The reduction of engine torque during changing gear aims to:

- improve the smoothness of changing gear,
- reduce the theoretical load on the hydraulic components used during the gear change,
- reduce stress on the mechanical components.

Torque reduction is achieved by altering the advance point.

The torque reduction signal is provided by the **A.T.** computer to the injection computer: during the complete period of changing gear, the advance point is retarded by **35°**.

Checking the connection between the A.T.computer and the injection computer

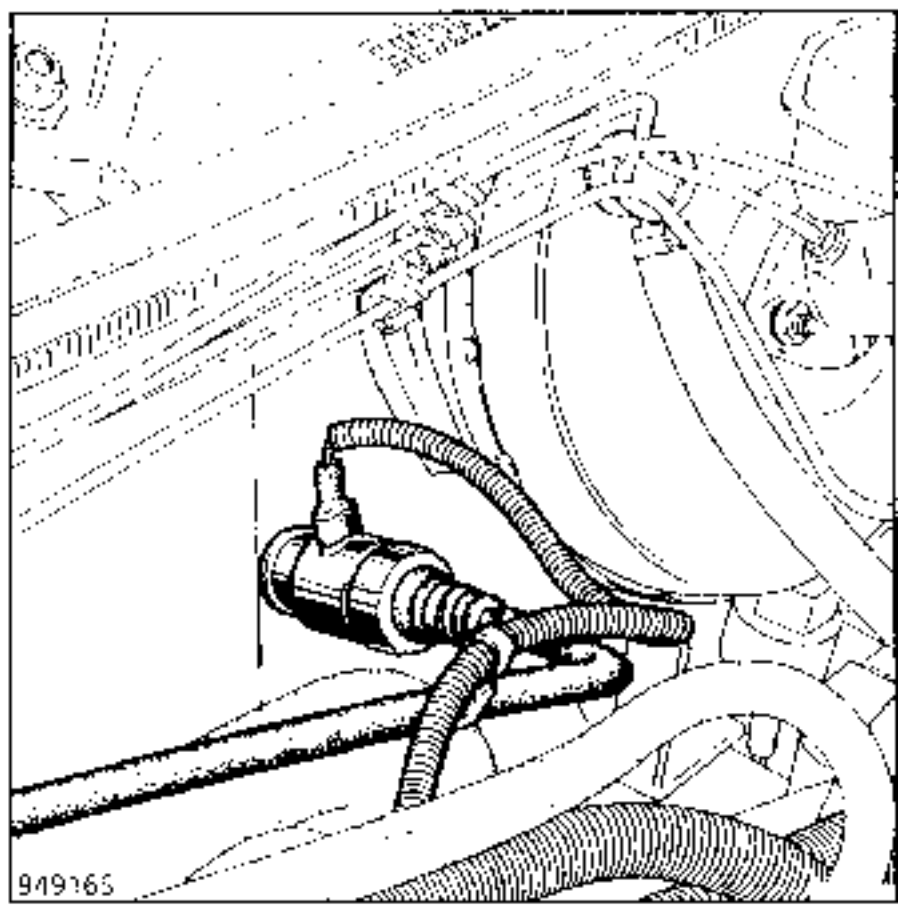
Condition	Selection on XR25	Display on XR25	Note
ECO warning light extinguished, lever in 3rd gear hold, vehicle at = **37 mph (60 km/h)** - **A.T.** in 2nd Change from **2/3** with no load	Enter **D 03** **# 51**	0000	The XR25 display will briefly show zero

KICKDOWN FUNCTION

For the operation of the kickdown function on automatic transmissions of type **AD4**, two items of information are required:

- **1st item of information** :
  Full load at accelerator pedal to give load potentiometer information (less than **6** %, value read on **XR25** using # **12**).

- **2nd item of information :**
  Detection by the kickdown switch located on the accelerator cable that the excess accelerator pedal travel has been used. The switch is compressed and establishes an earth connection to the computer.



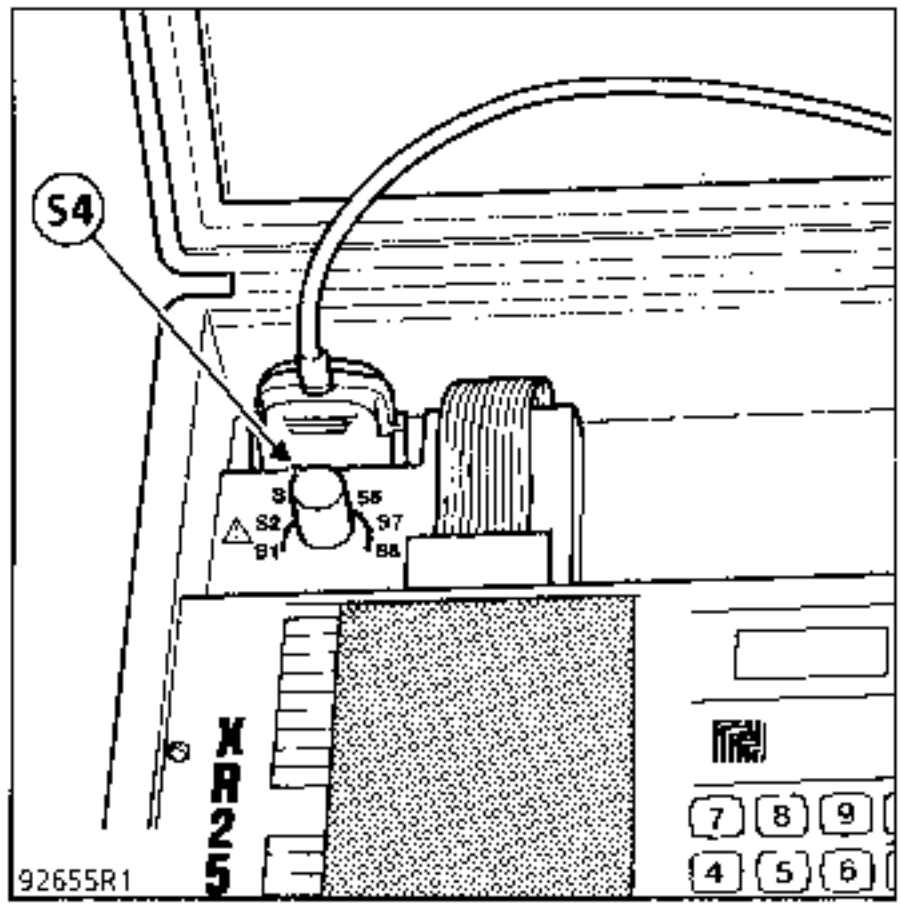
This method allows the kickdown switch to be used at higher engine speeds.

To ensure the accelerator pedal excess travel is used, ensure the cable is correctly adjusted (see following page).

ADJUSTING THE CABLE

Connect the **XR25** to the vehicle's **diagnostic** socket.

Set the ISO selector to position **S4**.



Turn the ignition on but do not start the engine.

Enter the code for transmission **"A" D 04** and enter **# 22**.

Test conditions	Display on XR25	Notes
Accelerator pedal not depressed - no load **(PL)**	1	If the value **1** is not shown, check the electrical connection on the **kickdown** switch.
Accelerator pedal depressed - full load **(PF)**	0	If the value **0** is not shown for **PF**, check the adjustment of the accelerator cable.

KEY

8	Line pressure sensor
103	Alternator
104	Ignition switch
119	Computer
129	Gear change threshold control
160	Stop switch
163	Starter motor
172	Rear right hand light
173	Rear left hand light
182	Right hand reversing light
222	Throttle potentiometer
225	Diagnostic socket
232	Starting relay
247	Instrument panel
250	Speed sensor
260	Fuse box
443	Solenoid valve
485	Multifunction switch
569	Kickdown switch
602	Reversing lights relay

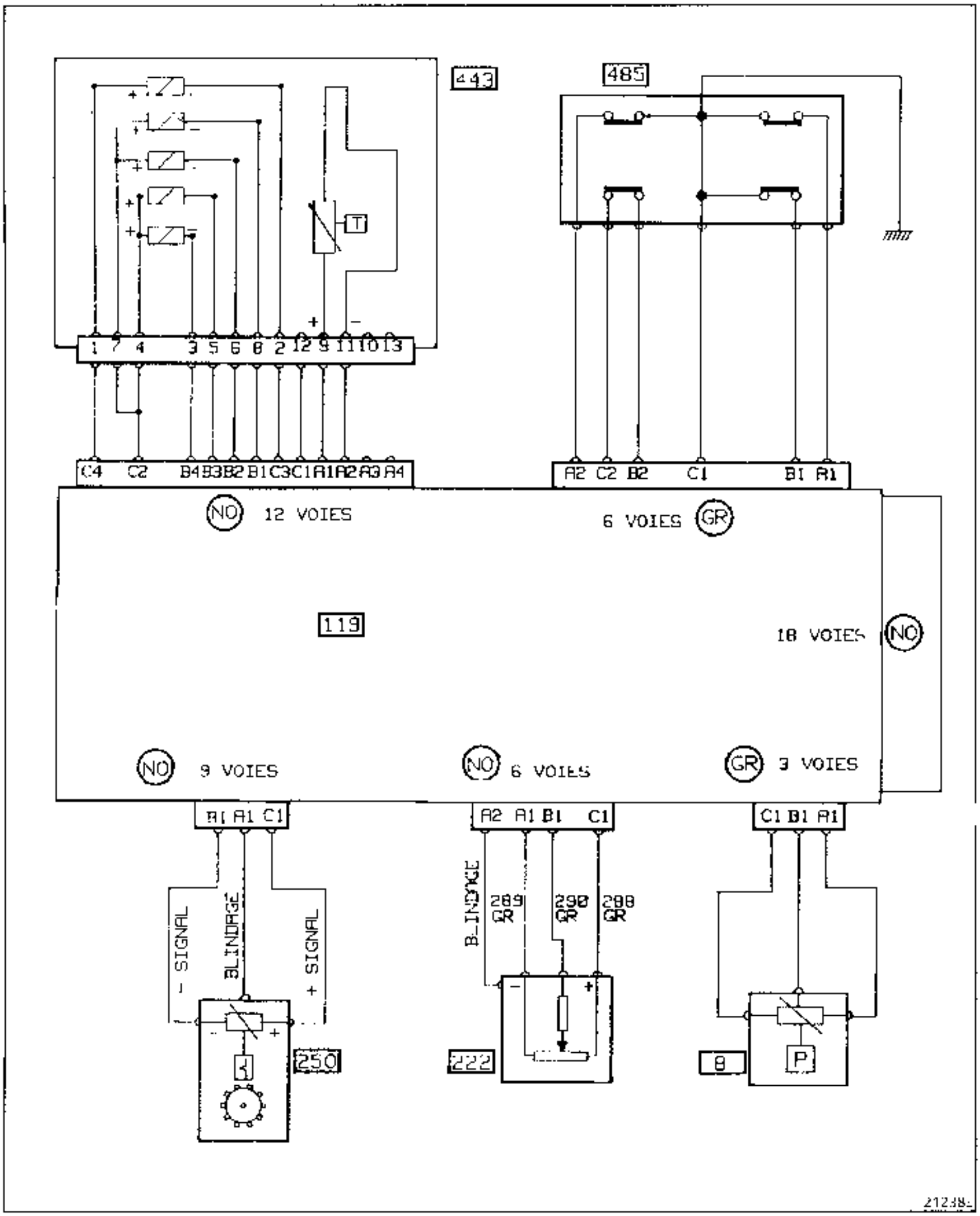
Connections

R1	Dashboard/ rear right
R2	Dashboard/ rear left
R5	Dashboard/ heating casing
R6	Dashboard/ centre console
R11	Dashboard/ left hand side member
R17	Heating casing/ engine
R28	Engine / left hand side member

Earths

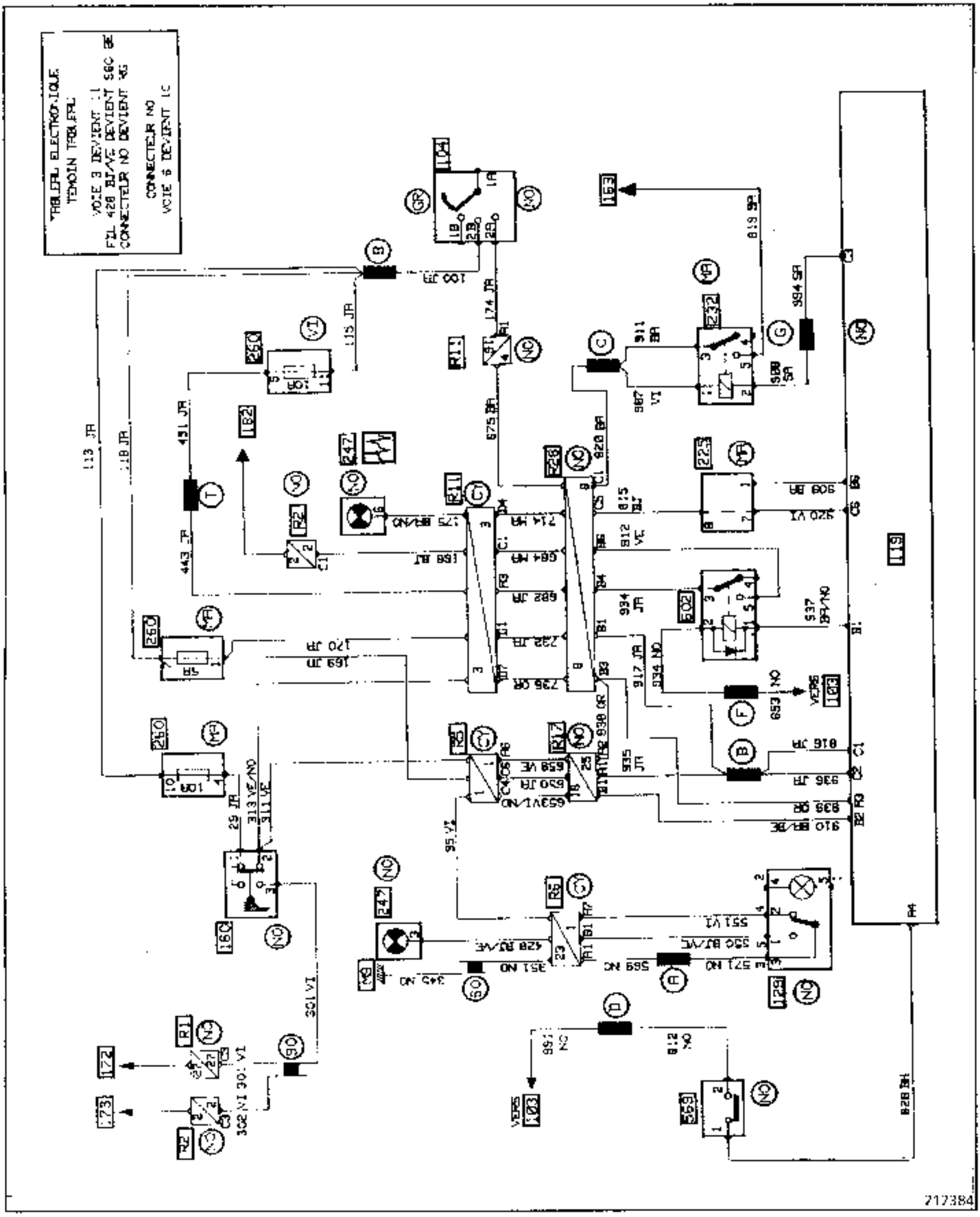
M9	Front right hand pillar earth

CONNECTION BETWEEN COMPUTER / ELECTRICAL COMPONENTS ON AUTOMATIC TRANSMISSION



UNNUMBERED WIRES ARE SUPPLIED WITH THE AUTOMATIC TRANSMISSION

COMPUTER / VEHICLE WIRING CONNECTION



UNNUMBERED WIRES ARE SUPPLIED WITH THE AUTOMATIC TRANSMISSION

PREFACE :

Thermoplastic gaiters

The thermoplastic gaiter at the wheel end is replaced with the driveshaft removed.

As this gaiter cannot be expanded, the gaiter at the gearbox end must be removed (except for the first type of Lobro joint).

Consequently, two kits must be ordered (wheel end and gearbox end) and both gaiters must be replaced to ensure the repair is of good quality.

Only driveshafts not fitted with weights may be repaired: if a thermoplastic gaiter is damaged on a transmission with weights, the driveshaft will also have to be replaced.

TYPE	QUANTITY	COMPONENT CONCERNED
LOCTITE SCELBLOC	Coat	Stub axle splines
RHODORSEAL 5661 (eg- CAF 4/60 THIXO)	Coat	Driveshaft roll pins, gearbox end
MOLYKOTE BR2	Coat	Joint splines, gearbox end
FRENBLOC	Coat	Brake caliper bolts
MOBIL CVJ 825 black star or MOBIL EXF 57 C	295 g 320 g 180 g 250 g 130 g 160 g 140 g	GE 86 Joint GE 86 Joint - Thermoplastic GE 76 Joint GE 76 Joint - Thermoplastic GI 62 Joint RC 490 Joint LOBRO Joint

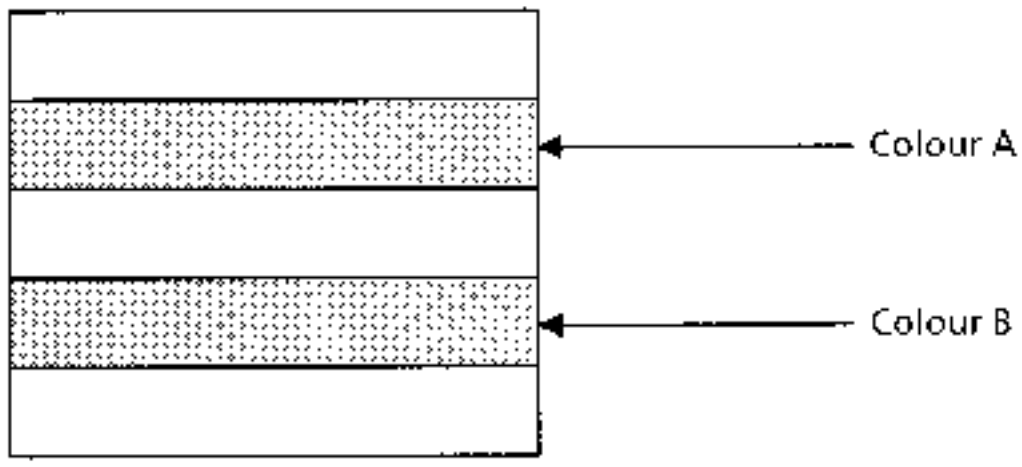
Since the driveshafts are of different lengths and have different specifications depending on the type of gearbox, they must be correctly matched (refer to the parts catalogue for the vehicle concerned).

The identification plates on the gearbox and driveshafts show coloured markers which allow them to be matched according to the tables below.

The driveshafts are marked by an adhesive label near the wheel end gaiter.

1st assembly

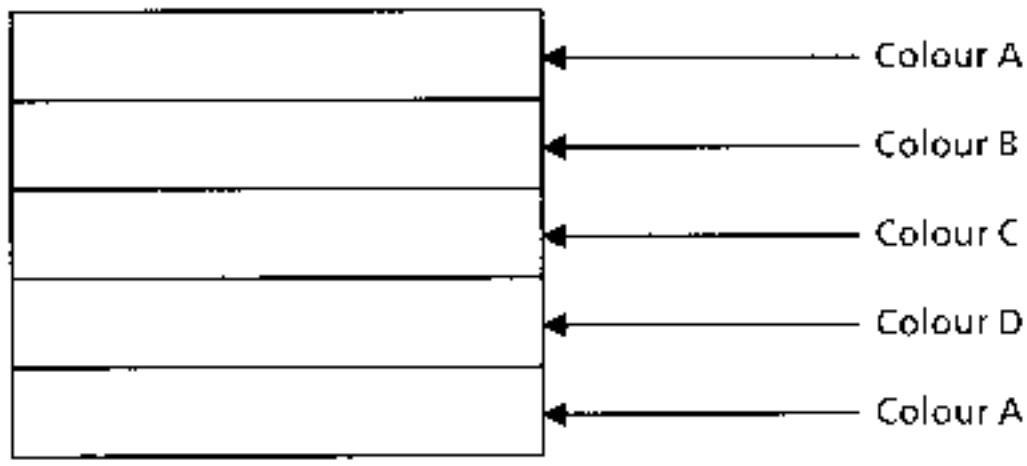
Adhesive label with two coloured bands.



Gearbox	Wheel end joint	Colour marking on gearbox identification plate	Driveshaft colour markings			
			LEFT		RIGHT	
			A	B	A	B
JB 2/3	GE 86	Black	White	Red	White	Red

2nd assembly

Adhesive label with five coloured bands.



Gearbox	Wheel end joint	Colour marking on gearbox identification plate	Driveshaft colour markings									
			LEFT					RIGHT				
			A	B	C	D	A	A	B	C	D	A
JB 1 JB 2 JB 3	GE 76 GE 86	Black	White		Black	White		White		Black	White	

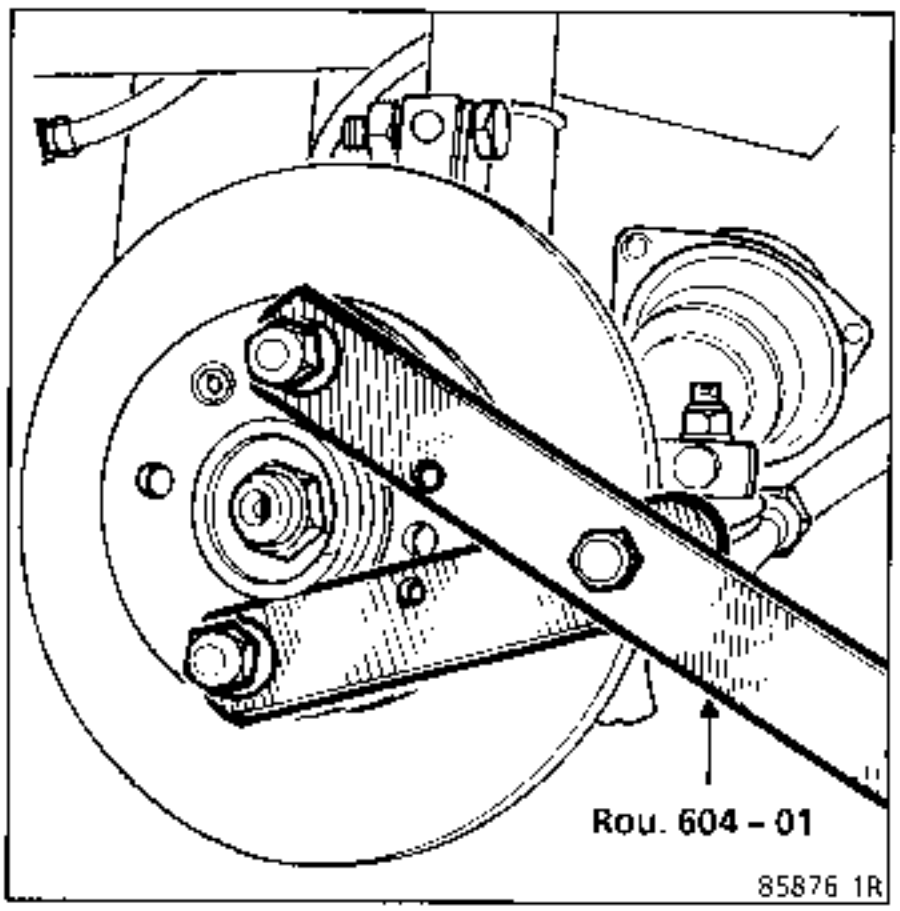
REPLACEMENT

SPECIAL TOOLING REQUIRED		
B.Vi.	31-01	Roll pin punch
Rou.	604-01	Hub locking tool
T.Av.	476	Ball joint extractor
T.Av.	1050-02	Driveshaft extractor

TIGHTENING TORQUES (in daN.m)	
Driveshaft nut	25
Bolt mounting gaiter to gearbox	2.5
Wheel bolts	9
Shock absorber base nut	11
Brake caliper mounting bolt	10
Track rod end nut	4

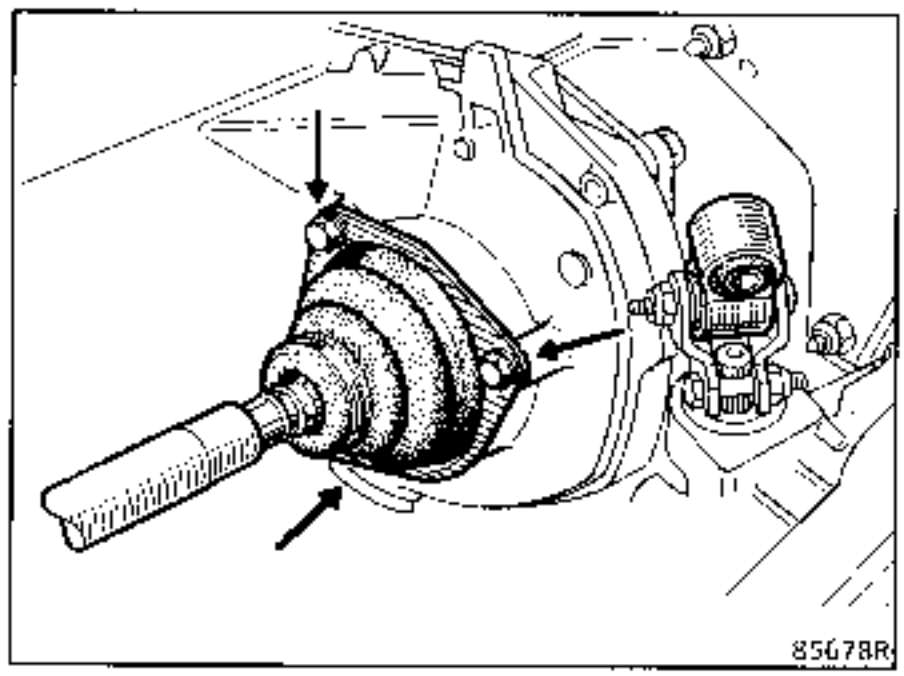
REMOVAL

Remove:
- the brake assembly (suspend it from the chassis to avoid damaging the brake hose),
- the driveshaft nut using tool **Rou. 604-01**.



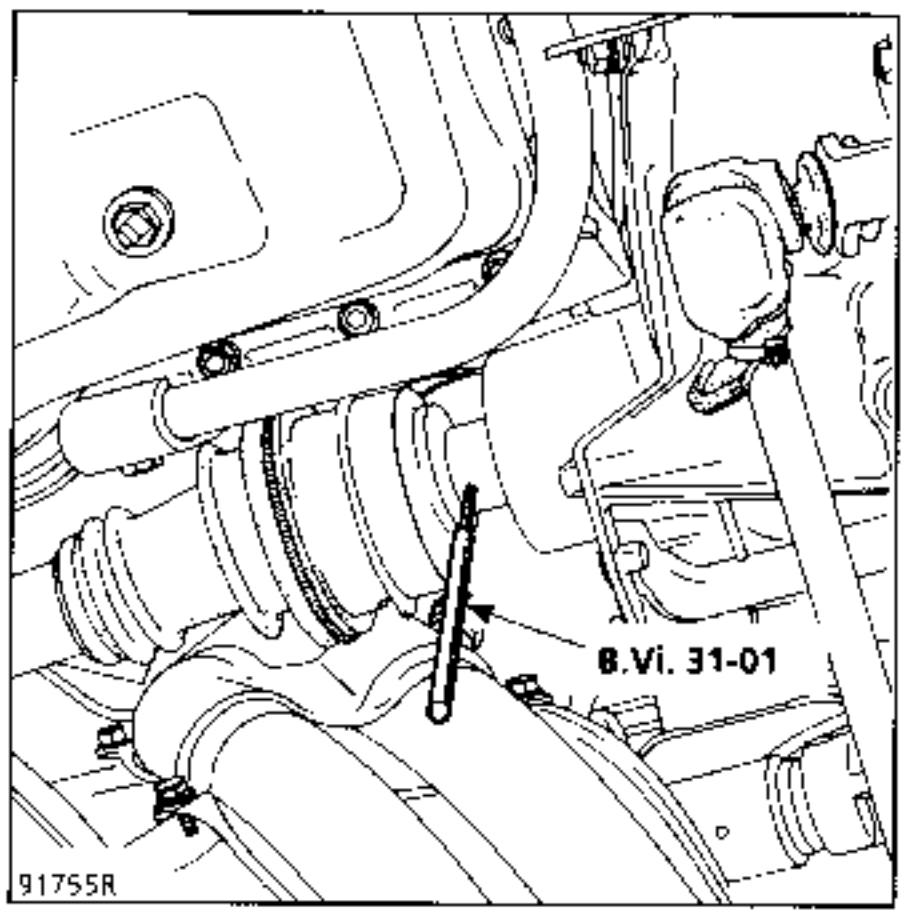
On the left hand side:

Drain the gearbox.
Remove the three bolts (1).



On the right hand side:

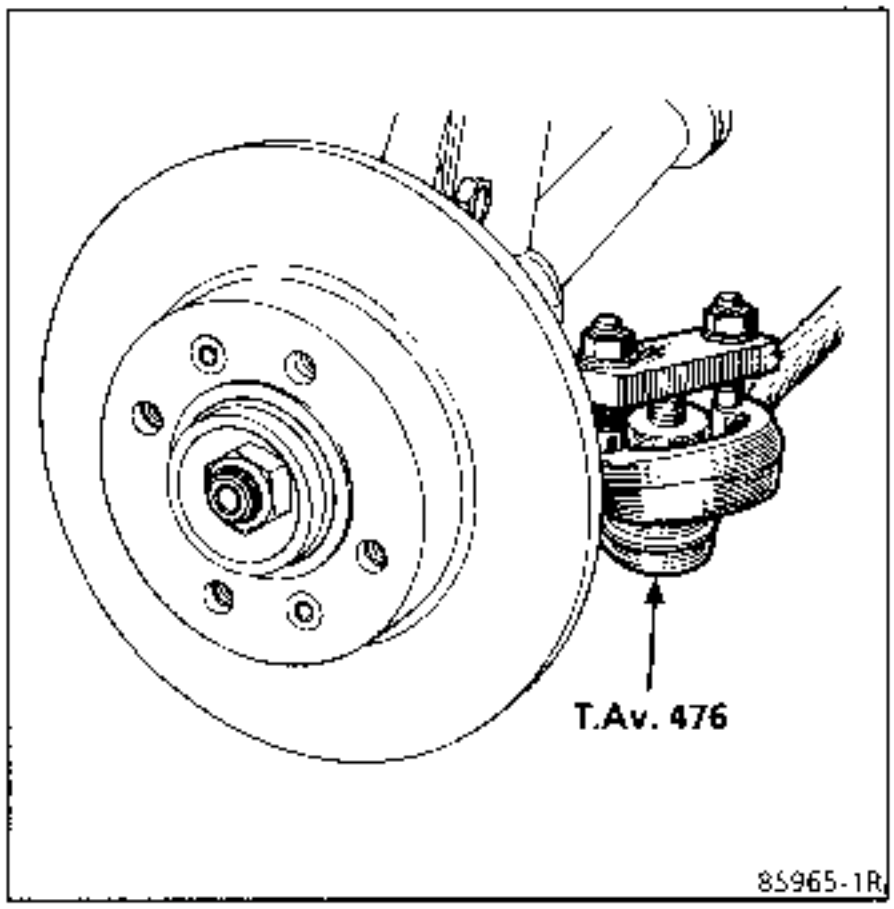
Remove the roll pin using tool **B.Vi. 31-01**.



REPLACEMENT (cont)

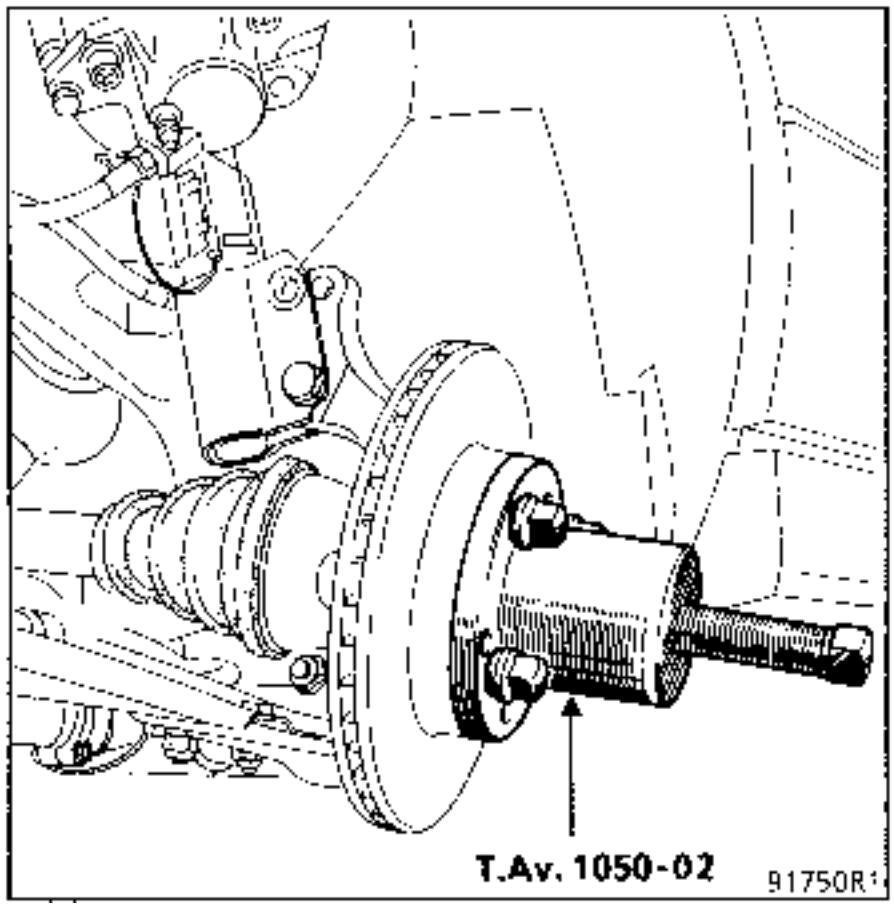
On both sides:

Remove:
- the track rod end nut using tool **T.Av. 476**,

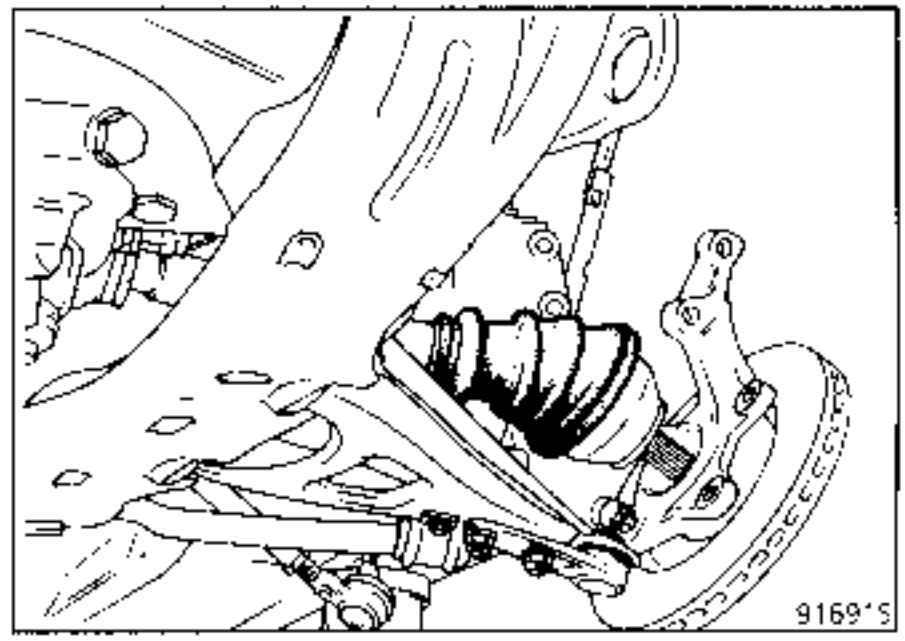


- the upper shock absorber base mounting bolt.

These vehicles are fitted with bonded driveshafts, which will need to be pushed back using tool **T.Av. 1050-02**.



Remove the lower shock absorber base mounting bolt and remove the driveshaft.



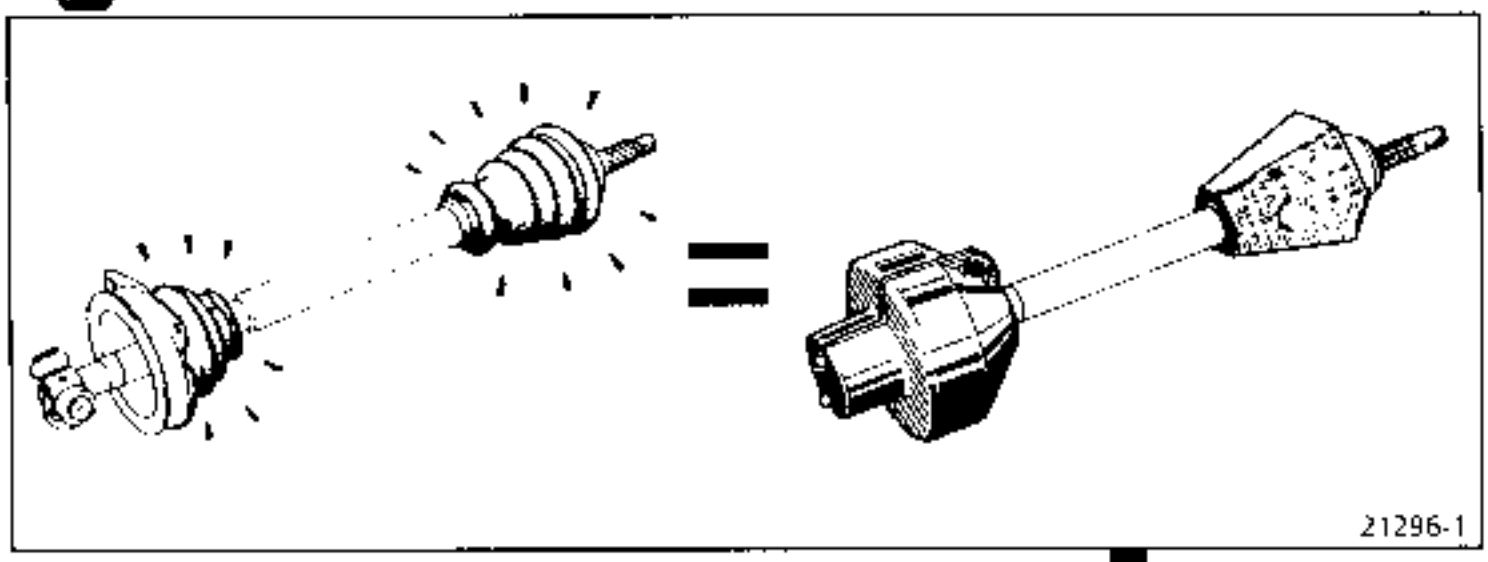
Take care not to damage the gaiters during this operation.

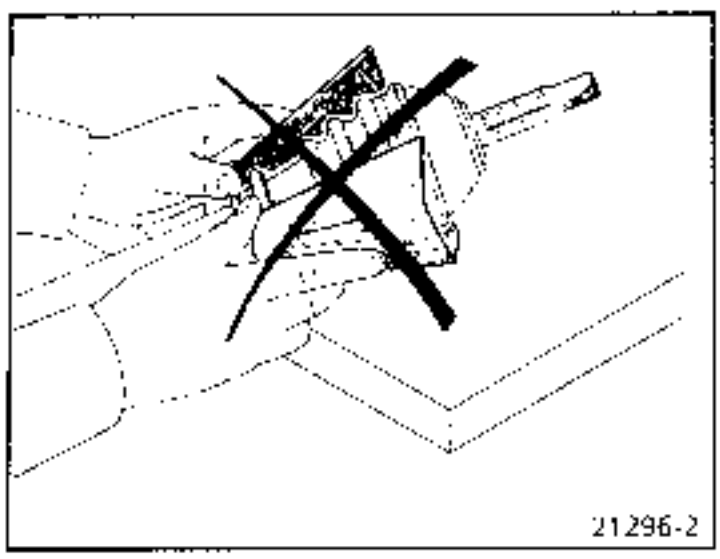
REFITTING

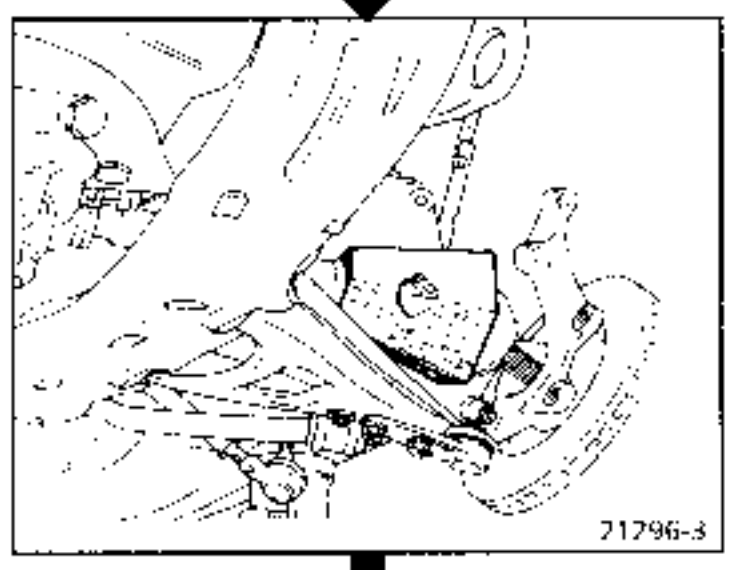
NOTE : the Parts Department now supplies driveshafts fitted with protectors and with fitting instructions. These instructions must be followed to ensure that the assembly is correct and of the highest QUALITY. Remember that the slightest knock on the gaiters causes the rubber to break and the driveshaft to be damaged in the long term.

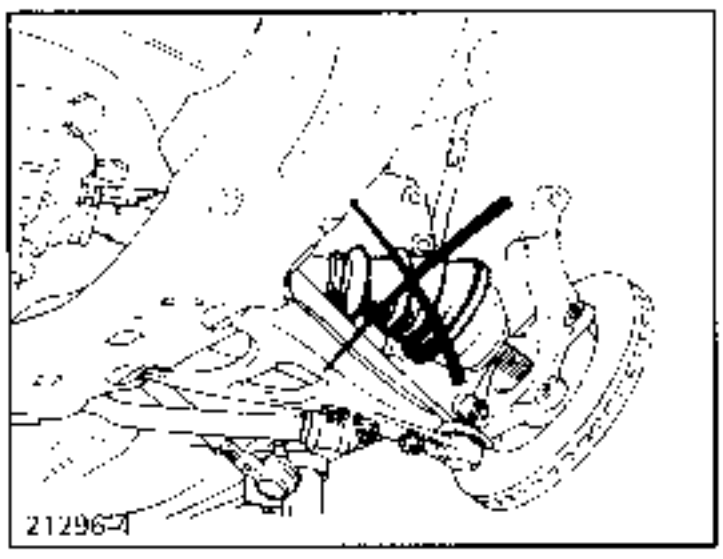
REPLACEMENT (cont)

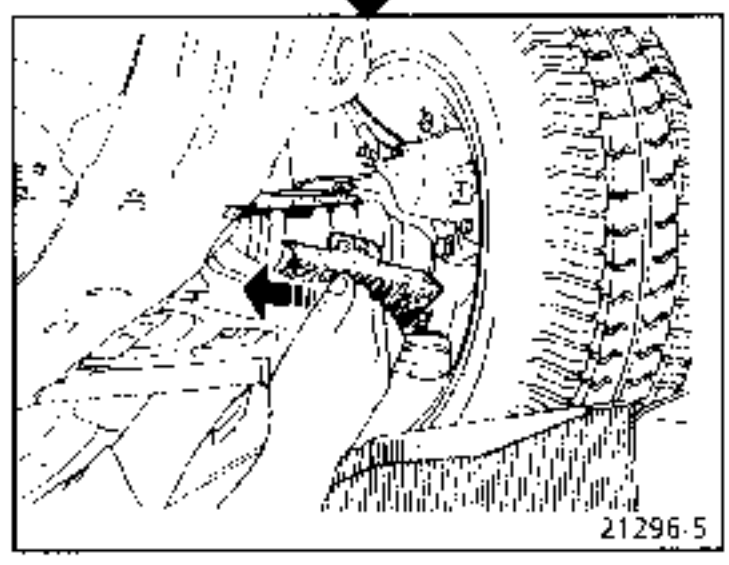
ESSENTIAL ASSEMBLY INSTRUCTIONS

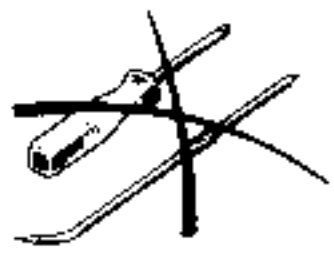








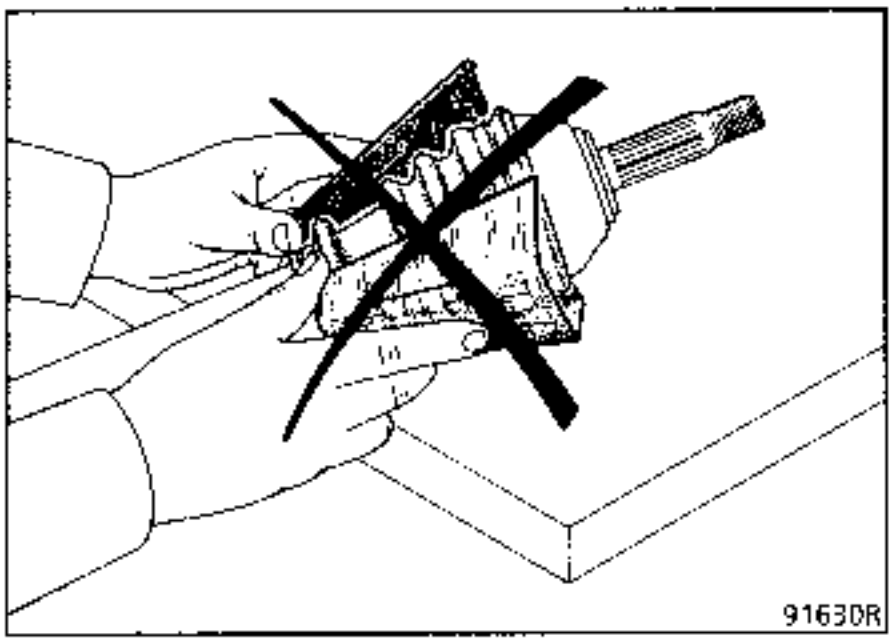




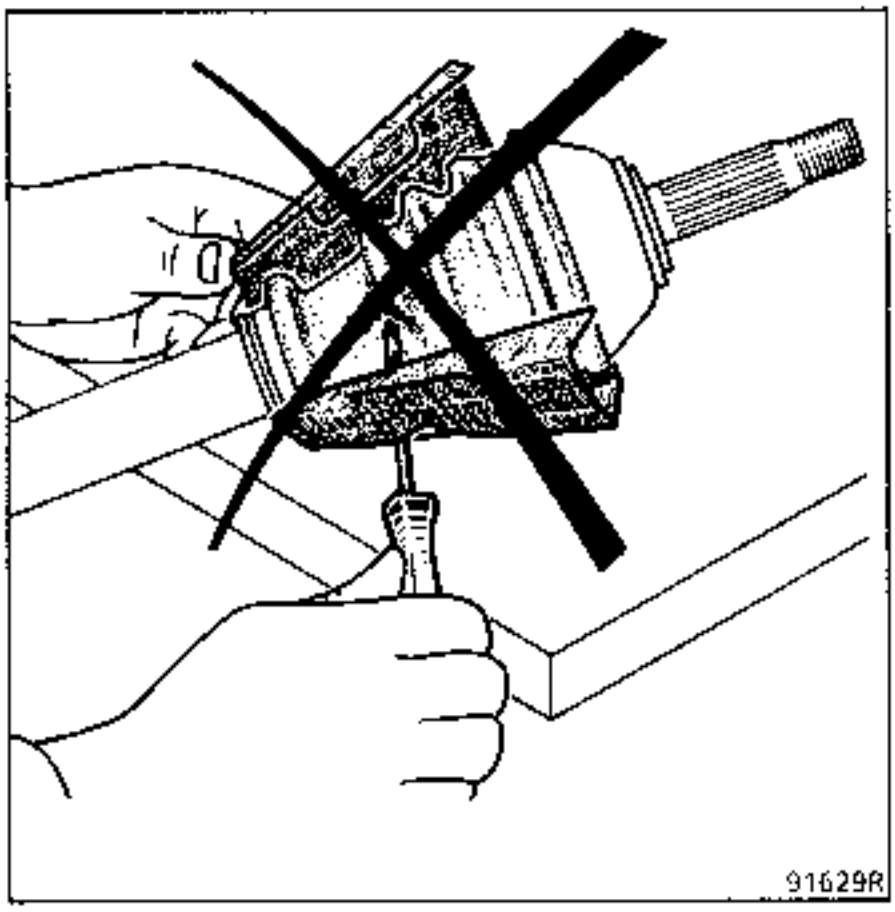
21296 6

REPLACEMENT (cont)

Never remove the cardboard protectors before the end of the operation to refit the driveshaft to the vehicle.

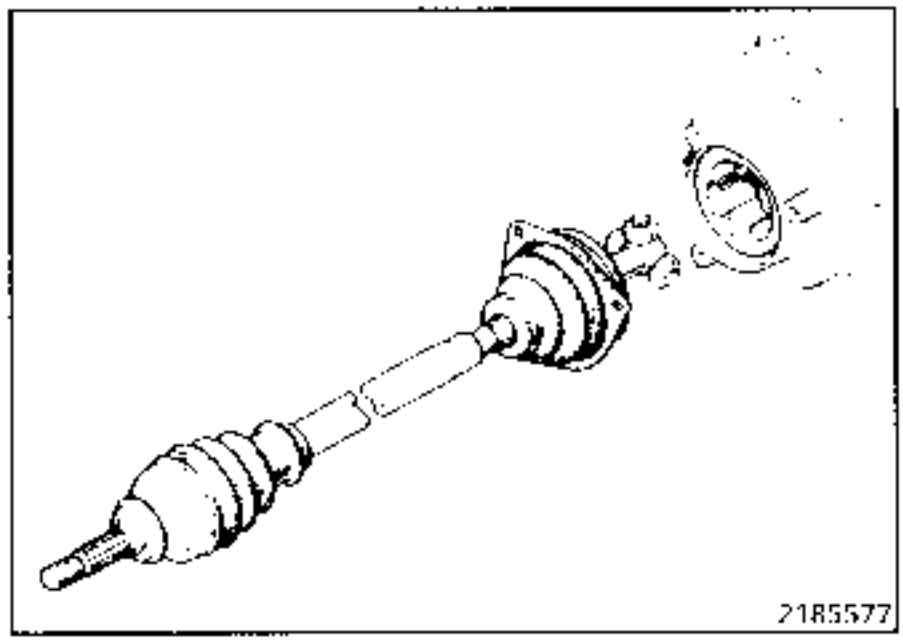


Never use an instrument with a sharp edge which could damage the gaiter.



On the left hand side:

Remove the plastic protector from the bearing gaiter and engage the driveshaft, keeping it as horizontal as possible.



On the right hand side:

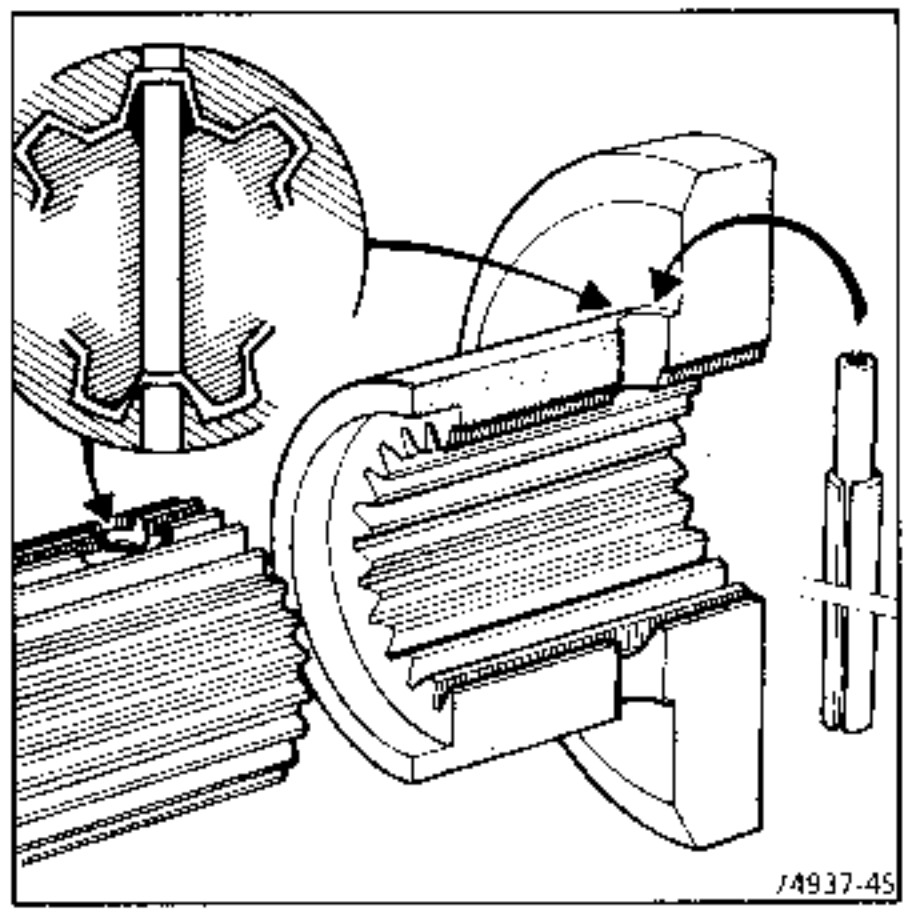
With the protector in position, coat the splines of the joint at the gearbox end with **MOLYKOTE BR2**.

Ensure that the rubber washer is present between the end of the sunwheel and the base of the driveshaft yoke.

Position the driveshaft in relation to the sunwheel and engage it.

Check its position using the angled pin **B.Vi. 31-01**.

Fit two **new** roll pins , using tool **B.Vi. 31-01**. Seal the roll pin holes using **RHODORSEAL 5661** (eg-**CAF 4/60 THIXO**).

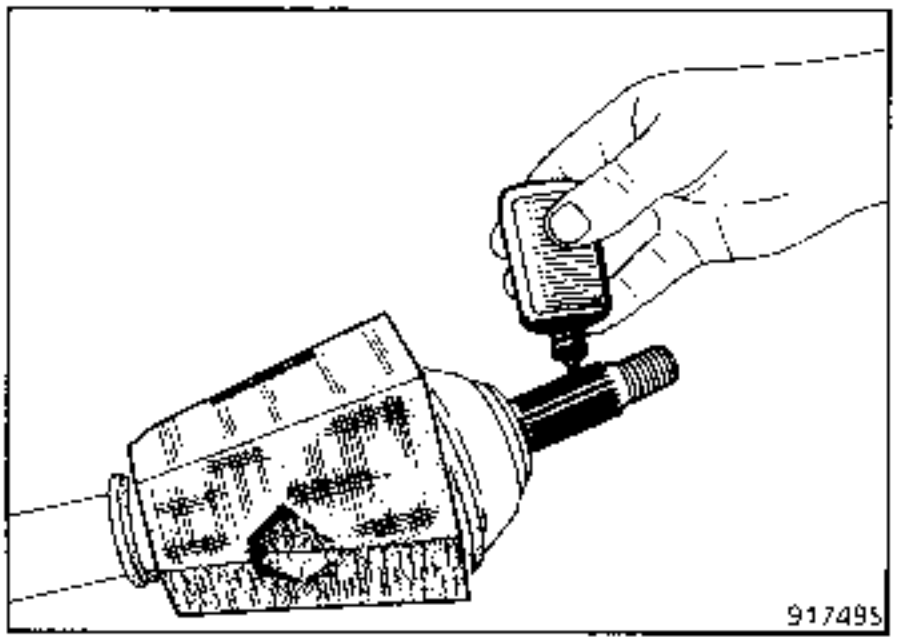


An inlet chamfer on the sunwheels makes it easier to fit the new roll pins.

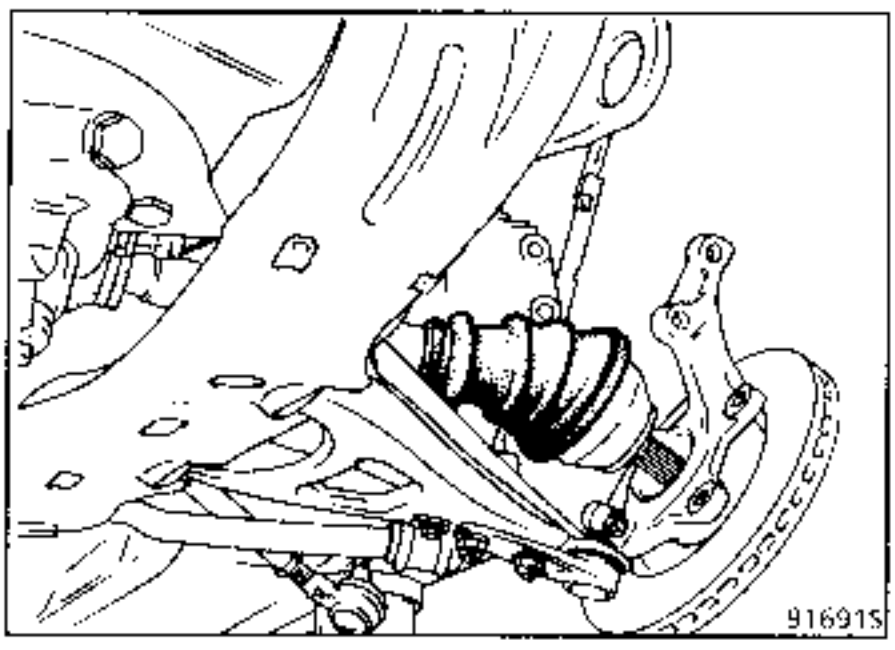
REPLACEMENT (cont)

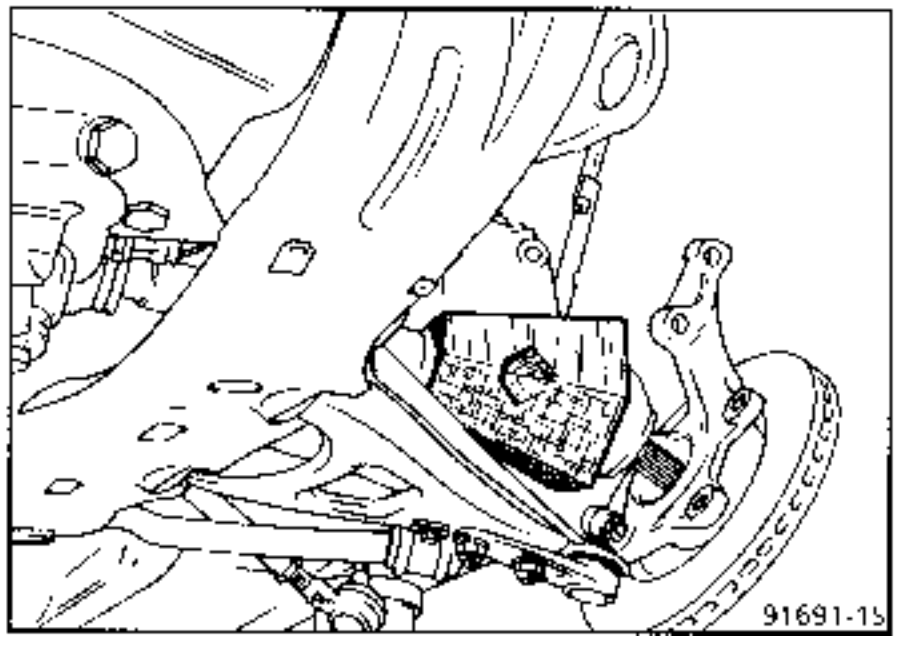
On both sides:

Coat the stub axle splines with **LOCTITE SCELBLOC**.



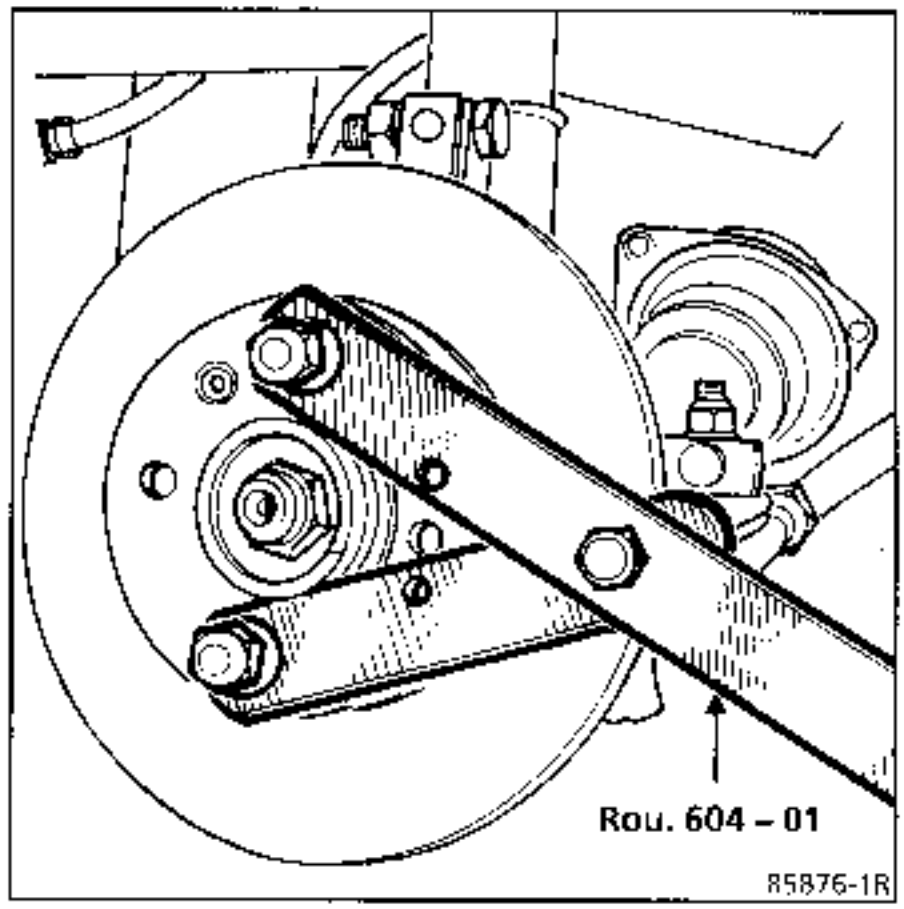
Fit the driveshaft stub axle into the hub.





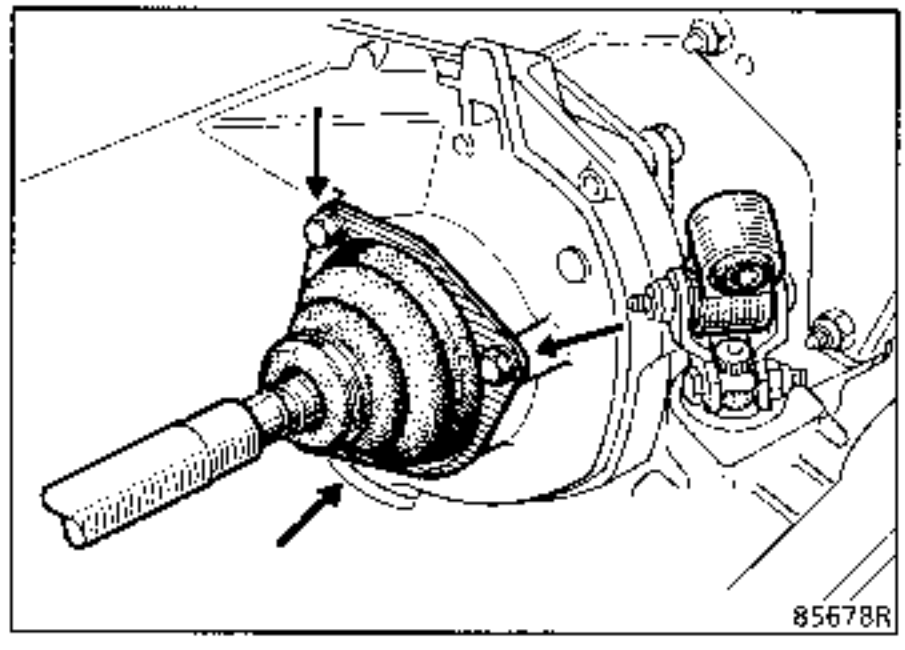
Refit:
- the 2 shock absorber base bolts to the stub axle carrier and tighten them to the correct torque,
- the track rod end and tighten the nut to the correct torque.

Lock the driveshaft nut to the correct torque using tool **Rou. 604-01**.



On the left hand side:

Clean the gaiter seating on the gearbox, refit the gaiter and the plate. Position the gaiter as horizontally as possible and torque tighten the three bolts.

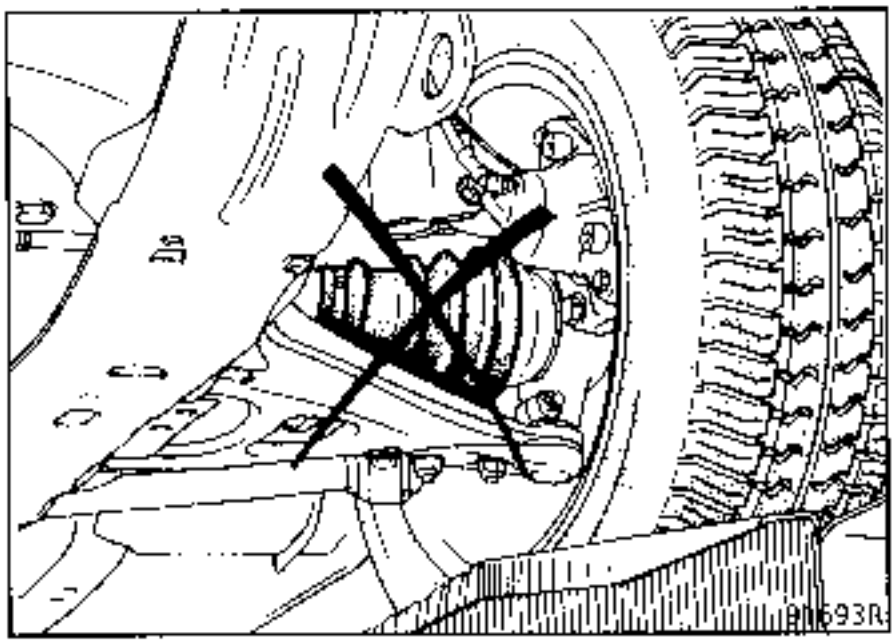


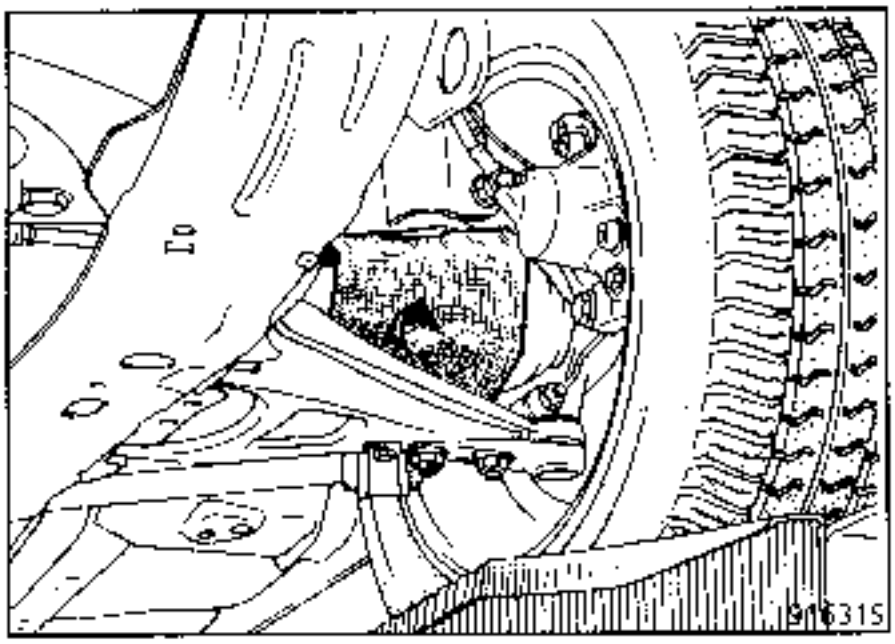
REPLACEMENT (cont)

On both sides:

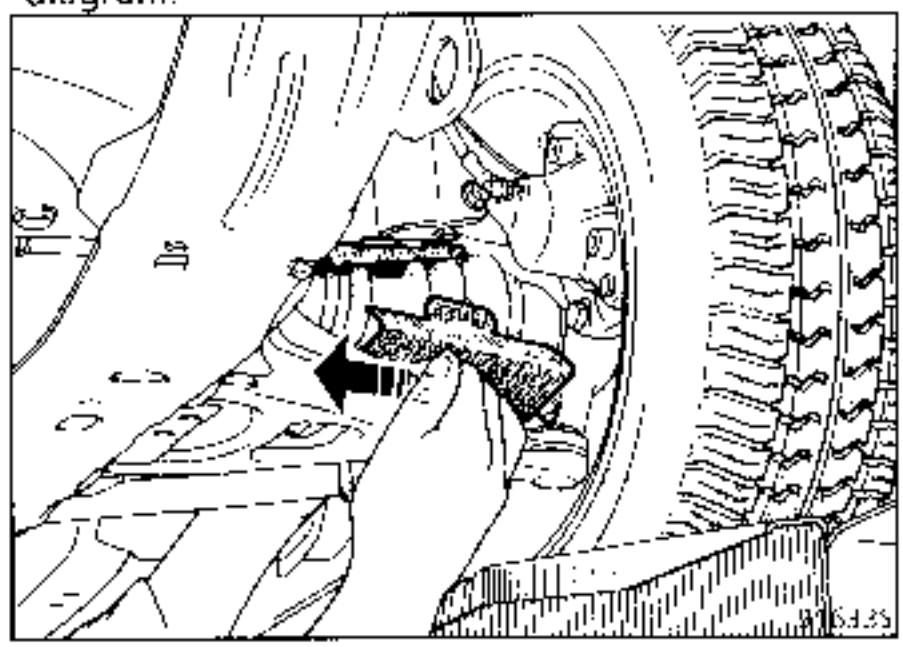
Fit the brake calipers, coat the bolts with **LOCTITE FRENBLOC** and torque tighten them.

Return the vehicle to its wheels.

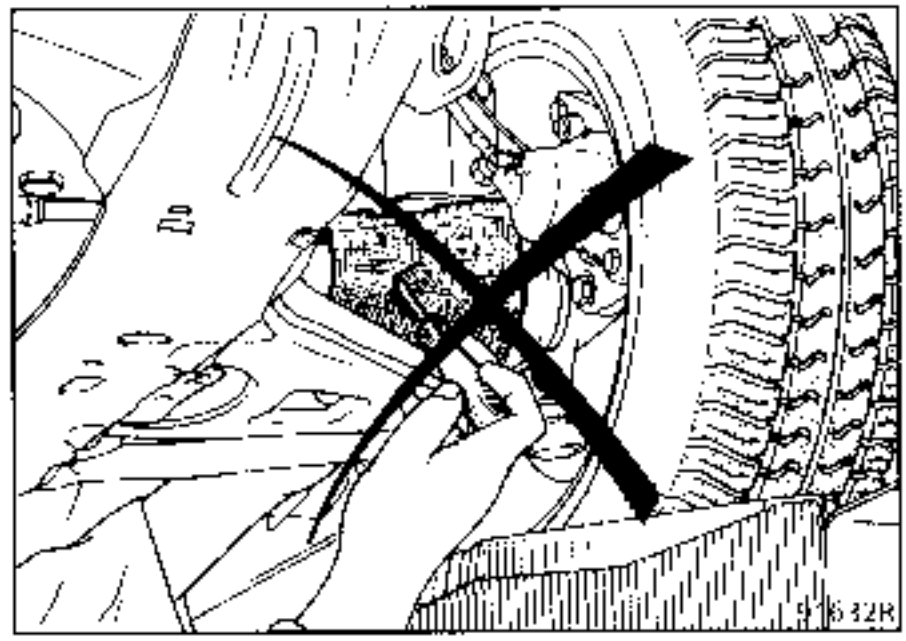




With the vehicle on its wheels, remove the cardboard protectors by tearing them as shown in the diagram.



Never use a sharp edged instrument which could damage the gaiter.



Press the brake pedal several times to bring the piston into contact with the linings.

If the left hand driveshaft has been removed, top up the gearbox with oil.

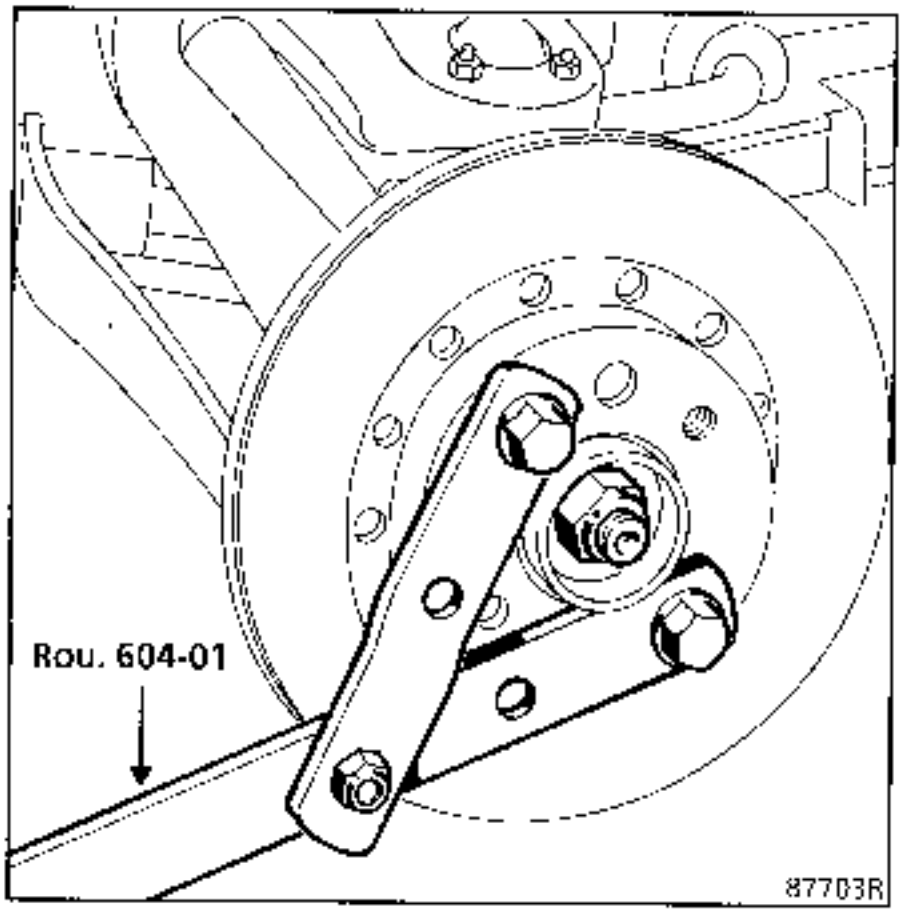
REPLACEMENT

SPECIAL TOOLING REQUIRED		
B.Vi.	31-01	Roll pin punch
Rou.	604-01	Hub locking tool
T.Av.	476	Ball joint extractor
T.Av.	1050-02	Driveshaft extractor

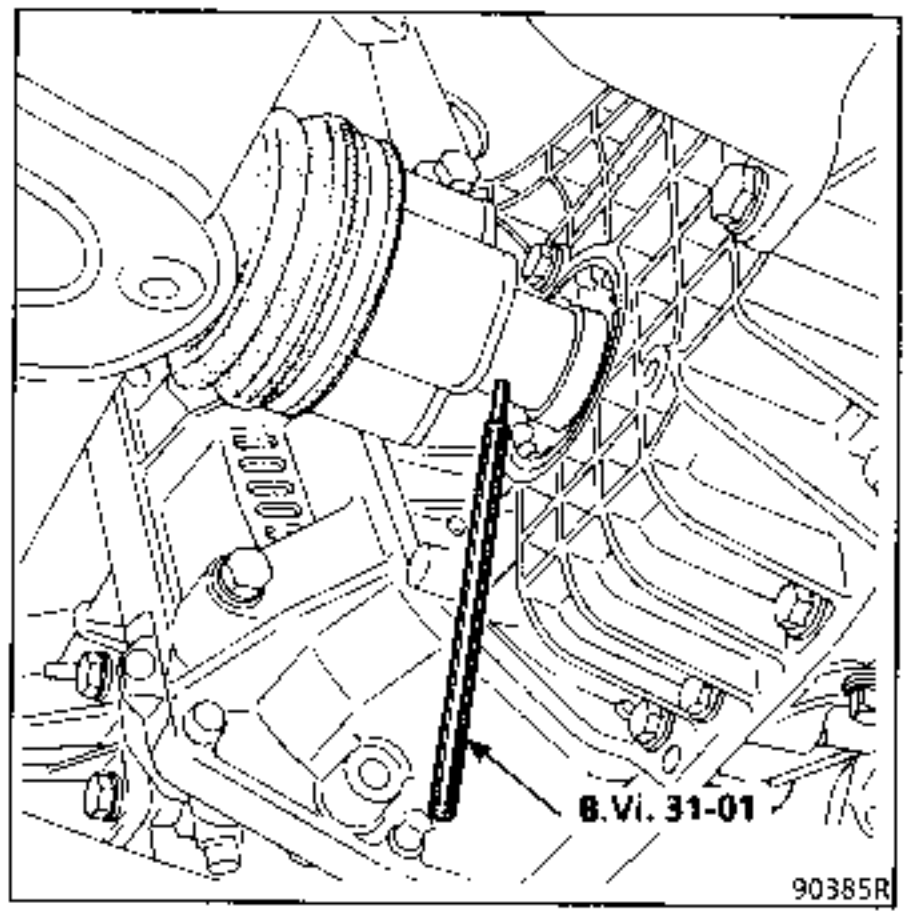
TIGHTENING TORQUES (in daN.m)		
Driveshaft nut		25
Wheel bolts	4 bolts	9
	5 bolts	10
Shock absorber base nut		20
Brake caliper mounting bolt		10
Track rod end nut		4

REMOVAL

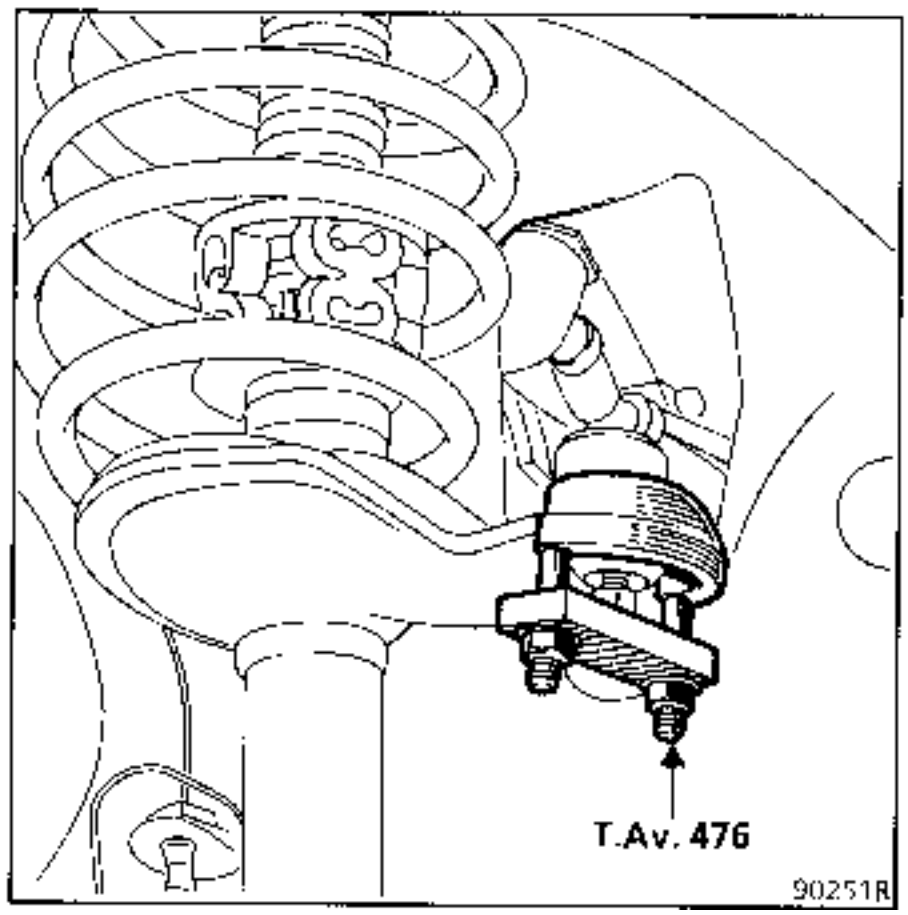
Remove:
- the brake assembly (suspend it from the chassis to avoid damaging the brake hose),
- the driveshaft nut using tool **Rou. 604-01**.



- the roll pins at the gearbox end using tool B.Vi.31-01,



- the track rod end using tool **T.Av. 476**,

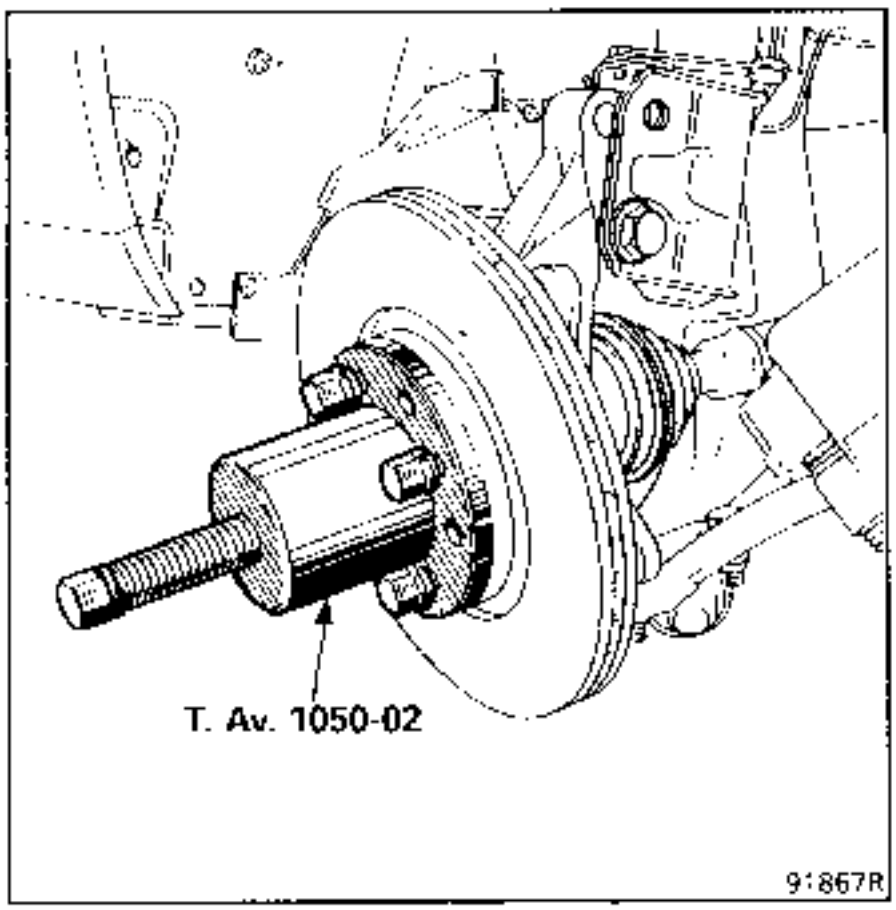


REPLACEMENT (cont)

- the upper shock absorber base mounting bolt.

Slacken but do not remove the lower bolt.

These vehicles are fitted with bonded driveshafts, which will need to be pushed back using tool **T.Av. 1050-02.**



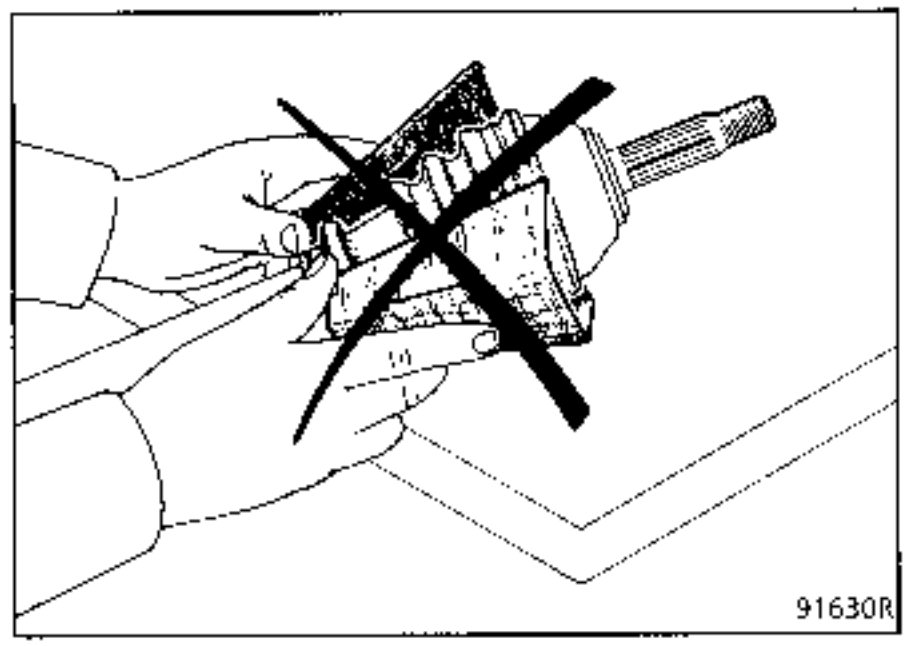
Tilt the stub axle carrier and remove the driveshaft.

Take care not to damage the gaiters during this operation.

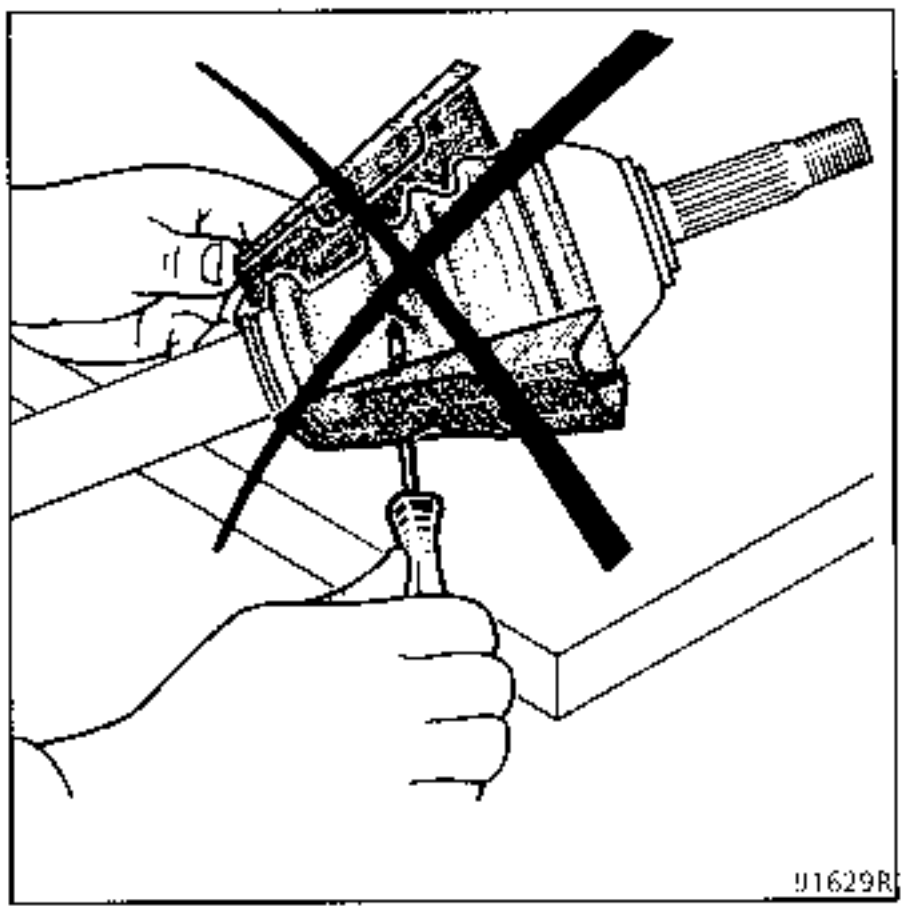
REFITTING

NOTE : the Parts Department now supplies driveshafts fitted with protectors and with fitting instructions. These instructions must be followed to ensure that the assembly is correct and of the highest QUALITY. Remember that the slightest knock on the gaiters causes the rubber to break and the driveshaft to be damaged in the long term.

Never remove the cardboard protectors before the end of the operation to refit the driveshaft to the vehicle.



Never use an instrument with a sharp edge which could damage the gaiter.



With the protector in position, coat the splines of the joint at the gearbox or AT end with **MOLYKOTE BR2**.

Ensure that the rubber washer is present between the end of the sunwheel and the base of the driveshaft yoke.

REPLACEMENT (cont)

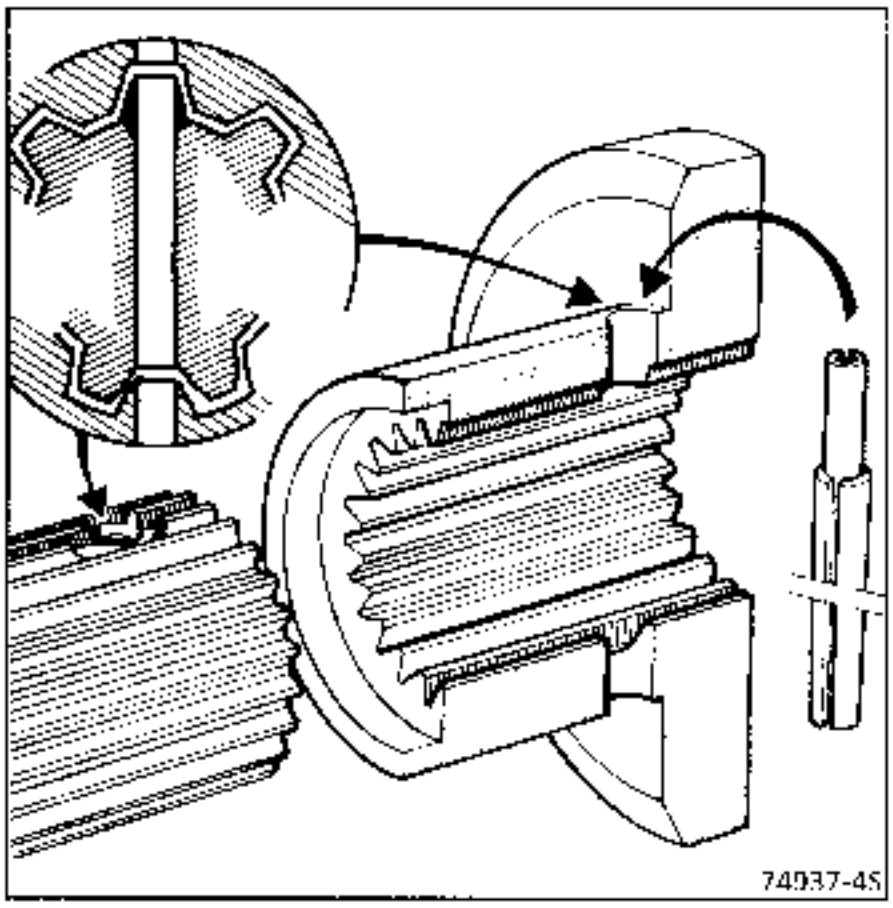
Position the driveshaft in relation to the sunwheel and engage it.

Check its position using the angled pin **B.Vi. 31-01**.

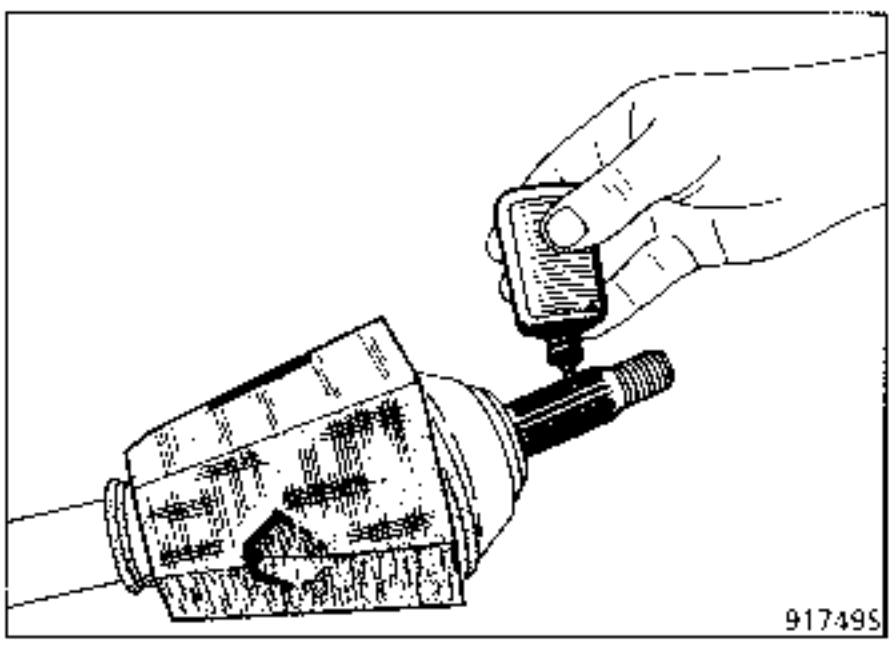
Fit two **new** roll pins , using tool **B.Vi. 31-01**. Seal the roll pin holes using **RHODORSEAL 5661** (eg- **CAF 4/60 THIXO**).

Special notes for NG gearboxes and AT MJ

An inlet chamfer on the sunwheels makes it easier to fit the new roll pins.



Coat the stub axle splines with **LOCTITE SCELBLOC**.



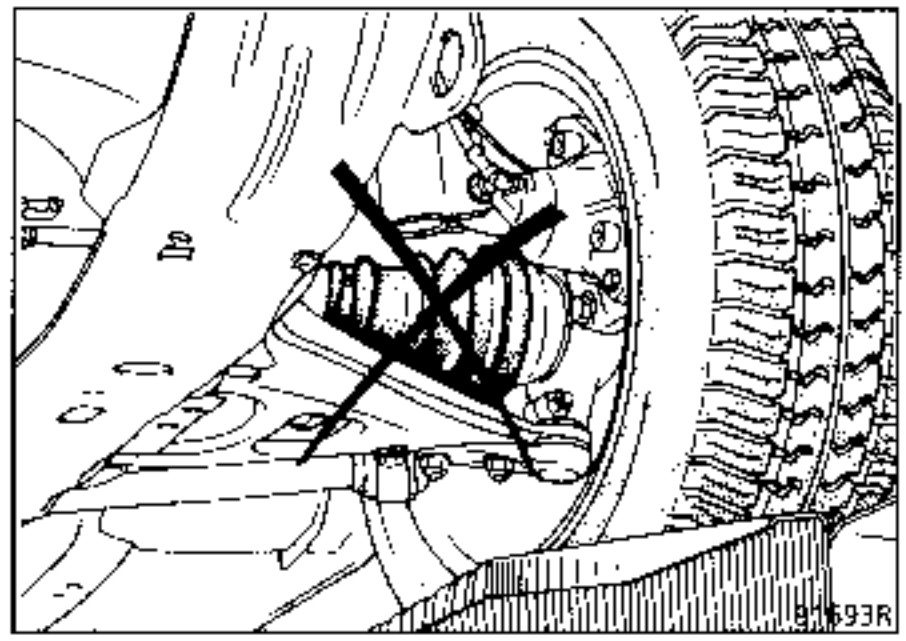
Fit the driveshaft stub axle into the hub.

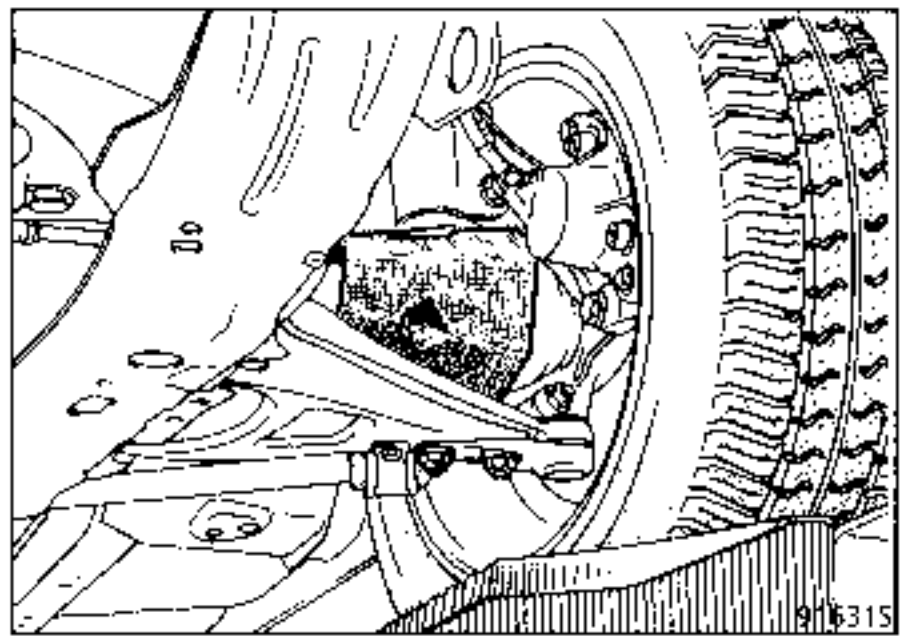
Refit:
- the 2 shock absorber base bolts to the stub axle carrier and tighten them to the correct torque,
- the track rod end and tighten the nut to the correct torque.

Fit the brake calipers, coat the bolts with **LOCTITE FRENBLOC** and torque tighten them.

Lock the driveshaft nut to the correct torque using tool **Rou. 604-01**.

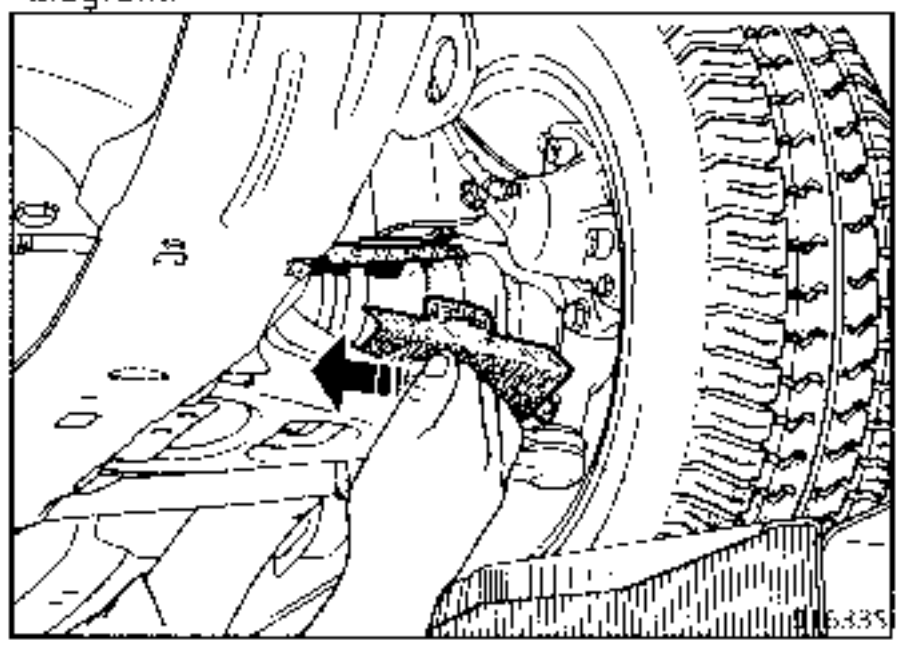
Return the vehicle to its wheels.



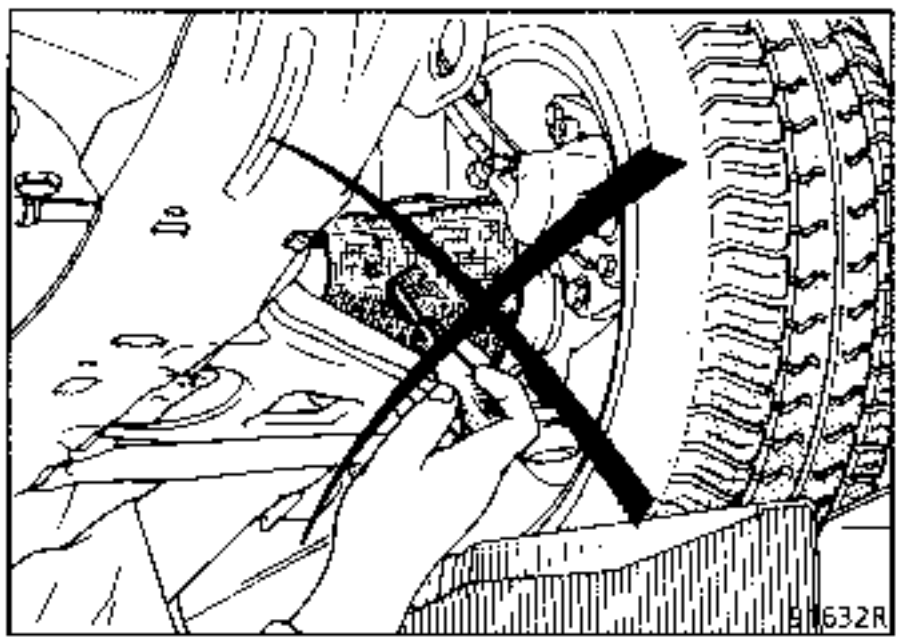


REPLACEMENT (cont)

With the vehicle on its wheels, remove the cardboard protectors by tearing them as shown in the diagram.



Never use a sharp edged instrument which could damage the gaiter.



Press the brake pedal several times to bring the piston into contact with the linings.

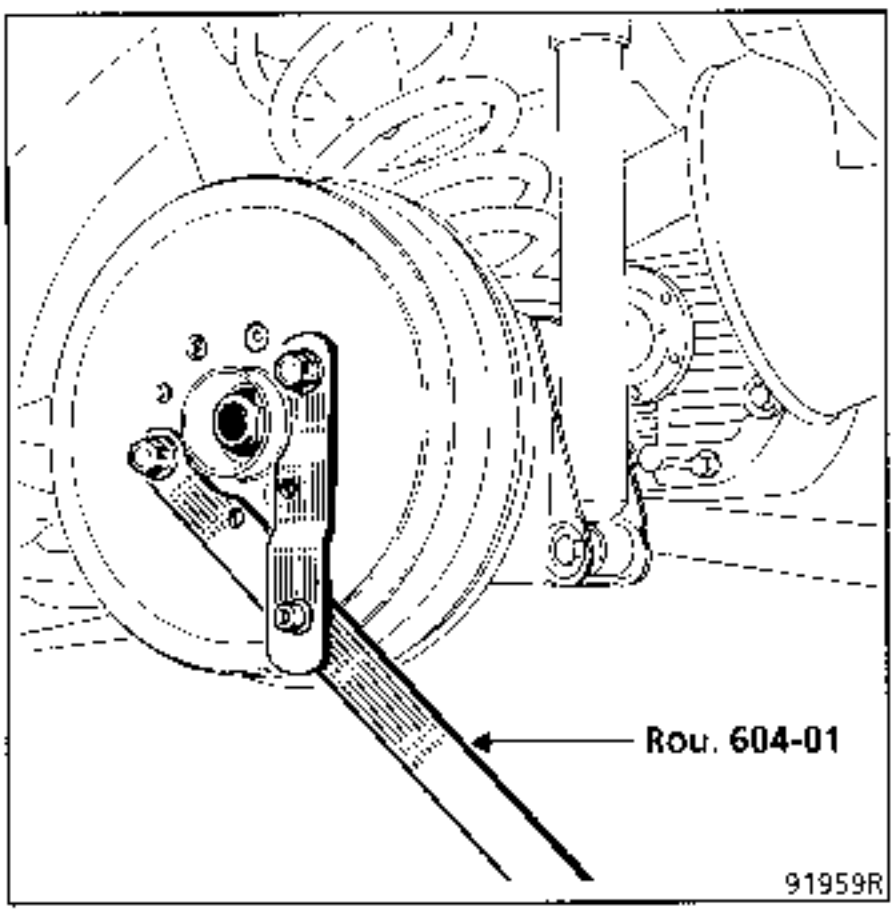
REPLACEMENT

SPECIAL TOOLING REQUIRED		
Rou.	604-01	Hub locking tool
T.Av.	1050-02	Driveshaft extractor

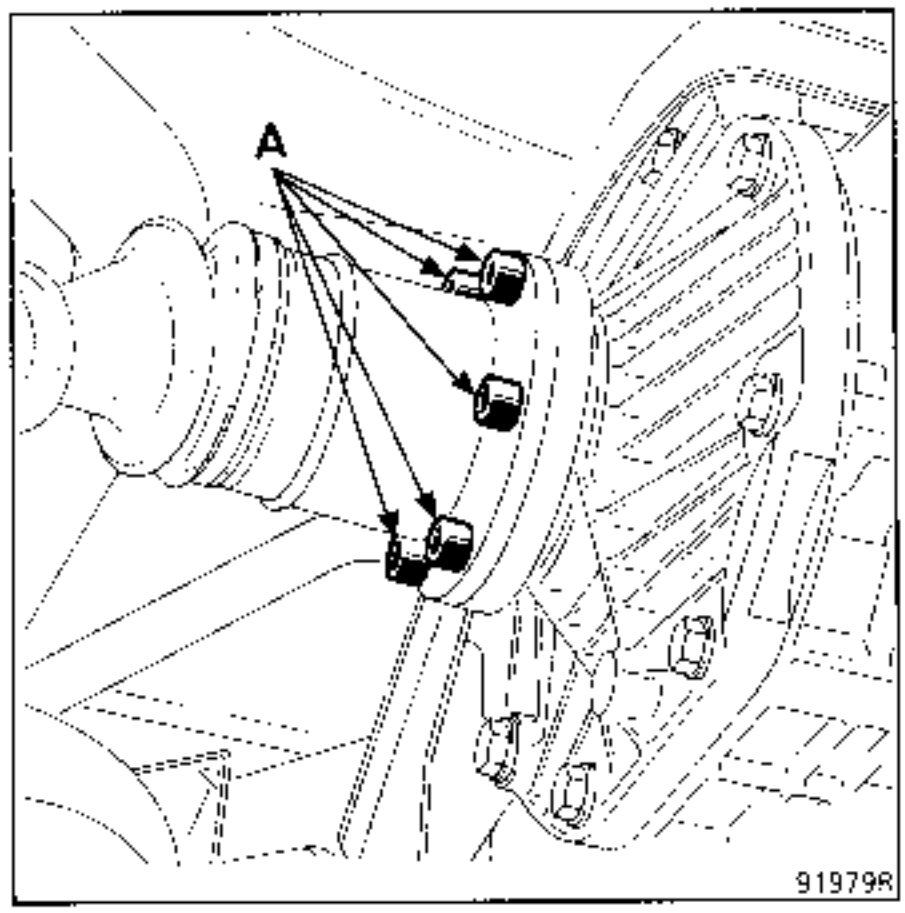
TIGHTENING TORQUES (in daN.m)	
Driveshaft nut	21
Mounting bolt on sunwheel	6
Wheel bolts	9

REMOVAL

Tool **Rou. 604-01** in position, remove:
- the driveshaft nut,

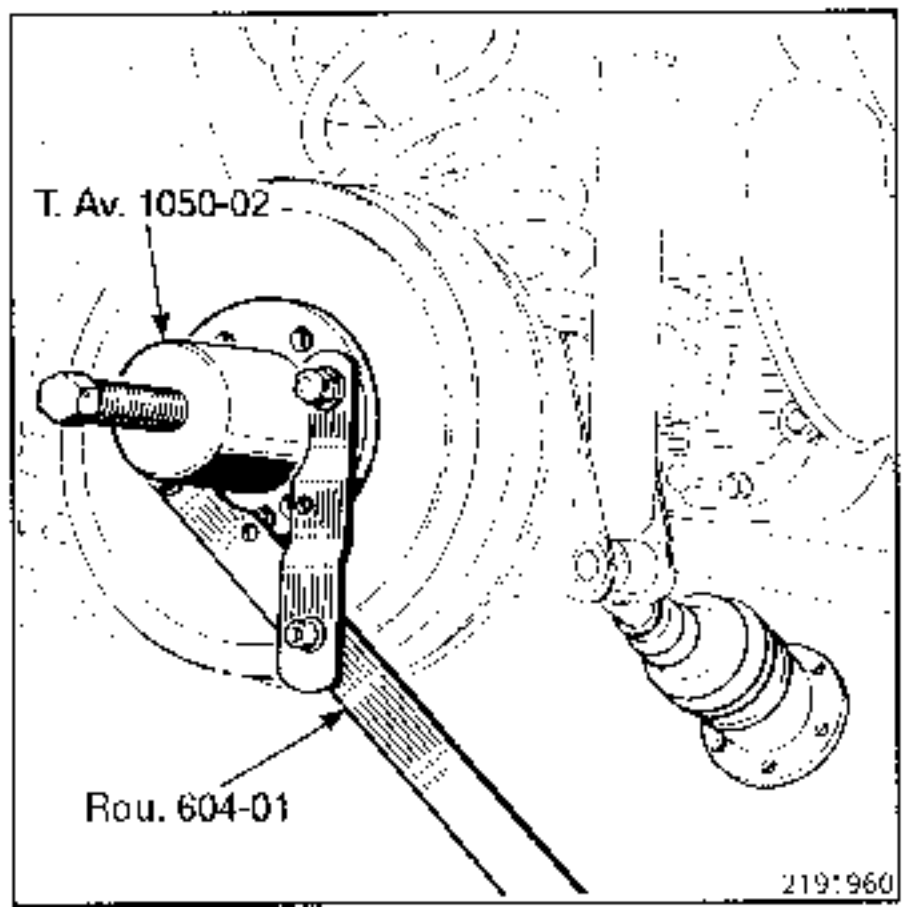


- the six mounting bolts (**A**) on the sunwheel.



These vehicles are fitted with bonded driveshafts, which will need to be pushed back using tool **T.Av. 1050-02**.

Remove the driveshaft:
tools **T.Av. 1050-02** + **Rou. 604-01**.

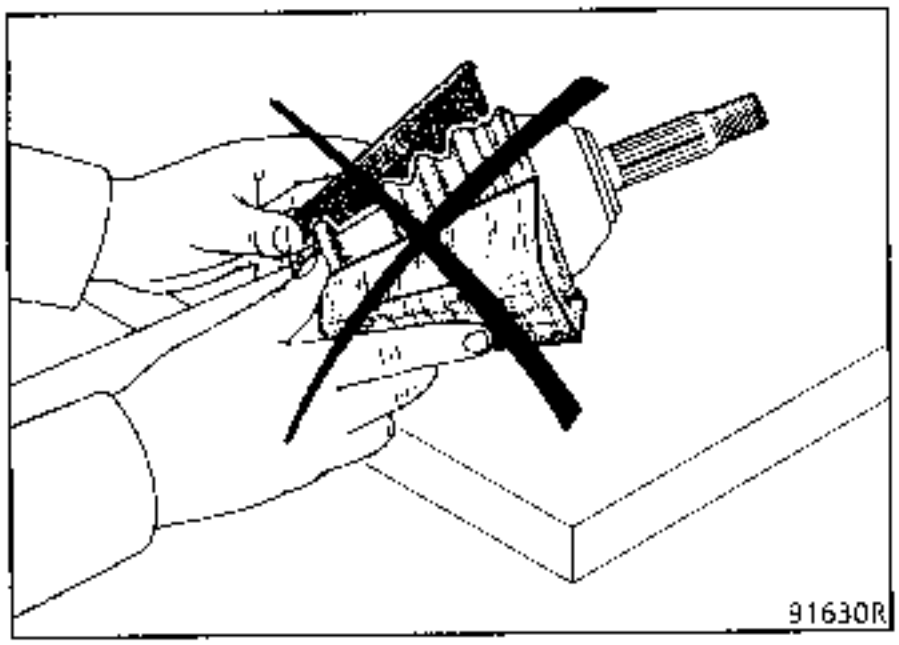


REPLACEMENT (cont)

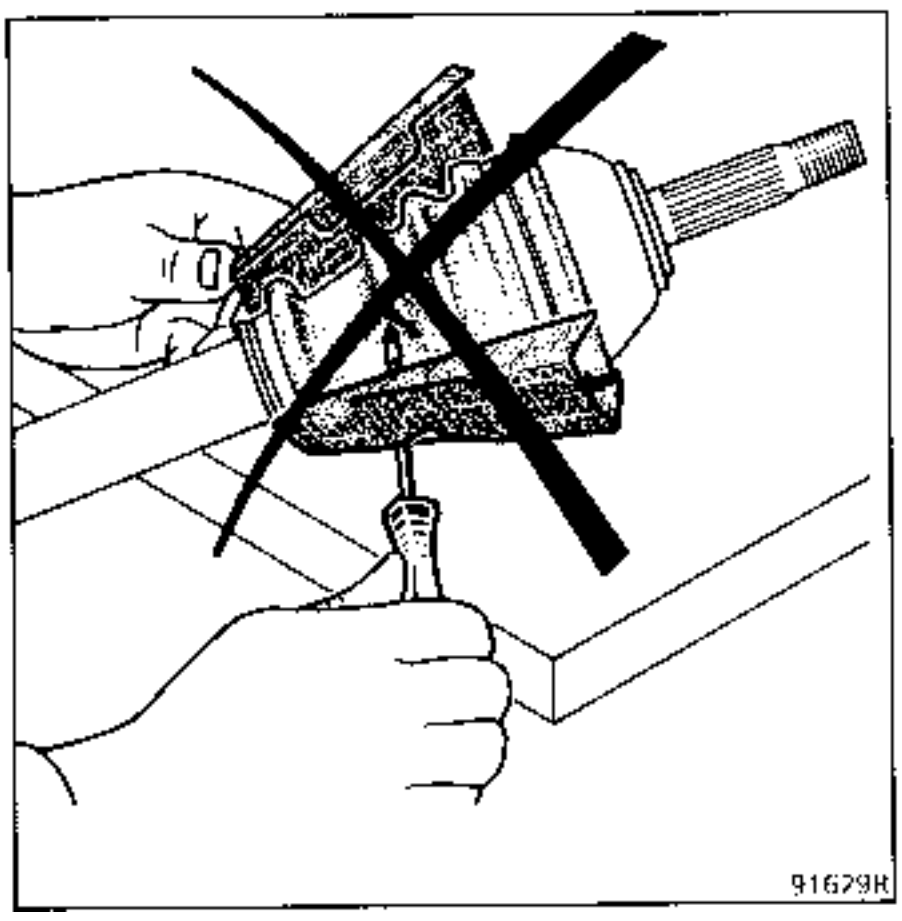
REFITTING

NOTE : the Parts Department now supplies driveshafts fitted with protectors and with fitting instructions. These instructions must be followed to ensure that the assembly is correct and of the highest QUALITY. Remember that the slightest knock on the gaiters causes the rubber to break and the driveshaft to be damaged in the long term.

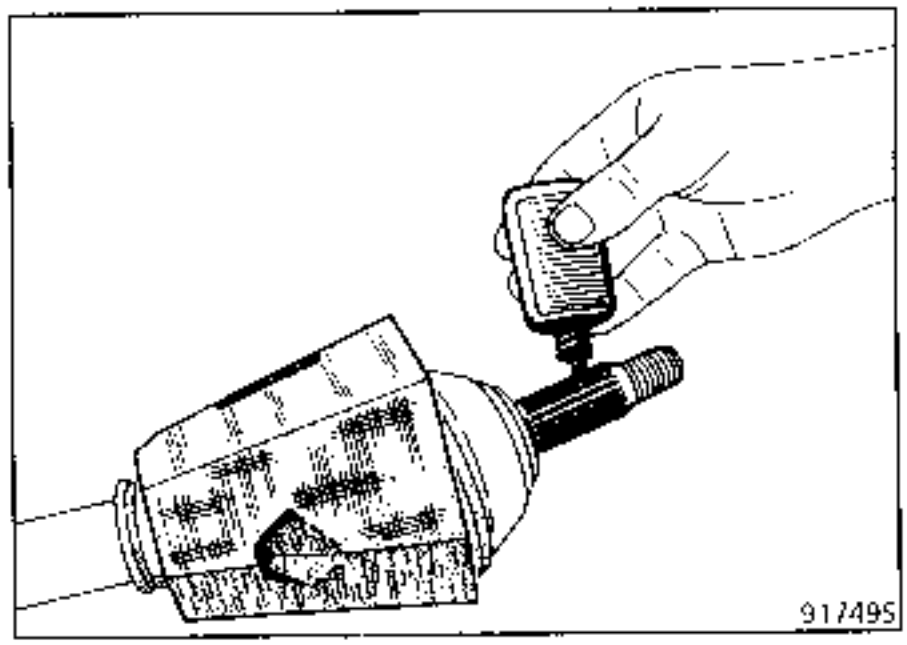
Never remove the cardboard protectors before the end of the operation to refit the driveshaft to the vehicle.



Never use an instrument with a sharp edge which could damage the gaiter.



Coat the stub axle splines with **LOCTITE SCELBLOC.**



Fit the driveshaft stub axle into the hub.

Secure the driveshaft to the sunwheel (six bolts **(A)** and tighten to the recommended torque, tool **Rou. 604-01**).

With the vehicle on its wheels, remove the cardboard protectors.

REPLACEMENT

SPECIAL TOOLING REQUIRED		
T.Av.	537-02	GE 86 expander
T.Av.	586-01	GE 76 expander
T.Av.	1034	Pliers for crimping OETIKER driveshaft clips

1 Stub axle bowl

2 Retaining starplate

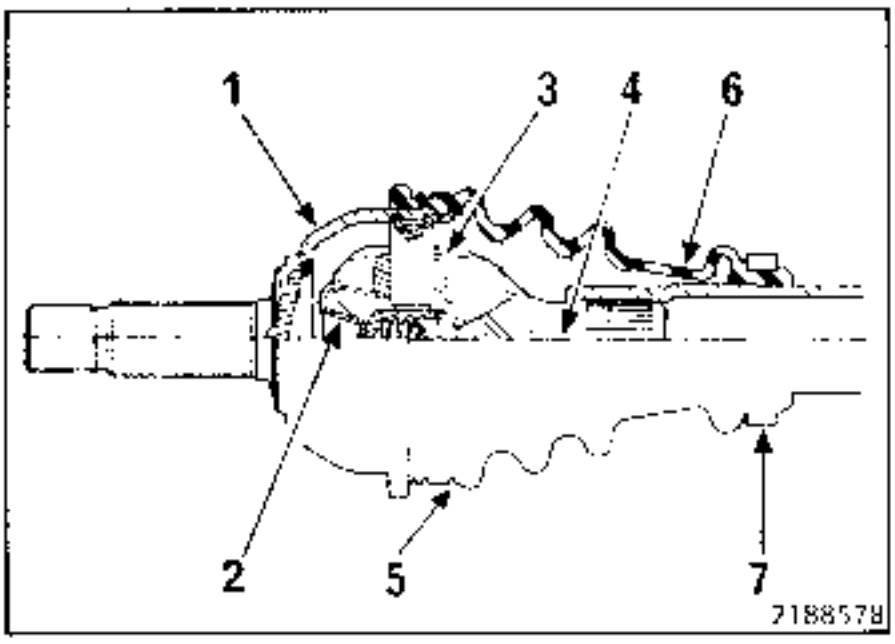
3 Spider

4 Shaft yoke

5 Retaining clip

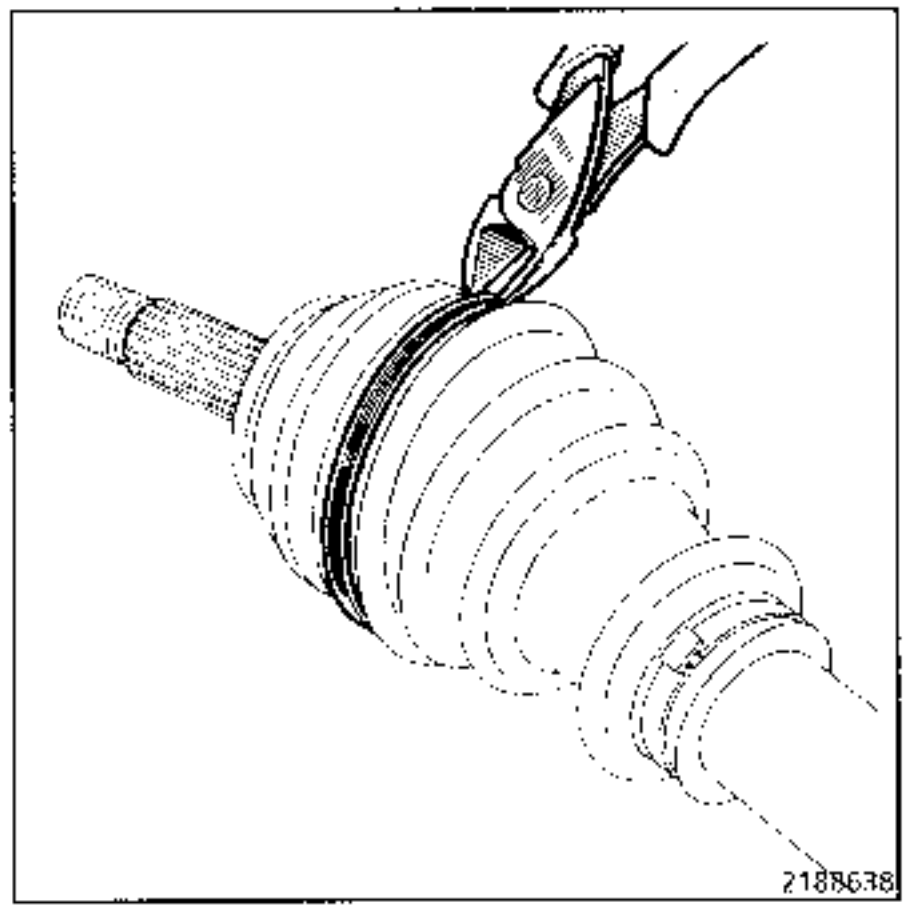
6 Rubber gaiter

7 Retaining collar



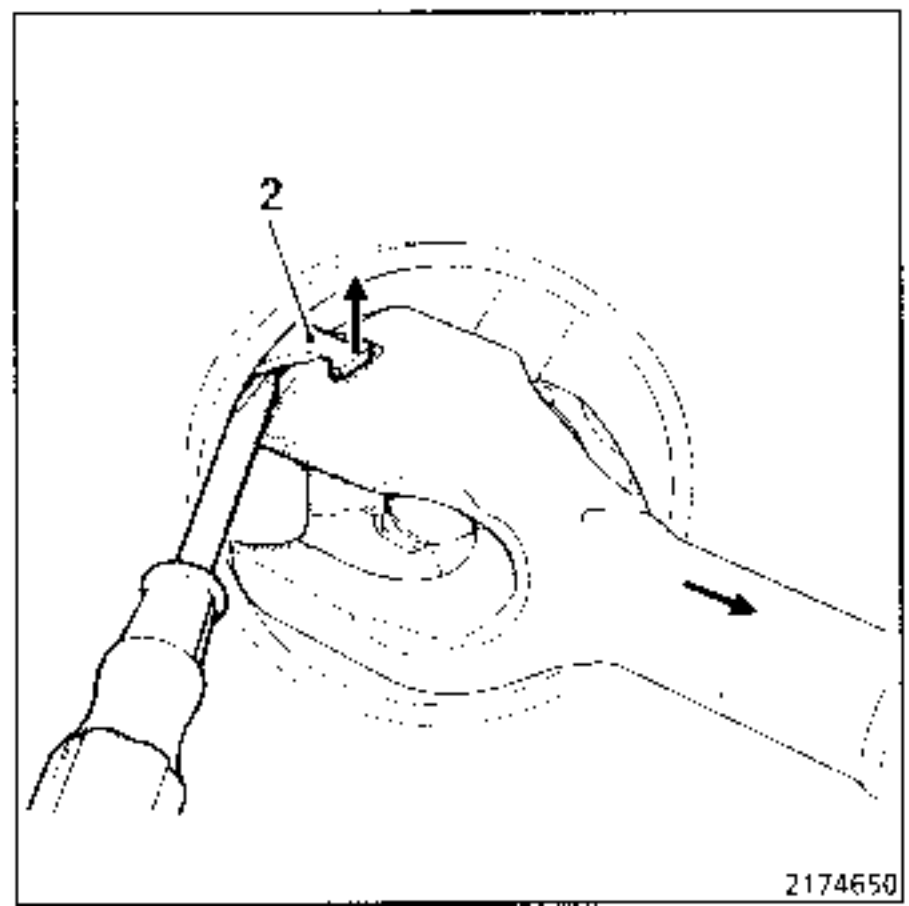
REMOVAL

Cut the collars, taking care to avoid damaging the grooves in the stub axle bowl.



Remove as much grease as possible.

Release the stub axle bowl from the driveshaft by lifting the starplate arms (2) one after the other.



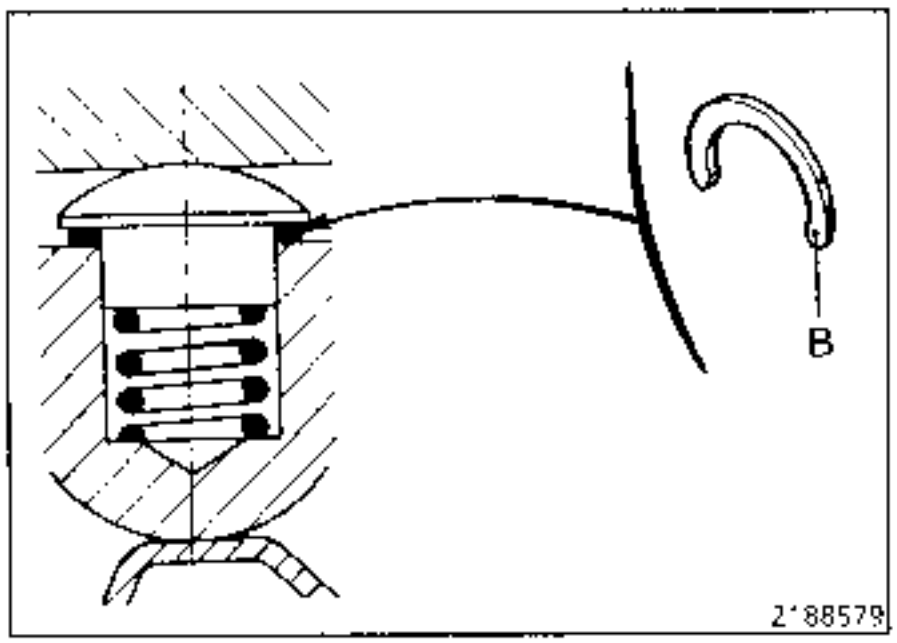
REPLACEMENT (cont)

DO NOT TWIST THE STARPLATE ARMS.

Retain the thrust ball, the spring and the shim under the ball joint (**B**).

NOTE : the thickness of the shim under the ball joint is adapted to the original clearance.

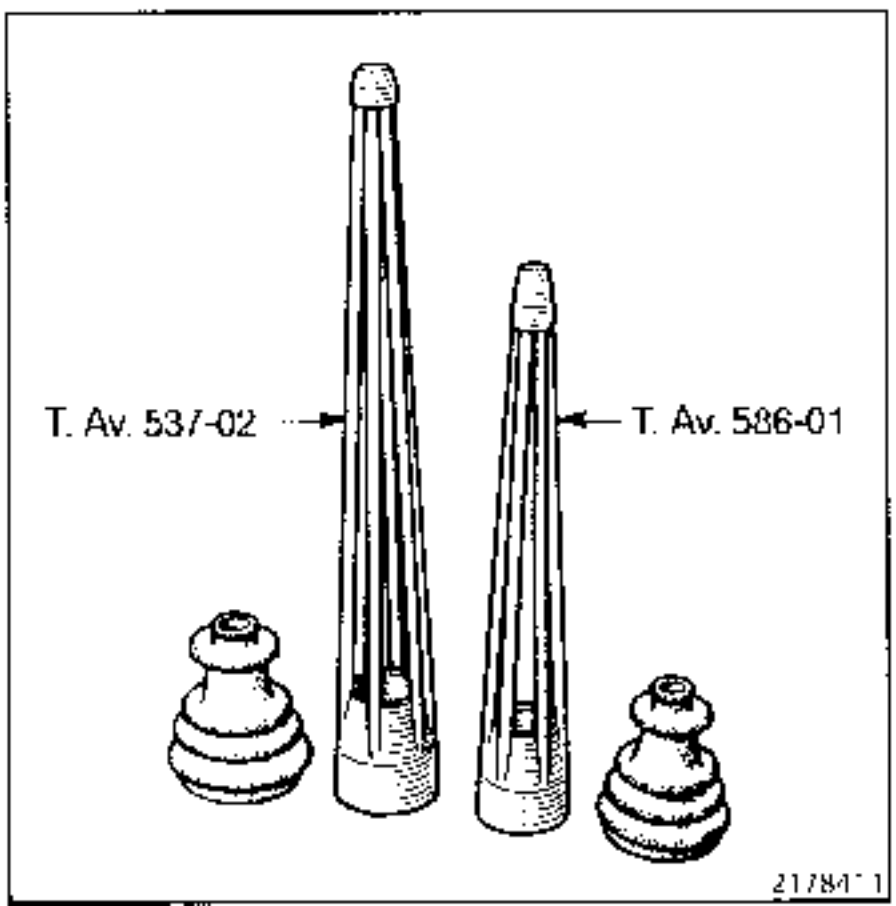
This shim should be retained and used on refitting.



Remove all traces of grease.

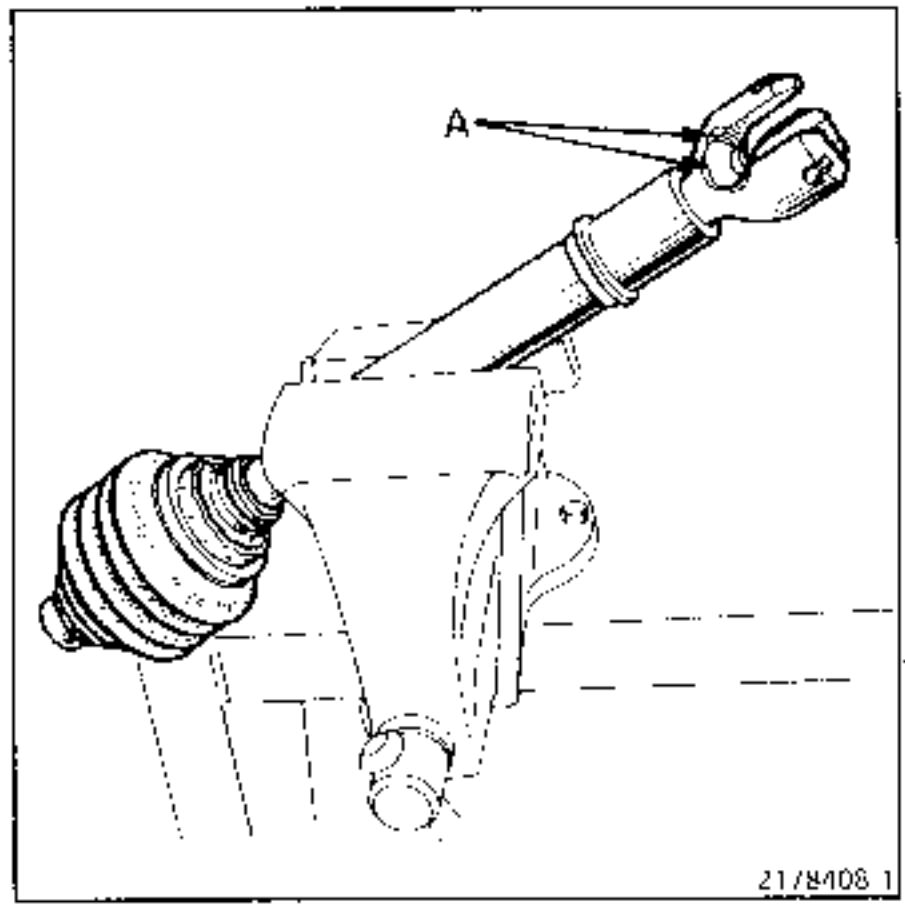
REFITTING

Fitting the gaiter requires the use of the following tools:
T.Av. 537-02 for **GE 86**,
T.Av. 586-01 for **GE 76**.



Hold the driveshaft at a convenient angle in a vice fitted with soft jaws.

Fit the expander tool on the end of the yoke (if it will not fit, deburr the cylindrical section inside the expander with emery paper).

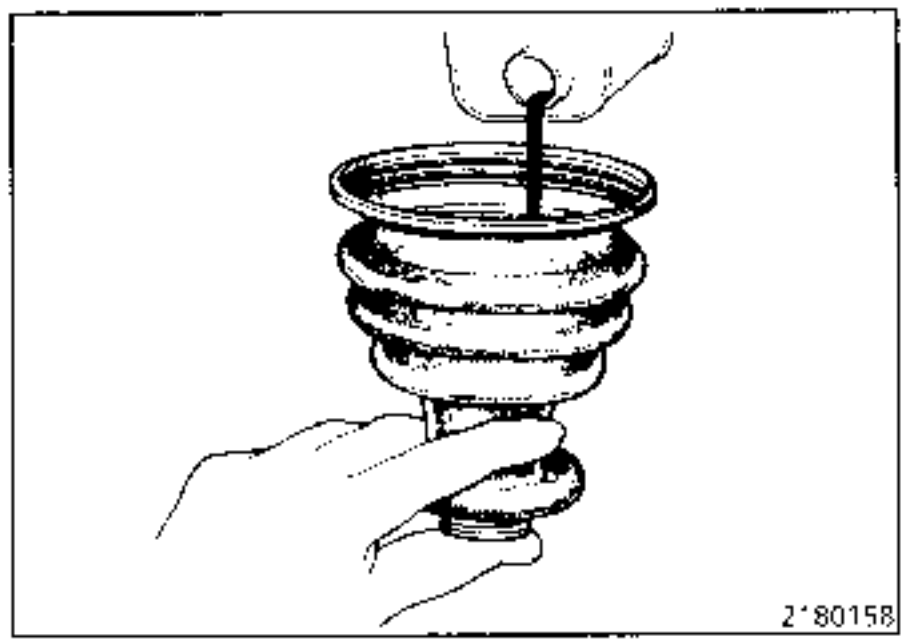


It is essential to ensure that there are no sharp edges on the yoke (**A**) (deburr lightly with emery paper if necessary).

Lubricate the following generously before assembly with clean automatic transmission oil:

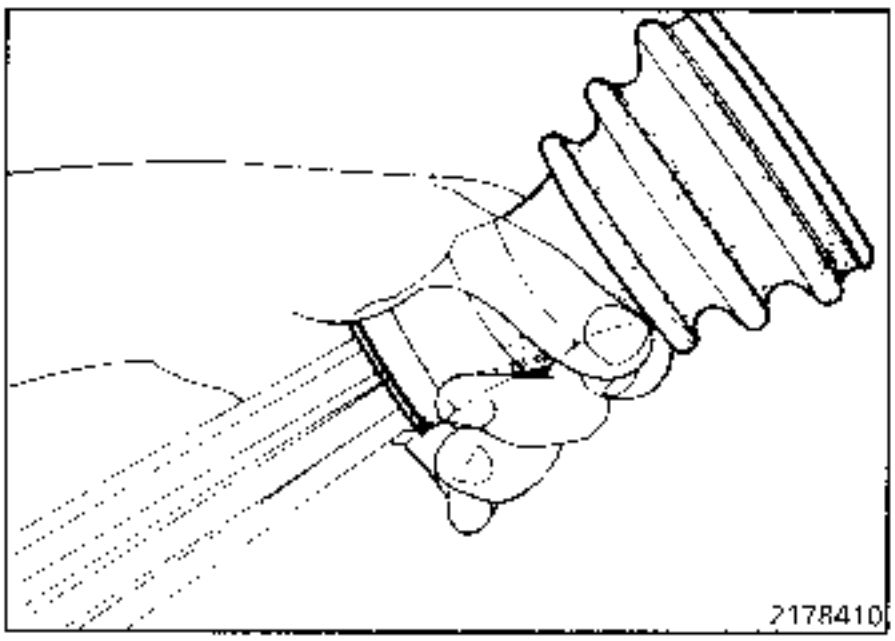
- the tool assembly (stems and centre),
- the inside of the gaiter, in particular the neck.

Place a thumb over the bottom hole, pour some oil into the gaiter and spread it round the inside.

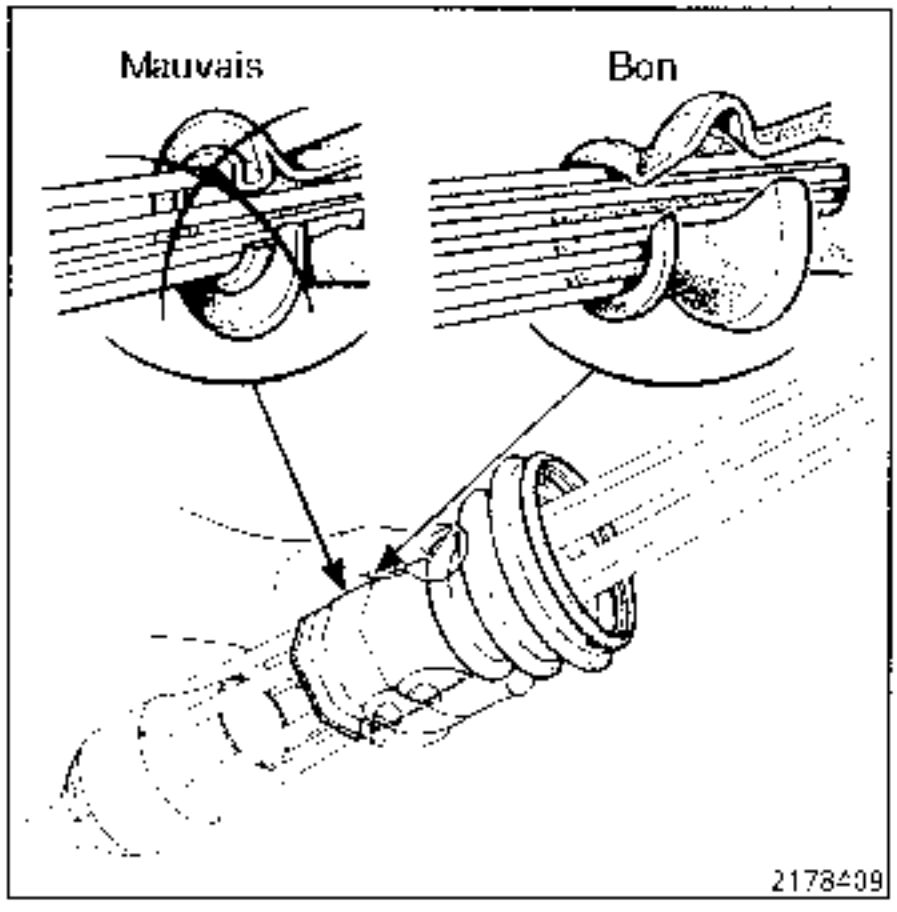


REPLACEMENT (cont)

Slip the gaiter over the end of the expander.



Wrap a piece of clean cloth around one hand and grip the gaiter so that the first fold will stretch when it is slid on.



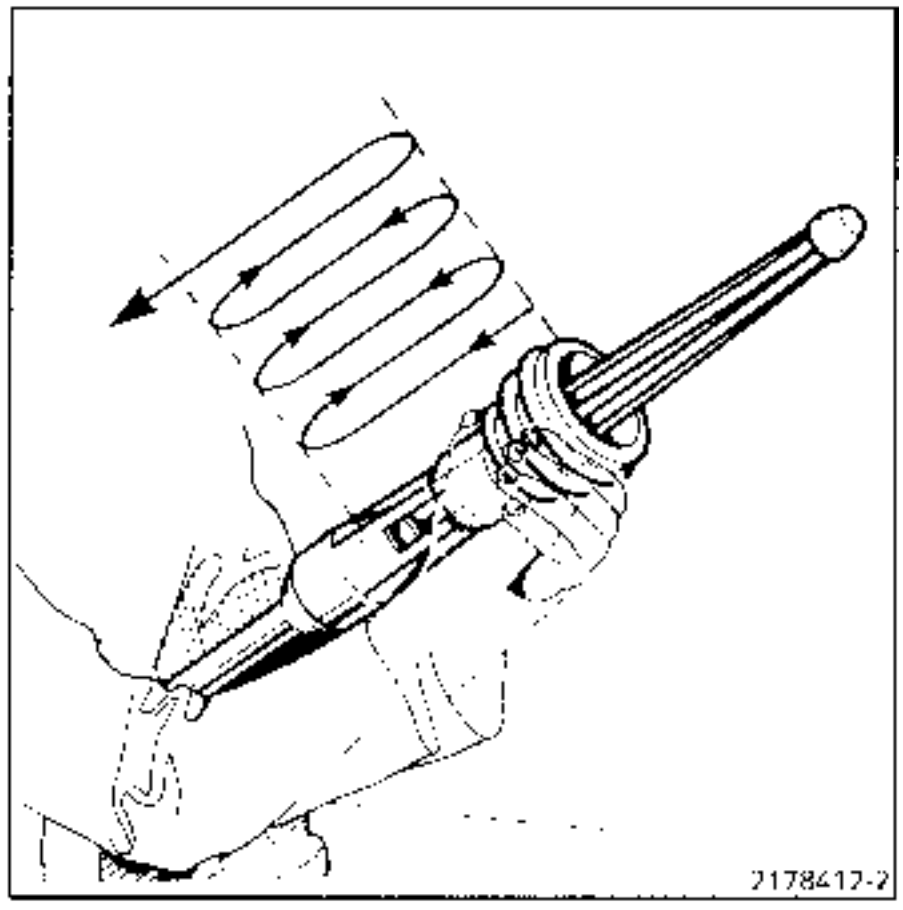
Lean your hip against the edge of the bench.

Place one hand around the other and pull, taking care that the first fold does not double back.

Pull the gaiter as far as possible towards the cylindrical part of the tool and then let it return halfway.

Repeat this operation several times (maximum 5 times) to make the gaiter rubber more pliable (relubricate the stems of the tool during the operation if required).

When the rubber feels more pliable and easy to slide, pull the gaiter in one movement on to the cylindrical part of the tool.

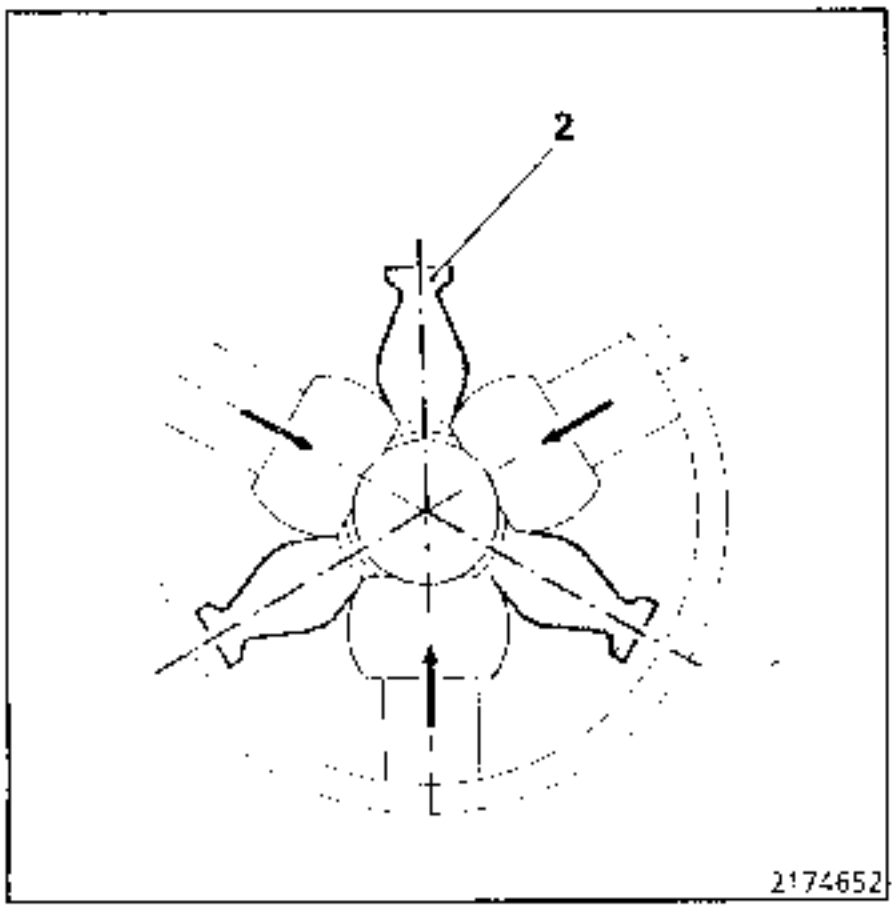


Fit the spring and thrust ball in the spider.

Move the rollers towards the centre.

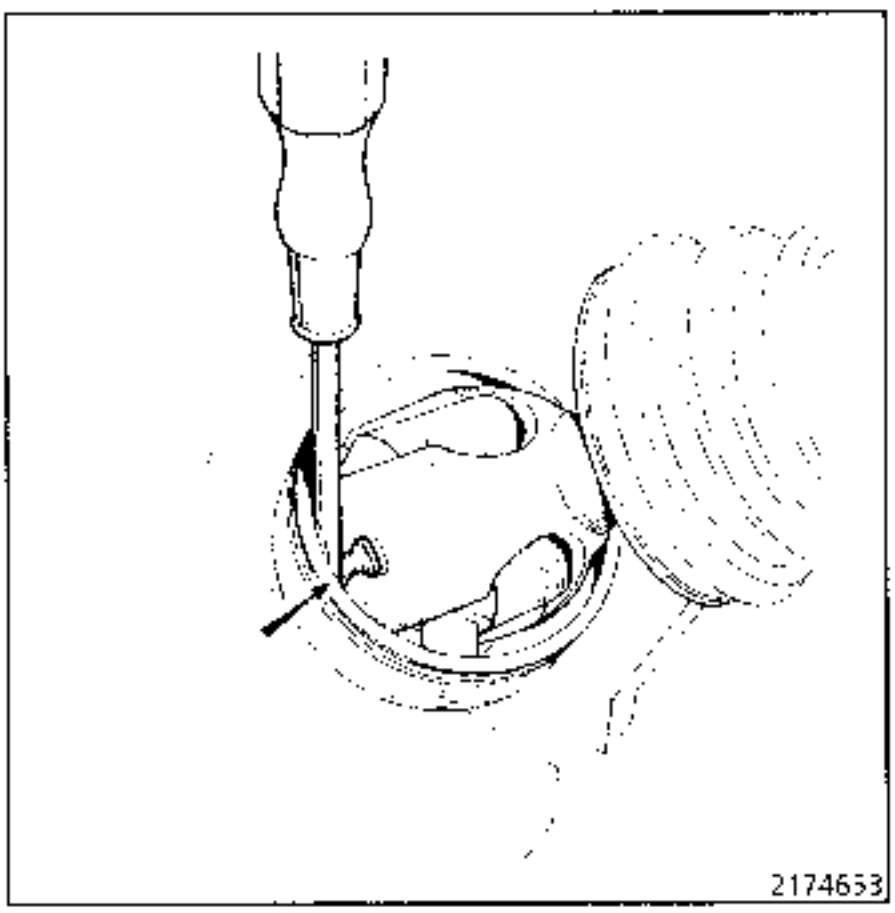
REPLACEMENT (cont)

Position the retaining starplate (**2**), so that each arm is central between each spider trunnion.



Insert the driveshaft yoke into the stub axle bowl.

Tilt the shaft to fit one arm of the starplate into a slot in the yoke, and press to centre it correctly.

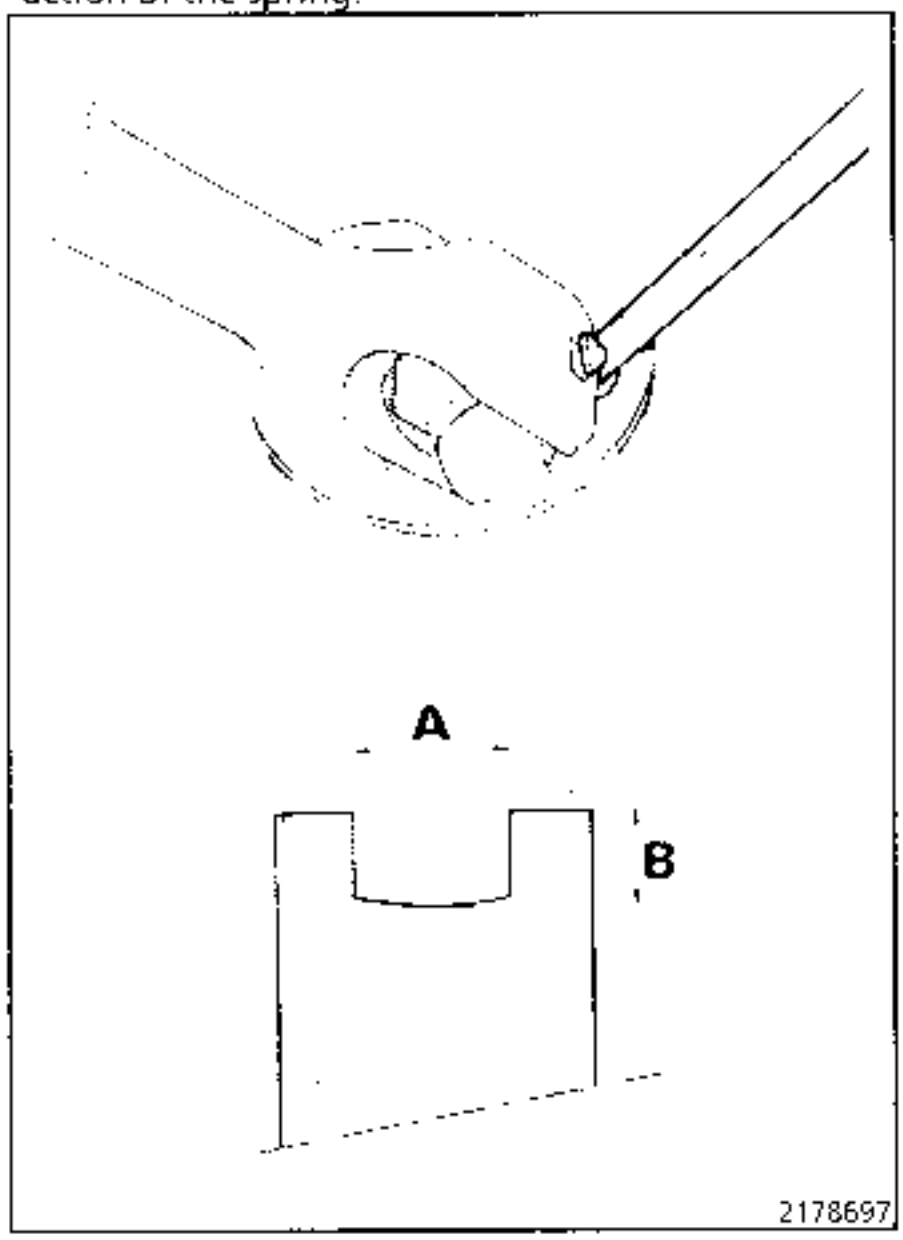


The other arms may be refitted more easily using a screwdriver modified as shown in the diagram.

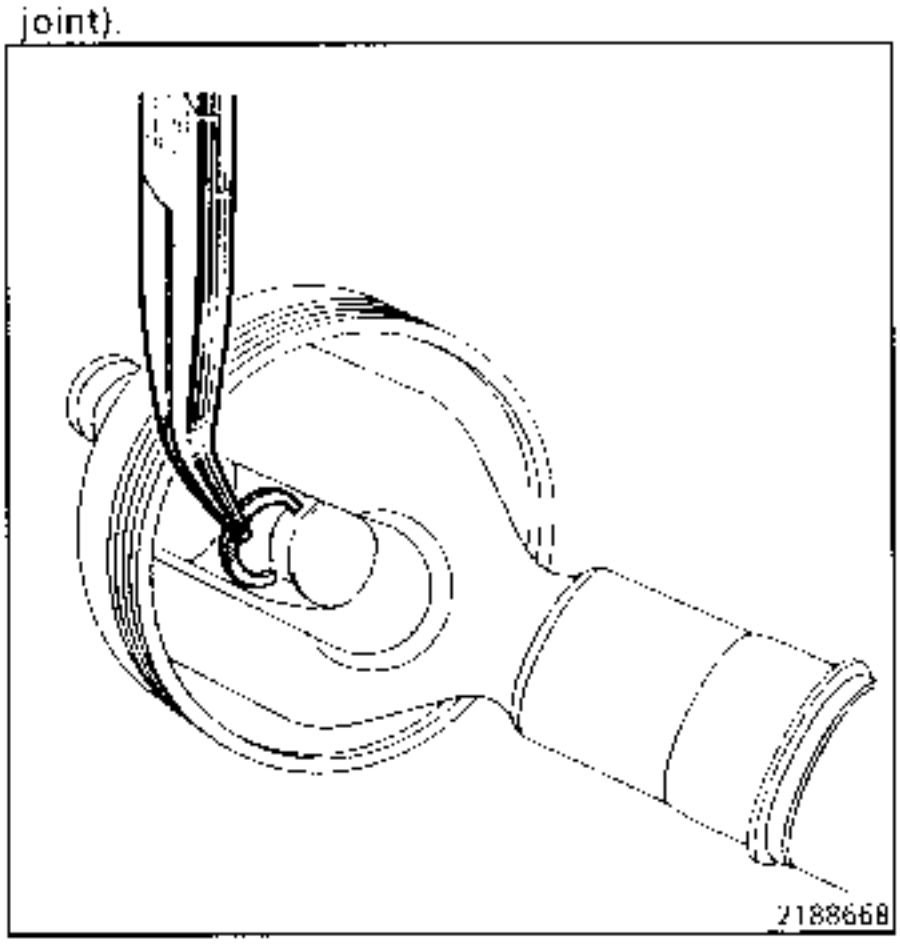
A = 5 mm **B = 3 mm**

Ensure that the arms of the retaining starplate are correctly fitted in their locations.

Tilt the shaft in the plane of one of the starplate arms and the ball joint will be released under the action of the spring.



Insert the shim under the top of the ball joint (the shim should not project above the top of the ball joint).



REPLACEMENT (cont)

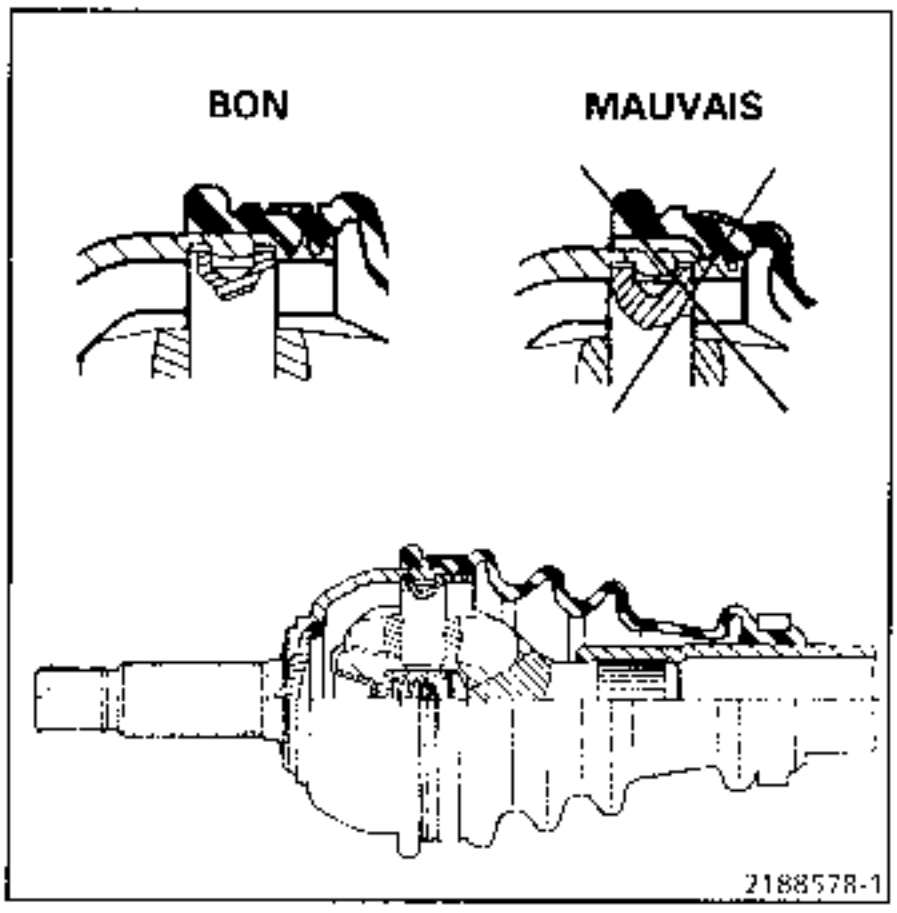
Check that the joint moves correctly by hand.

There should be no points of resistance.

Spread the sachet of grease evenly between the gaiter and the stub axle bowl.

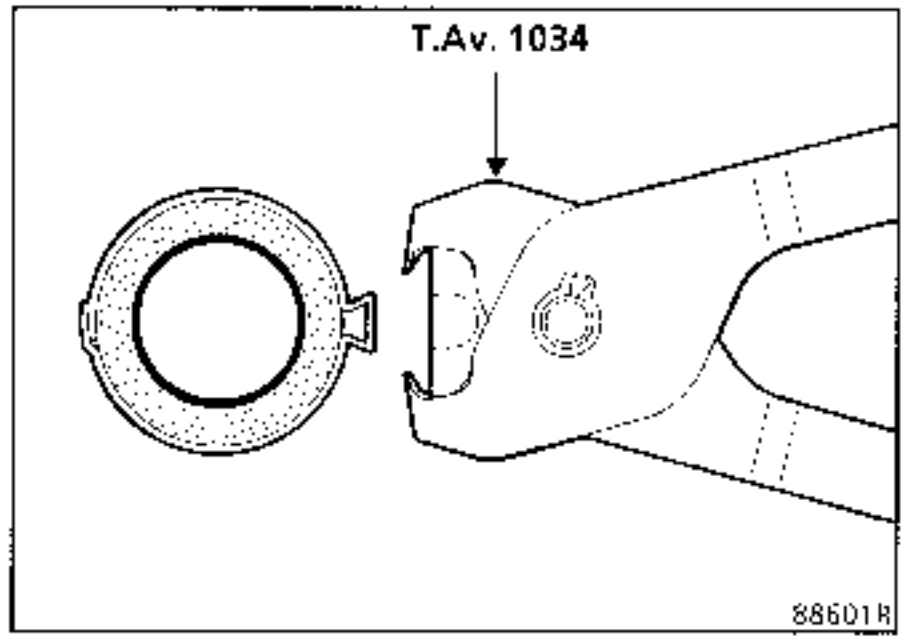
NOTE : Ensure that the amount of grease specified in the "Materials" section is used.

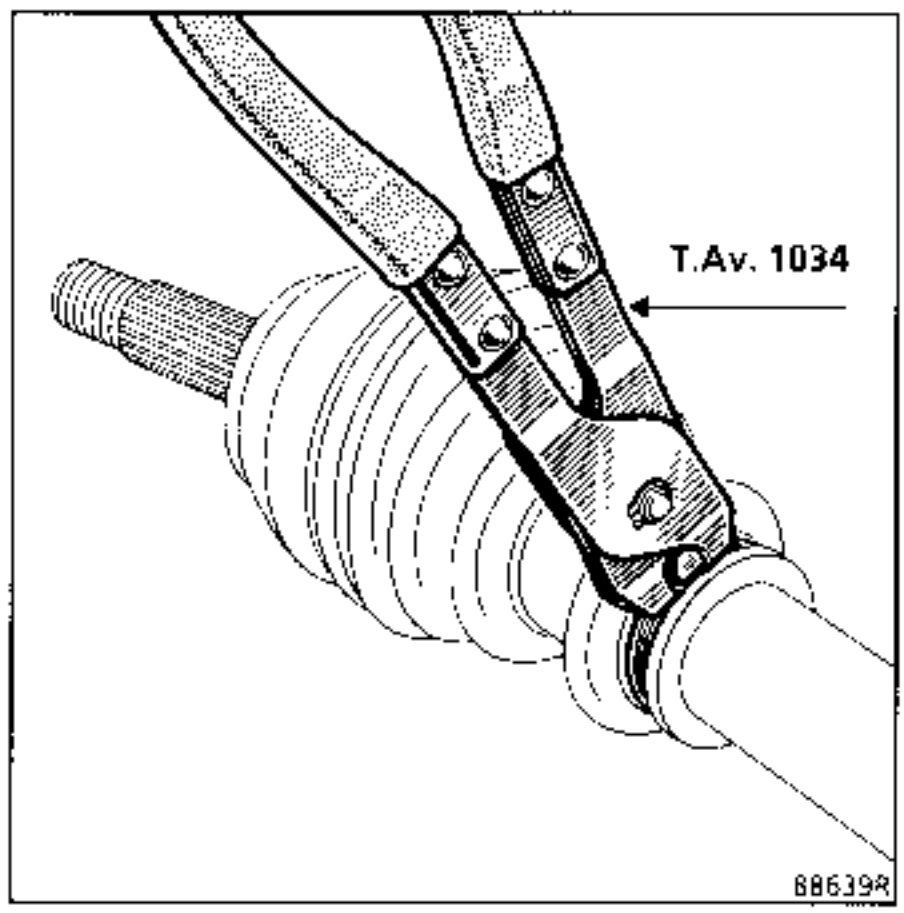
Position the gaiter lips in their grooves on the stub axle bowl and on the driveshaft.



Insert a smooth round-edged rod between the gaiter and the driveshaft to correct the amount of air inside.

Fit the clips and tighten them using tool **T.Av. 11034**.

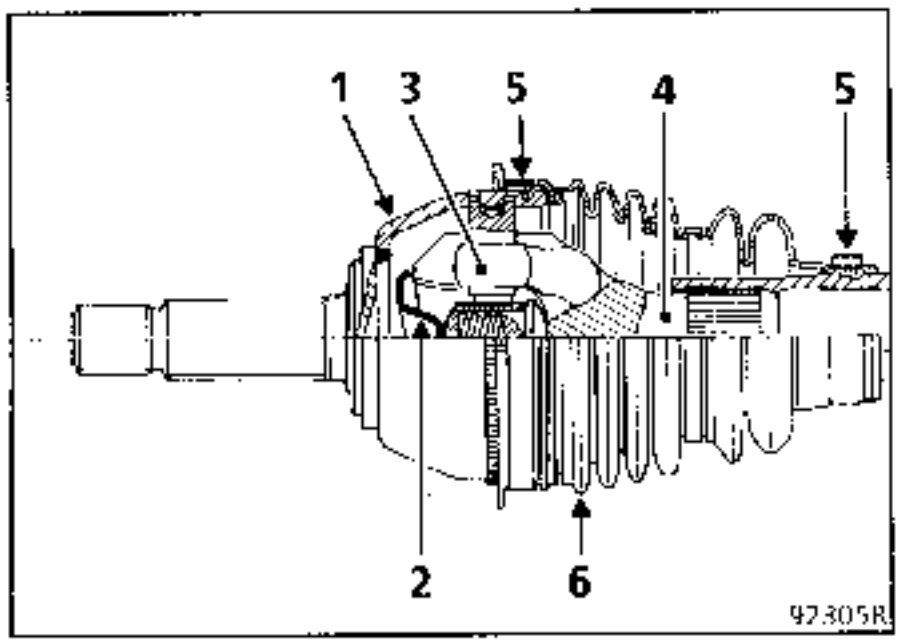




REPLACEMENT

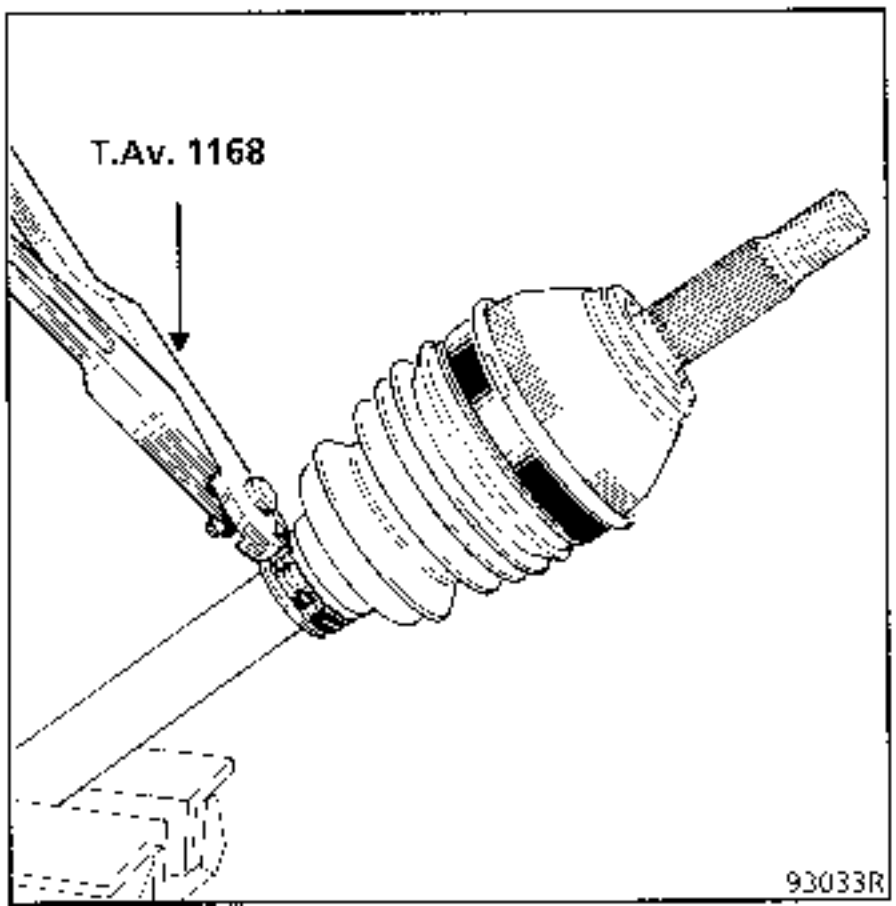
SPECIAL TOOLING REQUIRED		
T.Av.	1168	Pliers for CAILLAU clips for driveshafts with thermoplastic gaiters

1 Stub axle bowl
2 Retaining starplate
3 Spider
4 Shaft yoke
5 Retaining clip
6 Thermoplastic gaiter

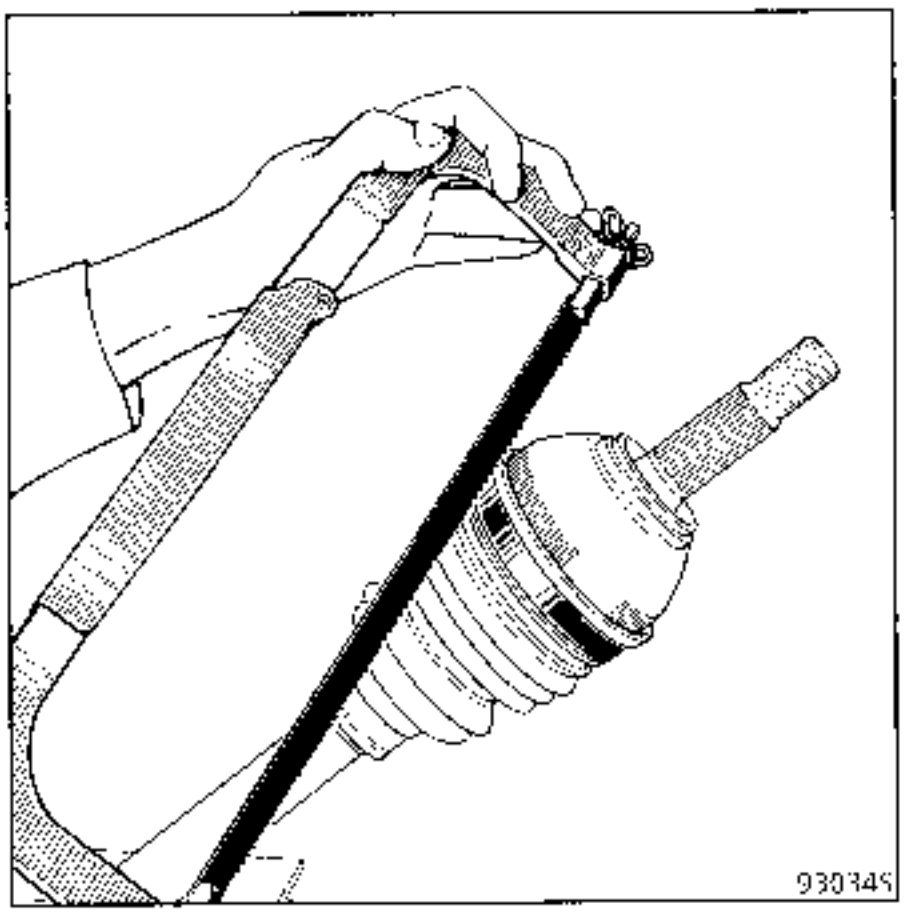


There are two types of driveshaft:
- diameter **35** — identical
- diameter **26** with ring diameter **35** — method

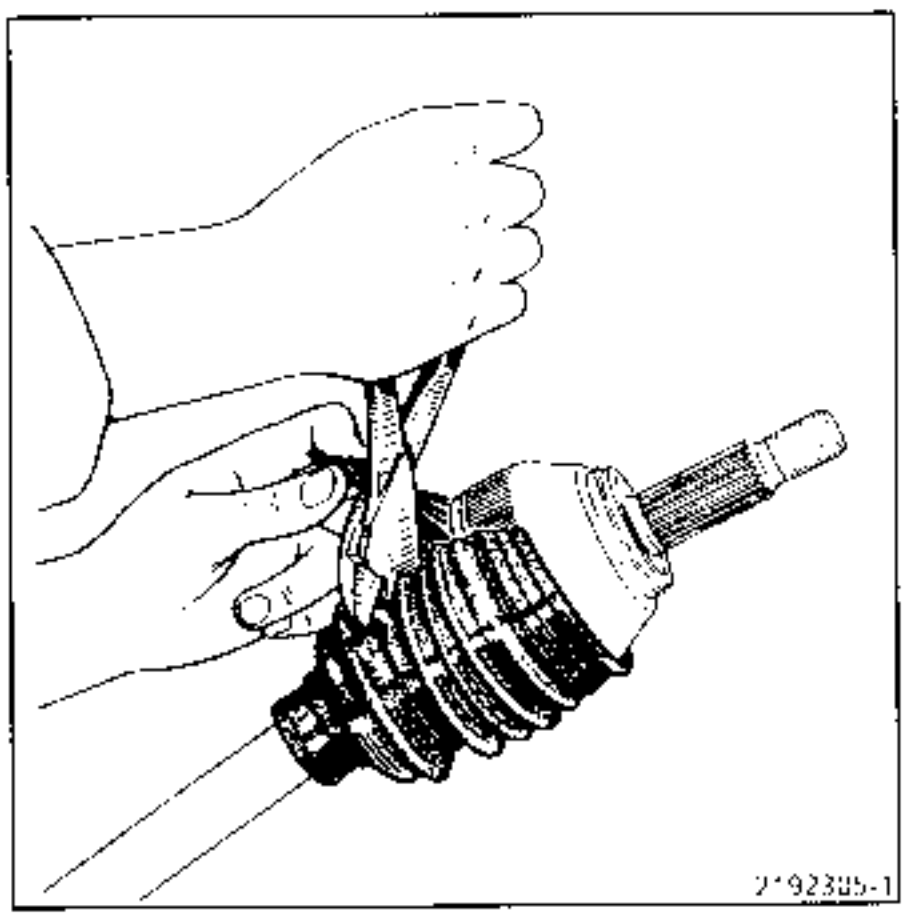
Remove the gaiter at the gearbox end (see section **"Gaiter at gearbox end"**).
Unclip the small clip using tool **T.Av. 1168**.



Cut the collars, taking care to avoid damaging the groove in the stub axle bowl.



Cut the gaiter.

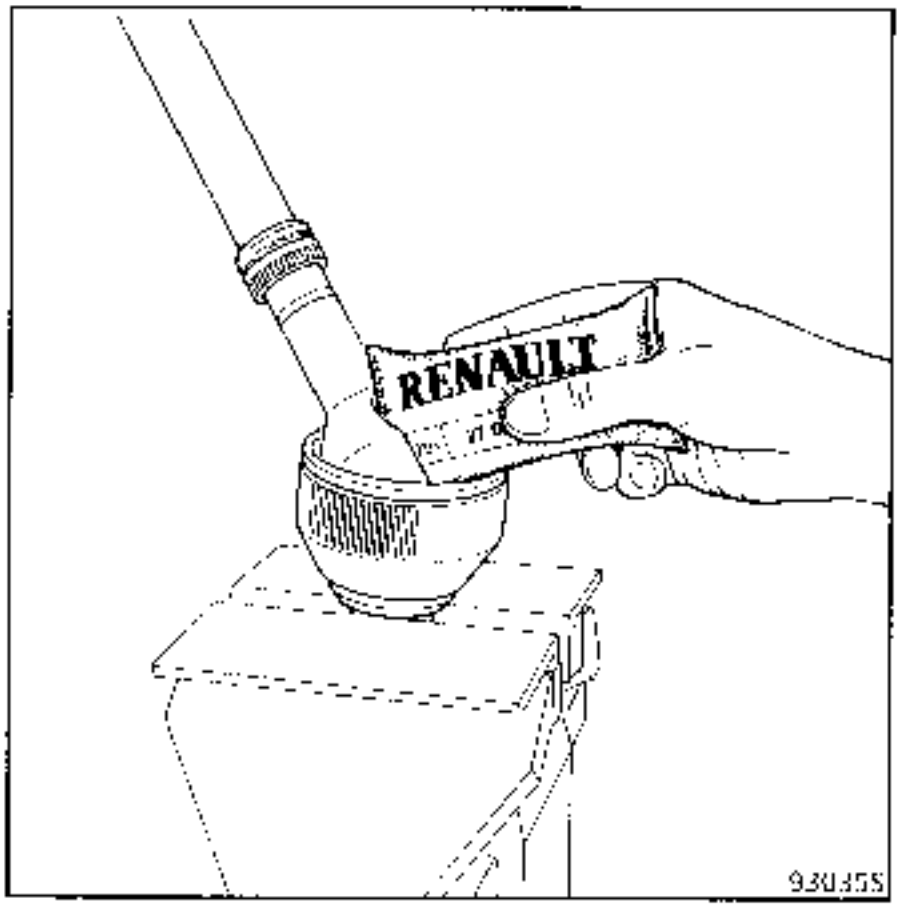


Remove as much grease as possible.

REPLACEMENT (cont)

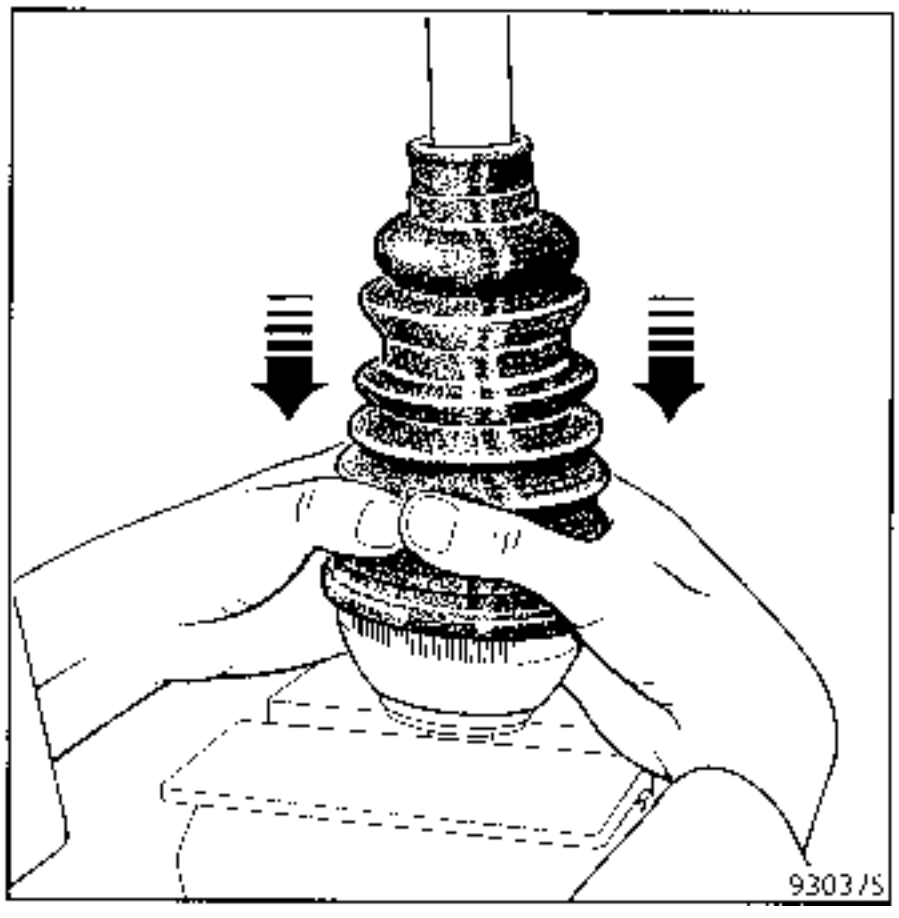
Refitting

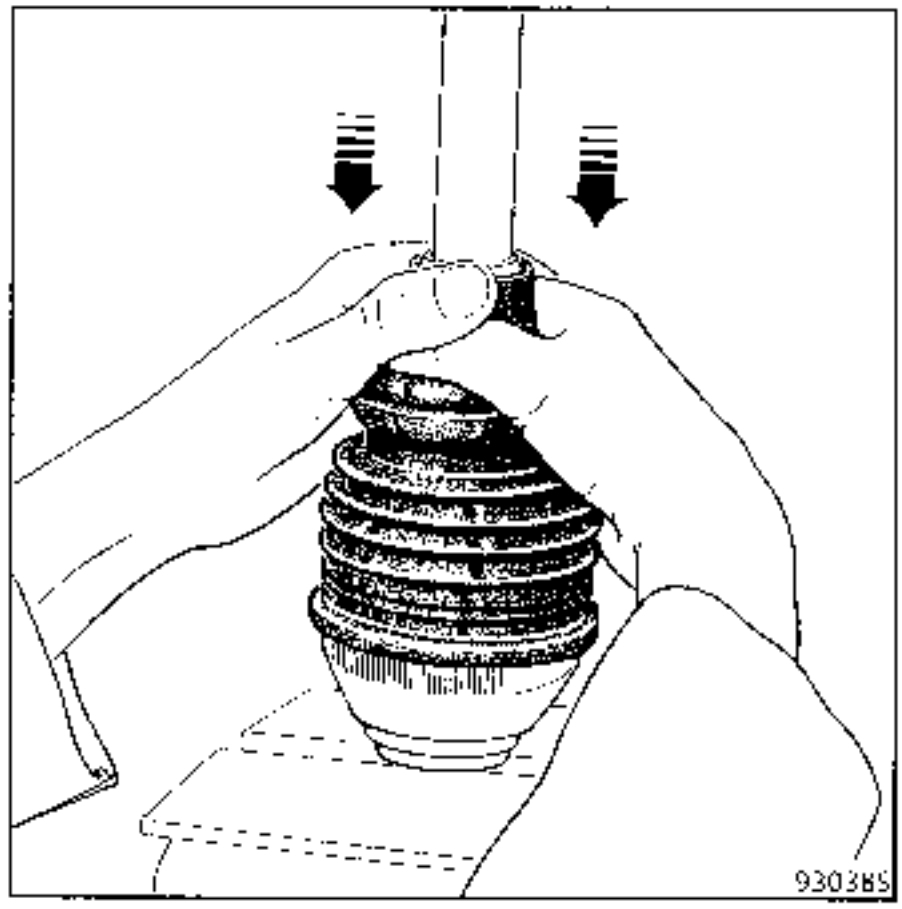
Spread the sachet of grease evenly between the gaiter and the stub axle bowl.



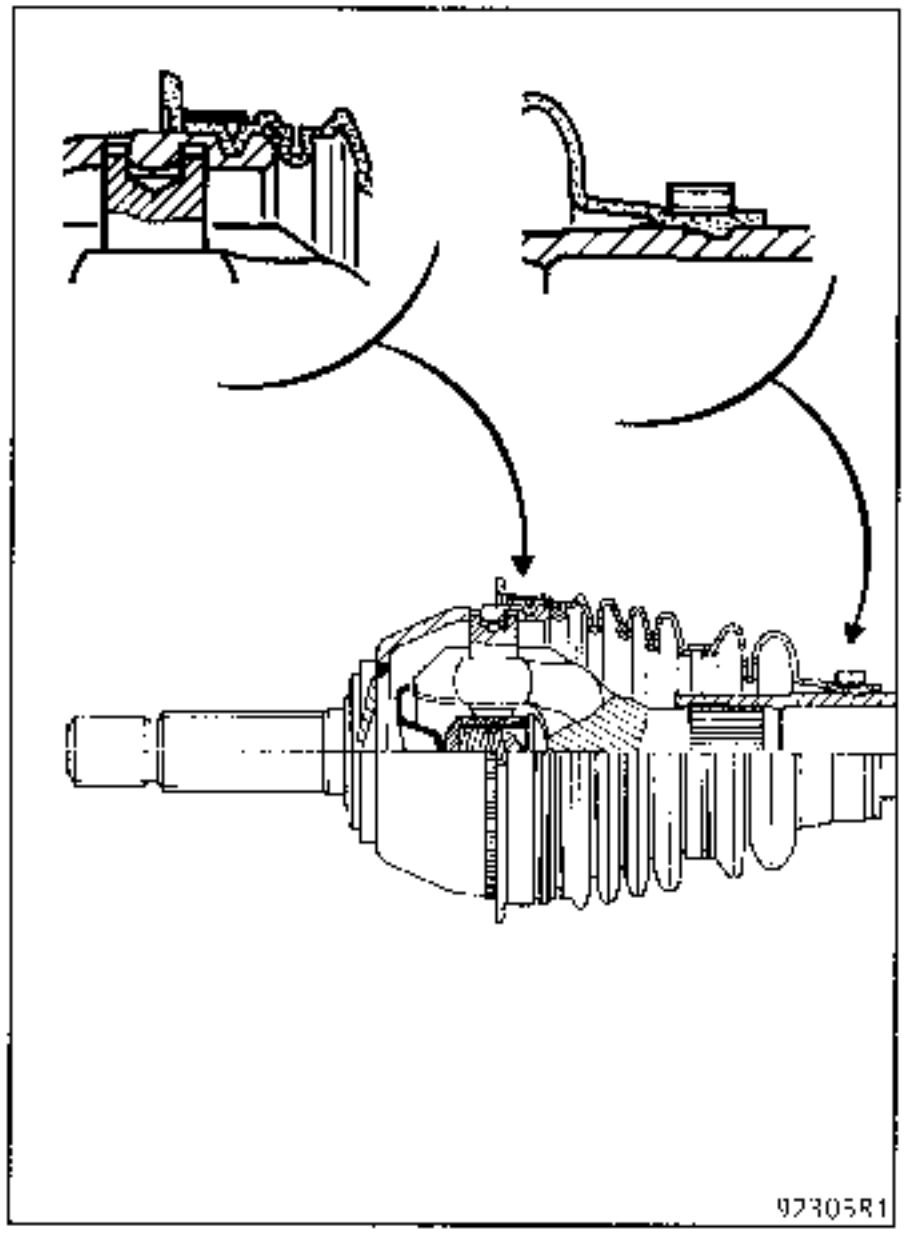
NOTE : Ensure that the amount of grease specified in the "Materials" section is used.

Fit the gaiter into position and check it "clicks" into the groove on the stub axle bowl and then on the driveshaft.





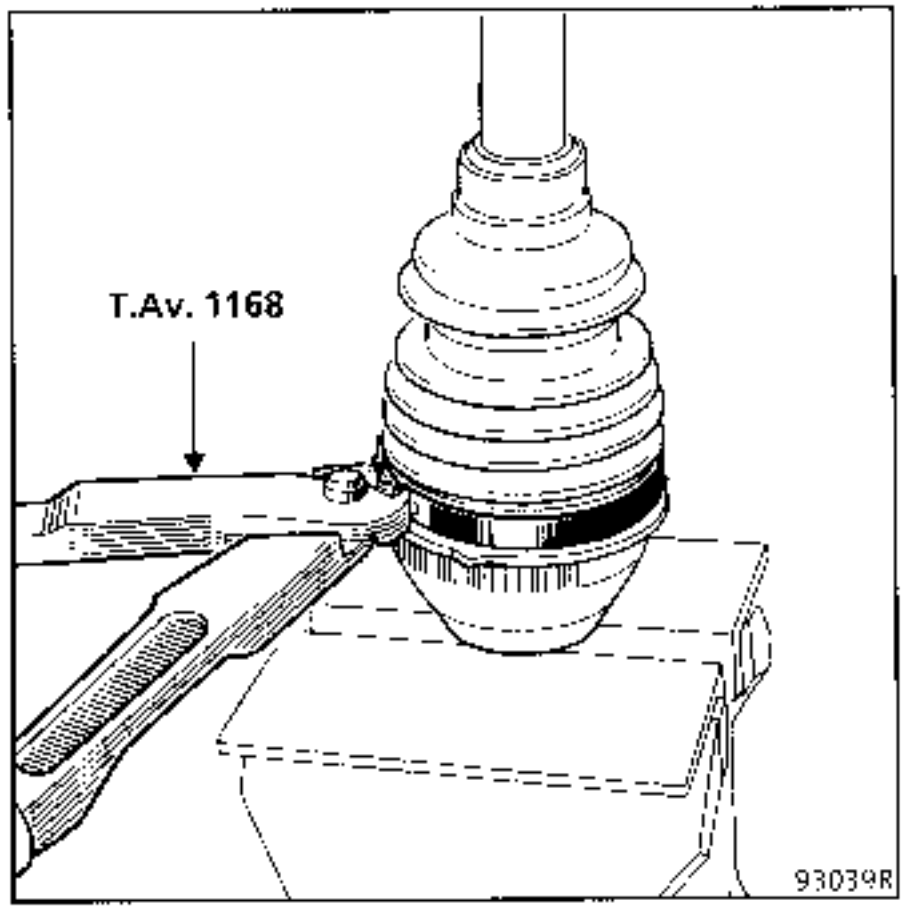
Positton the gaiter shoulders when it is mounted.

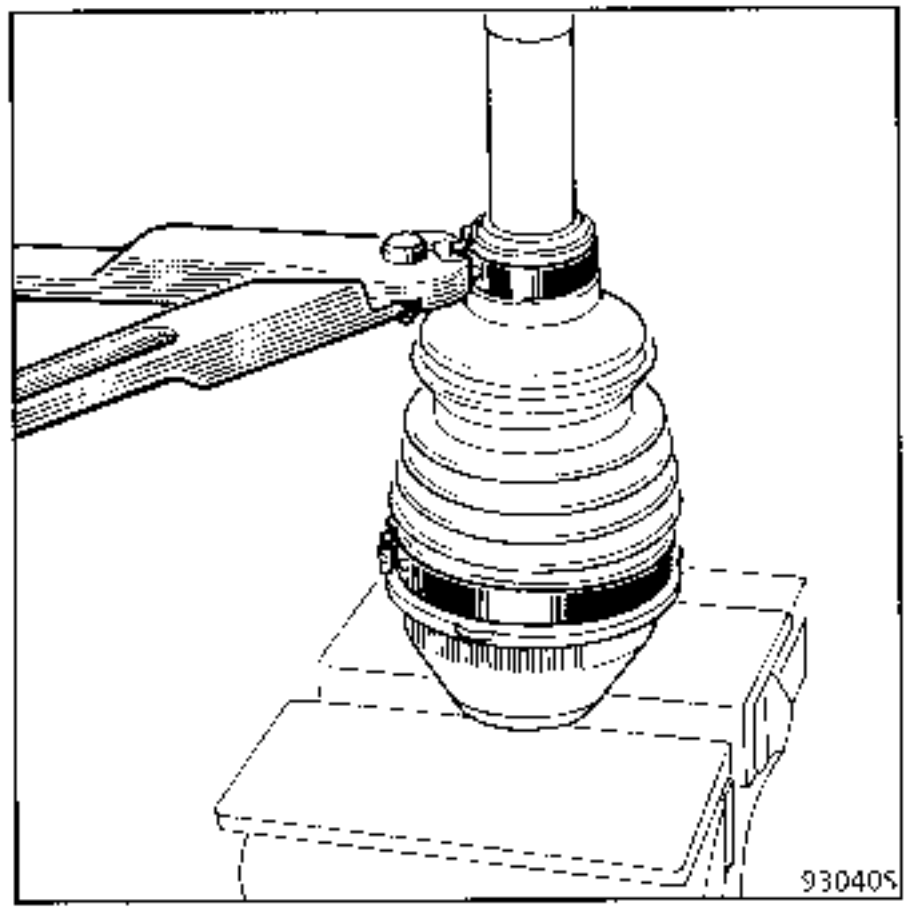


Turn the joint by hand to check the two shoulders have been correctly fitted and to ensure the correct amount of air is in the joint.

Refitting (cont)

Fit the clips and tighten them using tool T.Av. 1168.

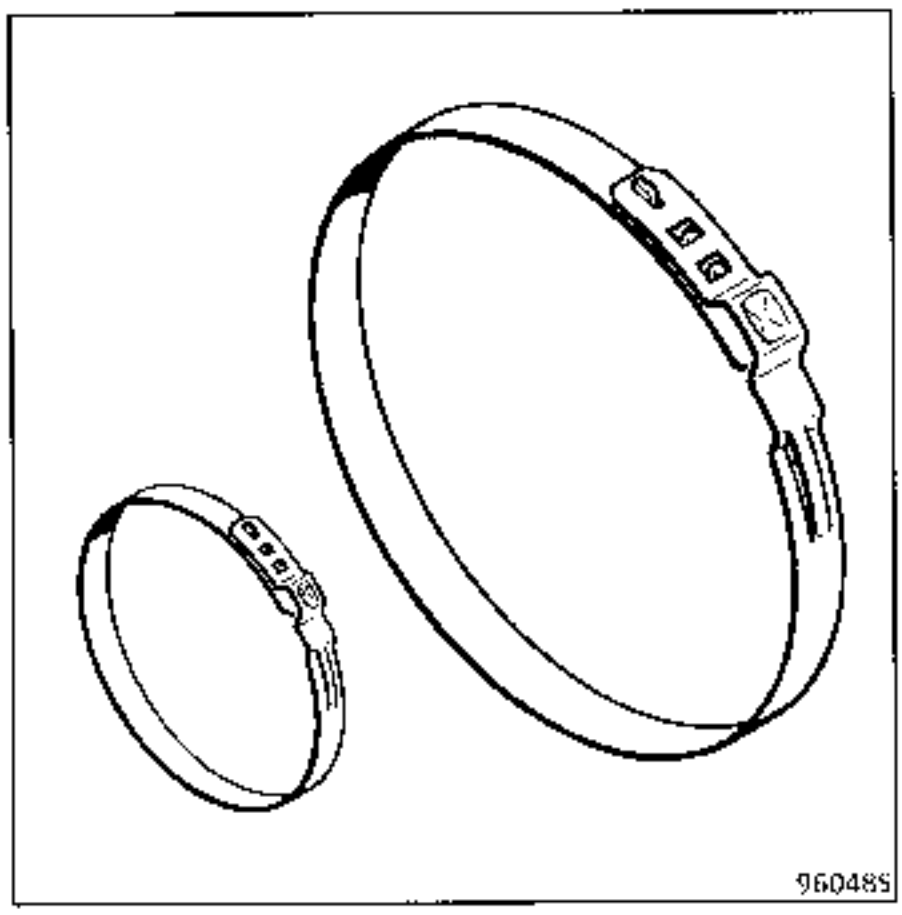




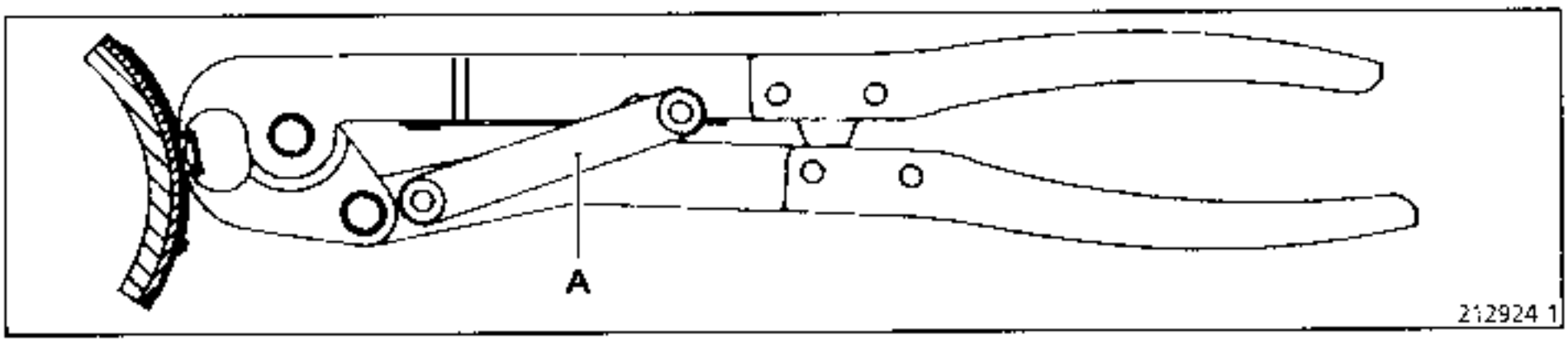
NOTE : do not re-use the small diameter clip.

Refit the gaiter at the gearbox end.

The OETIKER **T.Av. 1256** pliers for driveshaft gaiter clips may also be used for **GE** thermoplastic driveshaft gaiters.

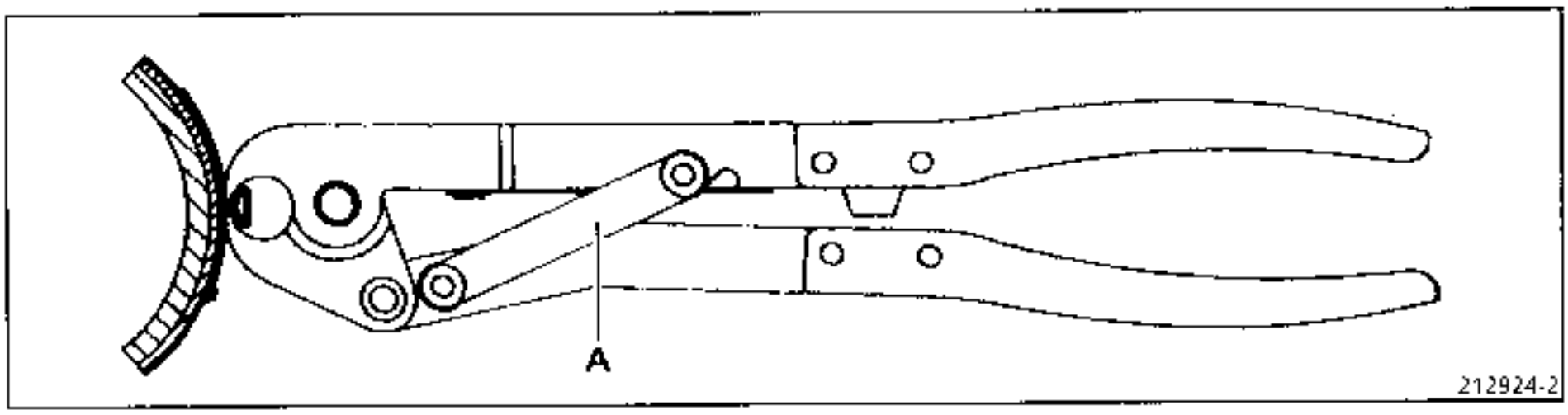


POSITION 1 - Pre-crimping and positioning the clip



Position bar (**A**) in the lower notch and close the pliers as far as possible. The pre-crimped clip slides onto the gaiter and may then be positioned.

POSITION 2 - Crimping

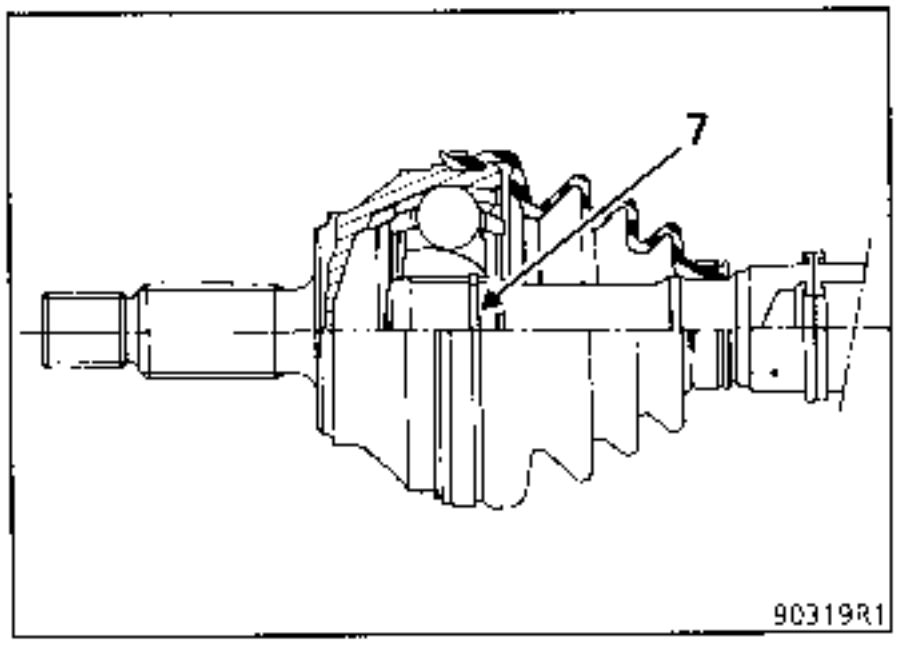


Position bar (**A**) in the upper notch and close the pliers as far as possible.

REPLACEMENT

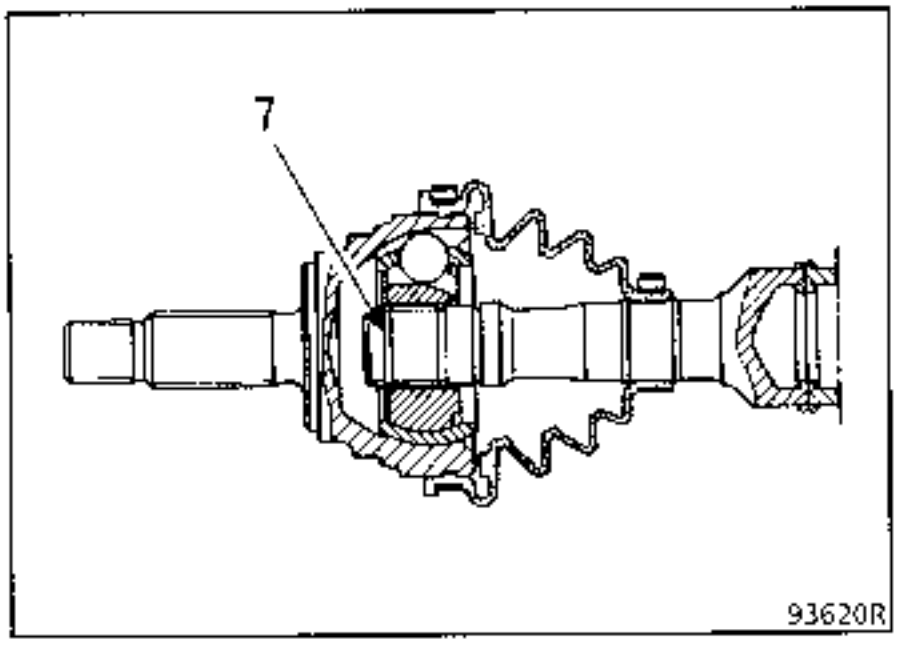
A 6 ball joint may be fitted at the wheel end on these drive shafts. There are two types:

- **1st assembly - can be dismantled** (locking ring 7 may be reached),



- **2nd assembly - cannot be dismantled** (driveshaft shaft **2** is bonded and locking ring **7** is inaccessible).

Slide the gaiter on and ensure it clicks into the grooves on the stub axle bowl and on the driveshaft.



The joint at the gearbox end must be removed to replace the gaiter.

Repairing 1st assembly

6-BALL JOINT AT WHEEL END

1 Stub axle bowl

2 Driveshaft

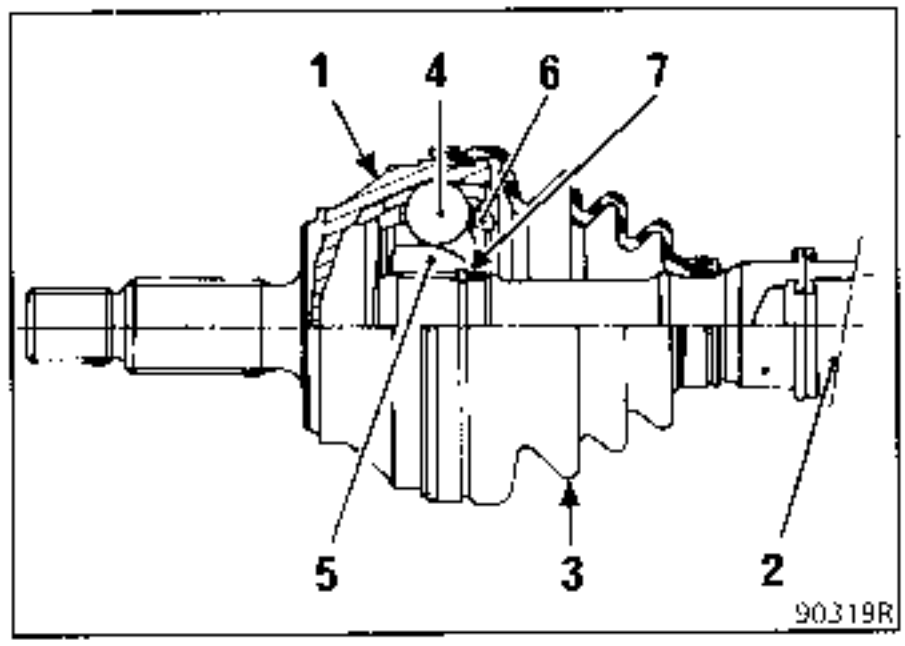
3 Rubber or thermoplastic gaiter

4 Balls

5 Ball hub

6 Ball cage

7 Locking ring



REMOVAL

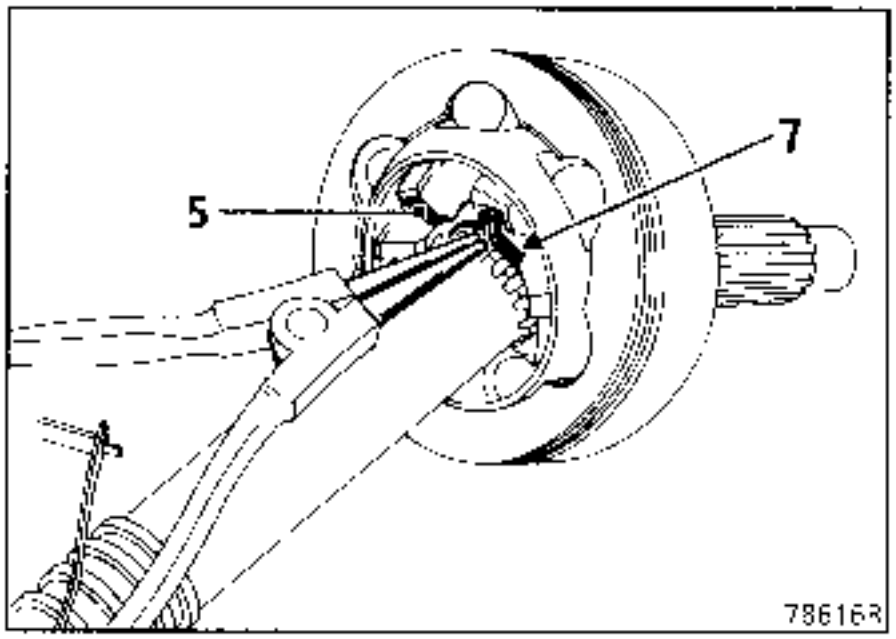
Cut the clip and the gaiter along its length.

Remove as much grease as possible.

Spread the locking ring (7) and at the same time tap the exposed face of the ball hub (5) with a mallet.

Separate the joint from the shaft.

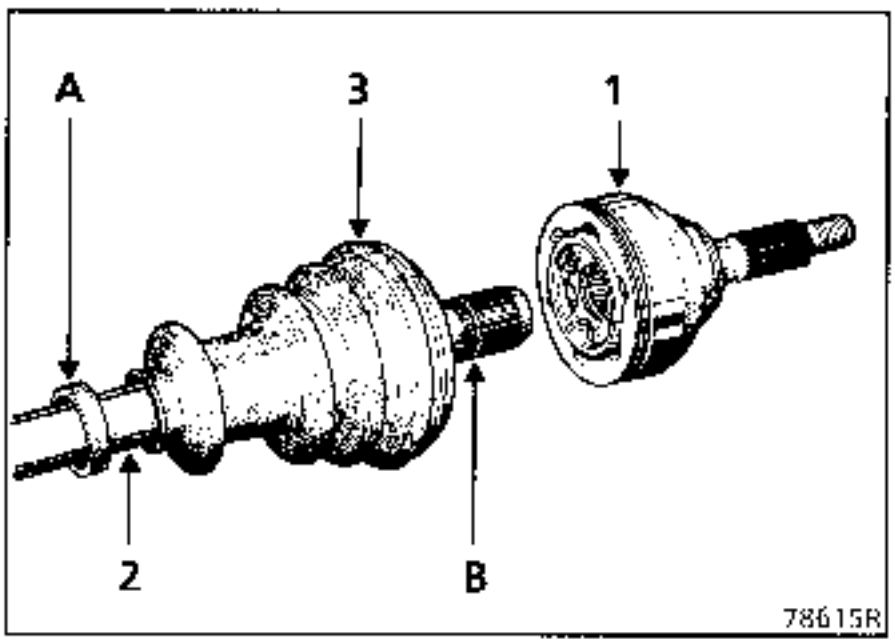
REPLACEMENT (cont)



REFITTING

Fit to the shaft:
- the rubber clip (**A**),
- the gaiter (**3**).

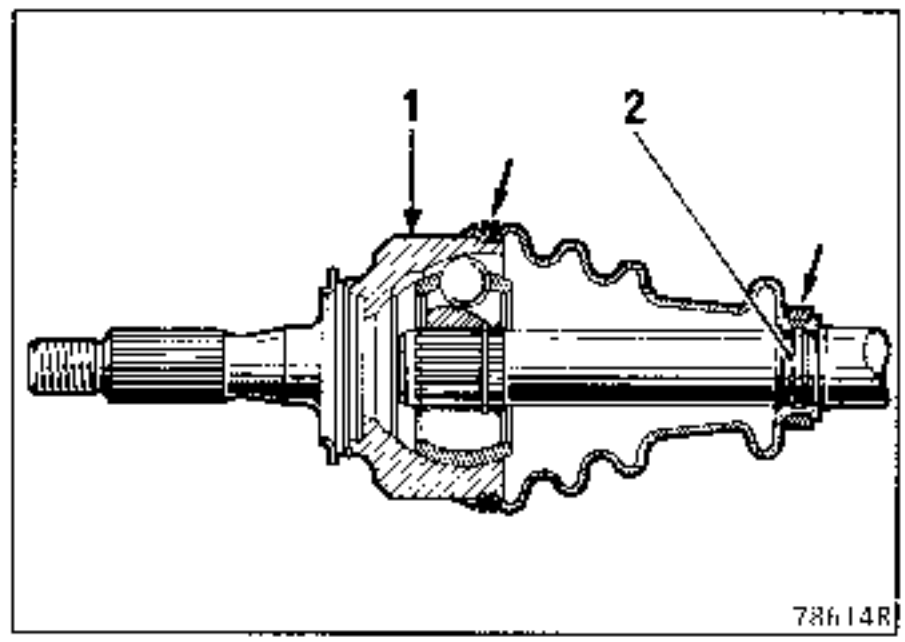
Slide the ball joint (**1**) complete with the locking ring onto the shaft splines until the locking ring locates in shaft groove (**B**).



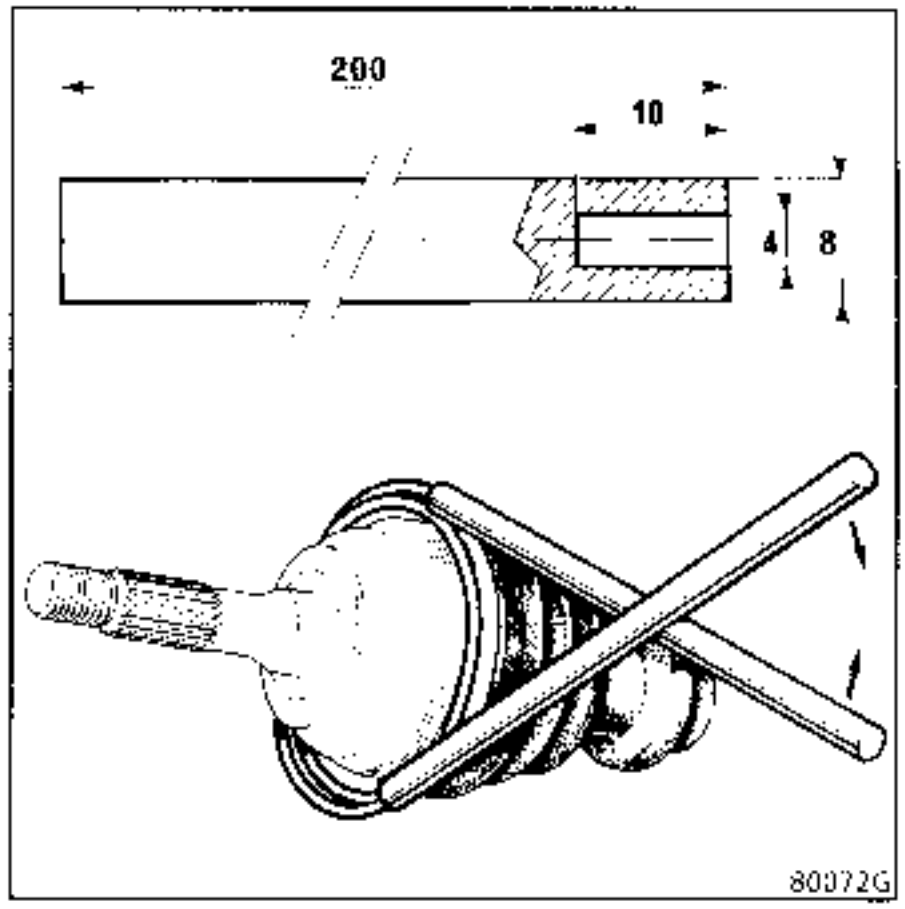
Spread the sachet of grease evenly between the gaiter and the stub axle bowl.

NOTE : Ensure that the amount of grease specified in the "Materials" section is used.

Position the gaiter lips in their grooves on the stub axle bowl (1) and the driveshaft (**2**).



Fit the retaining clips on the gaiter using the two locally made rods (see diagram).



REPLACEMENT

1 Stub axle bowl

2 Driveshaft

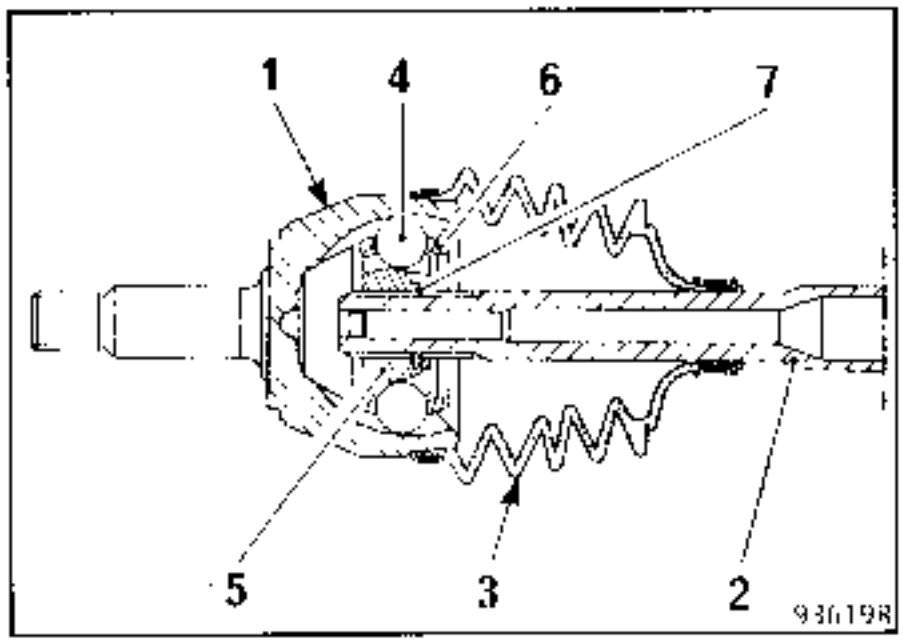
3 Rubber gaiter

4 Balls

5 Ball hub

6 Ball cage

7 Locking ring



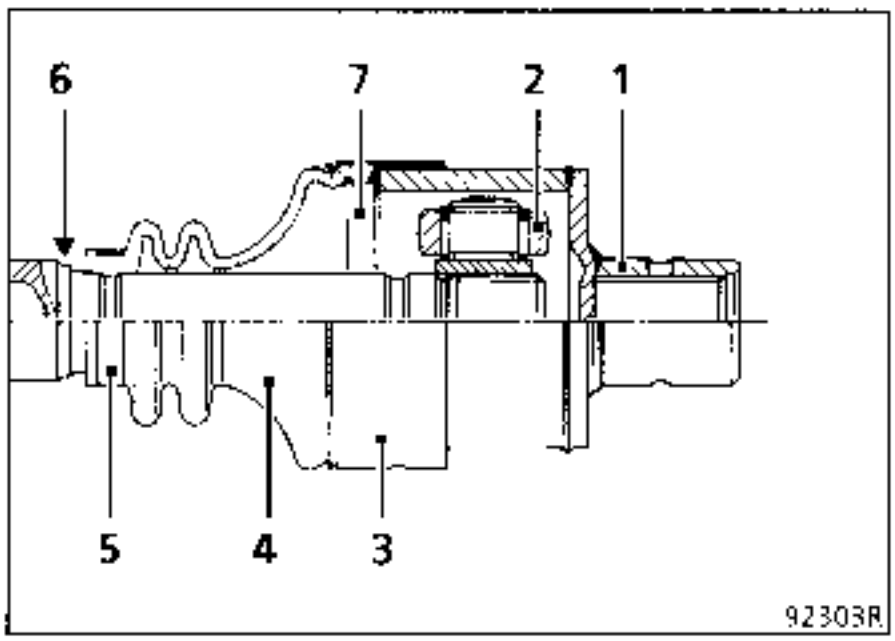
This joint cannot be dismantled as the shaft (**2**) is too tightly fitted into the ball hub (**5**).

If the gaiter breaks, the driveshaft must be replaced, since it is impossible to expand the gaiter to pass it over the gearbox end.

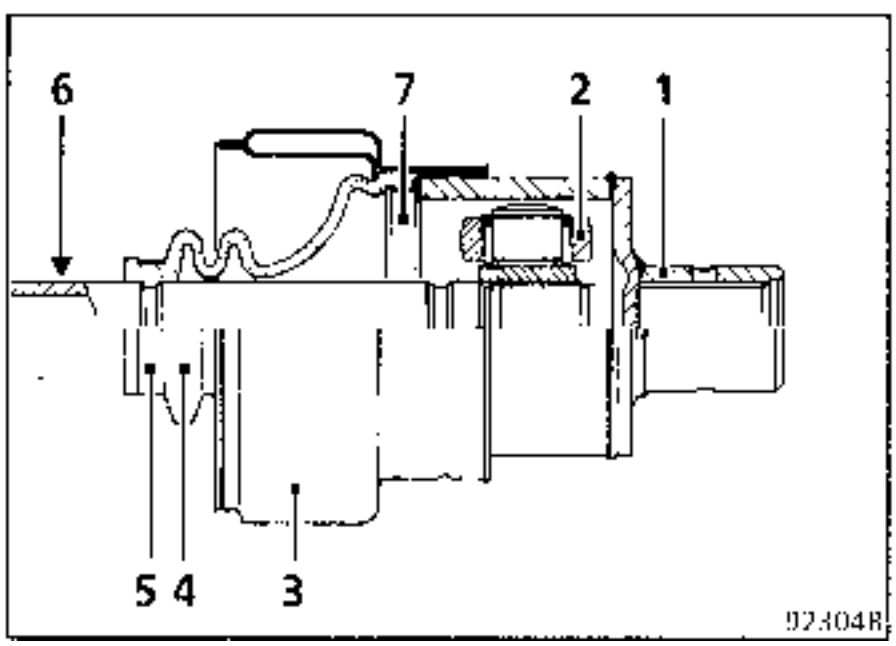
REPLACEMENT

SPECIAL TOOLING REQUIRED		
T.Av.	1034	Pliers for OETIKER driveshaft clips

1 Yoke
2 Spider
3 Heat shield or metal retaining cover
4 Rubber gaiter
5 Retaining clip
6 Driveshaft
7 Metal insert



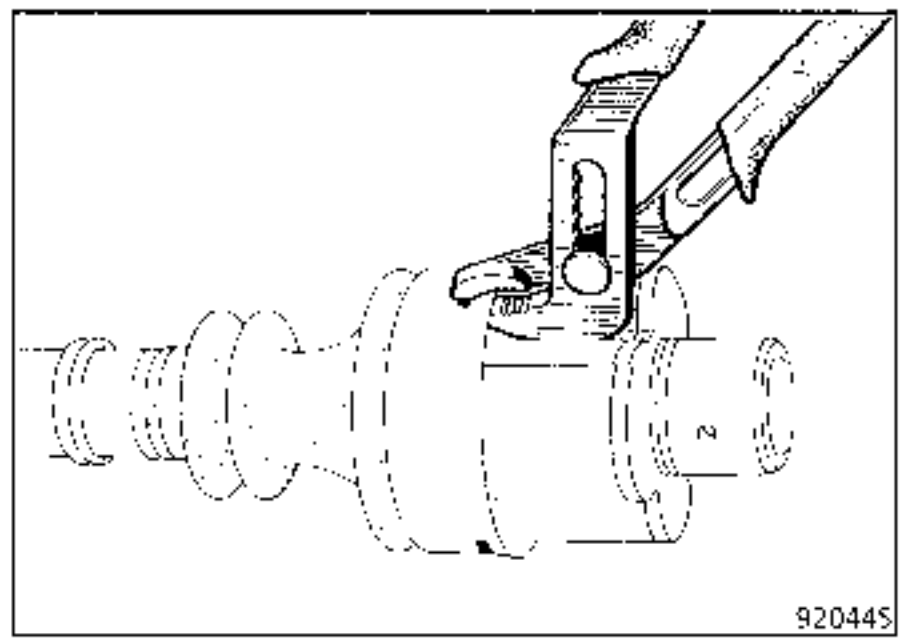
92303R

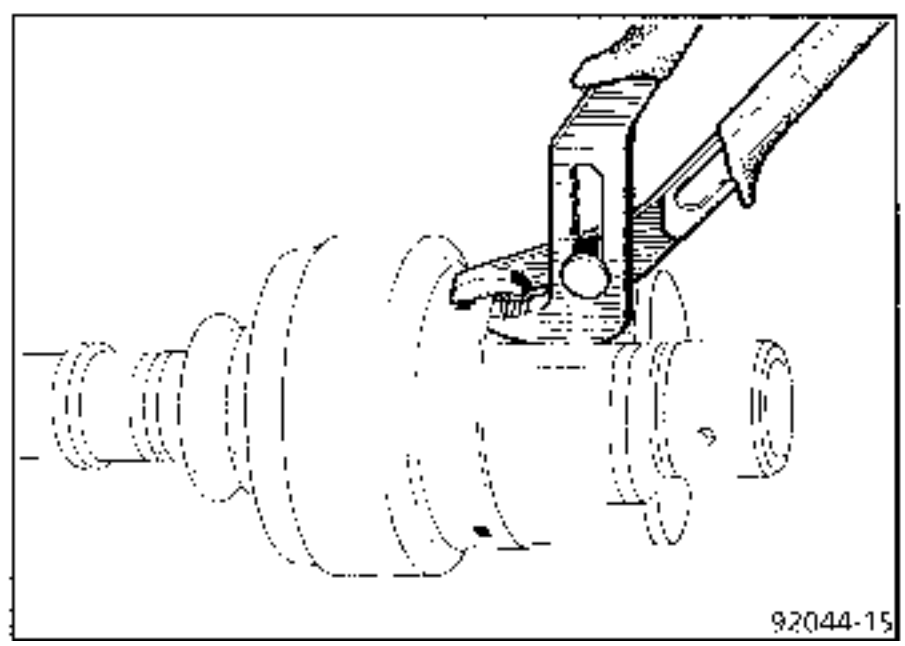


92304R

REMOVAL

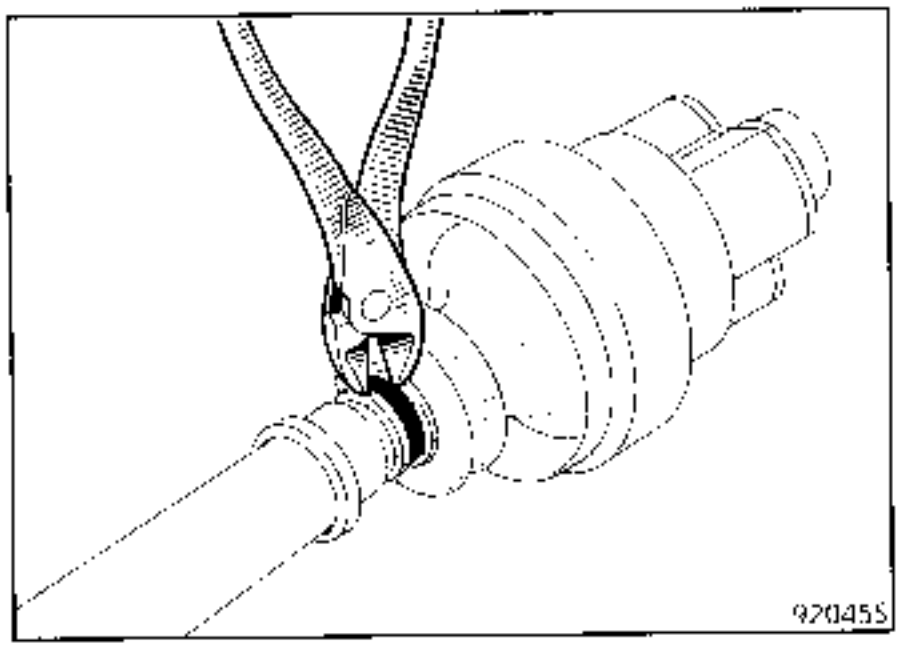
Uncrimp the three points securing the cover using pliers.


92044S


92044-15

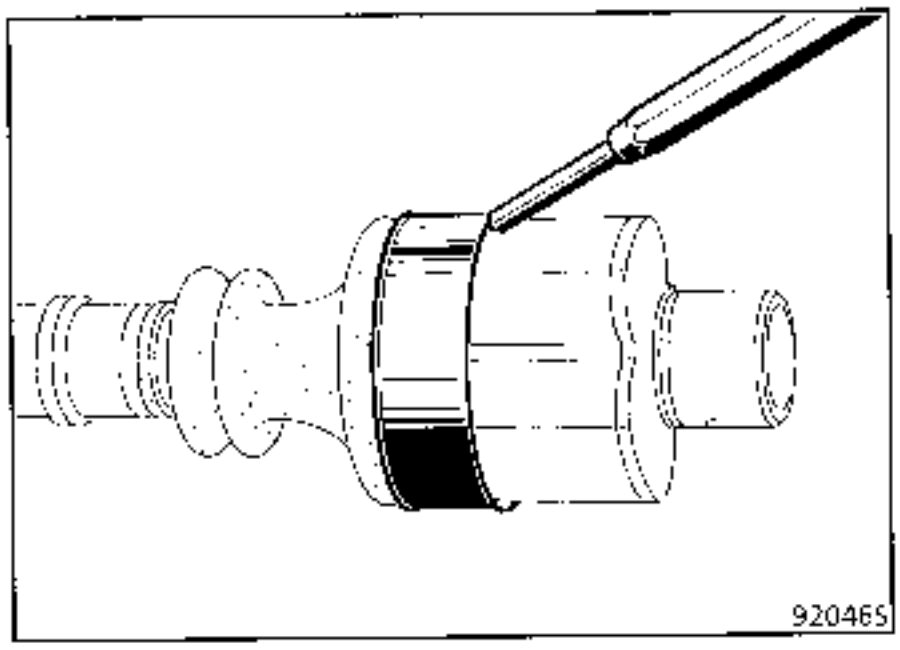
REPLACEMENT (cont)

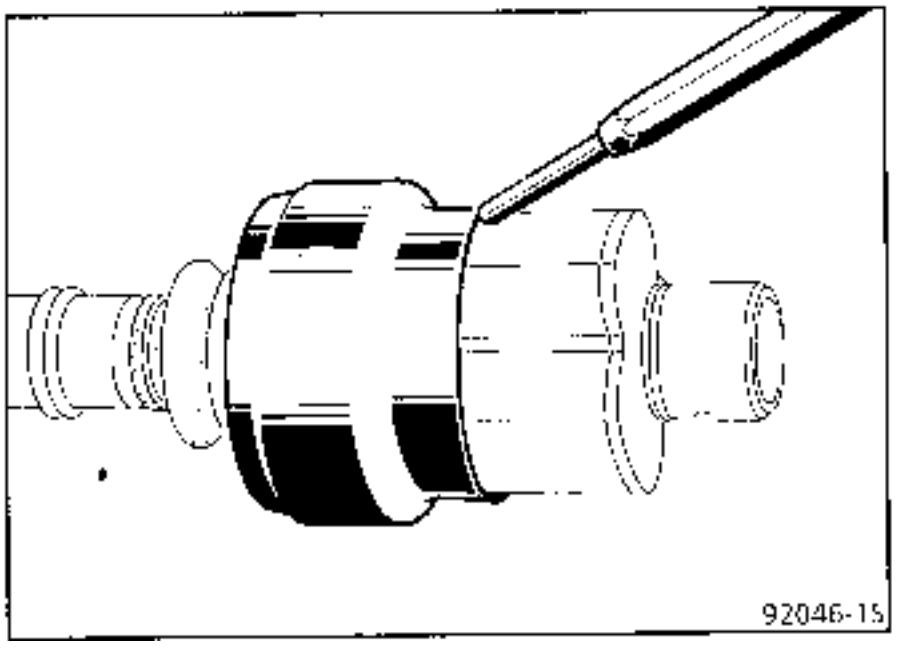
Cut the retaining clip and the gaiter along its length.



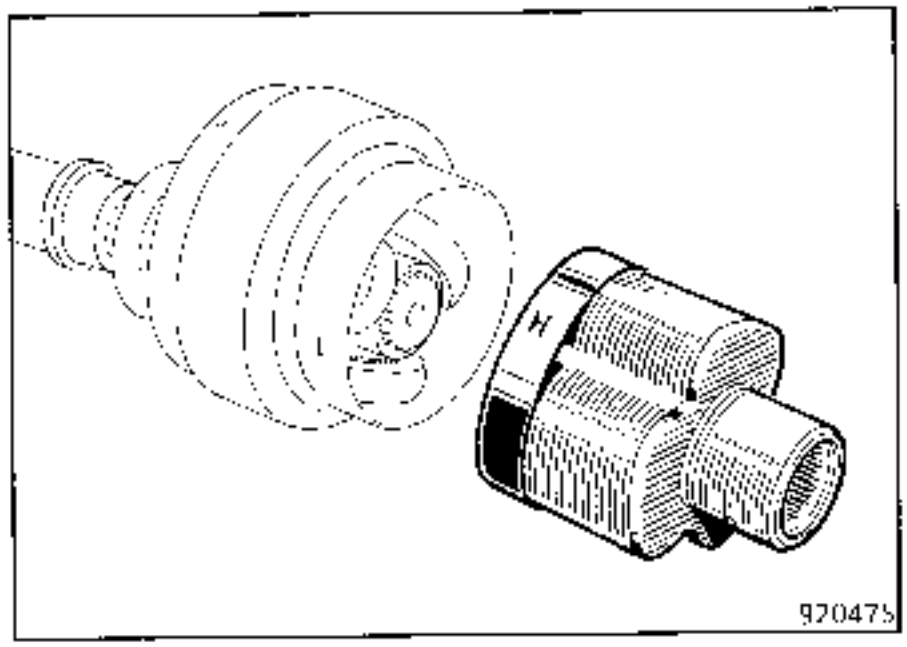
Remove as much grease as possible.

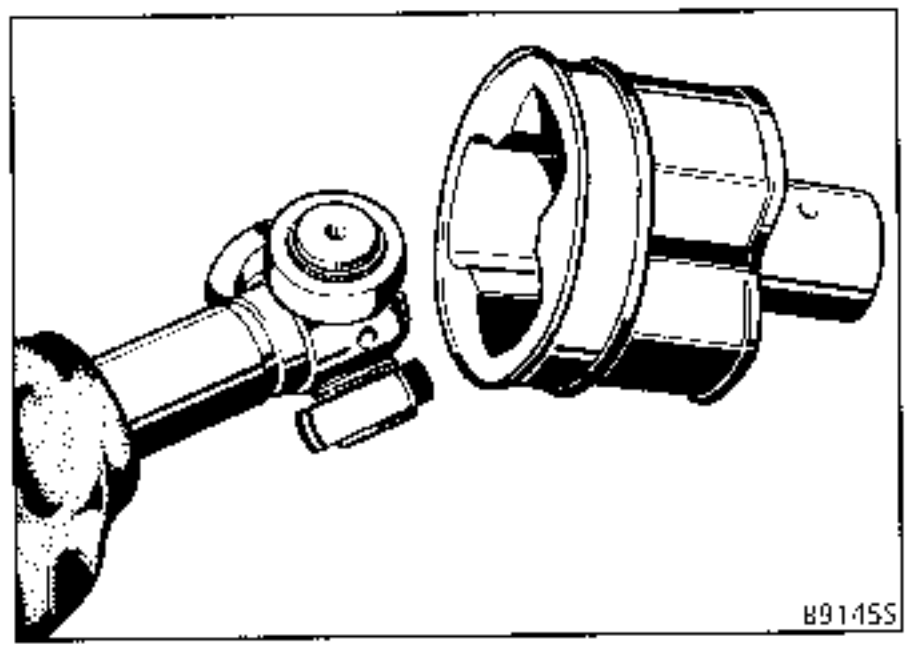
Remove the heat shield or the metal retaining cover (depending on assembly).





Remove the yoke.





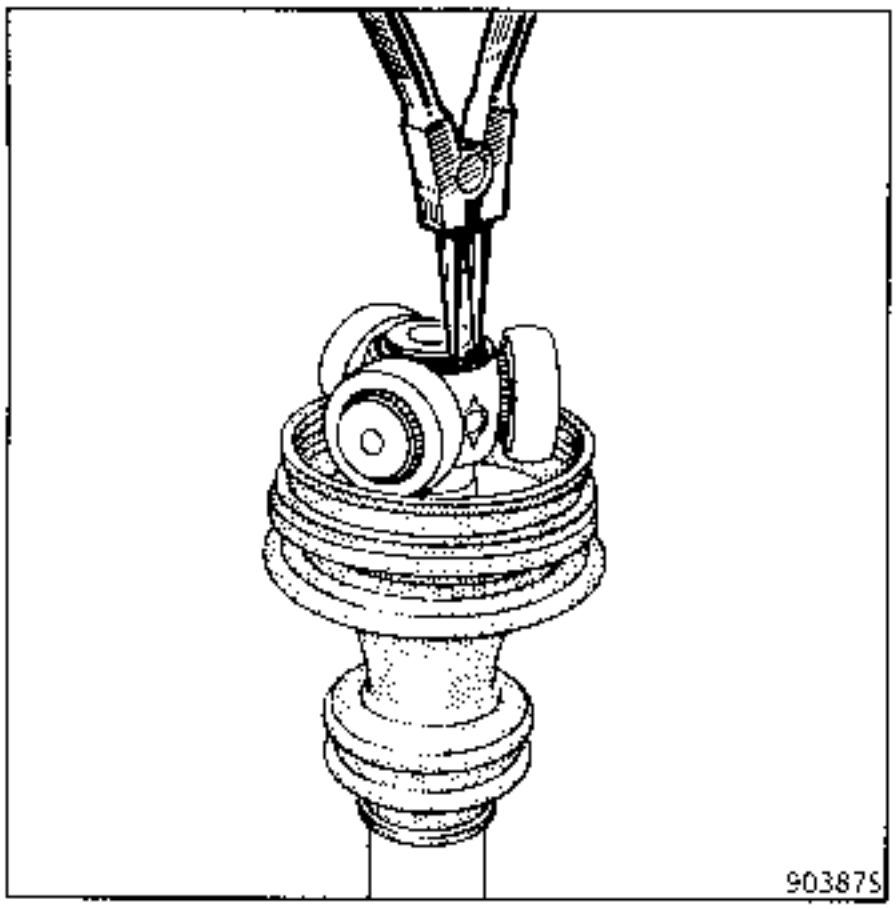
NOTE : the yoke is not fitted with a locking plate so it may be removed without force.

Do not remove the roller cages from their respective trunnions since the cages and rollers are matched and must never be mixed.

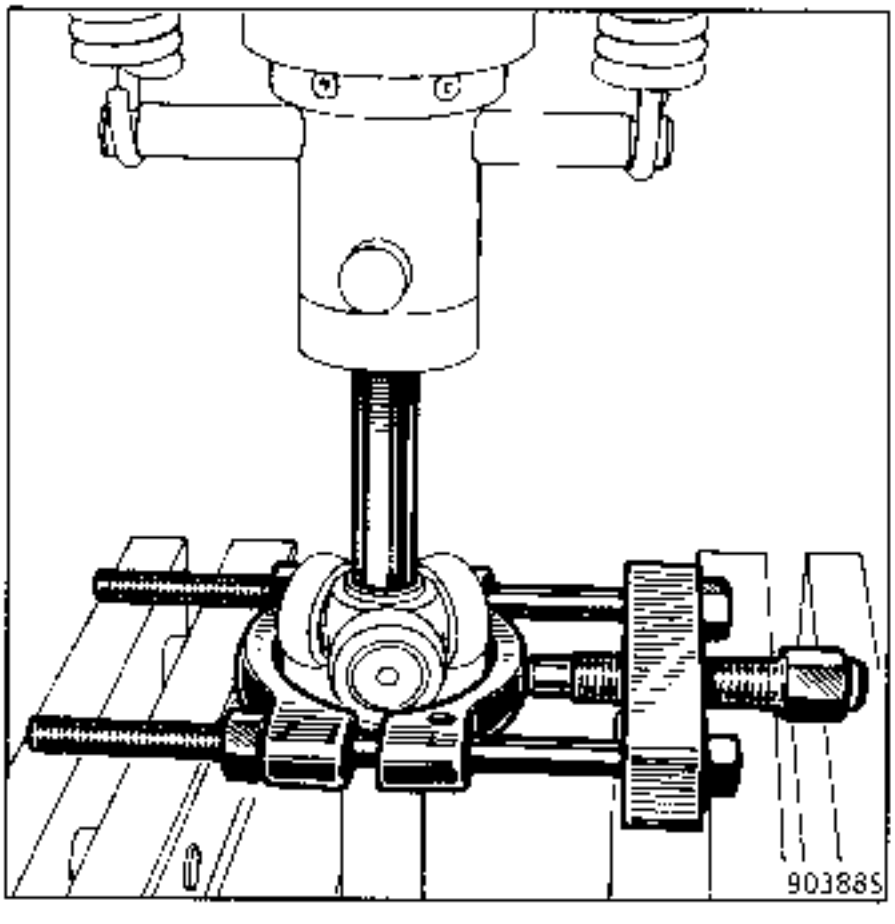
Never use thinners to clean the component parts.

REPLACEMENT (cont)

Remove the circlip (depending on model).

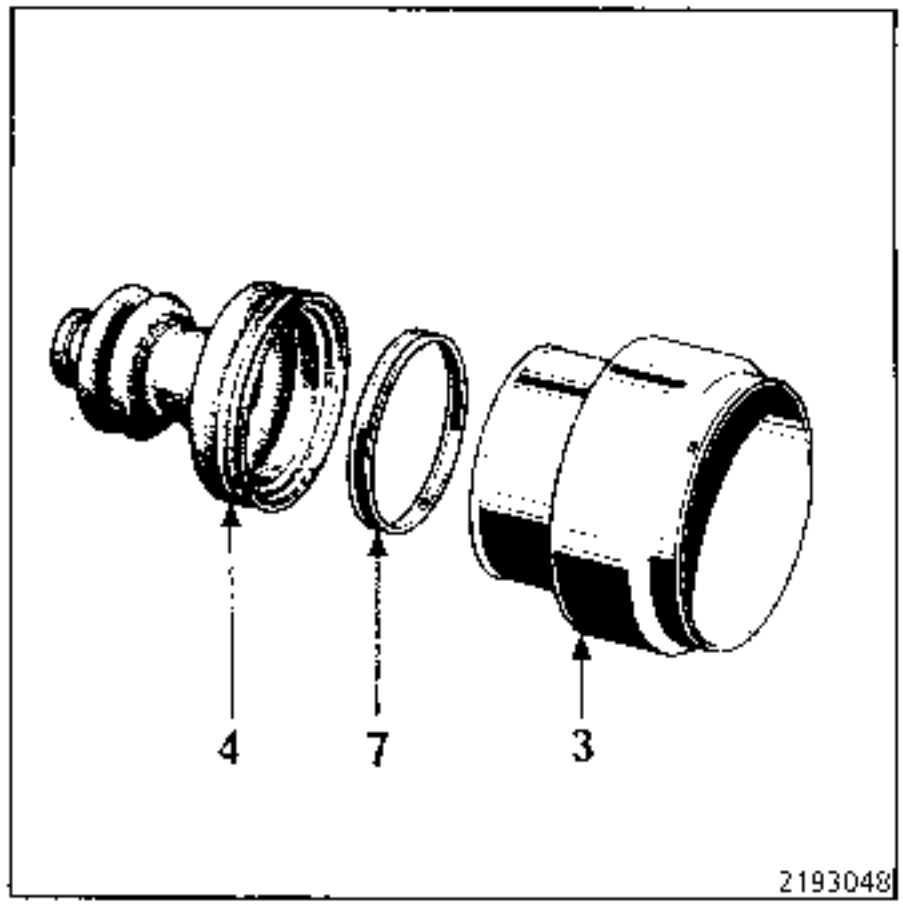


On the press, remove the spider, using a gripping extractor of type **FACOM U53G** for support.

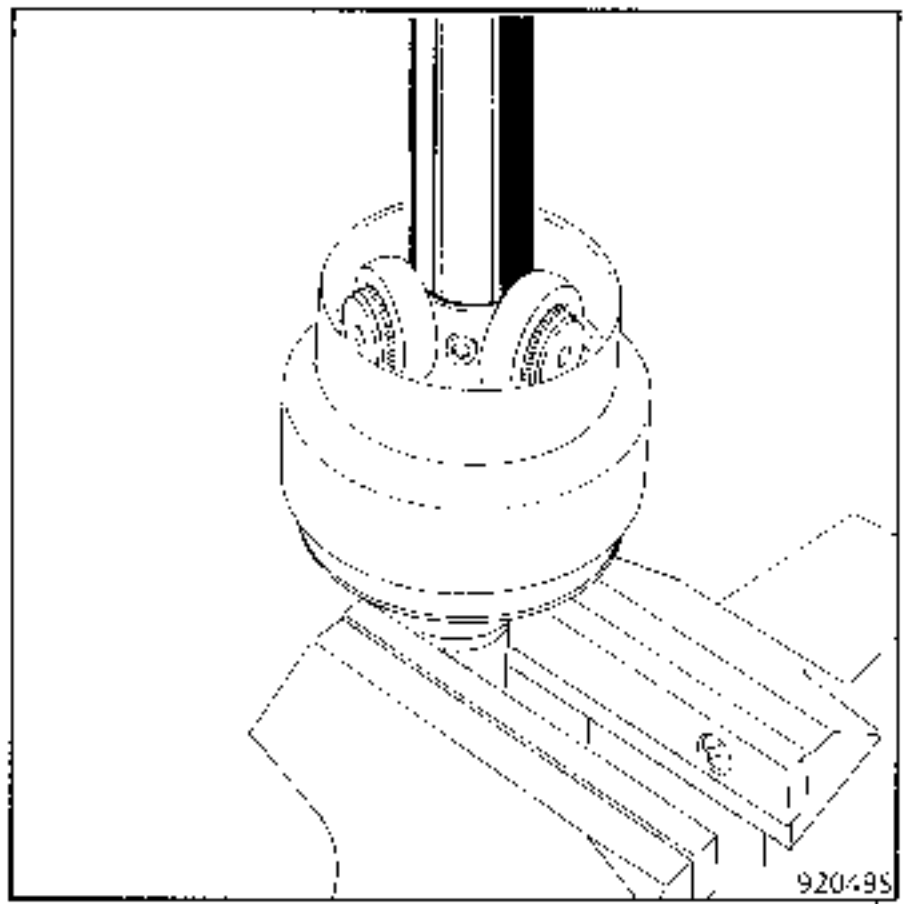


REFITTING

Lubricate the driveshaft and slide on:
- a new retaining clip,
- the rubber gaiter (4) with metal insert (7) and the heat shield or metal retaining cover (3) (depending on assembly).

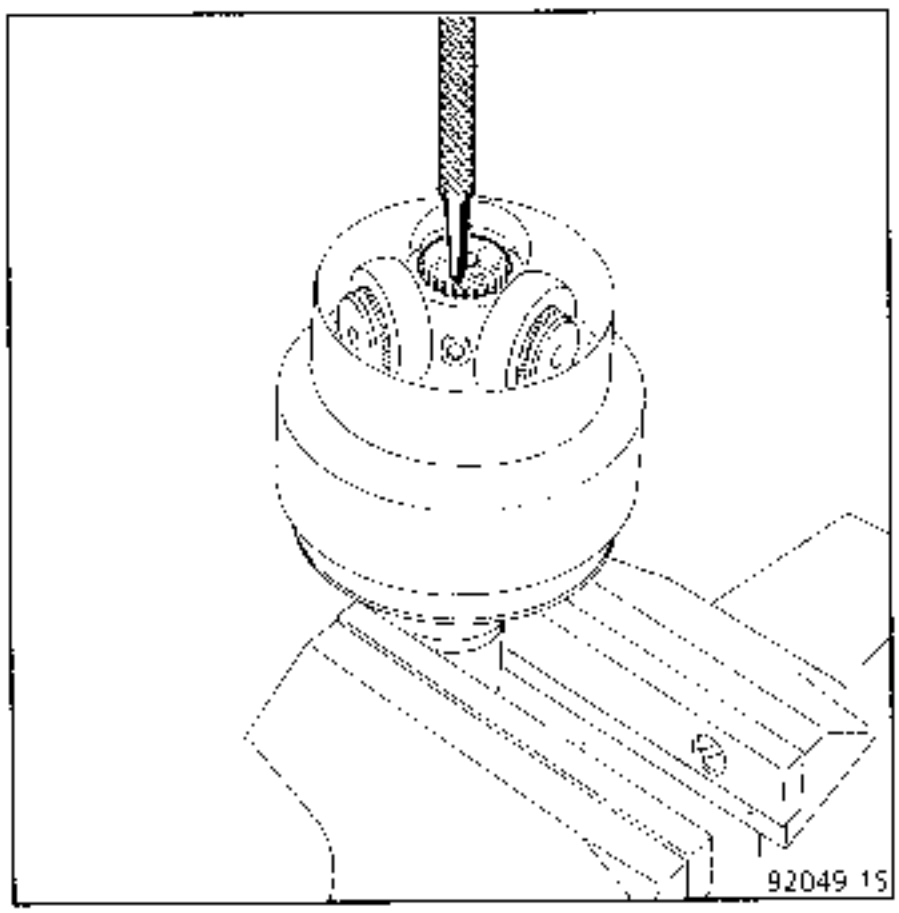


Fit the spider onto the splined shaft.



REPLACEMENT (cont)

Refit the retaining clip or make three crimping points **120°** apart, pushing back the metal on the driveshaft splines.



Lubricate the yoke and engage it onto the spider assembly.

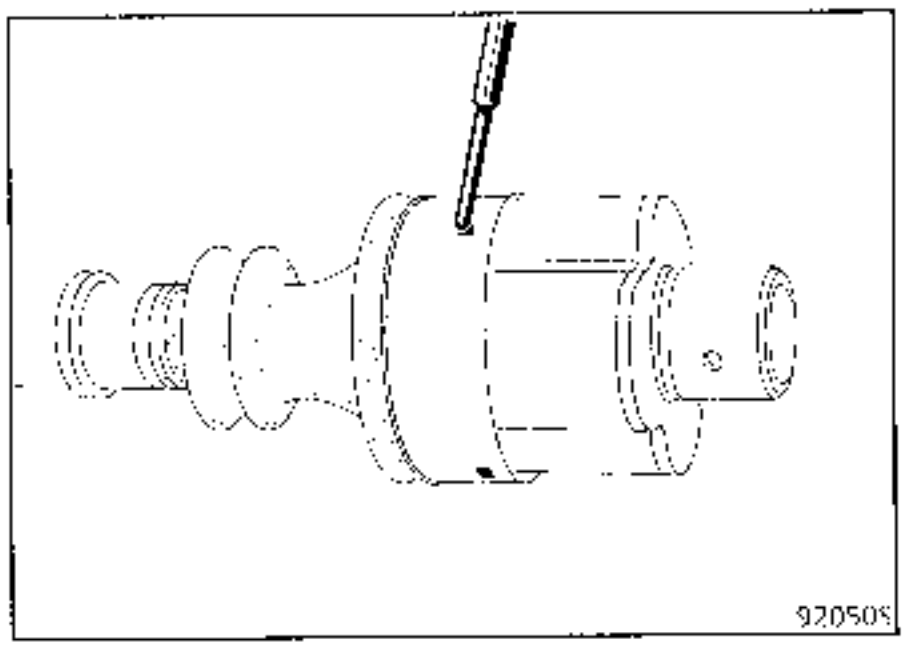
Spread the sachet of grease evenly between the gaiter and the yoke.

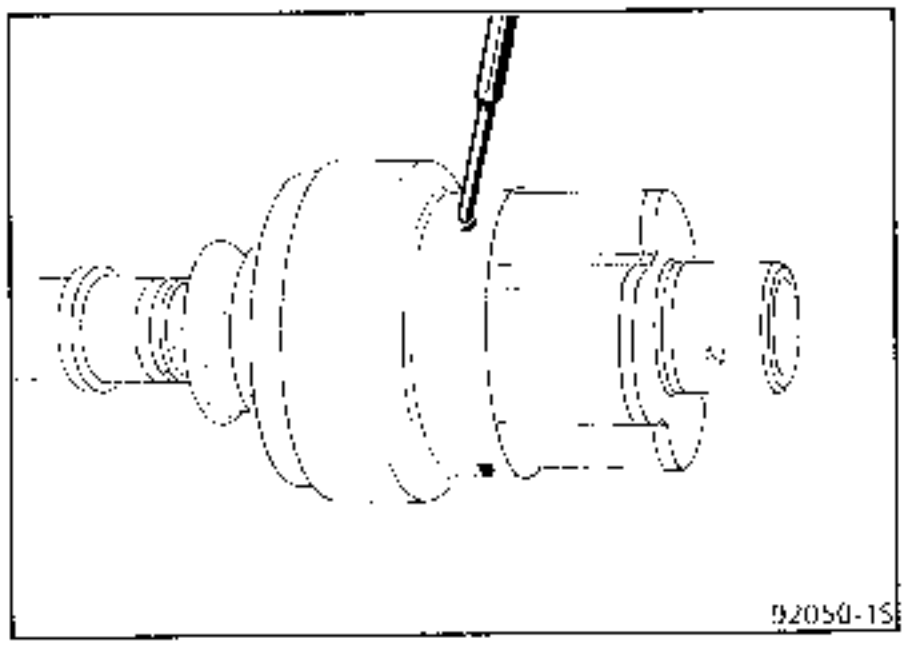
NOTE : Ensure that the amount of grease specified in the "Materials" section is used.

Position:

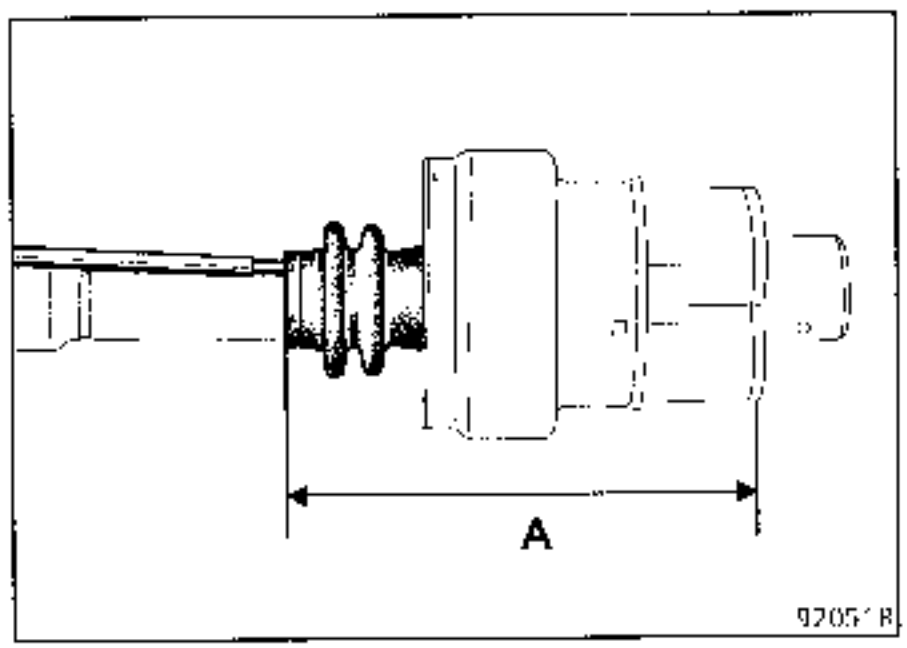
- the gaiter and its metal insert in the heat shield or retaining cover,
- the heat shield or retaining cover by sliding it on until the guide plate is flush with the yoke.

In this position, make three crimping points in the locations provided for this purpose on the guide plate.





Insert a smooth, rounded end rod between the gaiter and the shaft to correct the amount of air inside the joint.

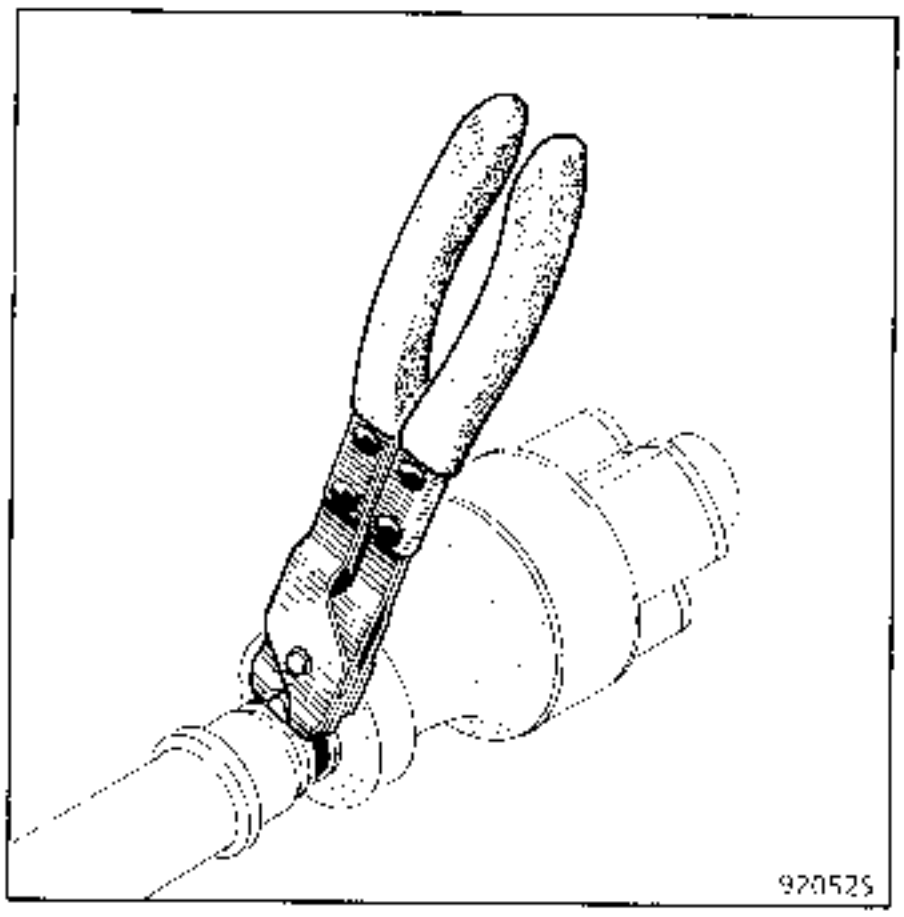


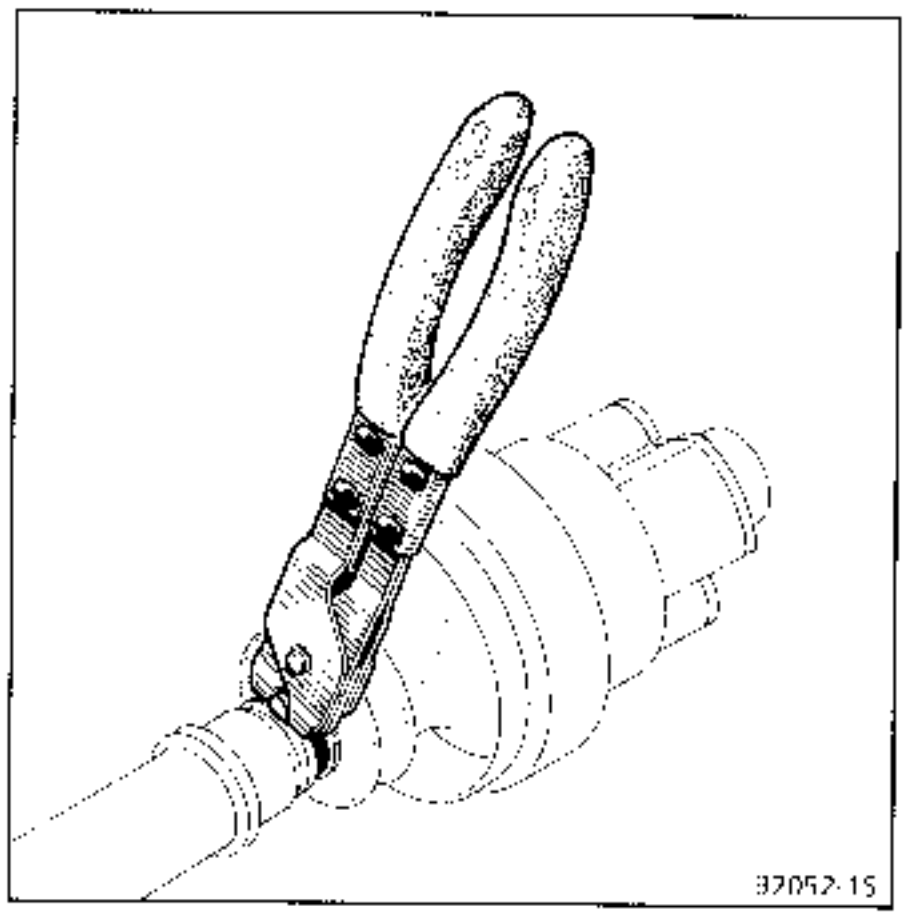
Expand or shorten the joint until dimension **A = 156 ± 1 mm** is obtained (dimension measured between the end of the gaiter and the largest diameter machined face of the yoke).

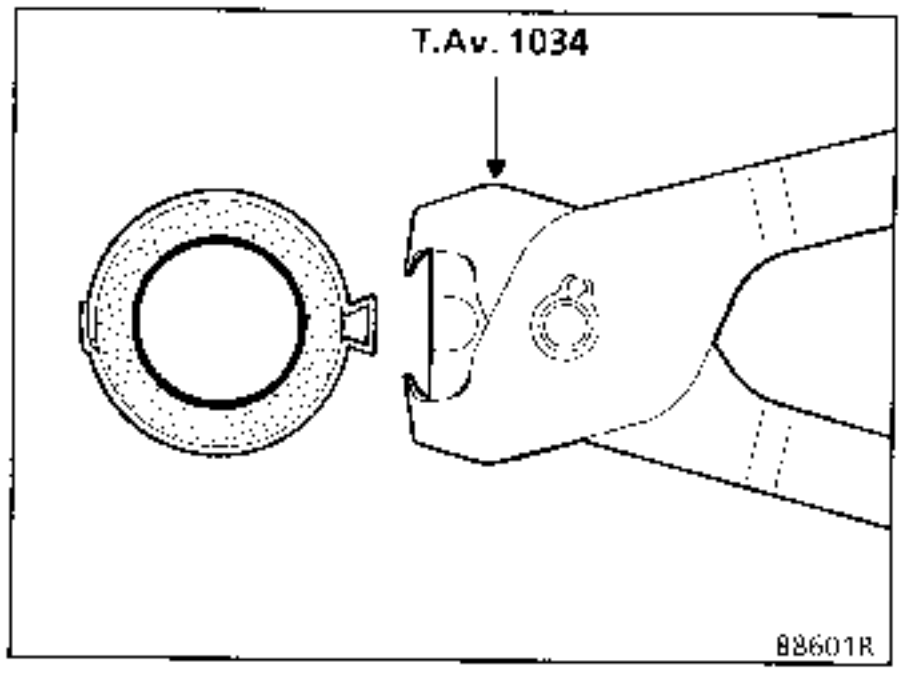
REPLACEMENT (cont)

In this position remove the rod.

Fit the clip to the gaiter and tighten it using tool **T.Av. 1034**.

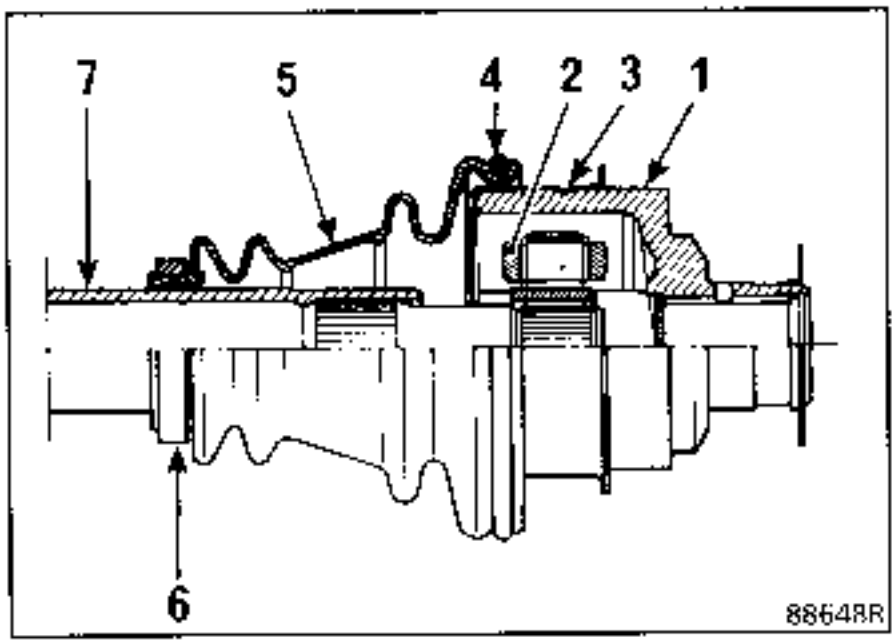






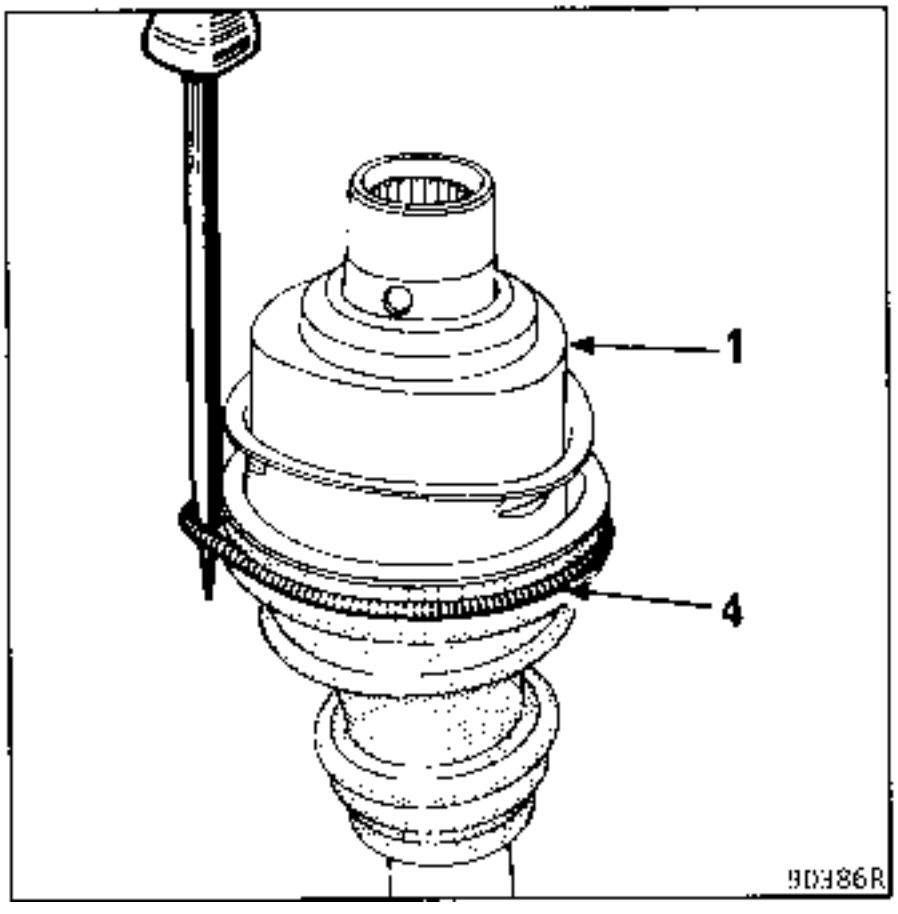
REPLACEMENT

1 Yoke
2 Spider
3 Metal cover
4 Retaining spring
5 Rubber gaiter
6 Retaining ring
7 Driveshaft



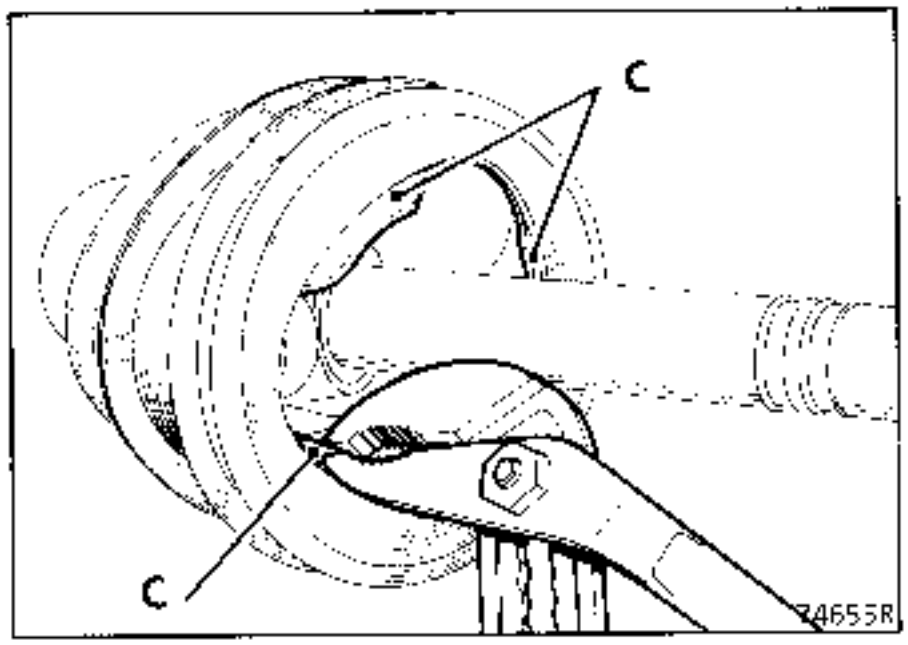
REMOVAL

Release the spring (4) which retains the gaiter on the yoke (1).



Cut the gaiter along its length. Remove as much grease as possible.

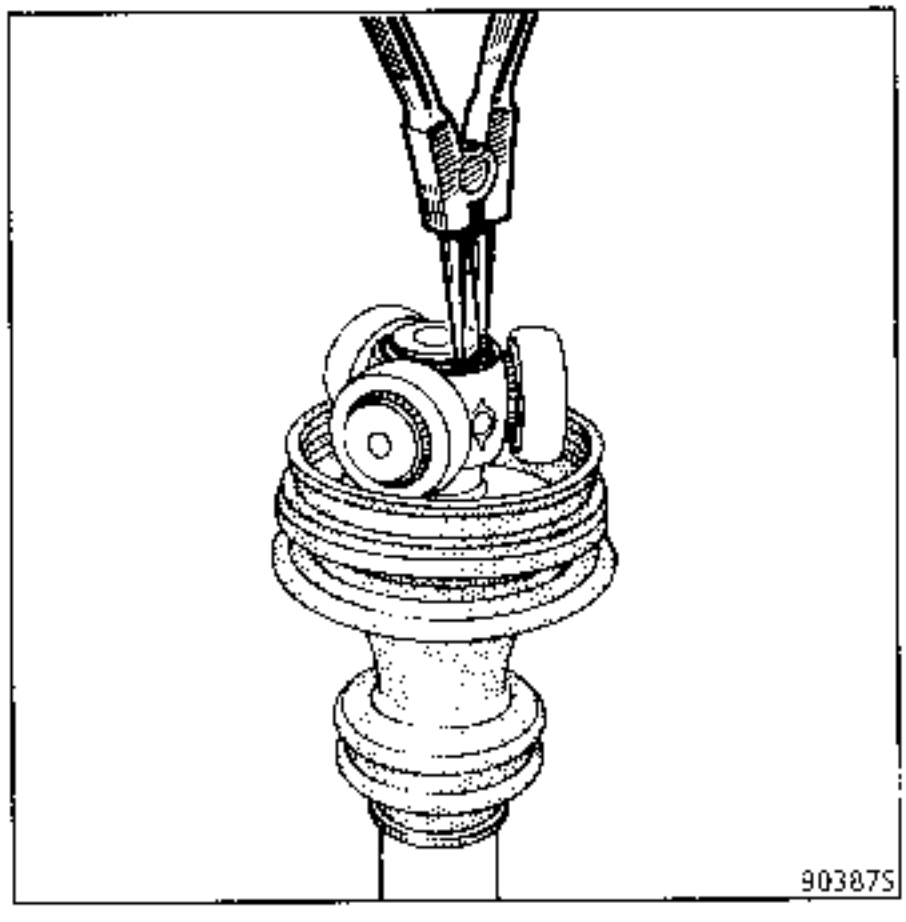
Using a pair of pliers, raise each end of the anti-separation plate (C), the remove the yoke.



Do not remove the roller cages from their respective trunnions since the cages and rollers are matched and must never be mixed.

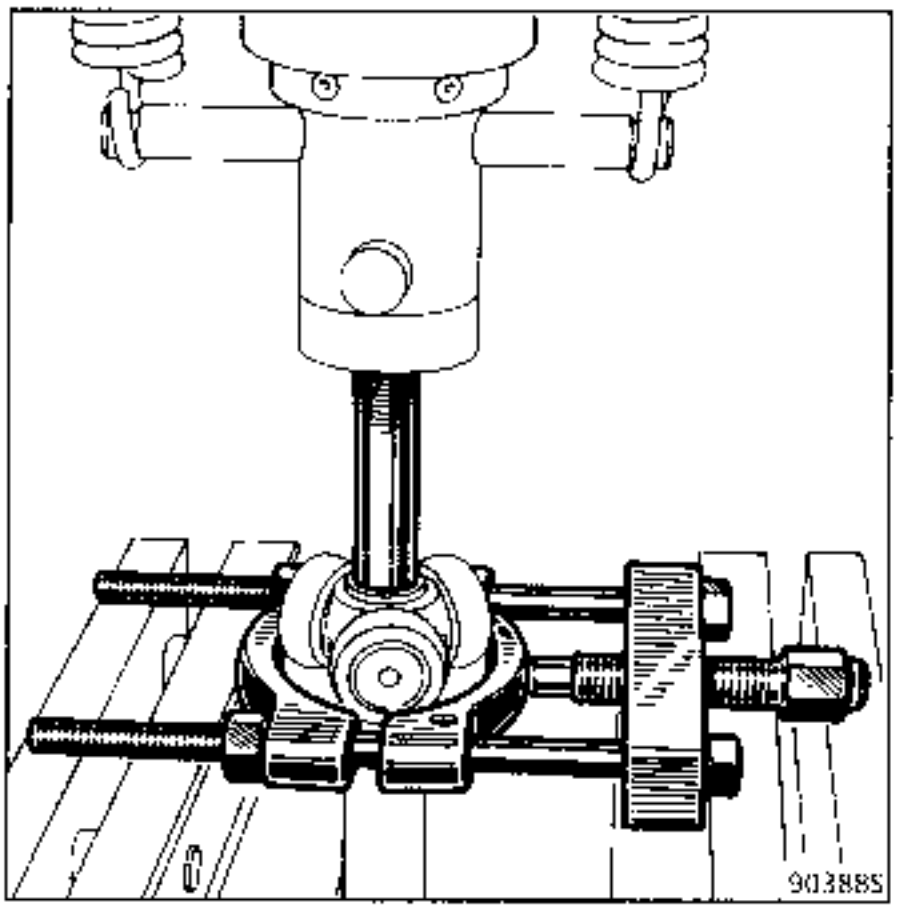
Never use thinners to clean the component parts.

Depending on assembly, remove the circlip.



REPLACEMENT (cont)

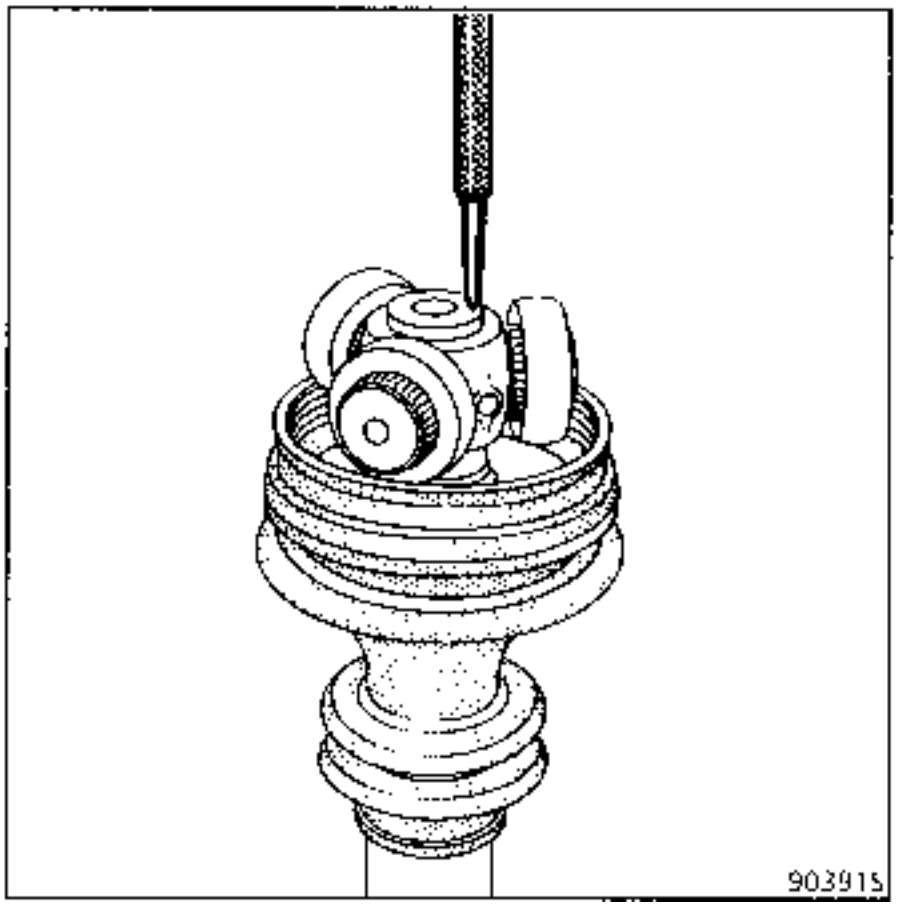
On the press, remove the spider, using a gripping extractor for support.



REFITTING

Lubricate the driveshaft and slide on the new retaining ring and gaiter.

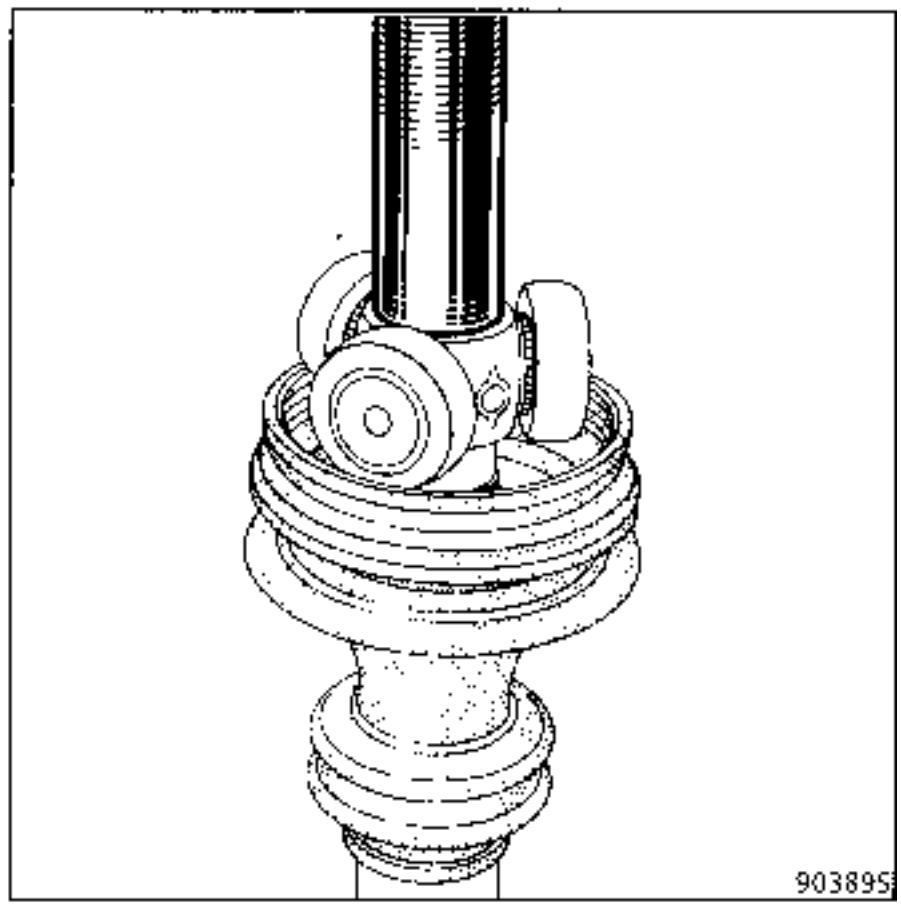
Fit the spider onto the splined shaft.



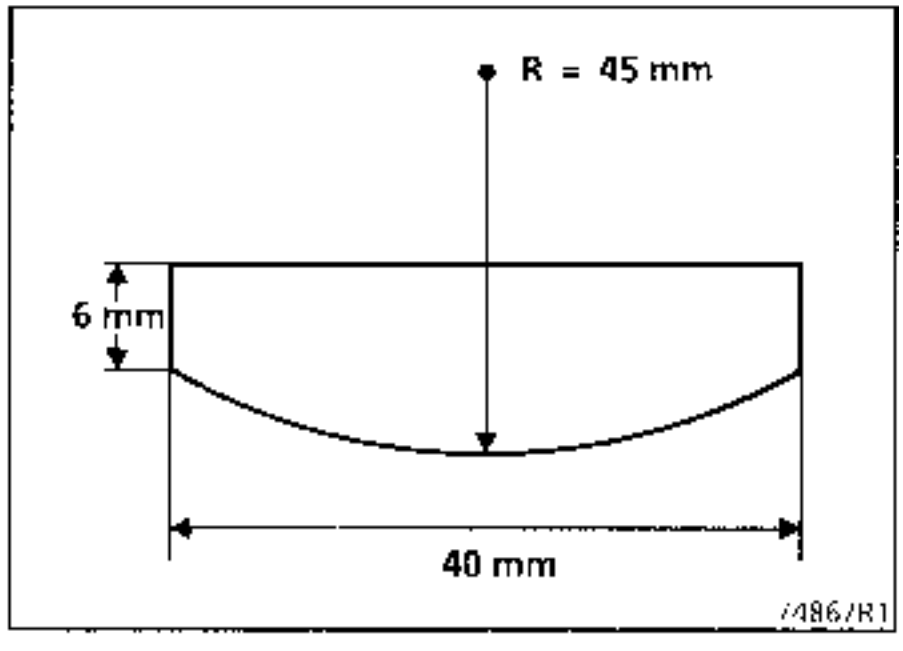
Refit the retaining clip or make three crimping points 120° apart, pushing back the metal on the driveshaft splines.

Spread the sachet of grease evenly between the gaiter and the yoke.

NOTE : Ensure that the amount of grease specified in the "Materials" section is used.

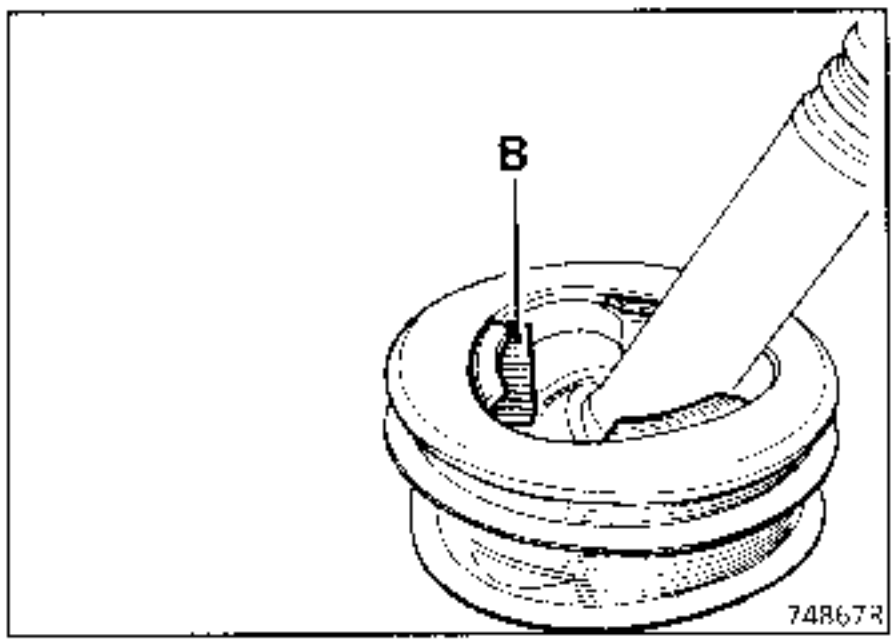


Insert a shim (B)of thickness **2.5 mm** (made as shown in the diagram), between the anti-separation plate and the yoke.

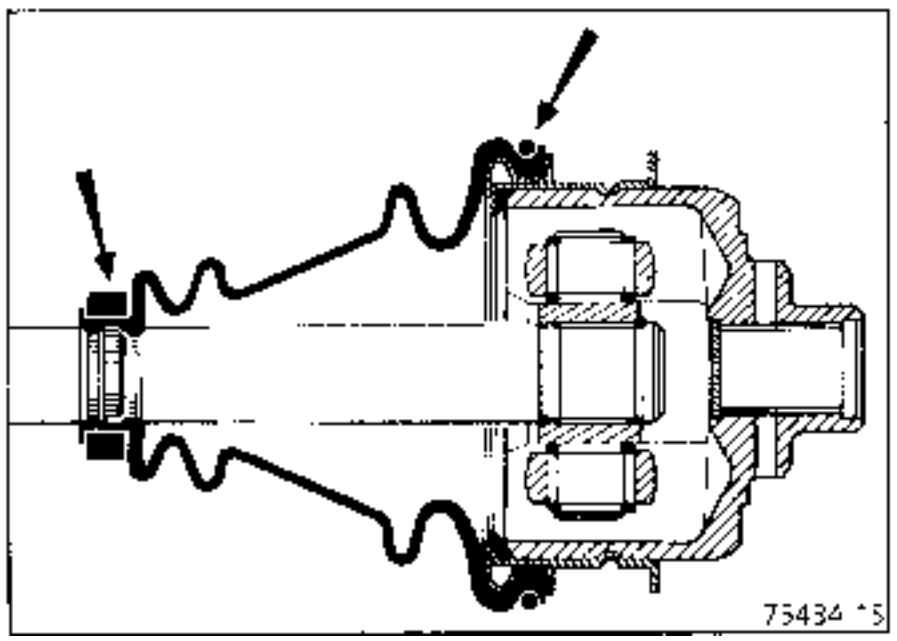


REPLACEMENT (cont)

Using a copper hammer, carefully tap the plate into its original position, then remove the shim **(B)**.

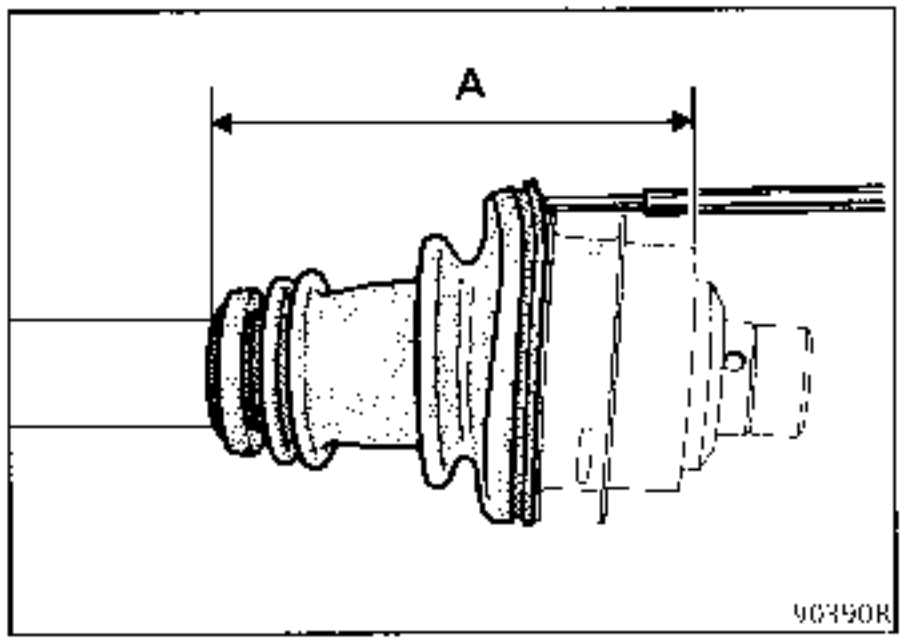


Position the gaiter lips in the grooves on the driveshaft and on the metal cover.



Insert a smooth, rounded end rod between the gaiter and the yoke to correct the amount of air inside the joint.

Expand or shorten the joint until dimension **A = 153.5 ± 1 mm** is obtained (dimension measured between the end of the gaiter and the largest diameter machined face of the yoke).



In this position, remove the rod.

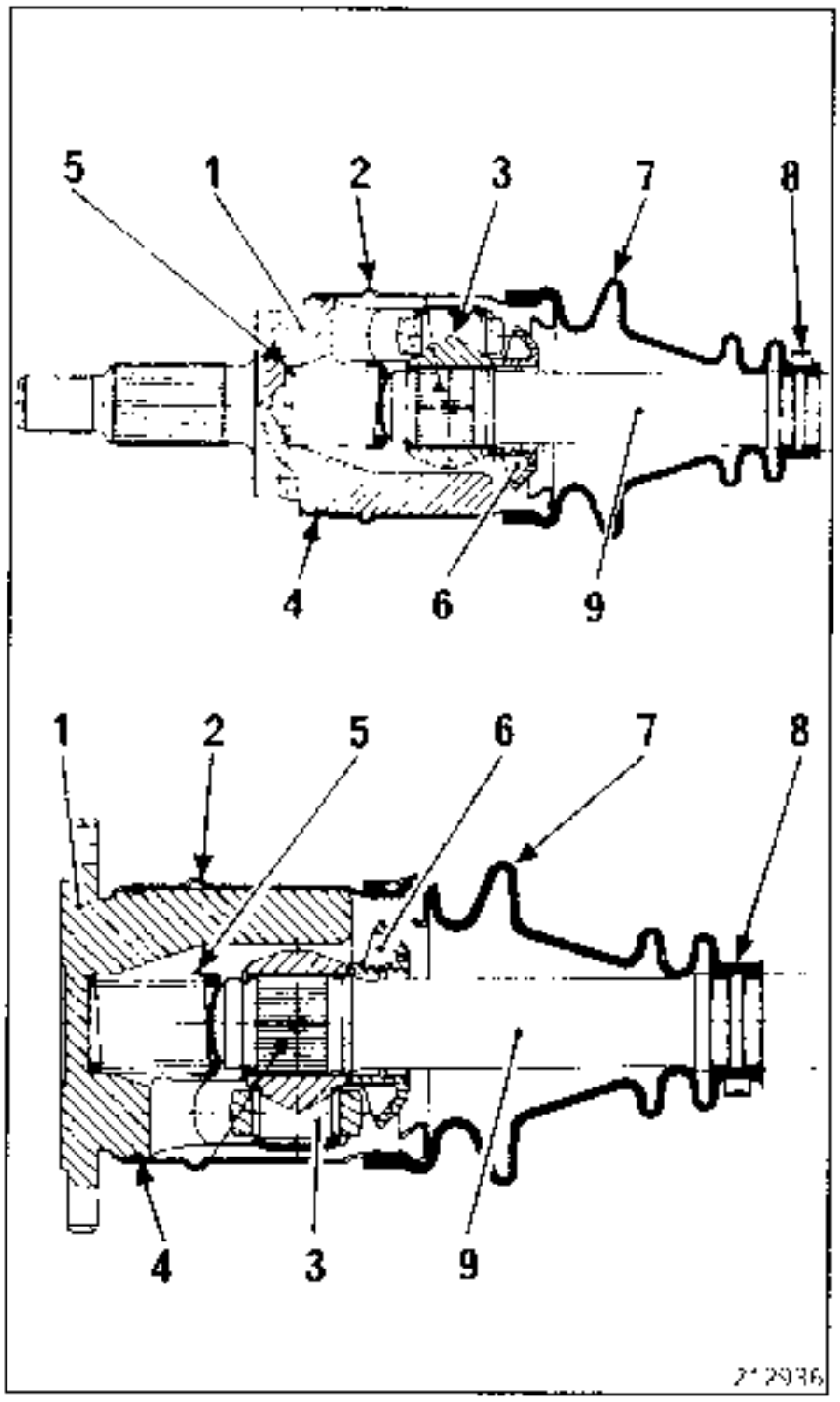
Fit the gaiter retaining spring and ring.

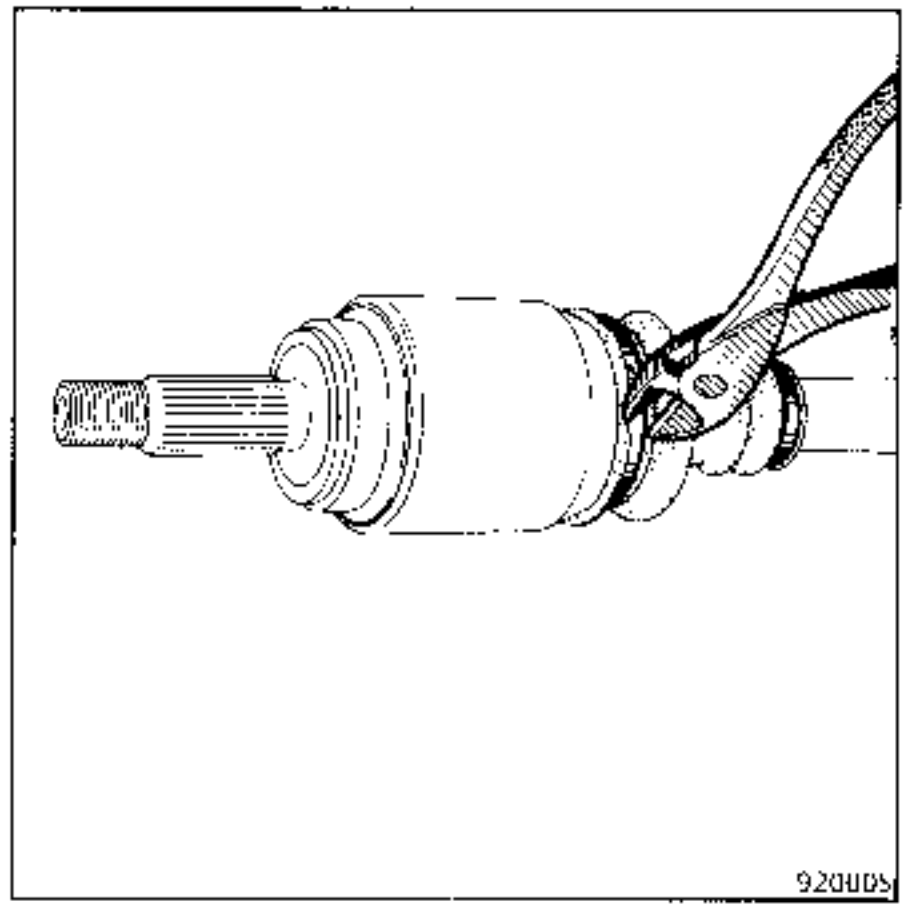
- the spring must not be extended,
- the coils must remain touching after assembly.

REPLACEMENT

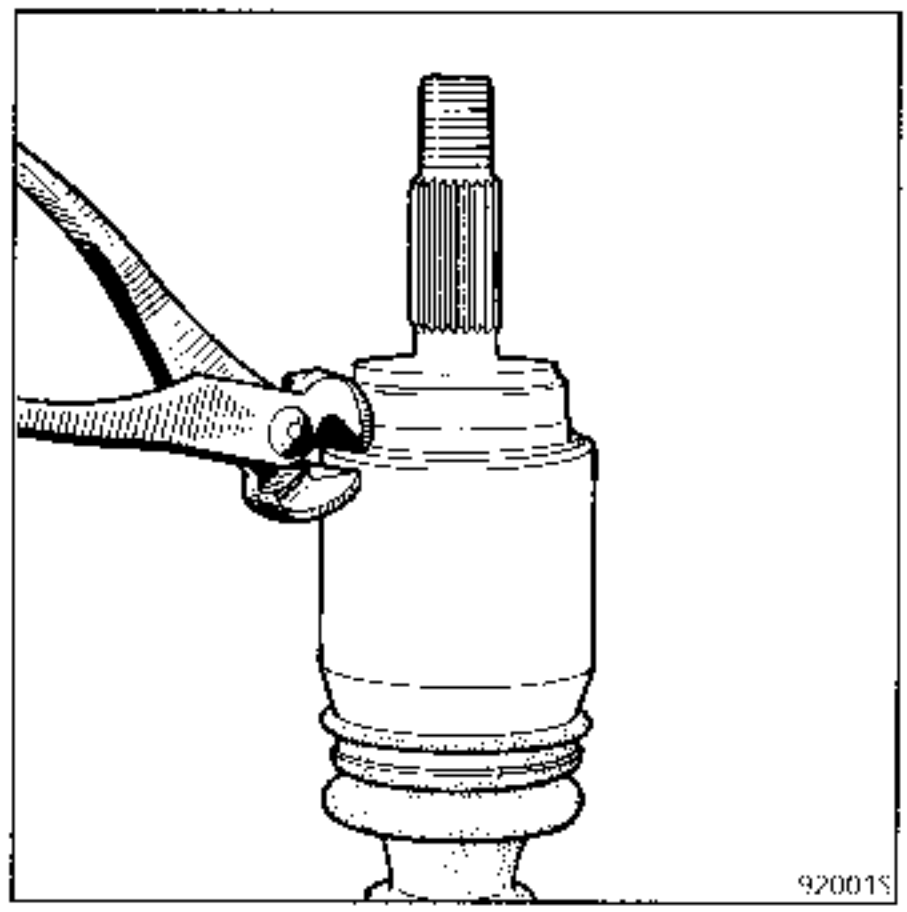
SPECIAL TOOLING REQUIRED		
T.Av.	1034	Pliers for OETIKER driveshaft clips

1 Yoke
2 Metal cover
3 Spider
4 Seal
5 Spring
6 Stop washer
7 Rubber gaiter
8 Retaining clip
9 Driveshaft





Uncrimp the metal cover from the yoke, release it and remove as much grease as possible.



REMOVAL

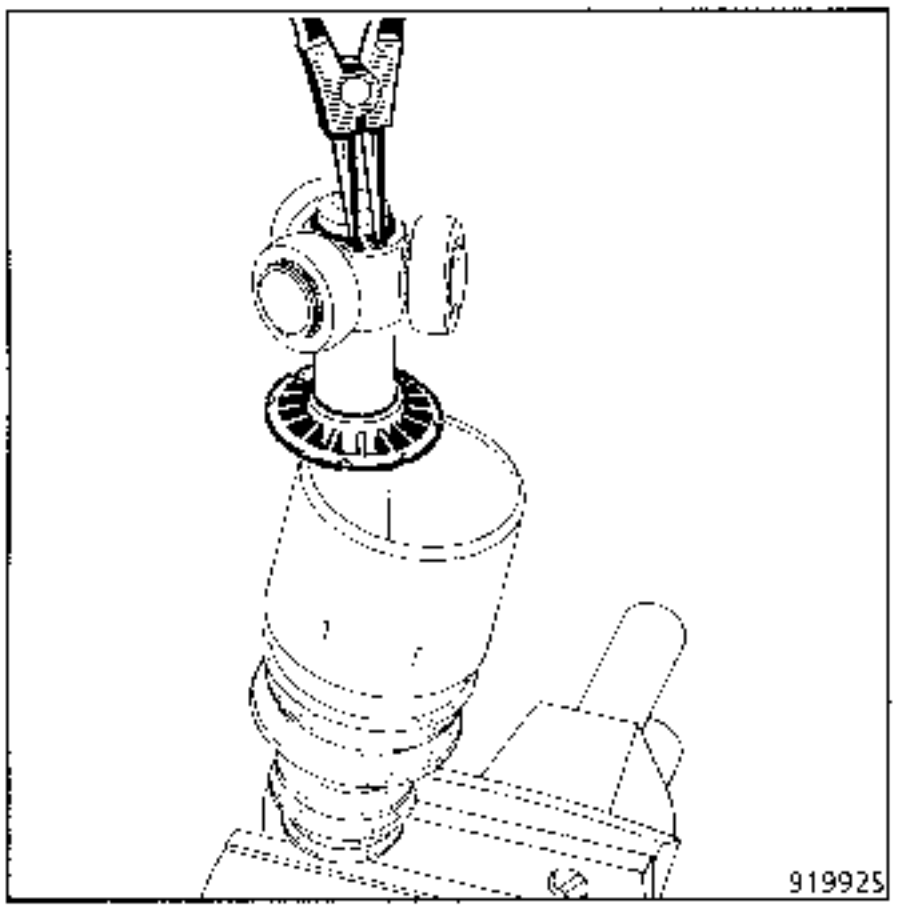
Cut the crimped clips.

REPLACEMENT (cont)

Remove:
- the yoke (1),
- the spring and its thrust cup **(5)**.

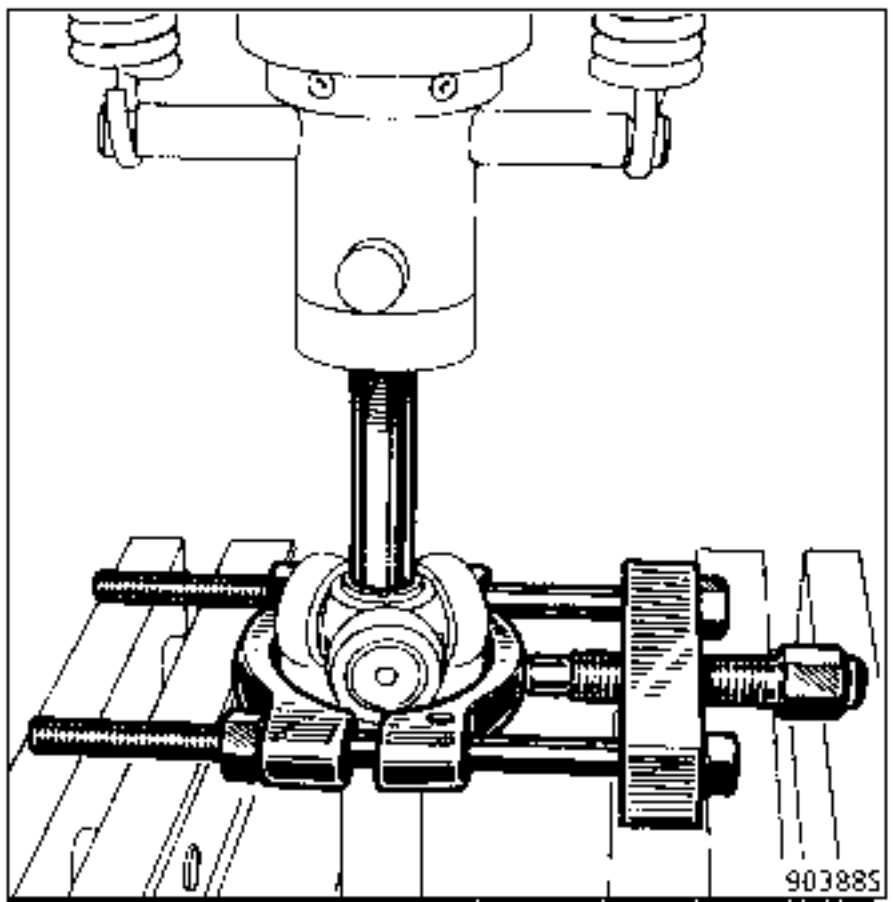
Do not remove the roller cages from their respective trunnions since the cages and rollers are matched and must never be mixed.

Remove the circlip.



Never use thinners to clean the component parts.

On the press, remove the spider, **after marking its position**, using a gripping extractor of type **FACOM U53G** for support.



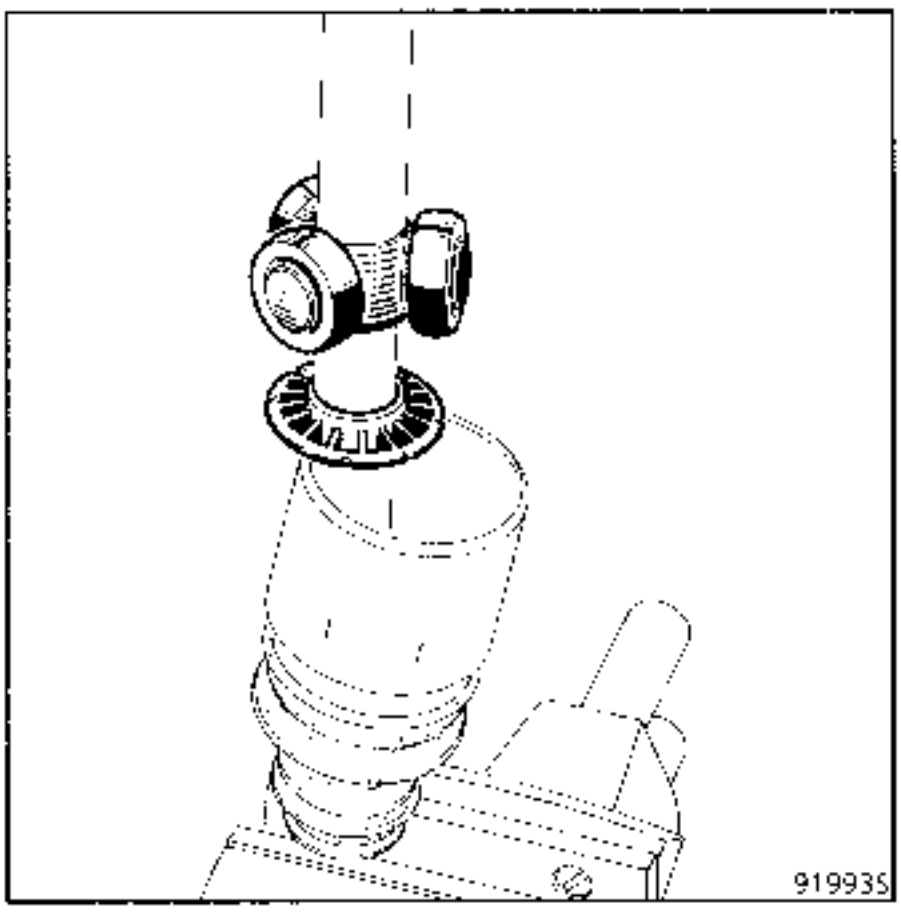
Remove:
- the stop washer **(6)**,
- the cover **(2)**,
- the rubber gaiter **(7)**.

REFITTING

Lubricate the driveshaft and fit :

- the two clips around the shaft if they are not of the "**open**" type,
- the new gaiter and metal cover,
- the stop washer **(6)**.

Fit the spider onto the splined shaft in the position marked on removal.



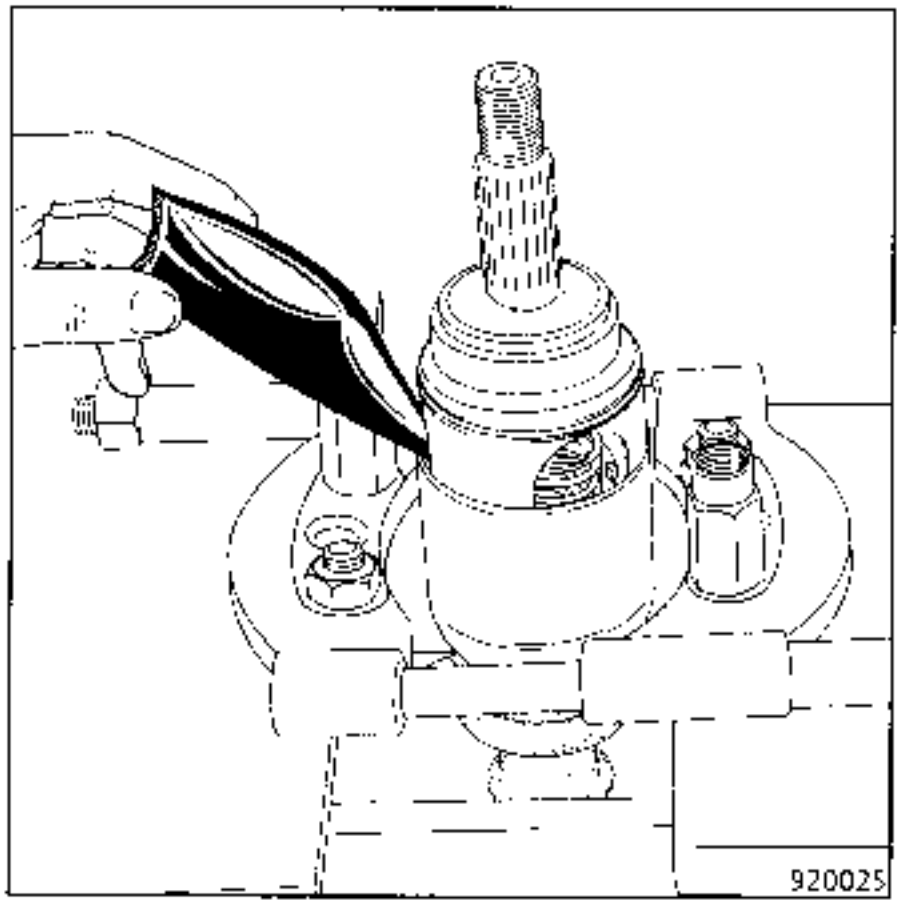
Refit the retaining clip.

Fit the seal **(4)** into the groove on the yoke. Fit the yoke with the spring and its thrust cup into the cover.

Spread the contents of the sachet of grease in the cover, through the openings in the yoke.

REPLACEMENT (cont)

Position a tool of type **FACOM U53G** on the cover.

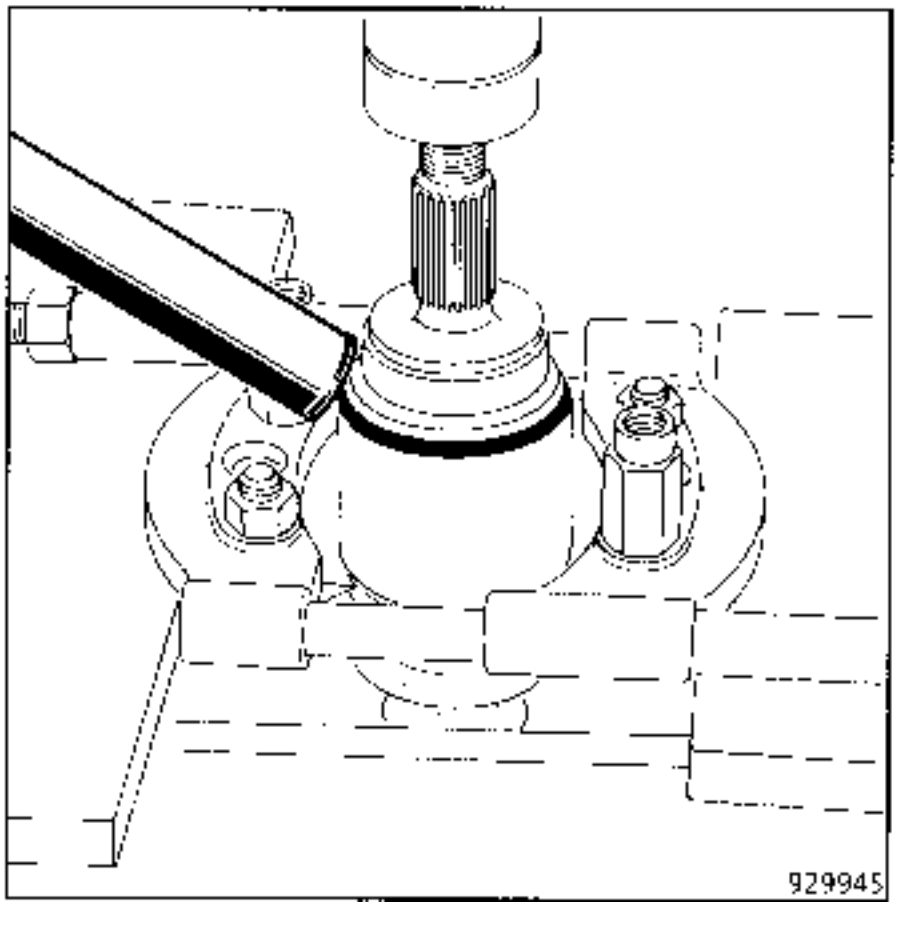


The cover is crimped onto the yoke on the press.

Engage the yoke completely.

DO NOT LET THE PRESSURE INCREASE.

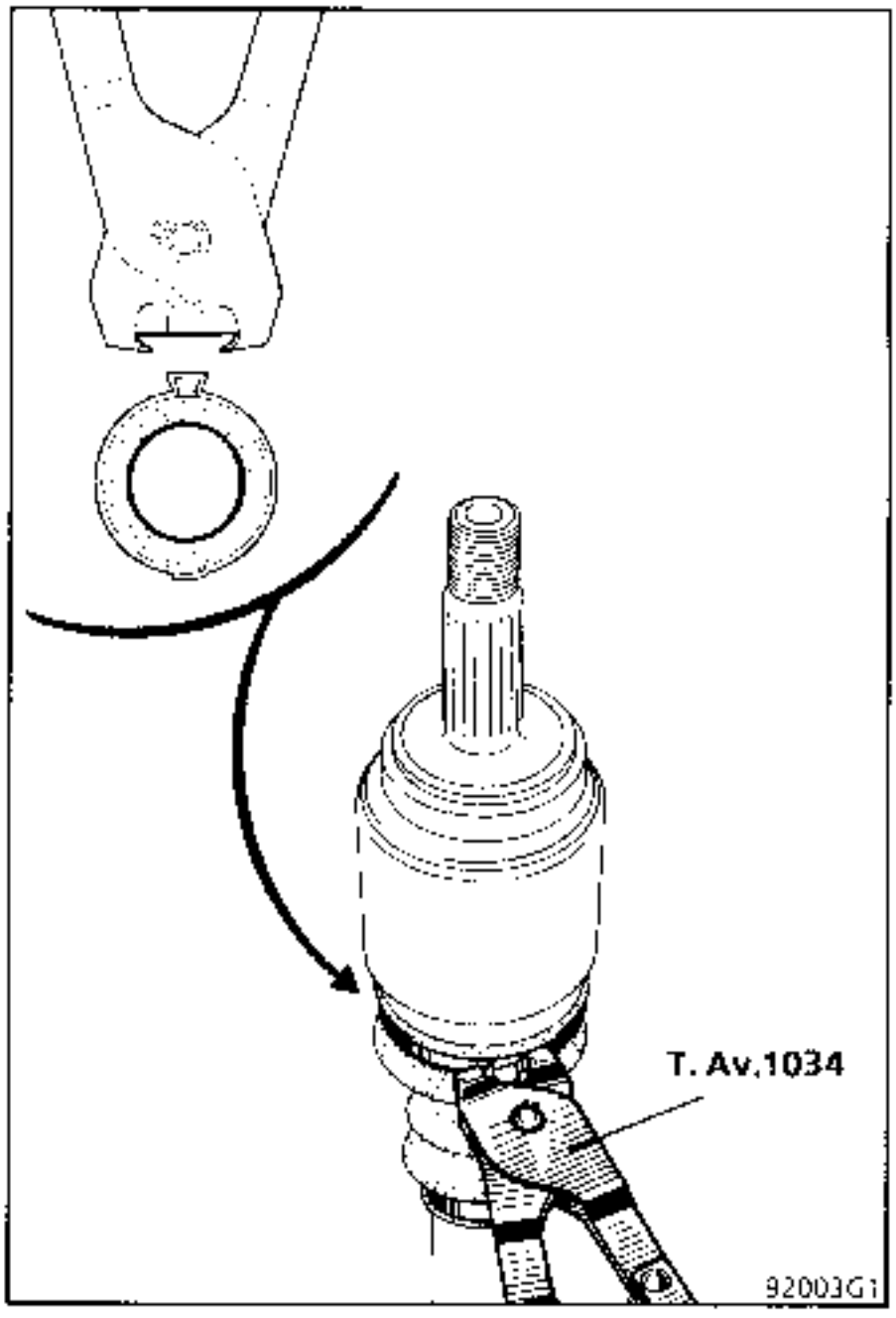
In this position, crimp the cover onto the yoke.



Position the gaiter lips into the grooves on the driveshaft and on the cover.

Insert a smooth, rounded end rod between the gaiter and the shaft to correct the amount of air inside the joint.

Fit the clips and tighten with tool **T.Av. 1034**.



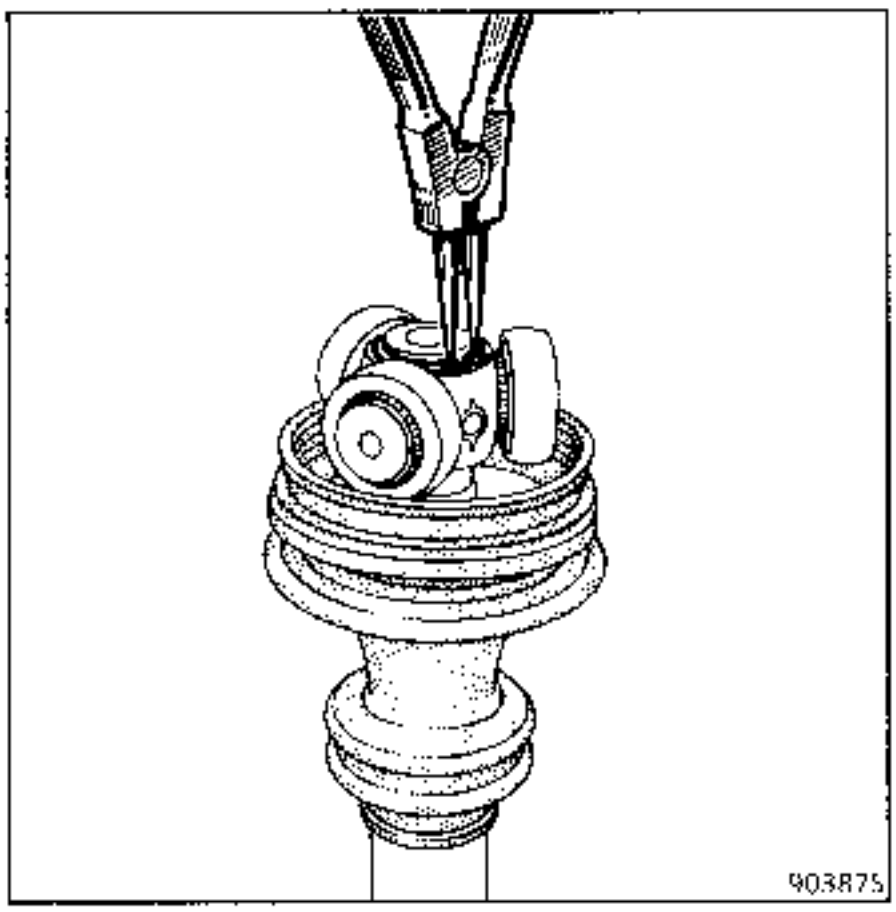
REPLACEMENT

SPECIAL TOOLING REQUIRED		
T.Av.	1331	Mandrel for fitting bearing to shaft

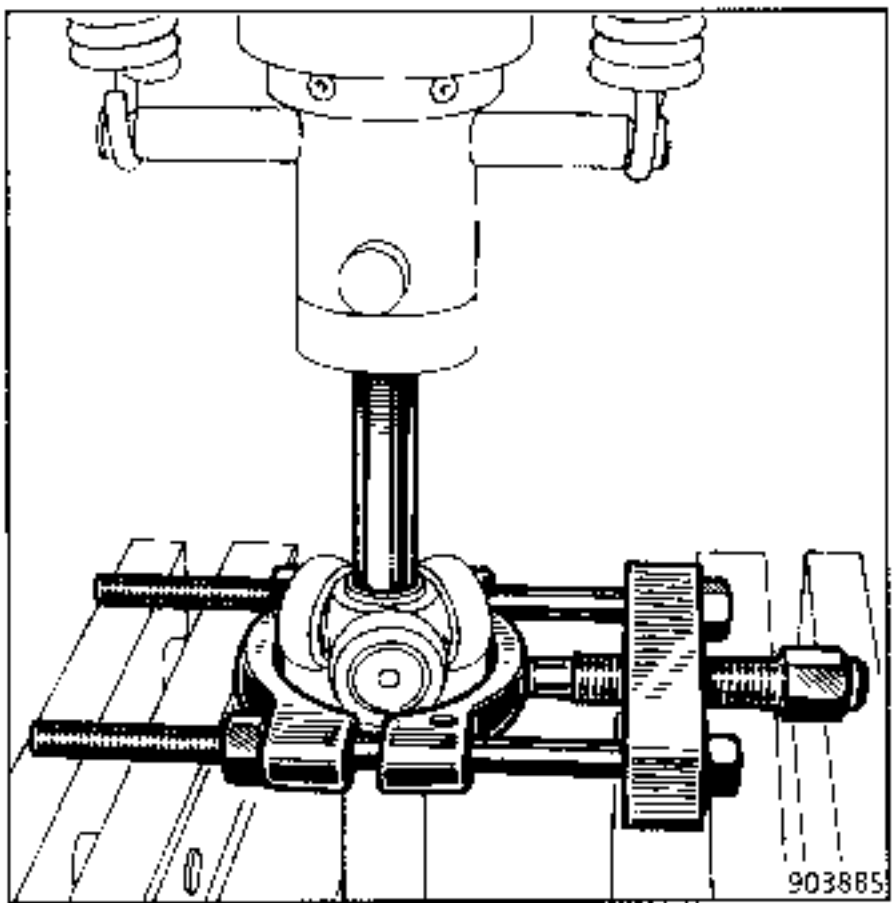
REMOVAL

Never use thinners to clean the component parts.

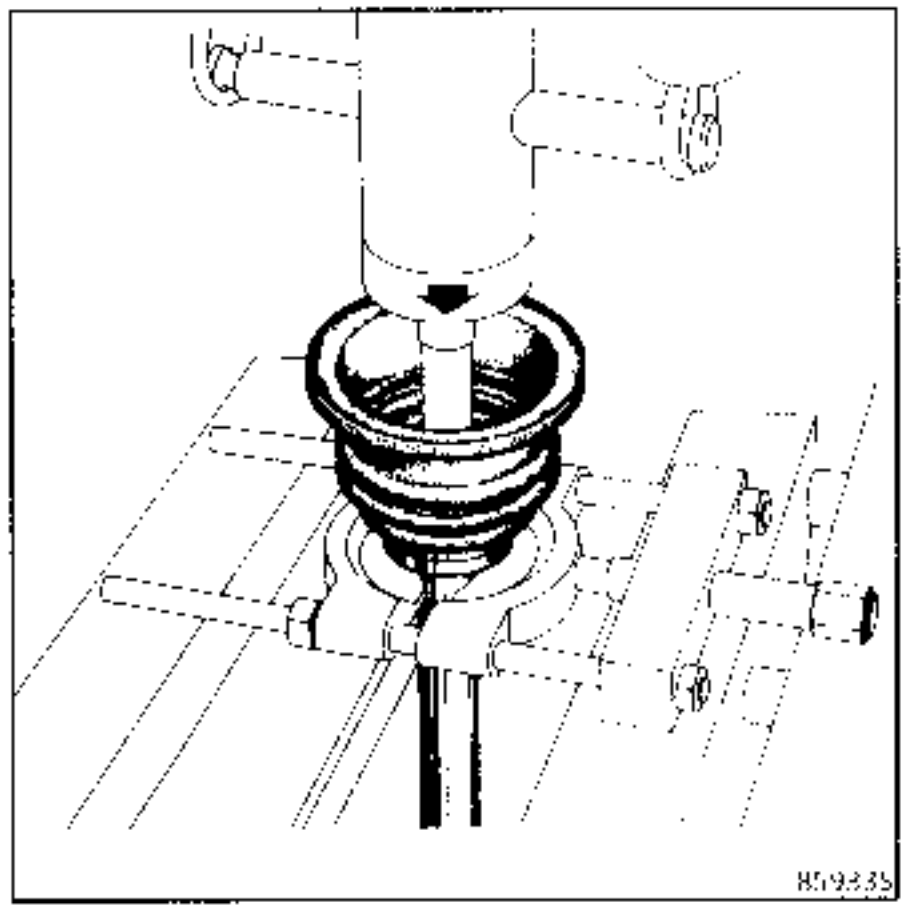
Depending on assembly, remove the circlip.



On the press, remove the spider, using a gripping extractor of type **FACOM U53G** for support.



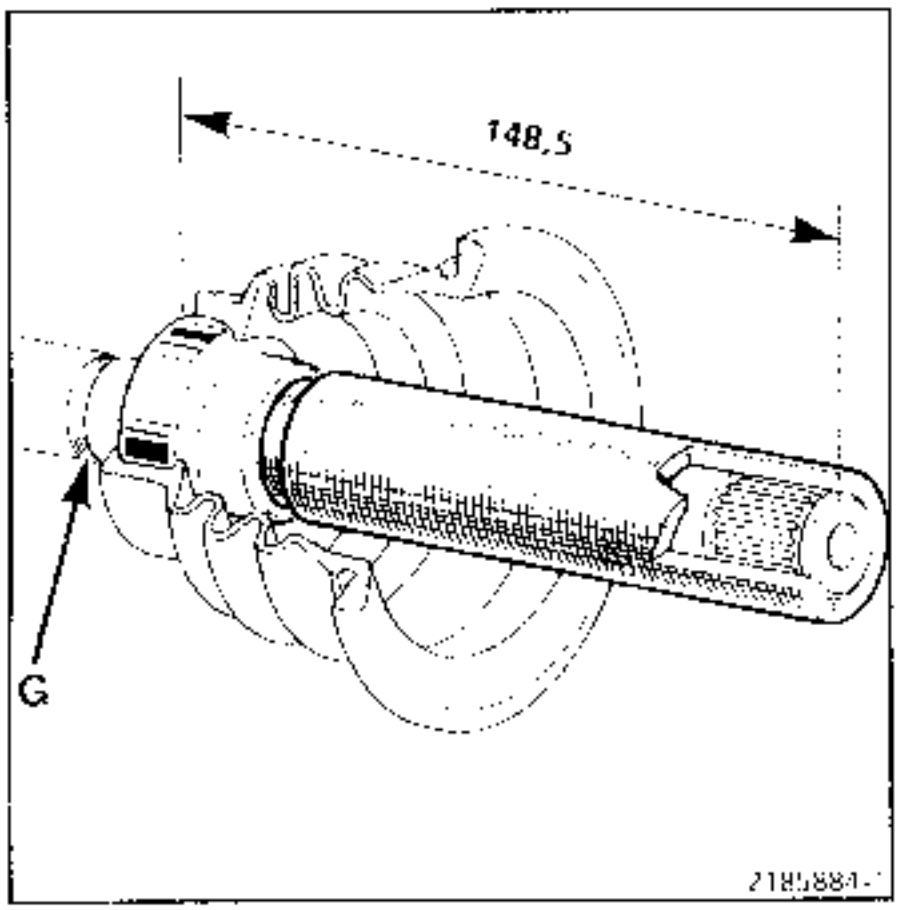
Remove the gaiter and bearing assembly in the same manner as the spider.



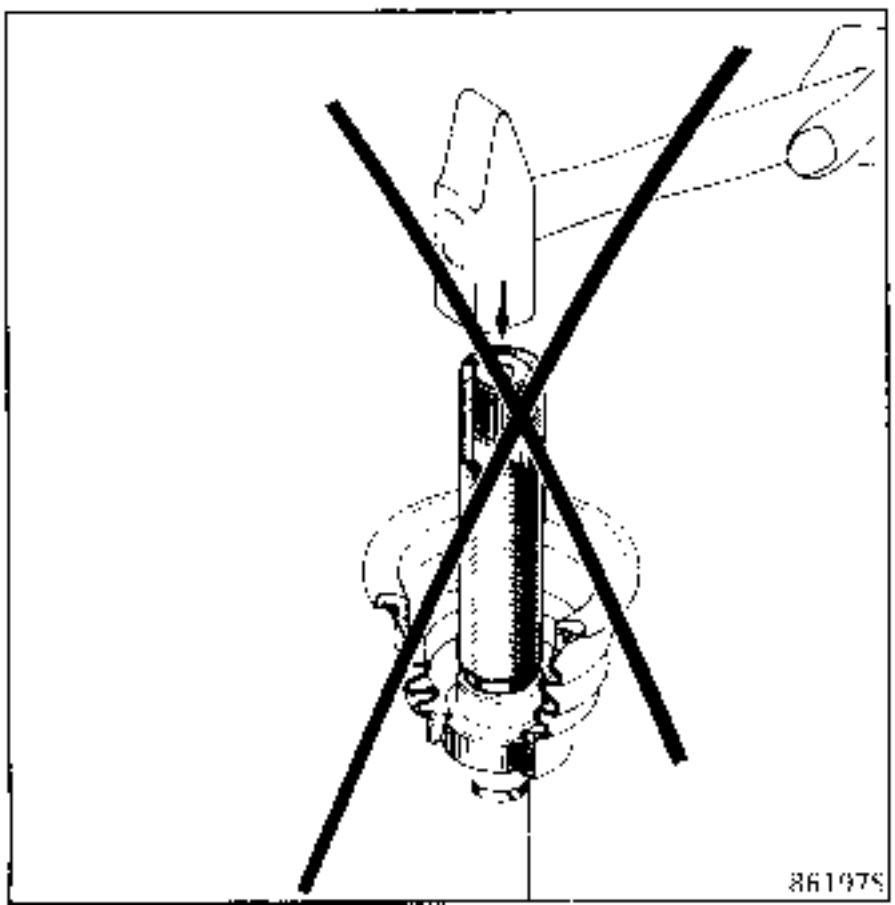
REPLACEMENT (cont)

Refitting

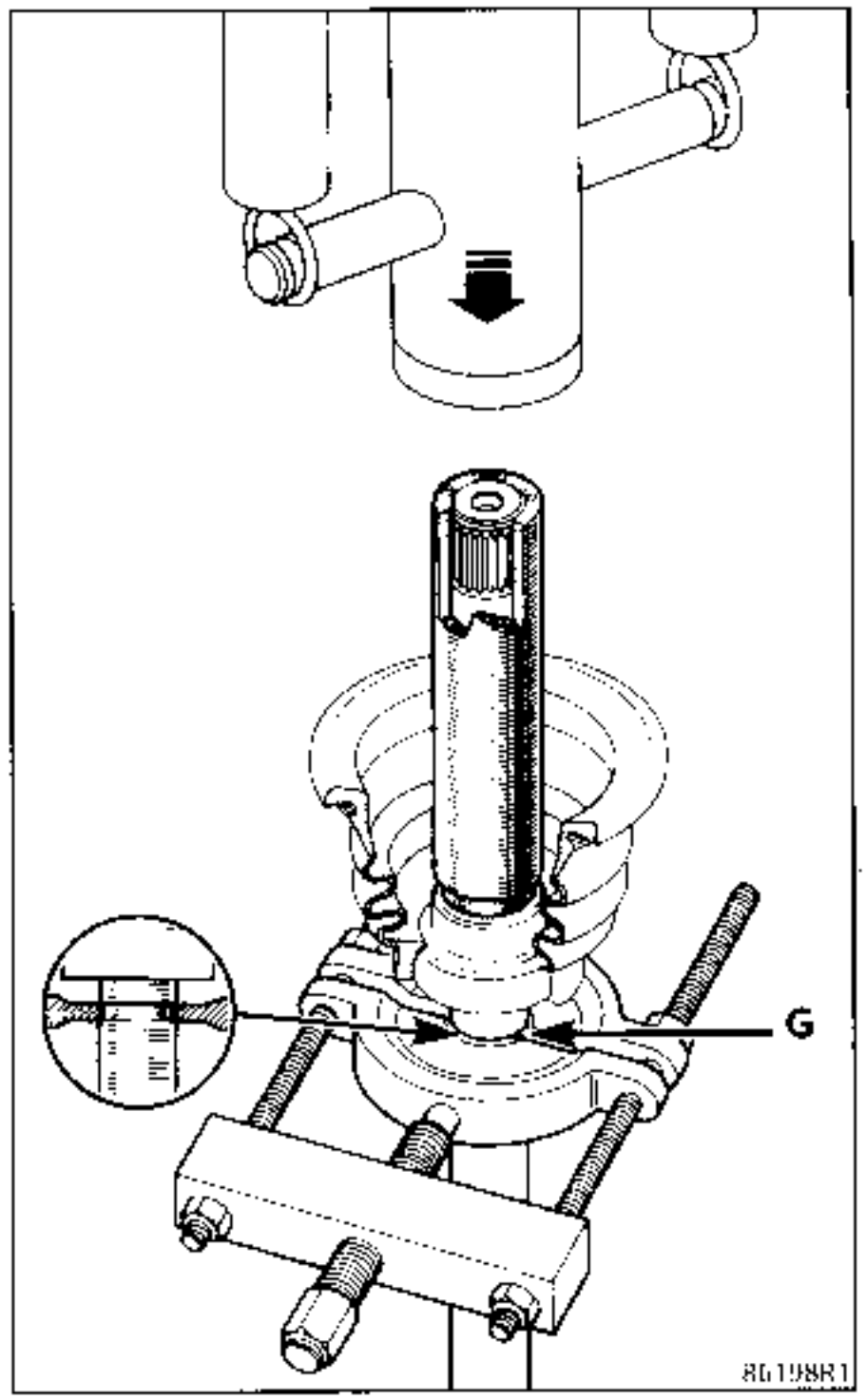
When in its correct position on the shaft the bearing must be inserted until dimension **L = 148.5 mm** between the rear face of the bearing and the end of the shaft.



To avoid damage to the bearing which has a lip seal, which could cause a leak, do not use a mallet to fit the bearing, but use the press to allow progressive pressure to be applied.

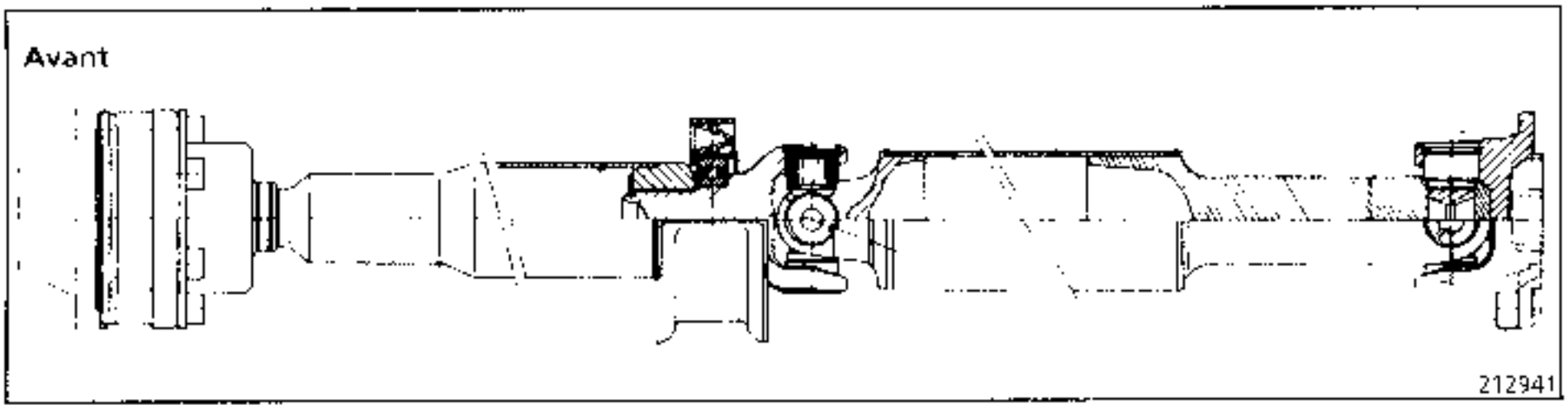


The driveshaft should be held in the press by groove (**G**) using a tool of type **FACOM U53G** (face plate at gaiter end) to avoid damaging the wheel end joint.



Fit the spider onto the splined shaft and refit the retaining circlip (depending on assembly).

REMOVAL - REFITTING

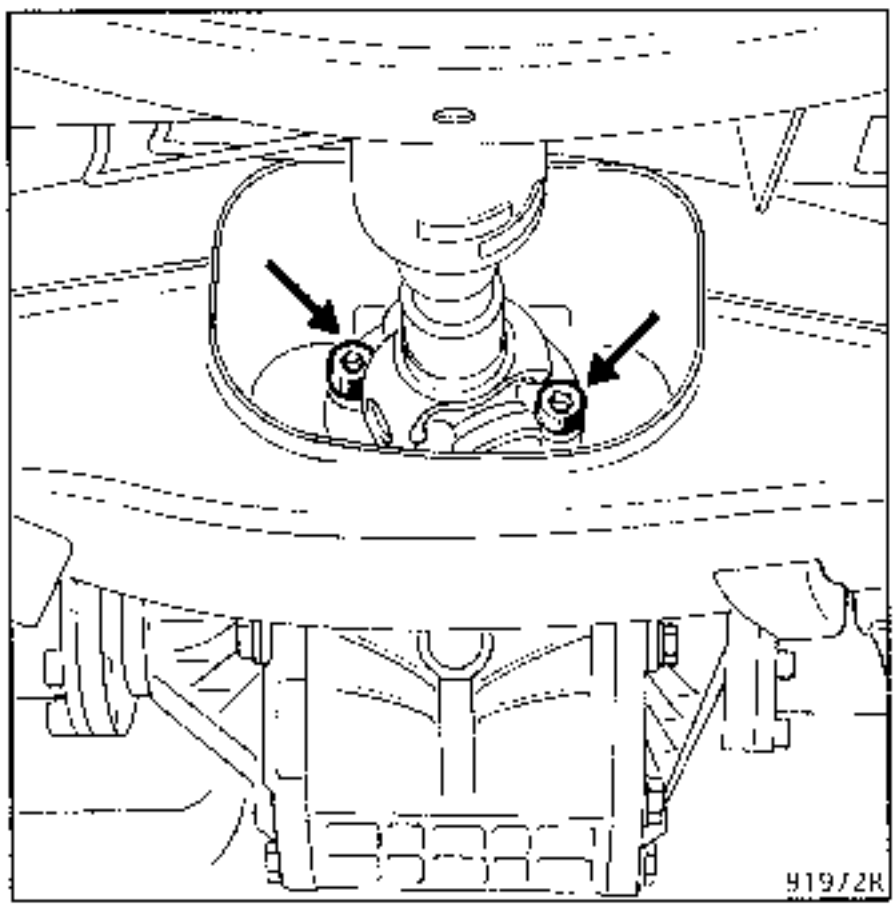


TIGHTENING TORQUES (in daN.m)	
Bolt on gearbox output flange	2.5
Bolt on final drive input flange	5
Bearing mounting bolt	2.5

REMOVAL

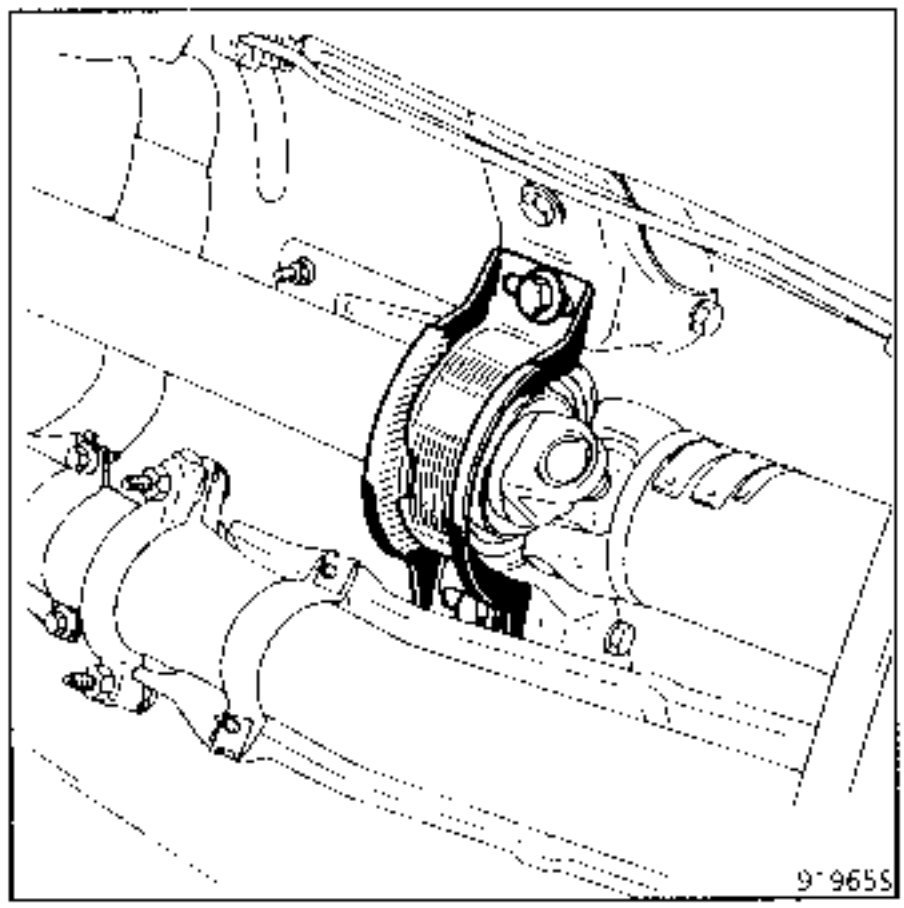
Remove:

- the bolts on the gearbox output flange,
- the bolts on the final drive input flange.



Release the intermediate exhaust pipe.

Remove the mounting bolts from the prop shaft intermediate bearing.



Remove the right hand mounting for the intermediate bearing.

Release the prop shaft from the final drive input flange and place it on the left hand side.

Place the intermediate bearing against the right hand side of the bodywork.

Release the **Lobro** joint from the gearbox output flange and release the left hand side.

Remove the prop shaft.

REFITTING : Special notes

Ensure that the seal is fitted to the gearbox out put flange which must be bonded with grease before the driveshaft is fitted.

Tighten the bolts to the correct torque.

REPLACING A UNIVERSAL JOINT CROSS

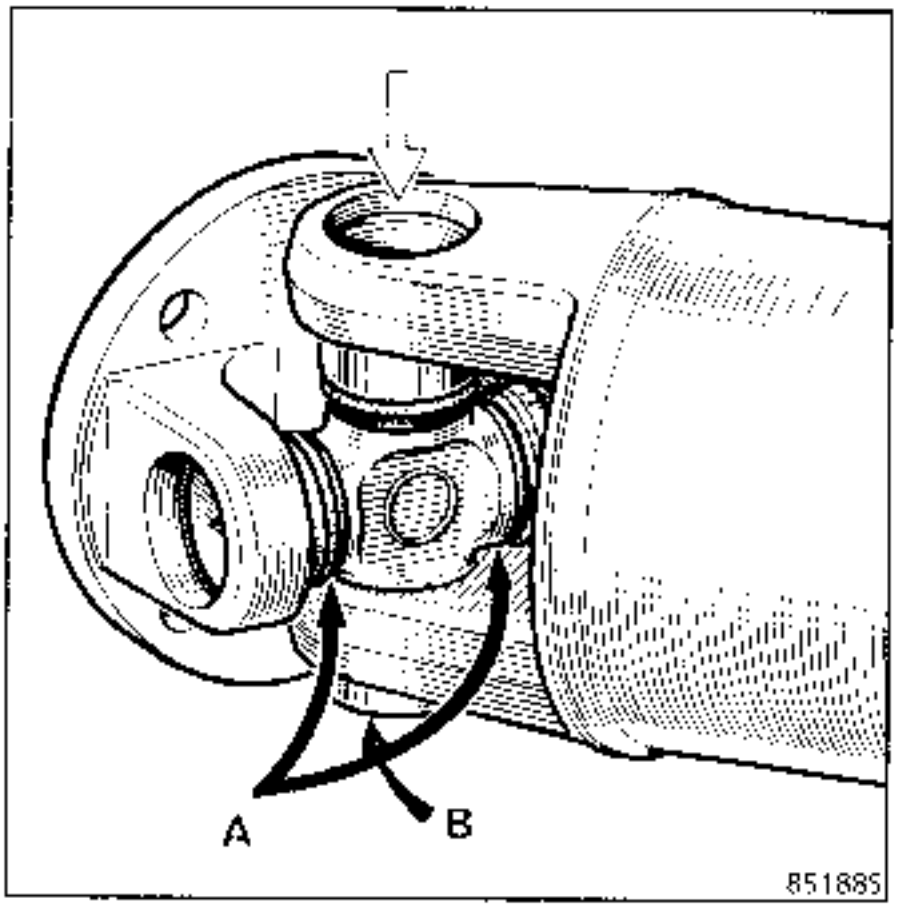
This operation is carried out after removing the prop shaft.

***IMPORTANT** : make marks on the tubes and the flanges to retain the same alignment when refitting.*

REMOVAL

Remove two diametrically opposed circlips.

Using a copper hammer, push one of the needle cages back until the transverse section of the cross is in contact with the clevice (**A**).



Remove the other cage (**B**).

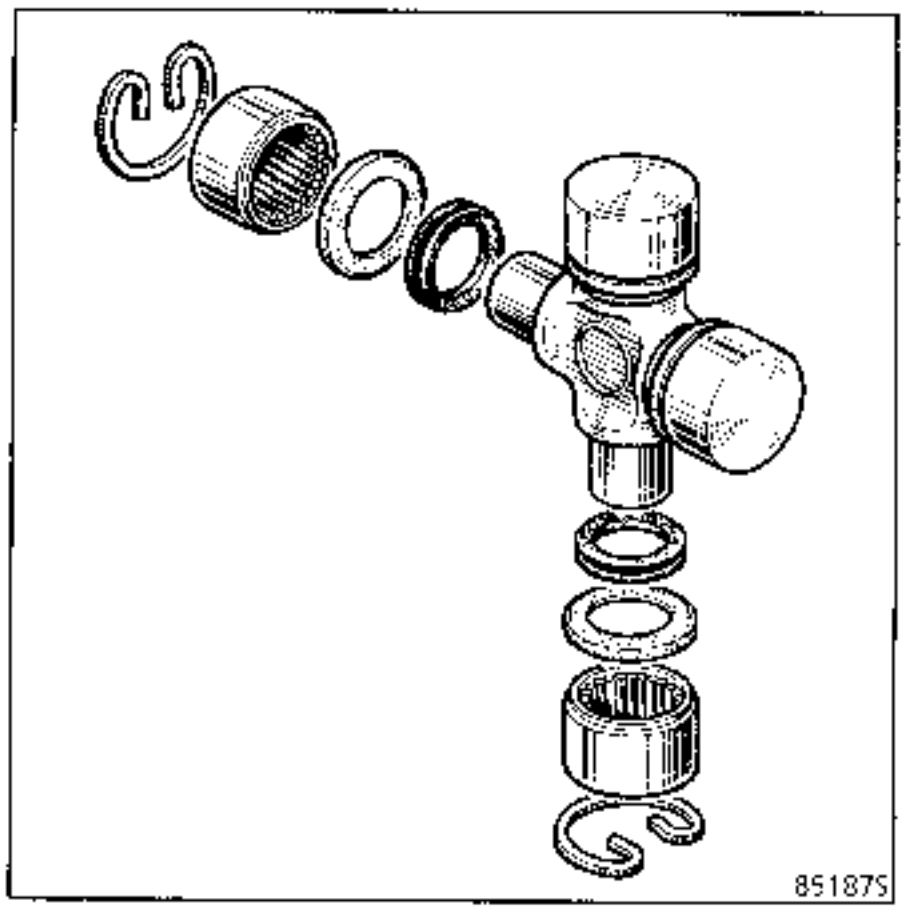
Push the shaft back so that the other cage may be released and remove the cross.

Operate in the same manner for the other shaft.

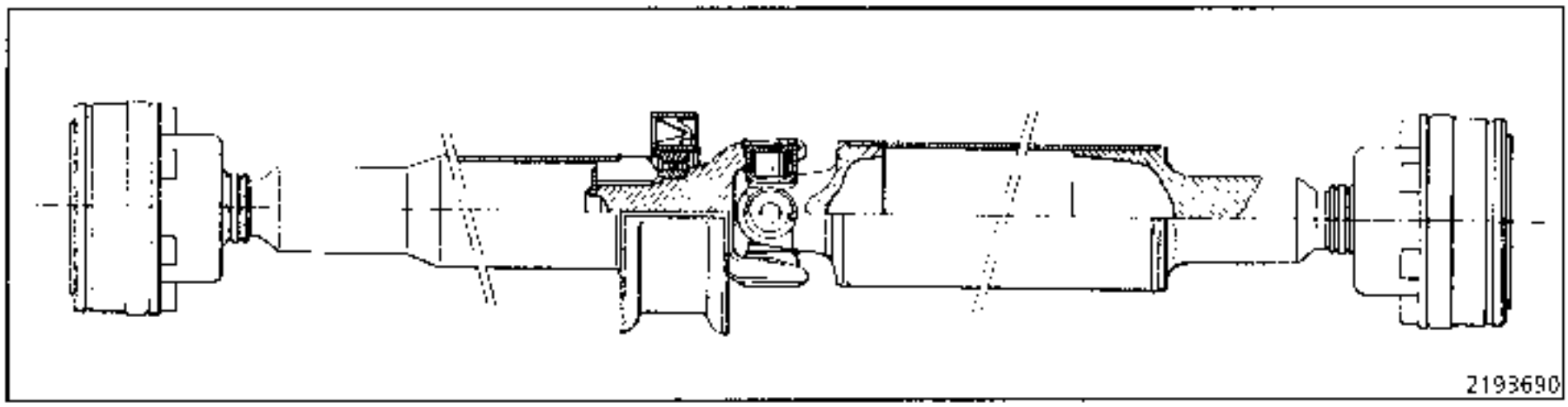
NOTE : if the cage (B) is seized, take the weight on the clevice to push back the other needle cage.

REFITTING

There are no special notes for refitting, other than to ensure the circlips are correctly refitted.



REMOVAL - REFITTING



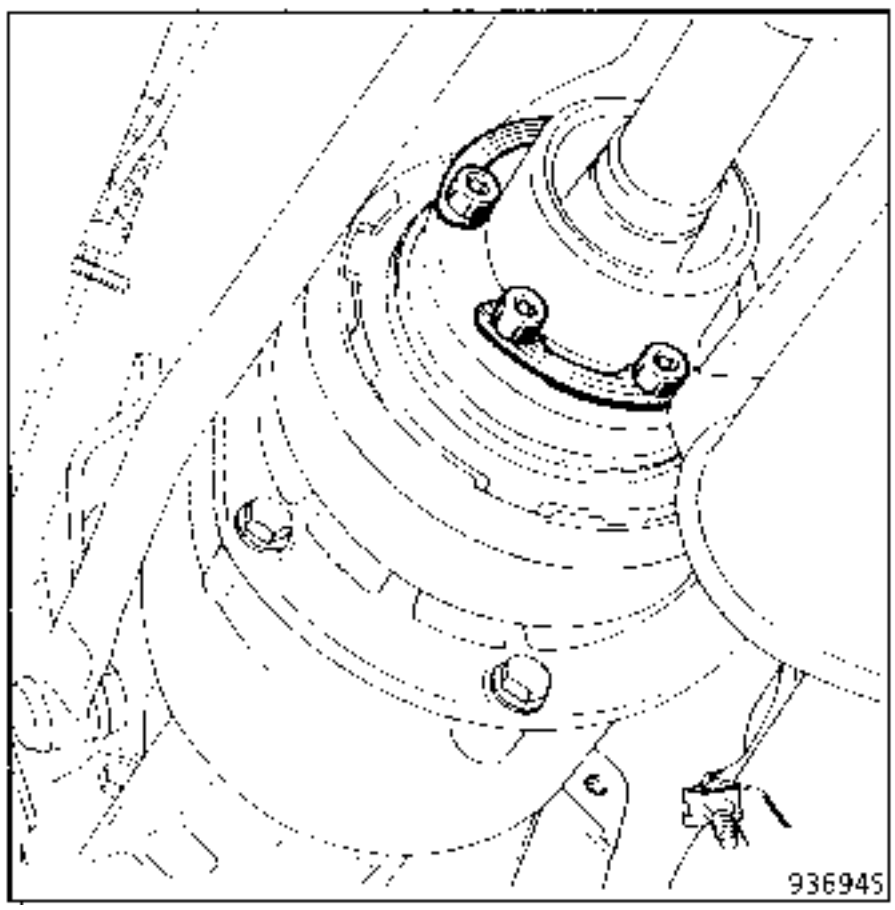
Note: prop shafts on **4 x 4 Integral** vehicles are very sensitive to balance, therefore no repairs are permitted and the prop shaft assembly must be systematically replaced.

TIGHTENING TORQUES (in daN.m)	
Bolt on gearbox output flange	2.5
Bolt on final drive input flange	2.5
Bearing mounting bolt	2.5

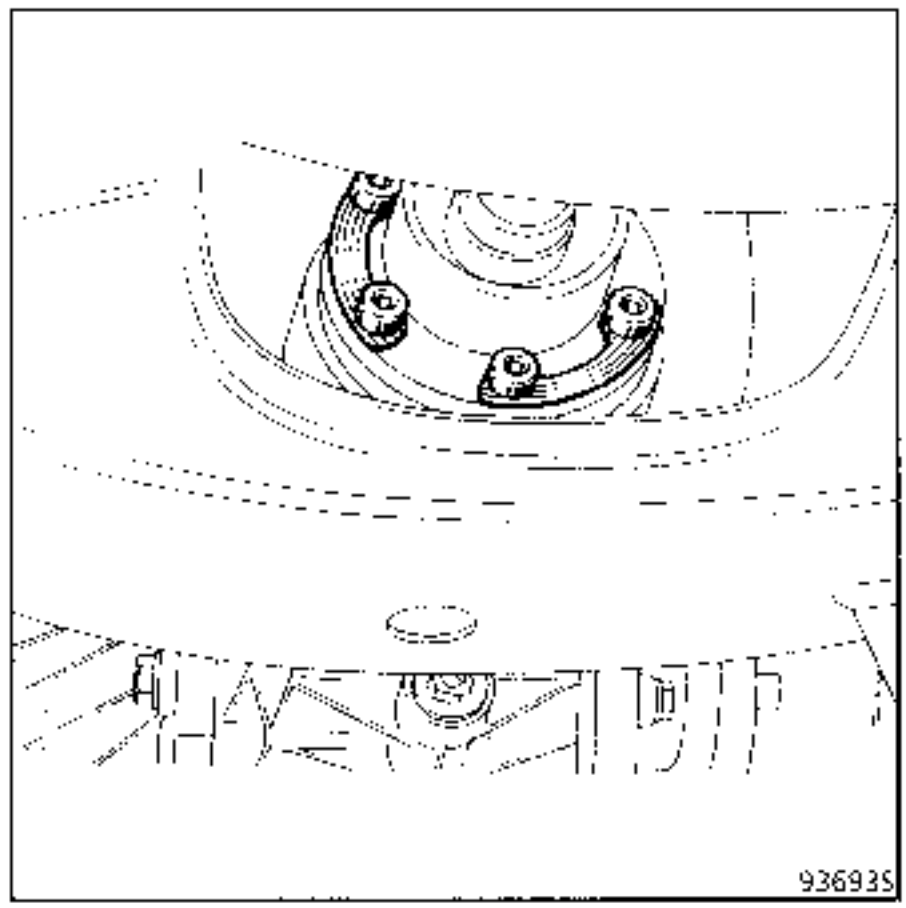
REMOVAL

Remove:

- the bolts on the gearbox output flange,

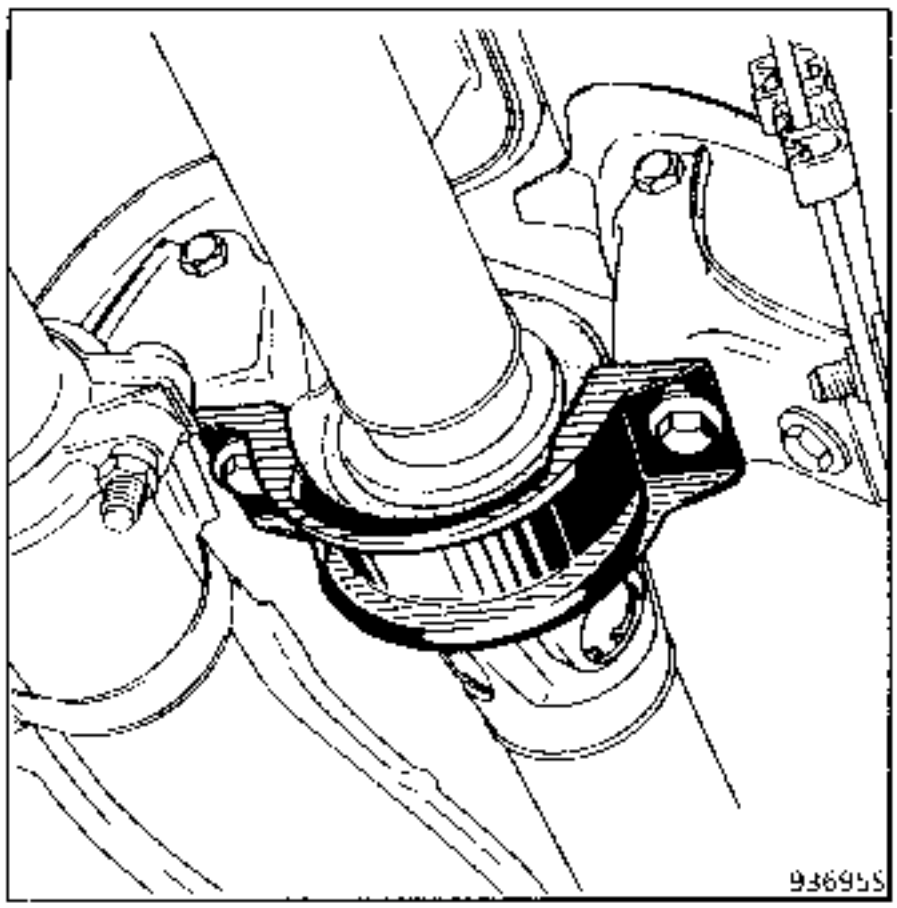


- the bolts on the final drive input flange.



Protect the gaiters.

Remove the mounting bolts from the prop shaft intermediate bearing.



Release the **Lobro** joint from the gearbox output flange and remove the driveshaft.

Note: to avoid damaging the cross and the prop shaft, it must be held simultaneously by the two tubes. The gaiters on the **Lobro** joint must also be protected.

REFITTING : Special notes

The prop shaft mounting bolts must be systematically renewed.

1st assembly:

Ensure the seal is present on the gearbox output flange - it must be bonded with grease before the prop shaft is fitted.
At the final drive end, check the plastic blanking cover is fitted.

2nd assembly:

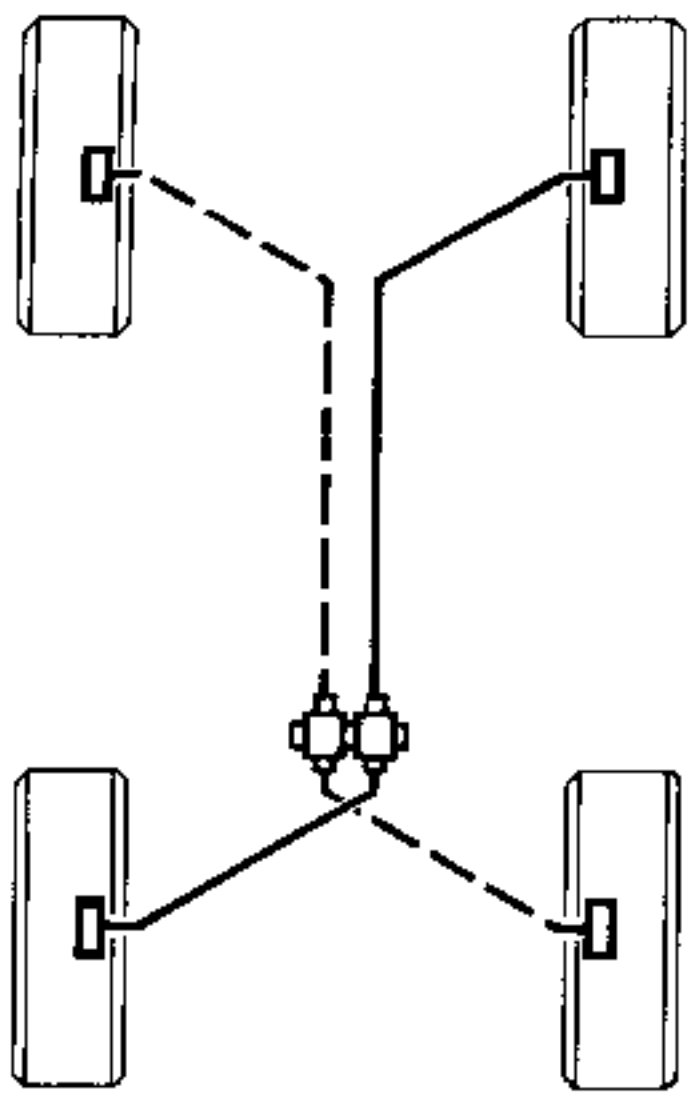
The gearbox and final drive flanges have a plastic blanking cover which must be assembled **without an additional seal** being fitted.

Fit the **Lobro** joints on the flanges, then offer up the bearing to its mountings. Tighten the two bolts but do not lock them. Slide the bearing as far as permitted by the slots. Finally tighten the bearing mounting bolts.

Tighten the bolts to the recommended torque.

NOTE : The following diagrams show general operating principles. Under no circumstances are they to be taken as a reference for the take-offs and allocation of the circuits. When one of the constituent parts of the brake circuit on the vehicle is replaced, the pipes and lines must always be marked before dismantling in order that they can be reconnected in their initial positions.

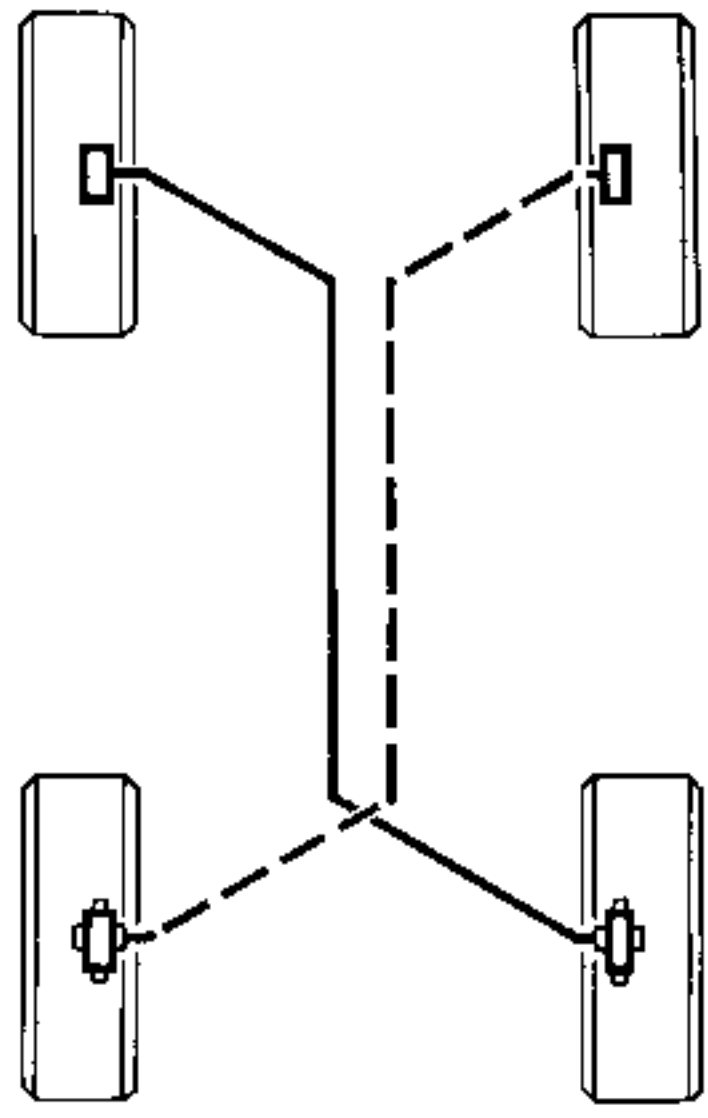
"X" TYPE BRAKING ARRANGEMENT with fixed compensators



91563-2S

L481
L482
L486
L48E
L48F
L48J
} 1st TYPE

"X" TYPE BRAKING ARRANGEMENT with compensators integrated in the wheel cylinder

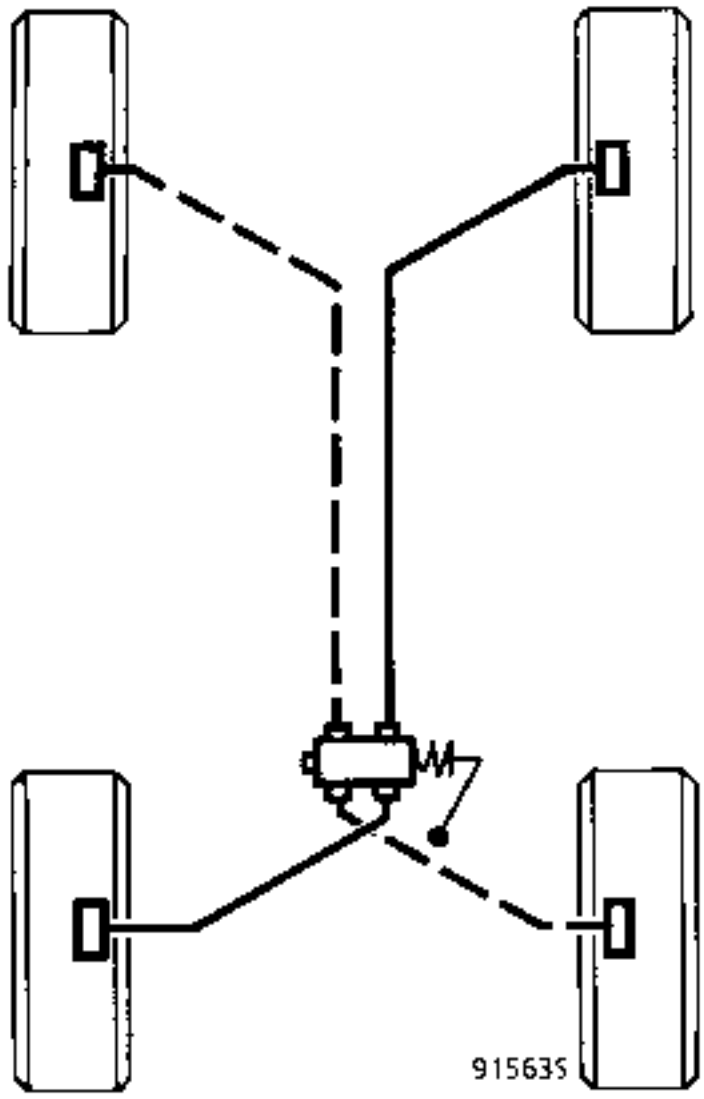


91563-3S

L481
L482
L486
L48E
L48F
L48J
} 2nd TYPE
L48M
L48N

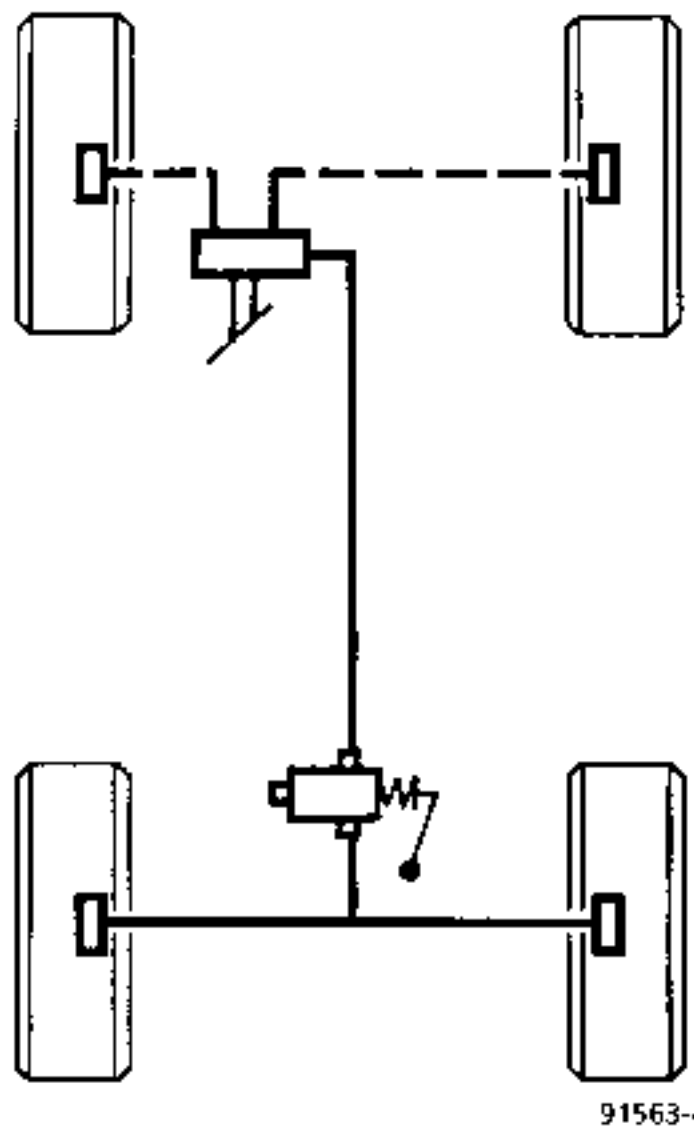
B481
B482
B486
L486
B48V
L48V
B48E
B48J
B48F

"X" TYPE BRAKING ARRANGEMENT
with load controlled compensator



B480 B48A L48P
L480 L48A B48R
B483 B48C L48R
L483 L48C B48Y
B487 B48K L48Y
L487 L48K B48W
B488 B48O L48W
L488 L480
L489 B48P
L485
L48L
L485 4 x 4
L48L 4 x 4
K480 K487 K48I
K481 K488 K48J
S481 K489 K48K
K482 K48A K48O
S482 K48E K48P
K483 K48F K48V
K486 K48H S48V
S486 S48H K48W
K48R
K483 4 x 4
K486 4 x 4
K46K 4 x 4
K48V 4 x 4

"ABS" BRAKING ARRANGEMENT
with load controlled compensator



B483 L488
L483 B48P
B487 L48P
L487 B48K
B488 L48K
B48R
L48R
B48Y
L48Y
K483
K48K
K487
K488
K48R

"X" TYPE BRAKING ARRANGEMENT

with load controlled compensator

Except for the versions with **ABS**, these vehicles are equipped with a dual braking circuit arranged in an "**X**" formation, the master cylinder is of the "**Tandem**" type (having two separate internal systems) :

The master cylinder activates separately :

1 - the front righthand - rear lefthand brakes,

2 - the front lefthand - rear righthand brakes.

The braking on the rear wheel is restricted :

- either by a fixed compensator,
- or by two fixed compensators incorporated in the wheel cylinders.
- or by a dual load controlled compensator.

"X" TYPE BRAKING ARRANGEMENT

with load controlled compensator

Vehicles with **ABS** have a compact hydraulic unit comprising a "**Tandem**" master cylinder and a hydraulic amplifier.

The master cylinder activates statically and separately :

1 - the front righthand brake,

2 - the front lefthand brake.

The hydraulic amplifier activates the two rear brakes dynamically which are restricted by :

- a delay valve,
- a single load controlled compensator.

Vehicle Type	B48I L48I B481 L481 B48D L48D B48F L48F B48H L48H L48M	B484 L484 B482 L482 B48E L48E B48J L48J L48N	B48W L48W L483 B483 L489 B48K L48K B487 L487 B488 L488	B480 L480 B486 L486 B48V L48V B48A L48A	B488 L488 B48W L48W	B483 L483 B48K L488 B48W L48W L48K	L485 B48Q L48Q B48Y L48Y L48R B48R L48L	B48Y L48Y L48R B48R
FRONT BRAKES (dimensions in mm)								
Wheel cylinder diameter	48	48	54	54	54	54	54	54
Disc diameter	238	238	265	244	244	265	285	285
Disc thickness	12	20	19.7	19.7	19.7	19.7	21	21
Minimum disc thickness*	10.5	18	17.7	17.7	17.7	17.7	19	19
Pad thickness (including backing)	18	18	17.5	17.5	17.5	17.5	17.5	17.5
Minimum pad thickness (including backing)	6	6	6.5	6.5	6.5	6.5	6.5	6.5
Maximum disc run-out	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
REAR BRAKES (dimensions in mm)								
Wheel cylinder diameter	22 or 20.6(1)	22 or 20.6(1)	22	22 or 20.6(1)	22	36	36	36
Drum diameter	180.25	180.25	228.5	180.25	228.5	–	–	228.5
Maximum diameter of drums after re-facing	181.25	181.25	229.5	181.25	229.5	–	–	229.5
Disc diameter	–	–	–	–	–	255	255	–
Disc thickness	–	–	–	–	–	10.5	10.5	–
Minimum disc thickness*	–	–	–	–	–	9.5	9.5	–
Lining width	40	40	40	40	40	–	–	40
Lining thickness (including shoe)	6.5	6.5	6.5	6.5	6.5	14	14	6.5
Minimum lining thickness (including shoe)	2.5	2.5	2.5	2.5	2.5	6	6	2.5
MASTER CYLINDER (dimensions in mm)								
Diameter	19	19	20.6	20.6	20.6	(ABS)	(ABS)	20.6

* The brake discs must not be re-faced. The part must be changed if excessive scoring or wear is present.

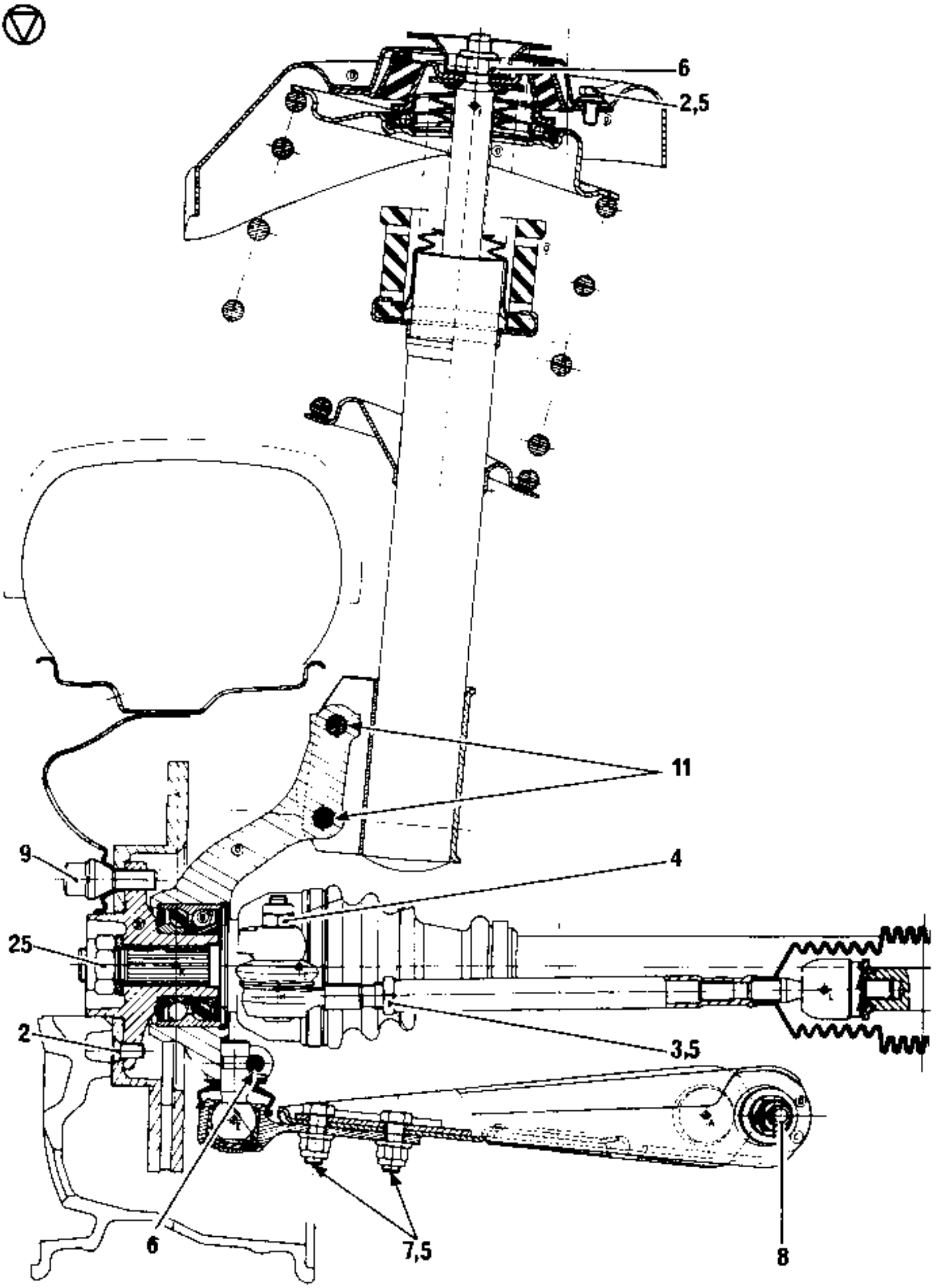
(1) Wheel cylinder with integral fixed compensator : if the wheel cylinder or compensator does not operate correctly, change the assembly, as all repairs are forbidden.

Vehicle type	K48I K484 K481 S481 K482 S482 K48E K48H S48H K48J K48M K48N	K483 K488 K48K K487	K486 K48V S486 S48V K489 K48A K48B K48C K48O	K483 K48K K488 K48W	K486 4 x 4 K48V 4 x 4 K483 4 x 4 K48K 4 x 4
FRONT BRAKES (dimensions in mm)					
Wheel cylinder diameter	48	54	54	54	54
Disc diameter	238	265	244	265	244
Disc thickness	20	19.7	19.7	19.7	19.7
Minimum disk thickness*	18	17.7	17.7	17.7	17.7
Pad thickness (including backing)	18	17.5	17.5	17.5	17.5
Minimum pad thickness (including backing)	6	6.5	6.5	6.5	6.5
Maximum disc run-out	0.07	0.07	0.0	0.07	0.07
REAR BRAKES (dimensions in mm)					
Wheel cylinder diameter	22	22	22	36	22
Drum diameter	228.5 229.5	228.5 229.5	228.5 229.5	– –	255 256
Maximum drum diameter after re-facing					
Disc diameter	–	–	–	255	–
Disc thickness	–	–	–	10.5	–
Minimum disc thickness*	–	–	–	9.5	–
Lining width	40	40	40	–	45
Lining thickness (including shoe)	6.5	6.5	6.5	14	6.5
Minimum lining thickness (including shoe)	2.5	2.5	2.5	6	2.5
MASTER CYLINDER (dimensions in mm)					
Diameter	19	20.6	20.6	(ABS)	20.6

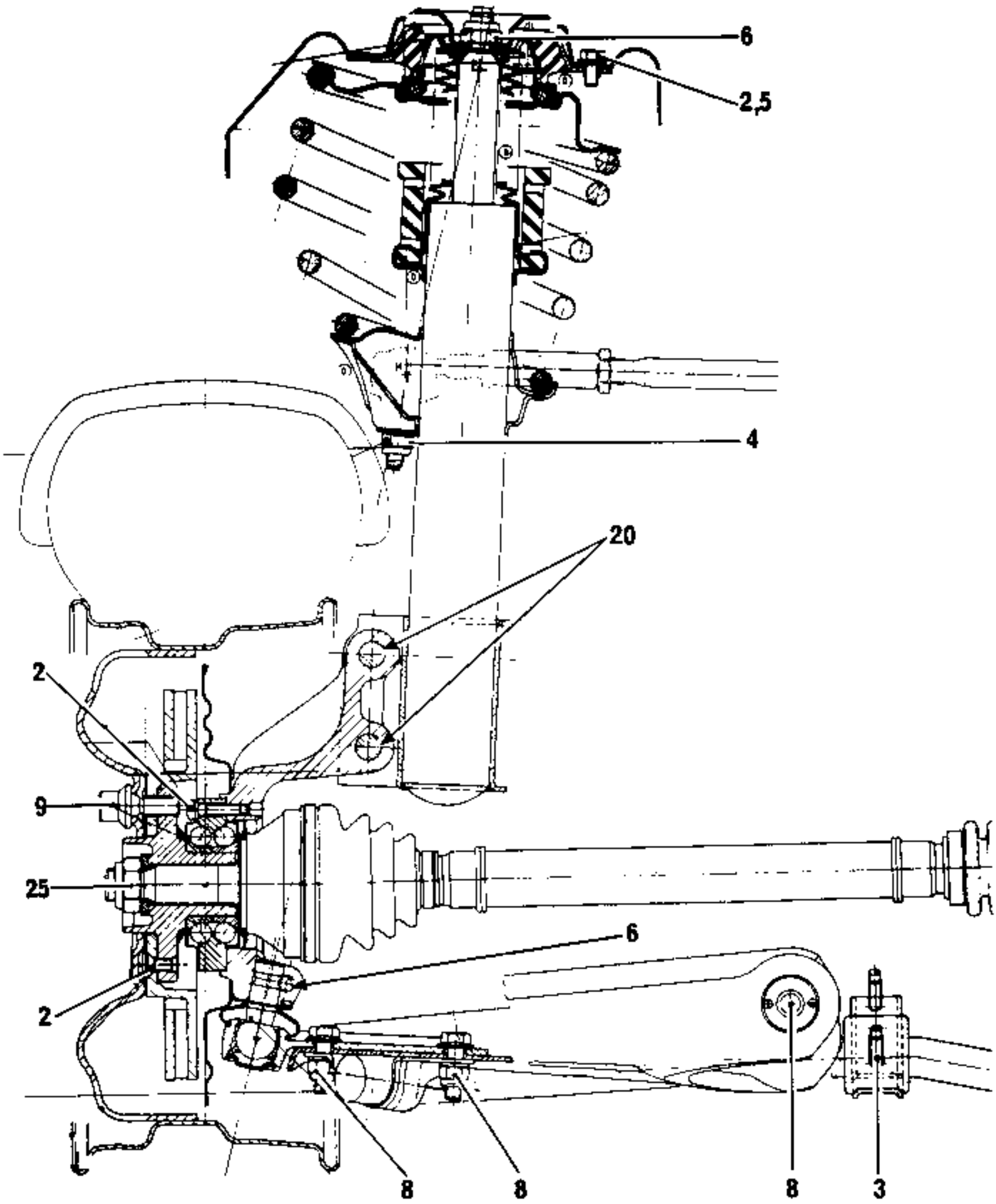
* The brake discs must not be re-faced. The part must be changed if excessive scoring or wear is present.

(1) Wheel cylinder with integral fixed compensator : if the wheel cylinder or compensator does not operate correctly, change the assembly, as all repairs are forbidden.

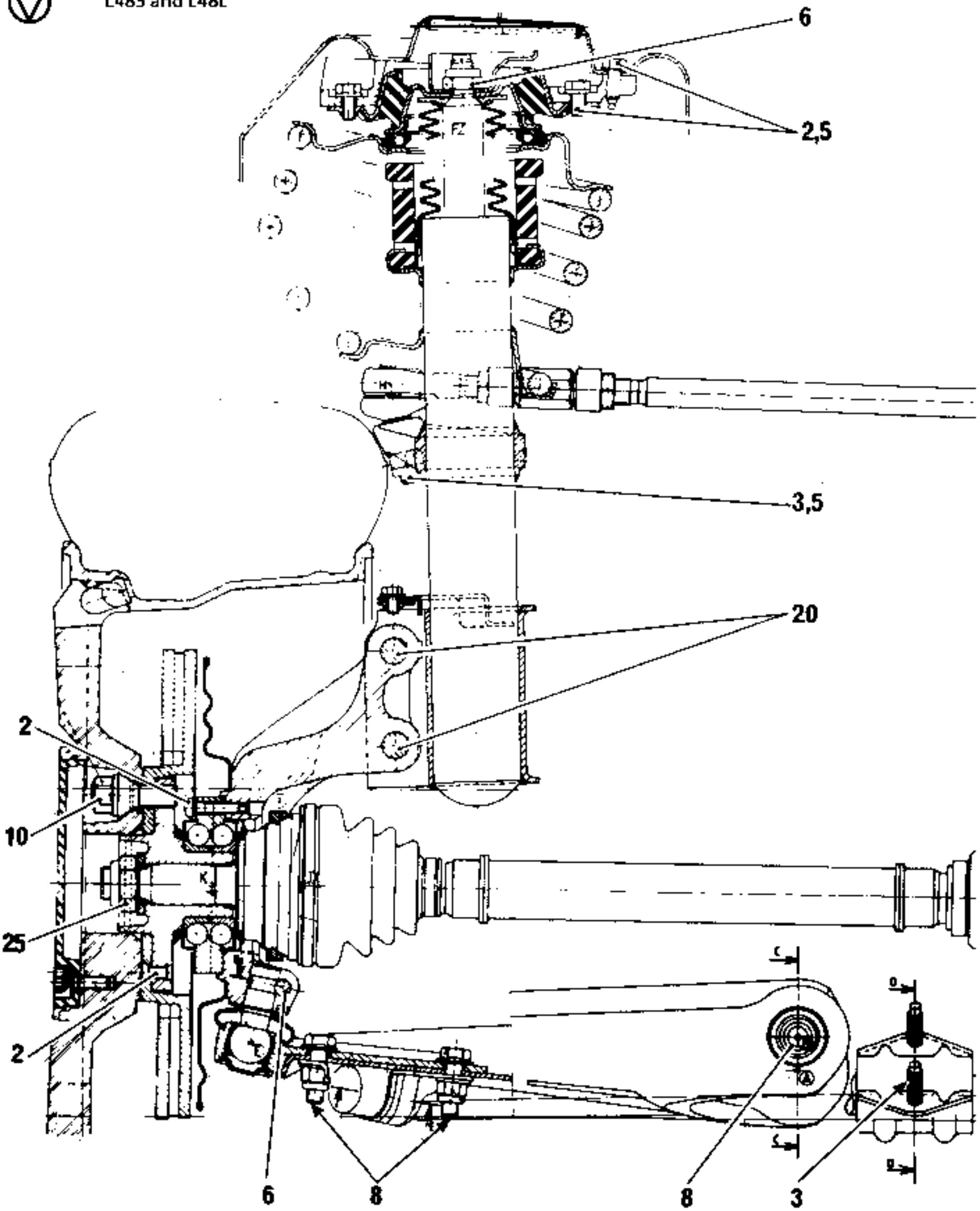
GENERAL
Tightening torques (in daN.m)



All types except L485 and L48L



L485 and L48L

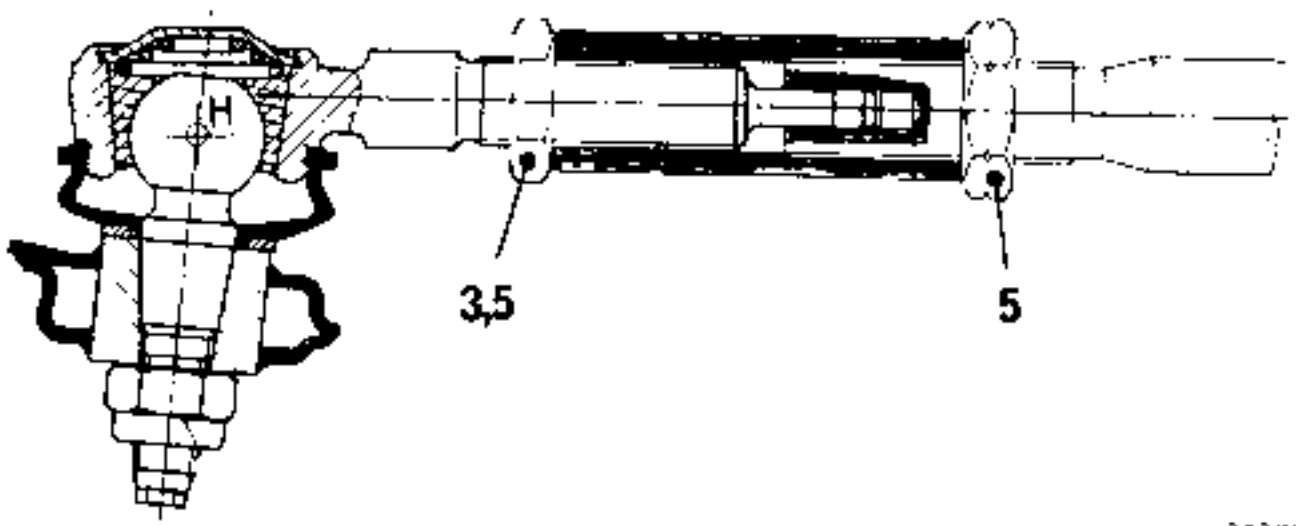


21308

HIGH STEERING BOX LINK ARM

1st TYPE

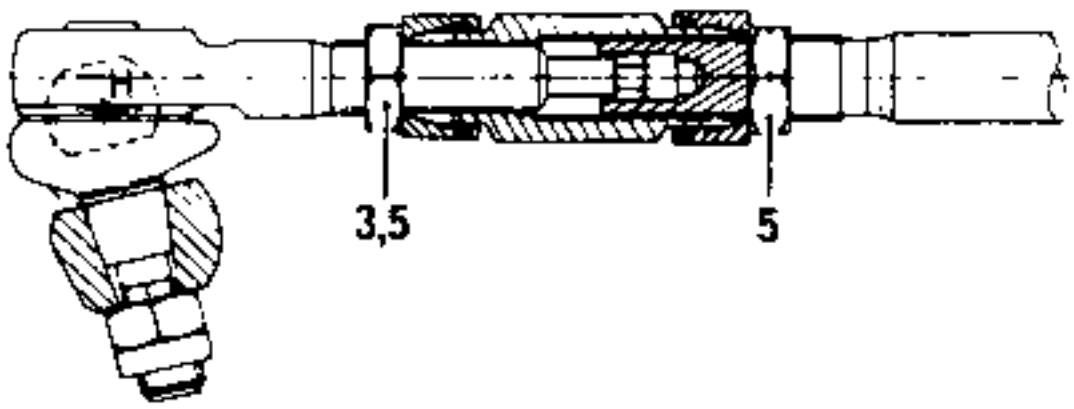
TORQUE AFTER PARALLELISM ADJUSTED



21309-1

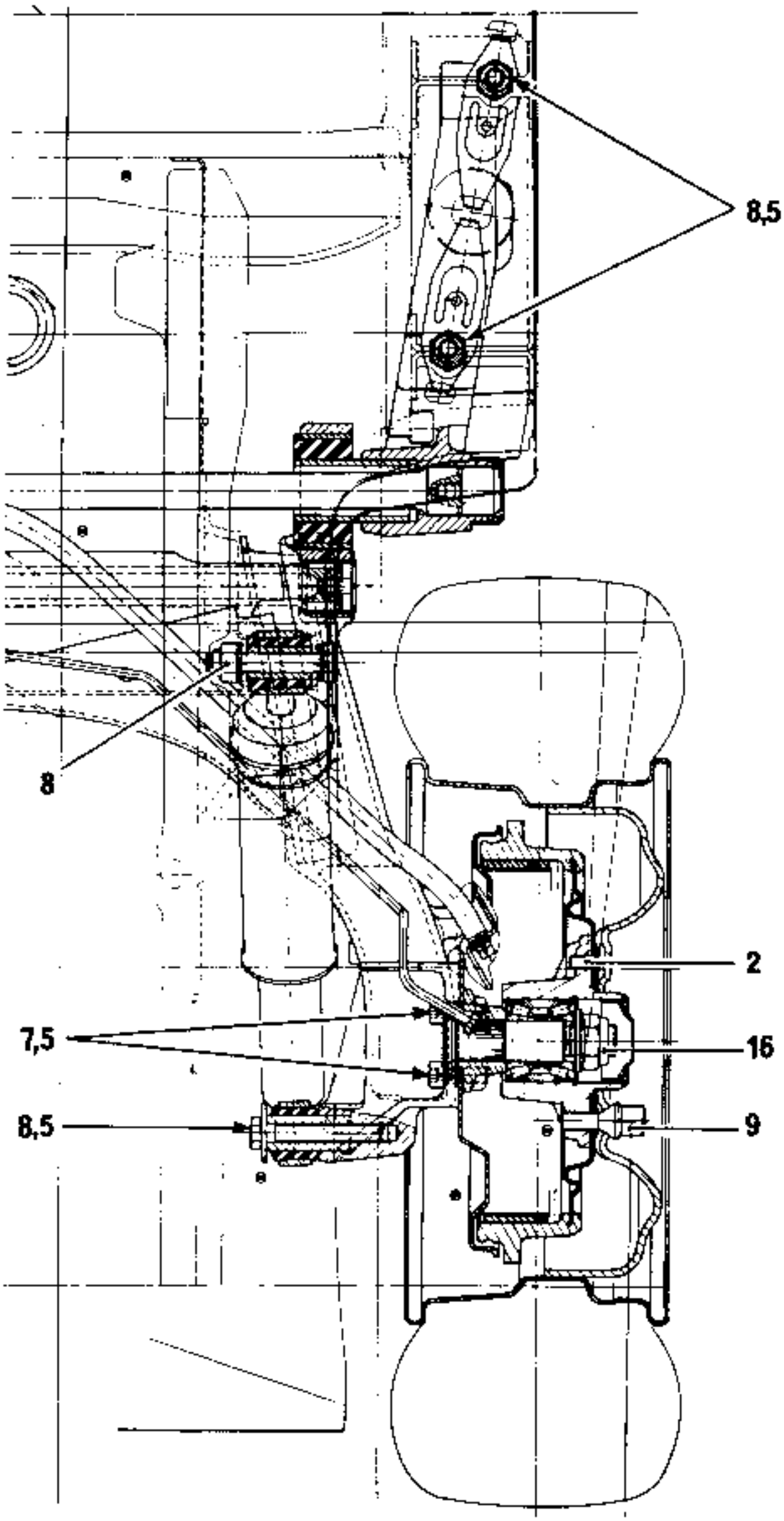
2nd TYPE

TORQUE AFTER PARALLELISM ADJUSTED

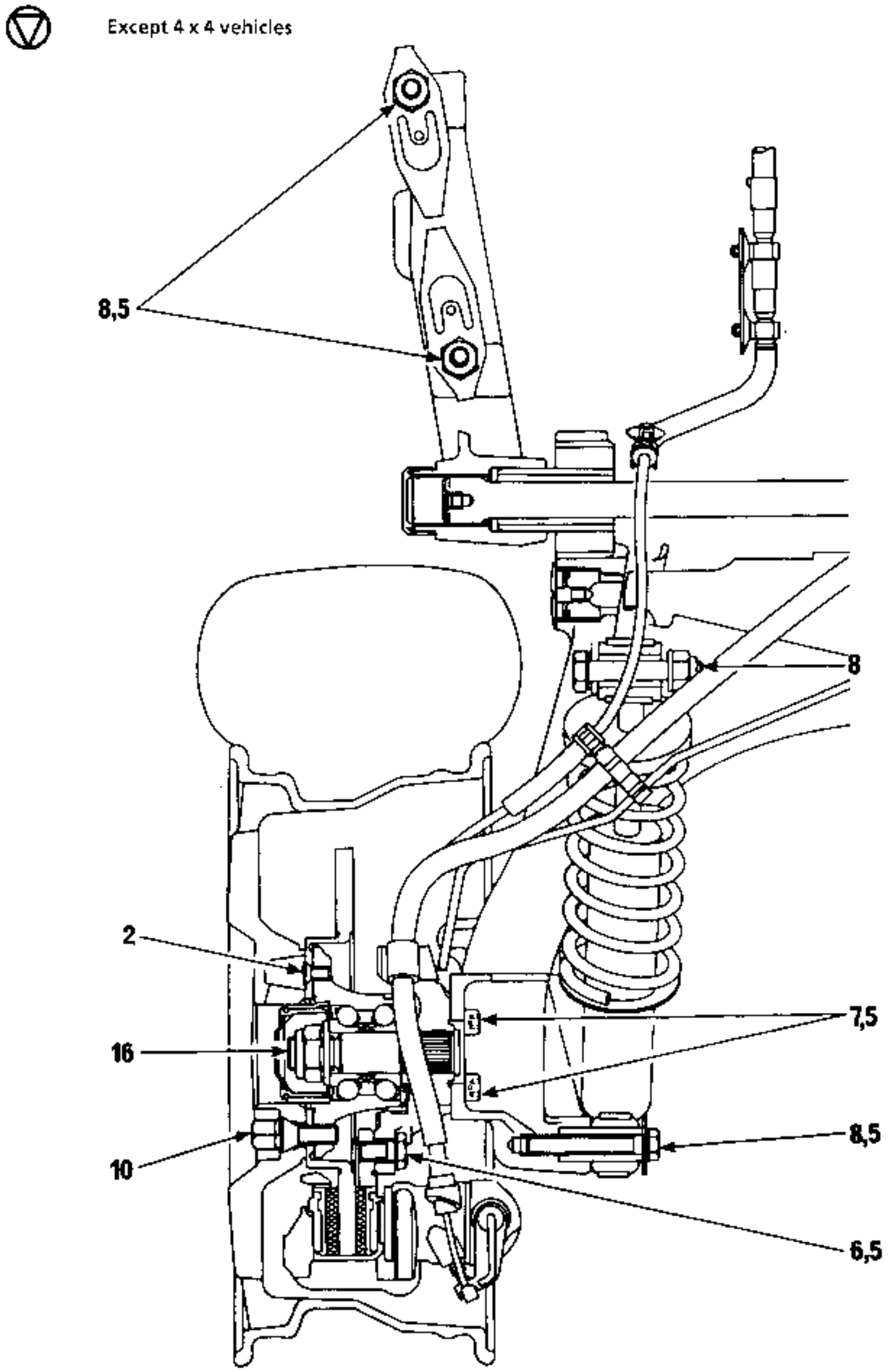


21309-2

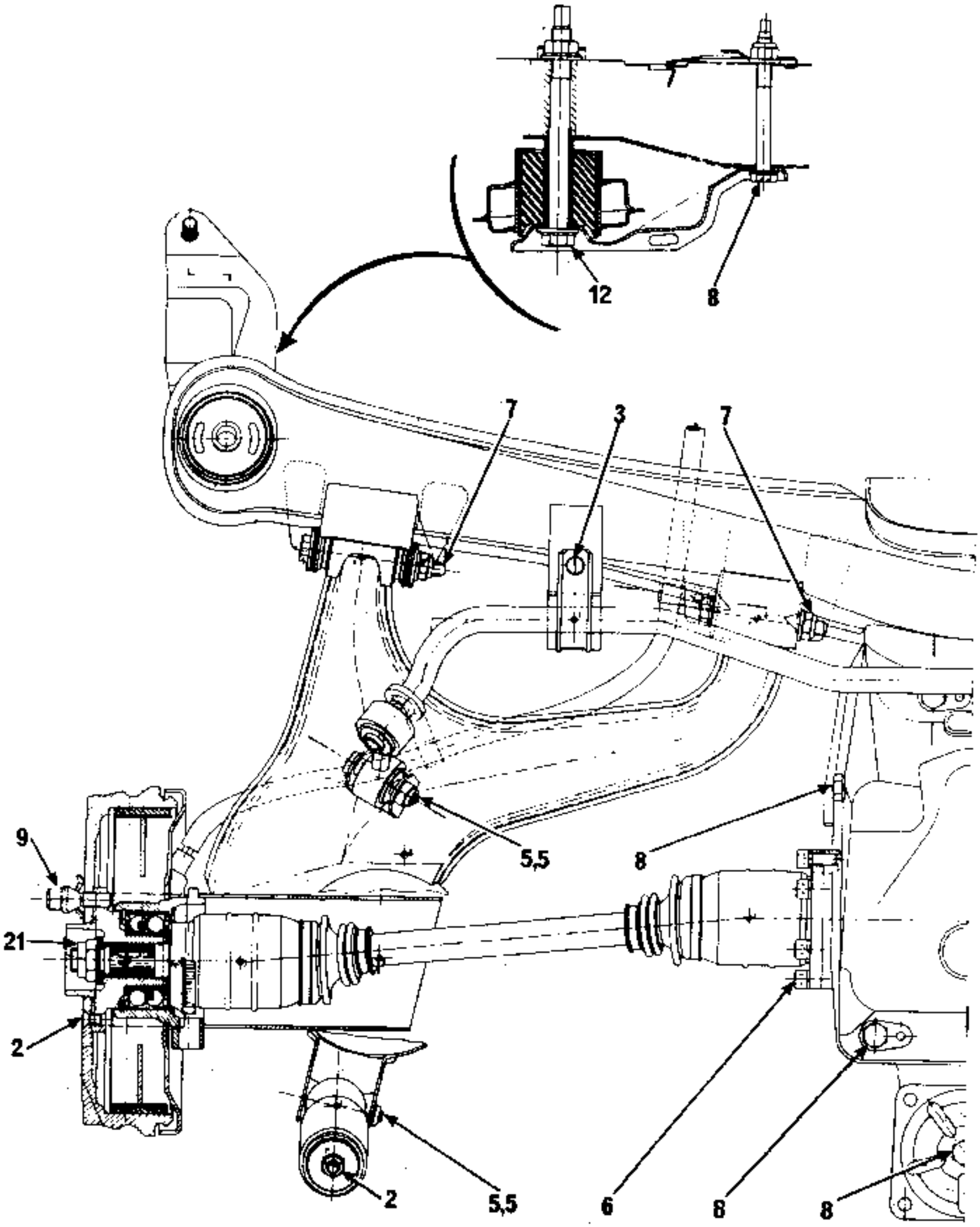
Except 4 x 4 vehicles



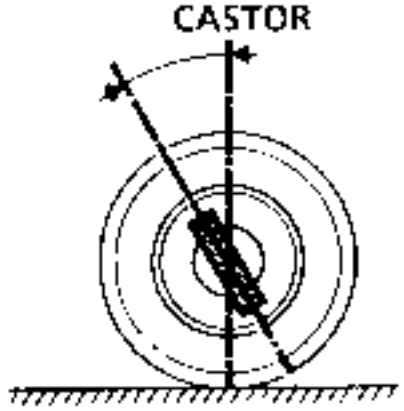
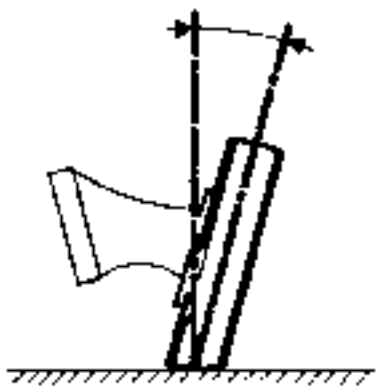
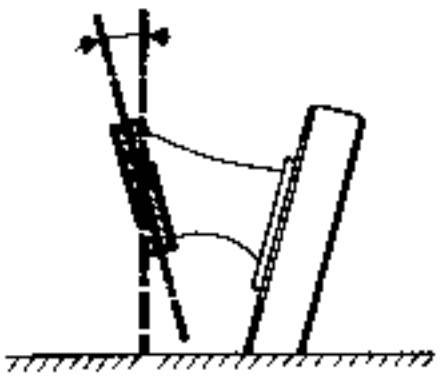
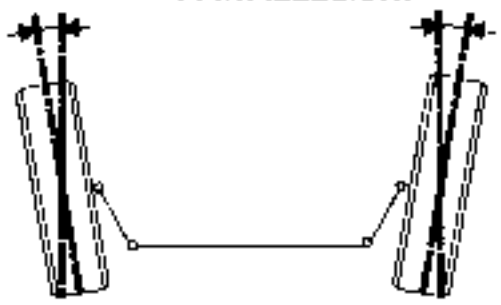
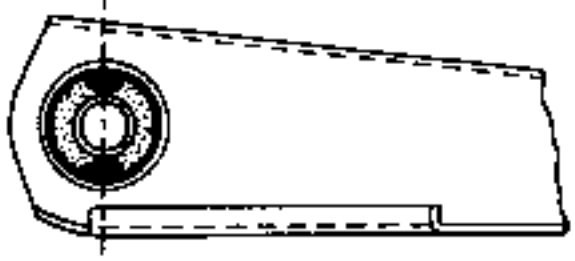
213010


Except 4 x 4 vehicles
8,5
8
2
16
10
7,5
8,5
6,5
213011

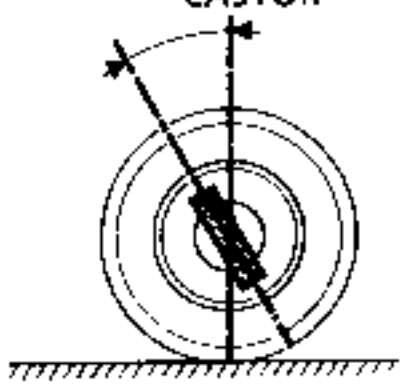
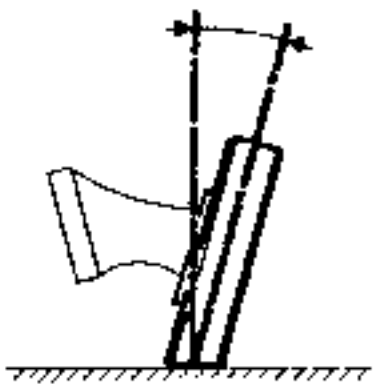
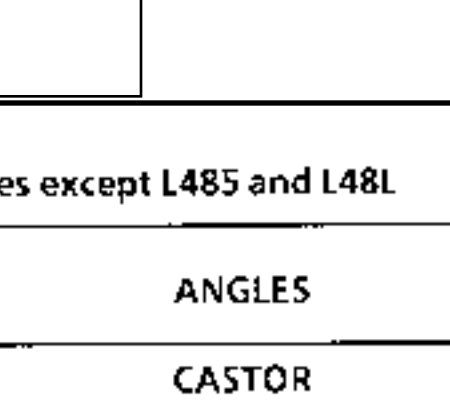
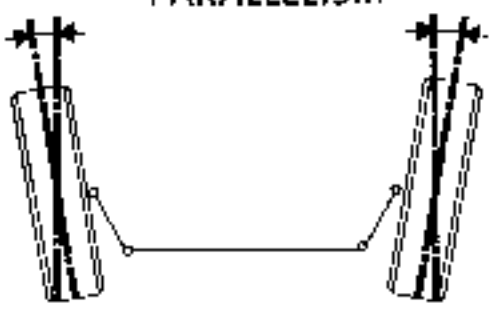
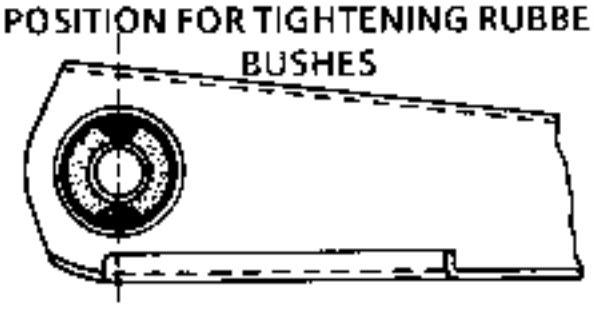
4 x 4 vehicles



213012

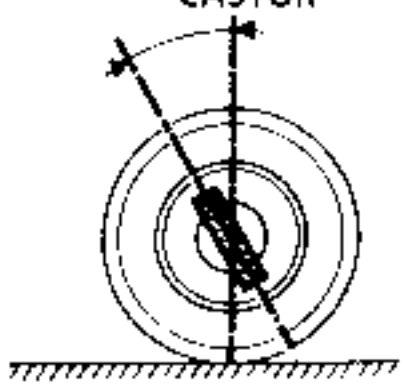
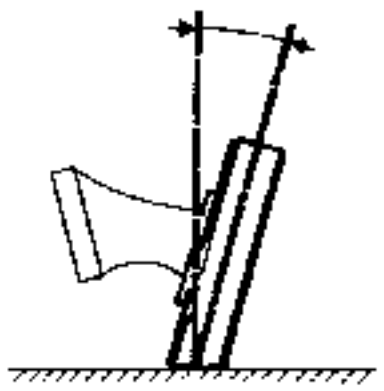
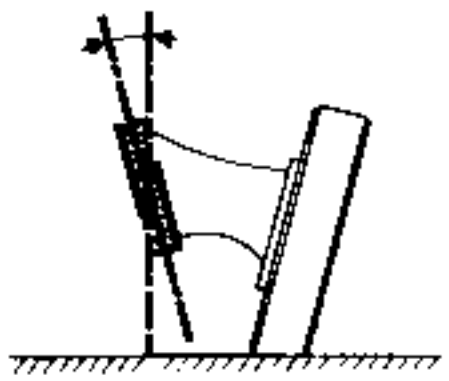
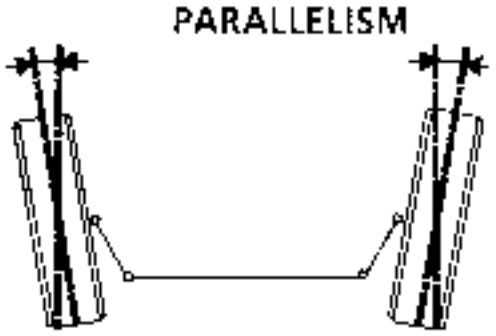
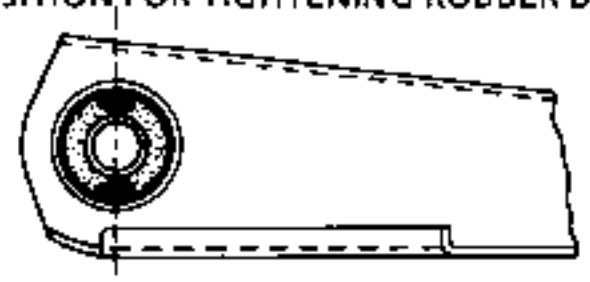
ANGLES	VALUES	FRONT AXLE POSITION	ADJUSTMENT
CASTOR  213013-1	3° 2°30 2° 1°30 1° Maximum difference between RH and LH sides = 1°	H5 – H2 = 28 mm H5 – H2 = 50 mm H5 – H2 = 70 mm H5 – H2 = 90 mm H5 – H2 = 112 mm	NOT ADJUSTABLE
CAMBER  213013-2	0°40′ 2°30′ 0° – 0°20′ – 0°35′ } ± 30′ Maximum difference between RH and LH sides = 1°	H1 – H2 = 56 mm H1 – H2 = 64 mm H1 – H2 = 84 mm H1 – H2 = 103 mm H1 – H2 = 123 mm	NOT ADJUSTABLE
KING PIN INCLINATION  213013-3	10°45′ 11° 11°40′ 12°15′ 12°45′ } ± 30′ Maximum difference between RH and LH sides = 1°	H1 – H2 = 56 mm H1 – H2 = 64 mm H1 – H2 = 84 mm H1 – H2 = 103 mm H1 – H2 = 123 mm	NOT ADJUSTABLE
PARALLELISM  78423S	(toe-out) 0° 10′ ± 10′ (1 mm ± 1)	UNLADEN	Adjustable by rotating steering arm sleeves 1 turn – 30′ (3 mm)
POSITION FOR TIGHTENING RUBBER BUSHES  8160351	–	UNLADEN	–

All types except L485 and L48L

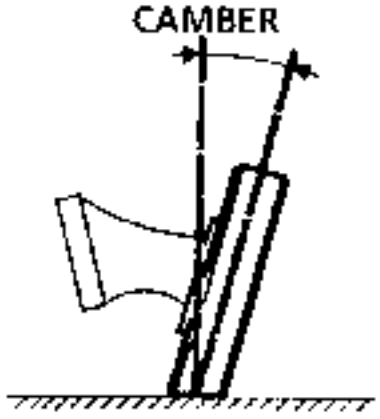
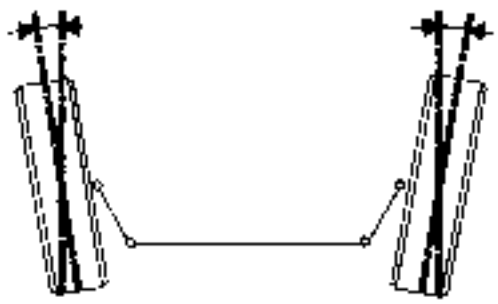
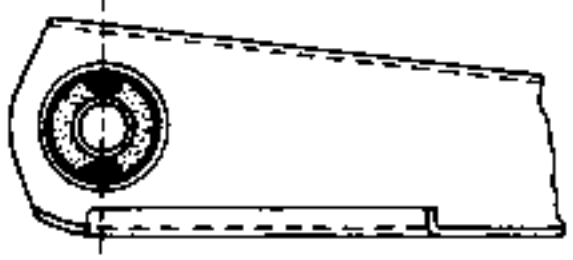
ANGLES	VALUES	FRONT AXLE POSITION	ADJUSTMENT
CASTOR  213013-1	Manual steering and PAS (2) / PAS (1) 3°30' / 4°30' 3° / 4° 2°30' / 2°30' 2° / 2° 1°30' / 1°30 with a tolerance of ± 30'	H5 – H2 = 35 mm H5 – H2 = 55 mm H5 – H2 = 75 mm H5 – H2 = 95 mm H5 – H2 = 115 mm	NOT ADJUSTABLE
CAMBER  213013-2	– 0°05' – 0°10' – 0°25' – 0°35' – 0°50' } ± 30' Maximum difference between LH and RH sides – 1°	H1 – H2 = 78 mm H1 – H2 = 83 mm H1 – H2 = 98 mm H1 – H2 = 110 mm H1 – H2 = 130 mm	NOT ADJUSTABLE
KING PIN INCLINATION  213013-3	12°10' 12°20' 12°45' 13°05' 13°40' } + 30' Maximum difference between LH and RH sides = 1°	H1 – H2 = 78 mm H1 – H2 = 83 mm H1 – H2 = 98 mm H1 – H2 = 110 mm H1 – H2 = 130 mm	NOT ADJUSTABLE
PARALLELISM  784235	(toe-out) 0° 10' ± 10' (1 mm – 1)	UNLADEN	Adjustable by rotating steering arm sleeves 1 turn = 60' (6 mm)
POSITION FOR TIGHTENING RUBBER BUSHES  B160351	–	UNLADEN	–

(1) As from 1990 model 1990
(2) Up to and including 1989 model

L485 and L48L vehicles

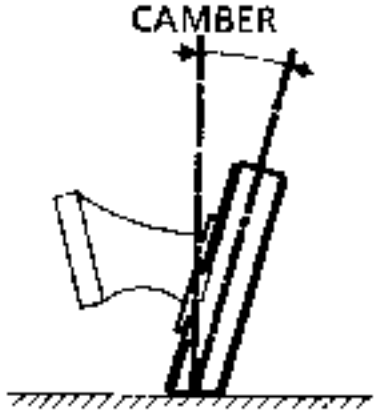
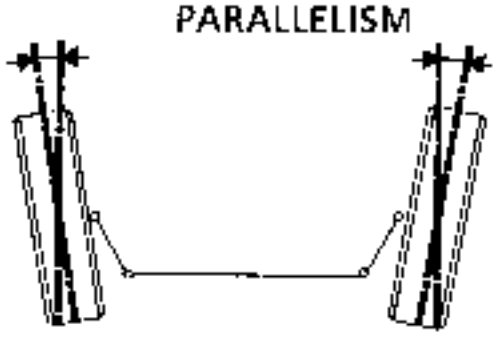
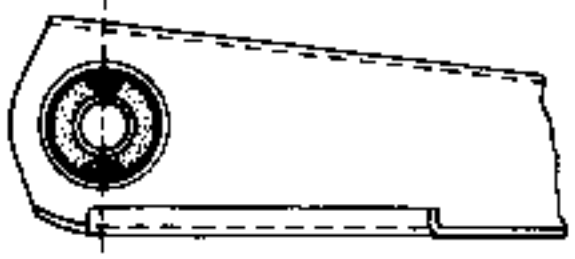
ANGLES	VALUES	FRONT AXLE POSITION	ADJUSTMENT
CASTOR  213013-1	5°20' ⎫ 4°50' ⎪ 4°20' ⎬ ± 30' 3°50' ⎪ 4°20' ⎭ Maximum difference between RH and LH sides = 1°	H5 – H2 = 35 mm H5 – H2 = 55 mm H5 – H2 = 75 mm H5 – H2 = 95 mm H5 – H2 = 115 mm	NOT ADJUSTABLE
CAMBER  213D13-2	0°05' ⎫ –0°20' ⎪ –0°30 ⎬ ± 30' –0°35' ⎪ –0°30' ⎭ Maximum difference between RH and LH sides – 1°	H1 – H2 = 60 mm H1 – H2 = 90 mm H1 – H2 = 120 mm H1 – H2 = 130 mm H1 – H2 = 145 mm	NOT ADJUSTABLE
KING PIN INCLINATION  213013-3	10°5' ⎫ 11°5' ⎪ 11°55' ⎬ ± 30' 12°10' ⎪ 12°30' ⎭ Maximum difference between RH and LH sides = 1°	H1 – H2 = 60 mm H1 – H2 = 90 mm H1 – H2 = 120 mm H1 – H2 = 130 mm H1 – H2 = 145 mm	NOT ADJUSTABLE
PARALLELISM  784235	Over two wheels (toe-out) 0° 10' + 10' 1 mm ± 1 mm	UNLADEN	Adjustable by rotating steering arm sleeves 1 turn = 60' (6 mm)
POSITION FOR TIGHTENING RUBBER BUSHES  816035t	–	UNLADEN	–

X48 vehicles prior to 01/07/1992

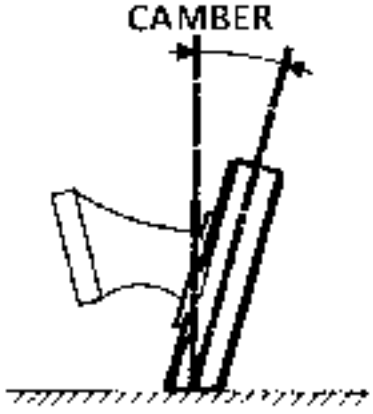
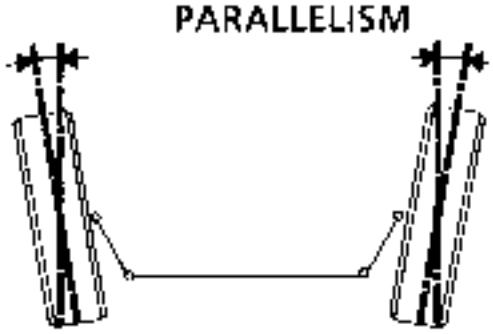
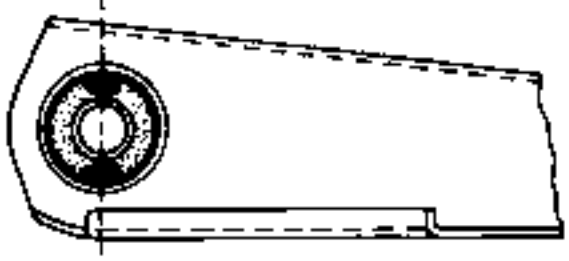
ANGLES	VALUES	REAR AXLE POSITION	ADJUSTMENT
CAMBER  213013-2	– 0° 40′ ± 10′	UNLADEN	NOT ADJUSTABLE
	– 0° 20′ ± 10′ (1)		
PARALLELISM  78423S	Over two wheels (toe-in) – 20′ to – 50′ or – 2mm to – 5 mm	UNLADEN	NOT ADJUSTABLE
POSITION FOR TIGHTENING RUBBER BUSHES  8160351	–	UNLADEN	–

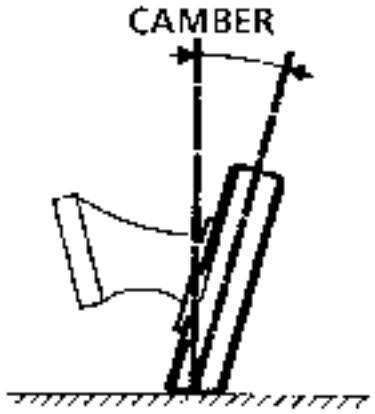
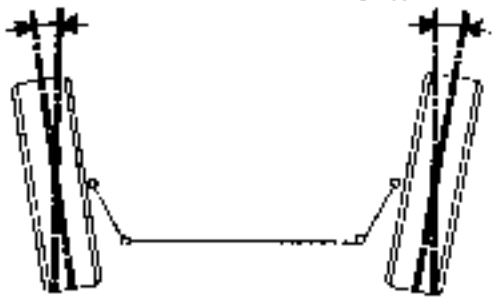
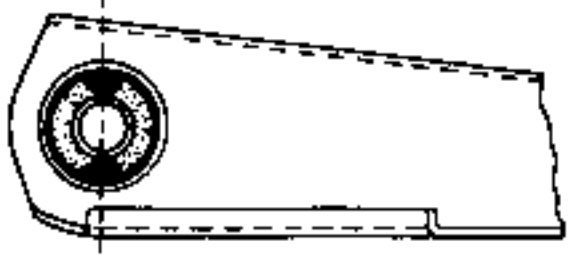
(1) As from 1989 model

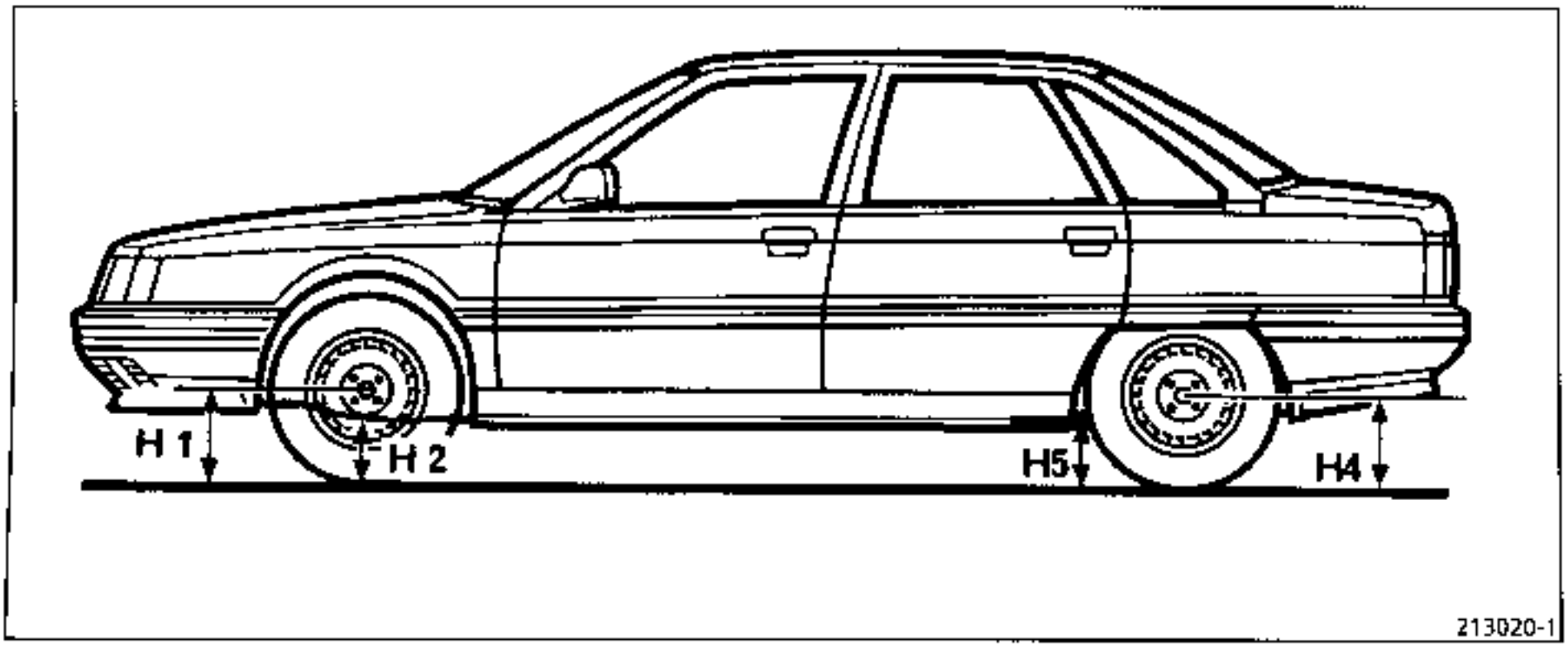
X48 vehicles after 01/07/1992 except petrol turbo version

ANGLES	VALUES	REAR AXLE POSITION	ADJUSTMENT
CAMBER  213013-2	– 1° 15' ± 10'	UNLADEN	NOT ADJUSTABLE
PARALLELISM  784235	Over two wheels (toe-in) – 4' to – 24' or – 0.4 mm to – 2.4 mm	UNLADEN	NOT ADJUSTABLE
POSITION FOR TIGHTENING RUBBER BUSHES  B1603S1	–	UNLADEN	–

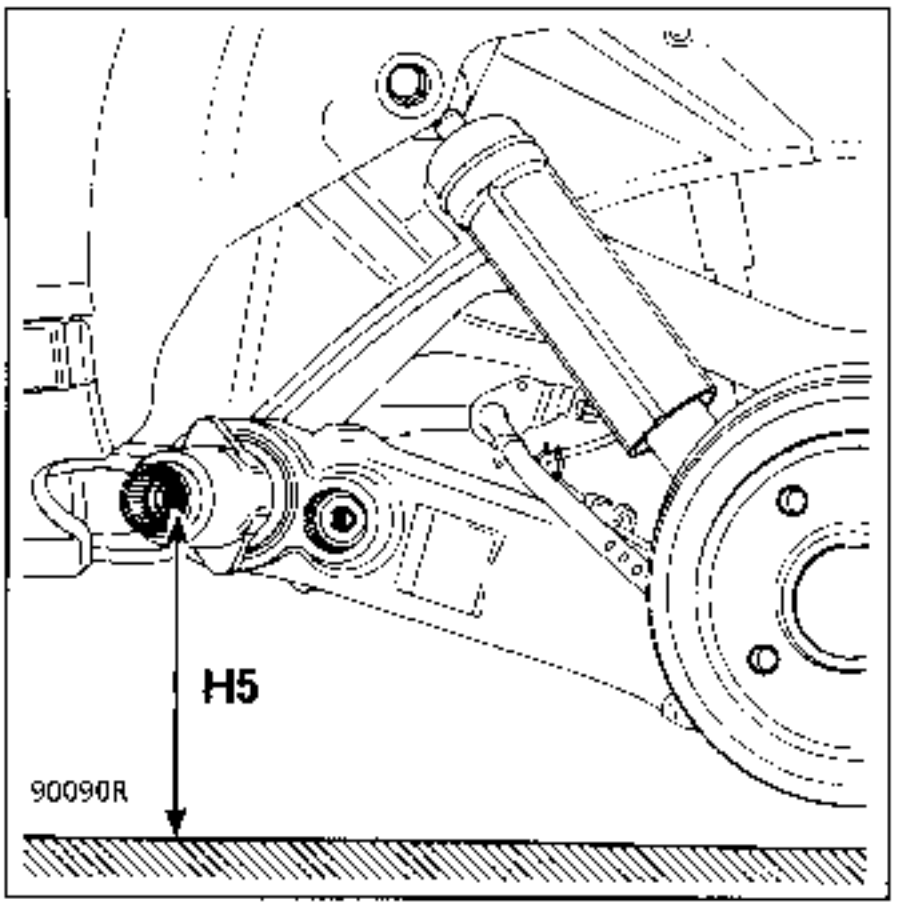
Petrol turbo vehicles as from 01/07/1992

ANGLES	VALUES	REAR AXLE POSITION	ADJUSTMENT
CAMBER  213013-2	– 1° 15' ± 10'	UNLADEN	NOT ADJUSTABLE
PARALLELISM  7B42.35	Over two wheels (toe-in) – 16' to – 24' or – 1.6 mm to – 2.4 mm	UNLADEN	NOT ADJUSTABLE
POSITION FOR TIGHTENING RUBBER BUSHES  B160351	–	UNLADEN	–

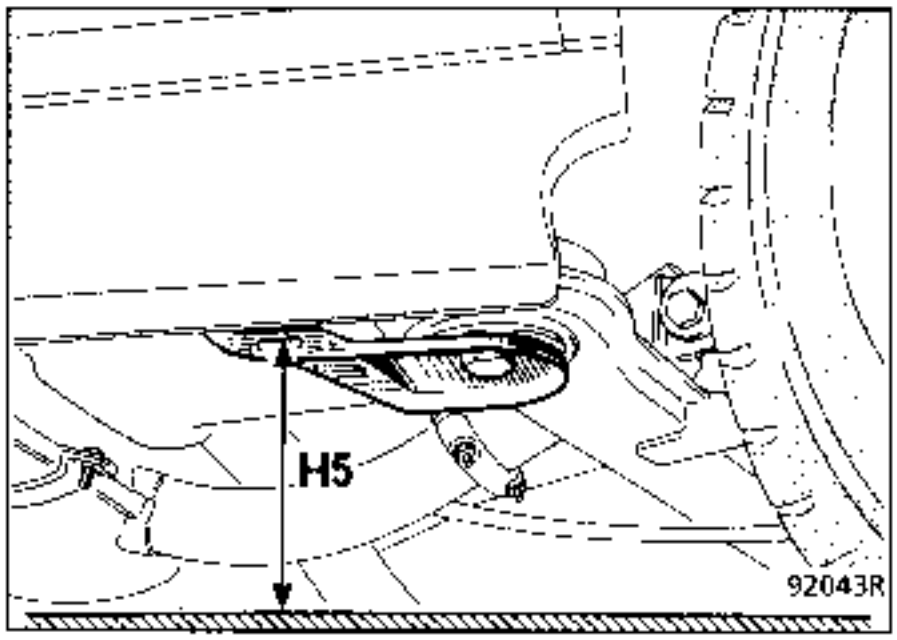
ANGLES	VALUES	REAR AXLE POSITION	ADJUSTMENT
CAMBER  213013-2	– 0° 30′ ± 10′	UNLADEN	NOT ADJUSTABLE
PARALLELISM  784235	Over two wheels (toe-in) – 30′ to – 50′ or – 3 mm to – 5 mm	UNLADEN	By rotating one cam bolt
POSITION FOR TIGHTENING RUBBER BUSHES  8160351	–	UNLADEN	–

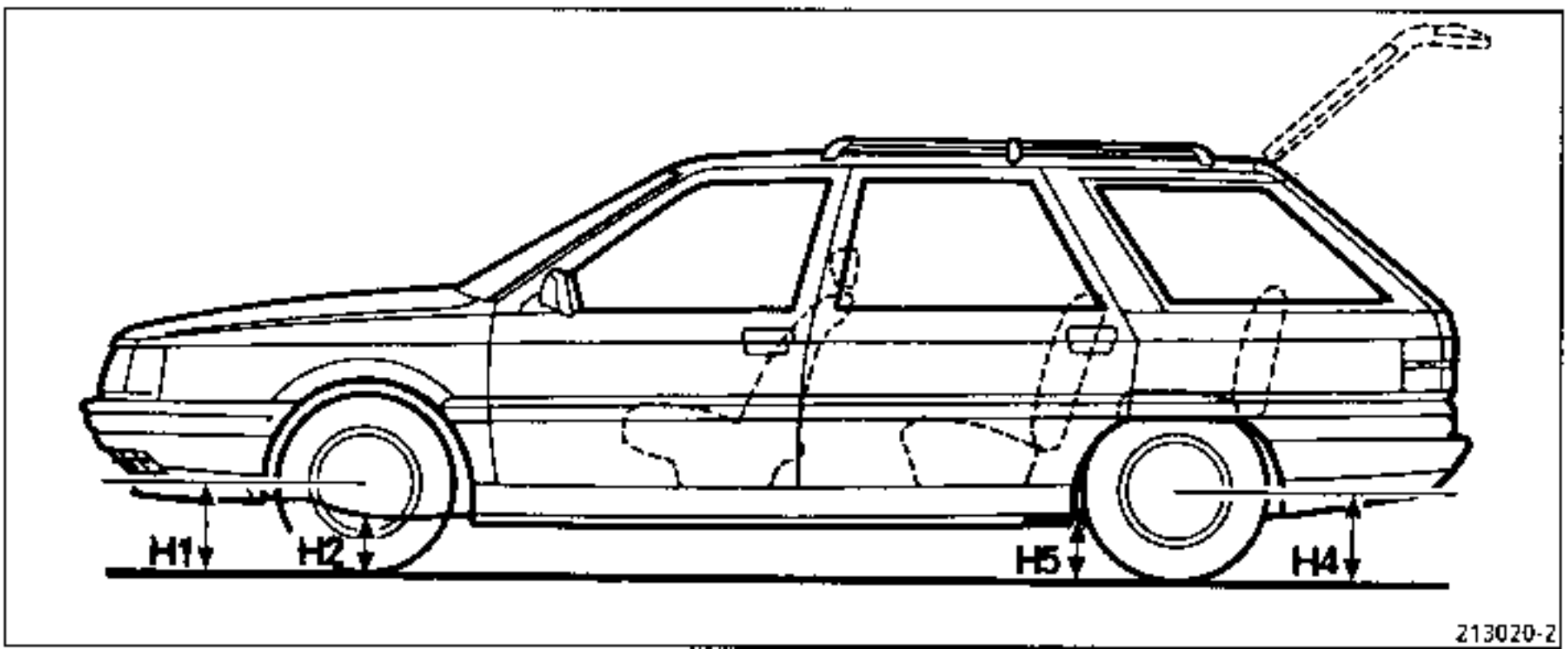


4 x 2 VEHICLES



4 x 4 VEHICLES





The underbody height is measured with the vehicle unladen (preferably on a lift) :
- fuel tank full,
- correct tyre inflation pressures.

H1 to **H4** equals distance from wheel centre lines to ground.

H2 equals distance of front side member from ground measured along the wheel centre line.

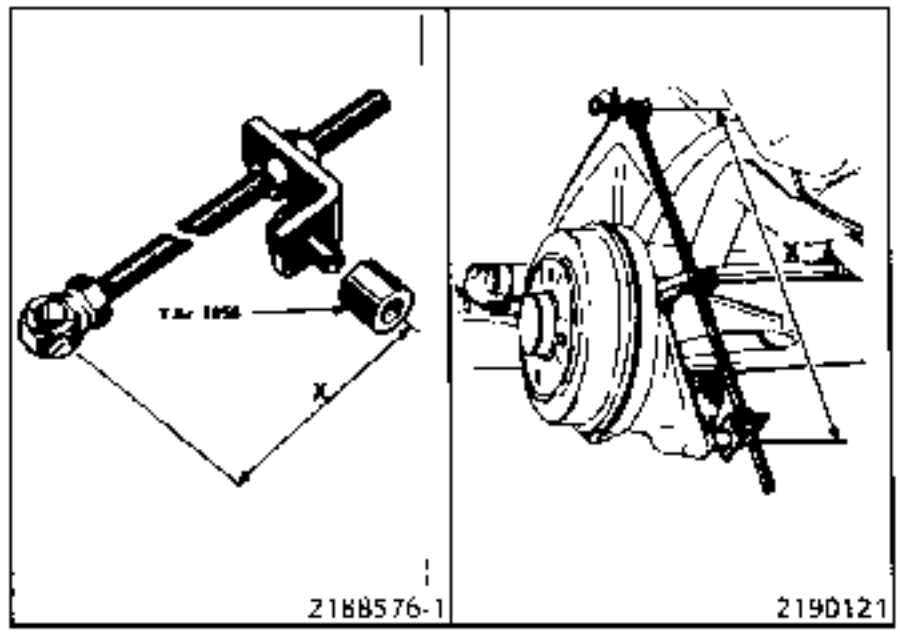
H5 equals distance from suspension bar centre line to ground **(4 x 2 vehicle)**.

H5 equals distance from a front face along rear jacking point **(4 x 4 vehicle)**.

Measure :
H1 and **H2** at the front,
H4 and **H5** at the rear and calculate the difference.

* Tolerance : ± **7.5 mm**

Only the rear underbody height can be adjusted by rotating the torsion bars. Whenever the underbody height has been altered, check the setting of the headlight beams.



Type	At the front H1 – H2 = ...mm*	At the rear H4 – H5 = ...mm*	Dimension X (mm) RH and LH
B481 B48F B484 L481 L48F L484 B482 B48H B48I L482 L48H L48I B48D B48J L48D L48J B48E L48M L48E L48N	84	28	496
L481 DAI L48J DAI	64	0	508
B487 L487 B483 L489 B48W B48C L48C L483 B48K B48P L48P B488 L48K L488 L48W	98	30	485
B480 L480 B486 B48A L48A L486 B48O L48O B48V L48V	84	23	485
L485 L48L	119	52	445
B48Y B48R B48Q L48Y L48R L48Q	108	38	480
K480 K481 K48H K48A S481 S48H K48I K482 K48J K48O S482 K48M K486 K48N S486 K48V K48E S48V K48F	84	10	475
K487 K48R K483 K48K K489 K488 K48W	98	10	475
K48J	64	10	475
K483 4 x 4 K48K 4 x 4	88	44	–
K486 4 x 4 K48V 4 x 4	73	42	–

TYPE	QUANTITY	UNITS CONCERNED
MOLYKOTE BR2	24 cm3 Smear	Steering box Driveshaft splines at gearbox end Torsion bar splines
RHODORSEAL 5661 (ex- CAF 4/60 THIXO)		Driveshaft roll pin hole
MOLYKOTE 33 MEDIUM	Smear	Anti-roll bar bearing bushes
LOCTITE FRENBLOC	1 to 2 drops	Axial ball joint threads Rear brake plate mounting bolts
LOCTITE SCELBLOC	5 to 6 drops	Drive shaft stub axle

Parts to be replaced systematically when they have been removed

- Axial ball joint lock plates.
- Balance weight clips.
- Hub bearings.
- Drive shaft gaiter - bearing.
- Girling brake calliper guide bolts.
- Bearing clips.
- Stub axle lock nut.
- Bolts securing stub axle to arm (4x2).
- Drive shaft metal cap gaiter (4x4).

Vehicle Type	B481 L481 K481 S481 B482 L482 K482 B484 K484 B48D L48D B48E L48E K48E B48F L48F K48F B48H L48H K48H S48H B48I L48I K48I B48J L48J K48J L48M K48M L48N K48N B48U K48U L48U	B480 K480 S480 L480 B483 K483 L483 K483 4 x 4 B486 K486 L486 S486 K486 4 x 4 B487 K487 L487 B488 K488 L488 K488 4 x 4 K489 L489 B48A L48A K48A K48B B48C K48C B48K L48K K48K K48 4 x 4 B48O K48O L48O B48P L48P K48P B48Q L48Q B48R L48R K48R K48S L48S B48V L48V K48V S48V K48 4 x 4 B48W L48W K48W B48Y L48Y	L483 L485 L489 L48C L48L L48Q L48Y
Diameter	25 mm	25.4 mm	24.9 mm

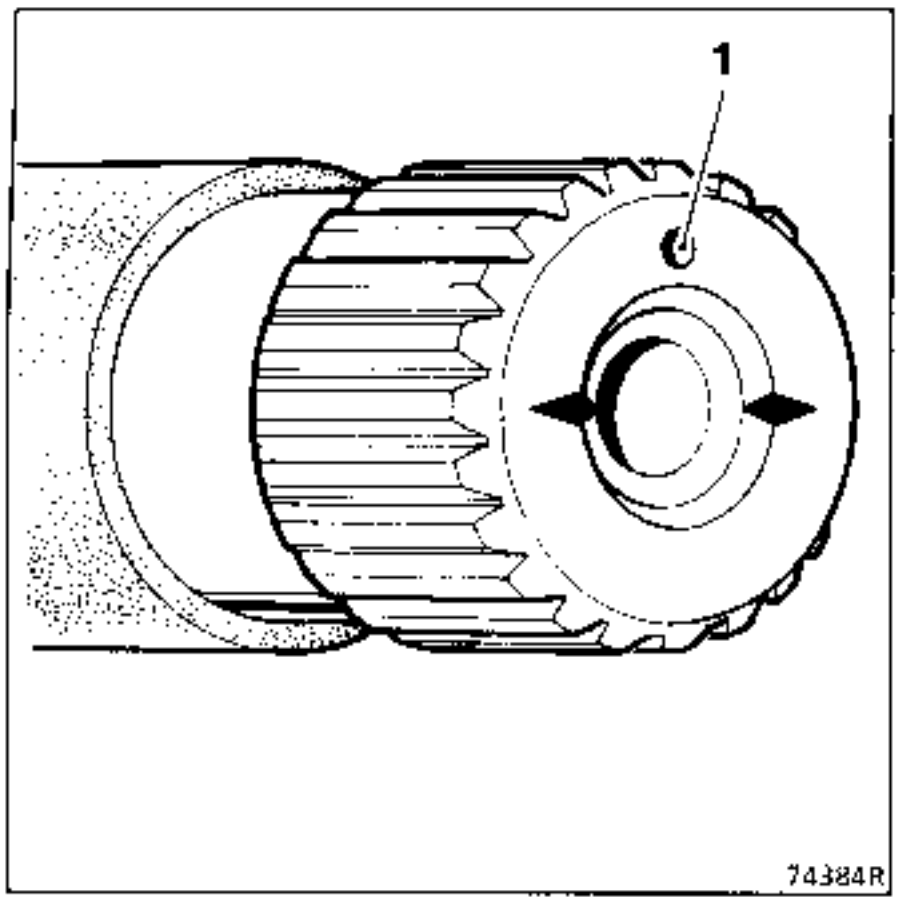
Vehicle Type	L481	B481	L480	B480	K480	L485	K483 4 x 4
	L482	B482	L483	B483	S480	L48L	K486 4 x 4
	L484	B484	L485		K481		K48K 4 x 4
	L48E	B48E	L486	B486	S481		K48V 4 x 4
	L48F	B48F	L487	B487	K482		
	L48I	B48I	L488	B488	S482		
	L48J	B48J	L489		K483		
	L48M		L48A	B48A	K486		
	L48N		L48C	B48C	S486		
	L48D	B48D	L48K	B48K	K487		
	L48H	B48H	L48L		K488		
	L48U	B48U	L48O		K489		
			B48O		K48A		
			L48P		K48B		
			B48P		K48C		
			L48Q		K48E		
			B48Q		K48F		
			L48S		K48H		
			L48V		S48H		
			B48V		K48I		
			L48W		K48J		
			B48W		K48K		
			L48R		K48M		
			B48R		K48N		
			B48Y		K48P		
			B48Y		K48R		
					K48S		
					K48U		
					K48V		
					K48W		
Diameter	21 mm		24 mm		22 mm	26.5 mm	20.5 mm
Length	575 mm		575 mm		575 mm	575 mm	–
Number of splines at bearing end	31		31		31	31	–
Number of splines at link block end	30		30		30	30	–

Vehicle Type	K480 S480 B481 L481 K481 S481 B482 L482 K482 S482 K483 L484 B484 L485 K486 S486 K487 K488 K489 K48A K48B K48C L48D B48D L48E K48E B48E L48F K48F B48F L48H B48H K48H S48H L48I B48I K48I L48J K48J B48J K48K L48L L48M K48M L48N K48N K48P K48R K48S L48U B48U K48U K48V S48V K48W	B480 L480 B483 L483 L485 B486 L486 B487 L487 B488 L488 L489 B48A L48A B48C L48C B48K L48K L48L B48O L48O B48P L48P B48Q L48Q B48R L48R L485 B48V L48V B48W L48W B48Y L48Y
Diameter	24.5 mm	22.5 mm
Length	650 mm	650 mm
Number of splines at bearing end	31	31
Number of splines at link block end	30	30

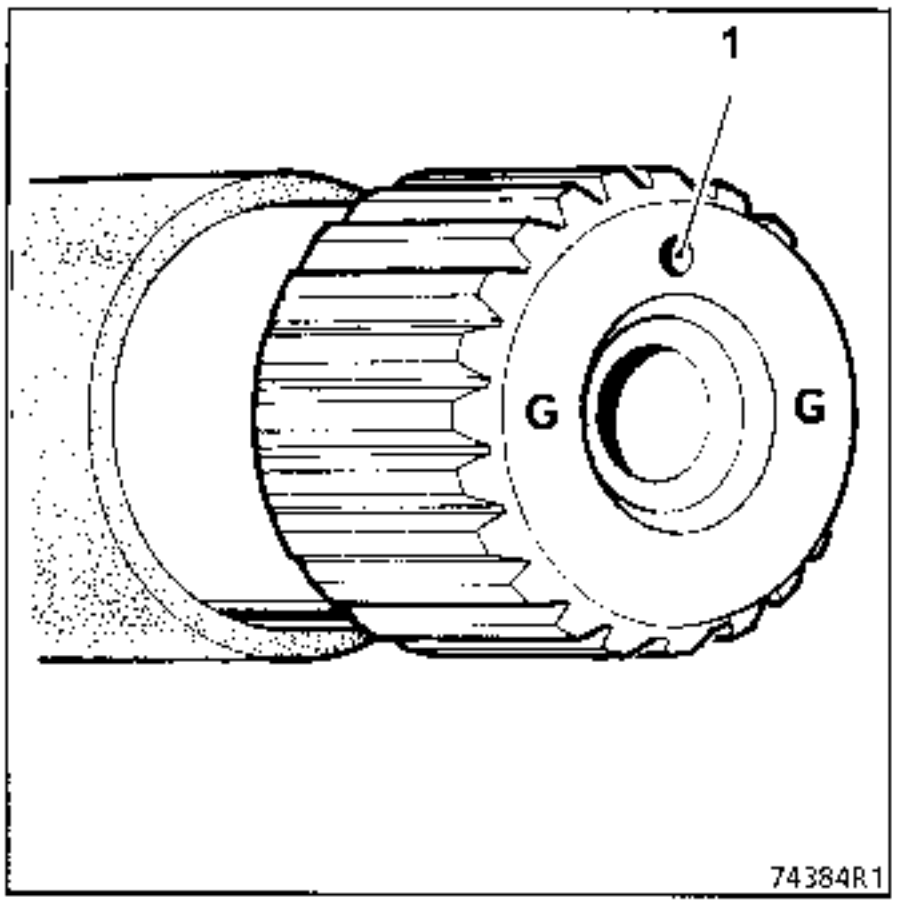
As the direction of torsion when laden is reversed, the righthand and lefthand bars are identified by :

- recesses on their ends
  or
- letters stamped on their ends

LEFTHAND BAR

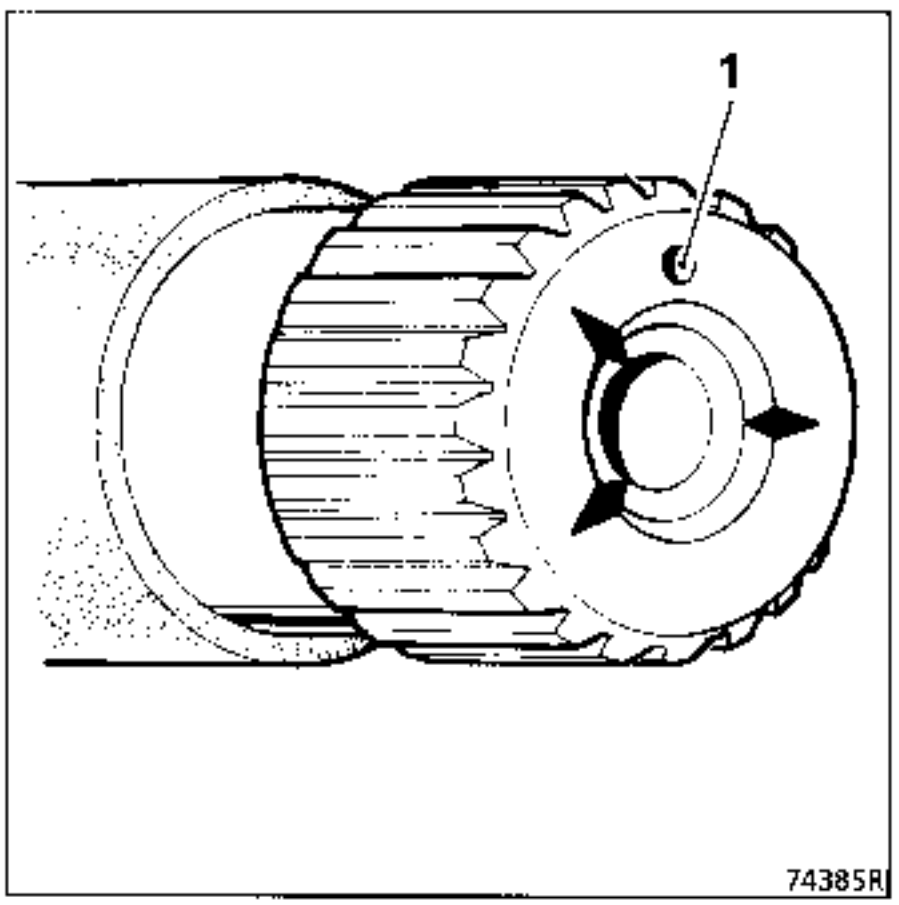


2 recesses

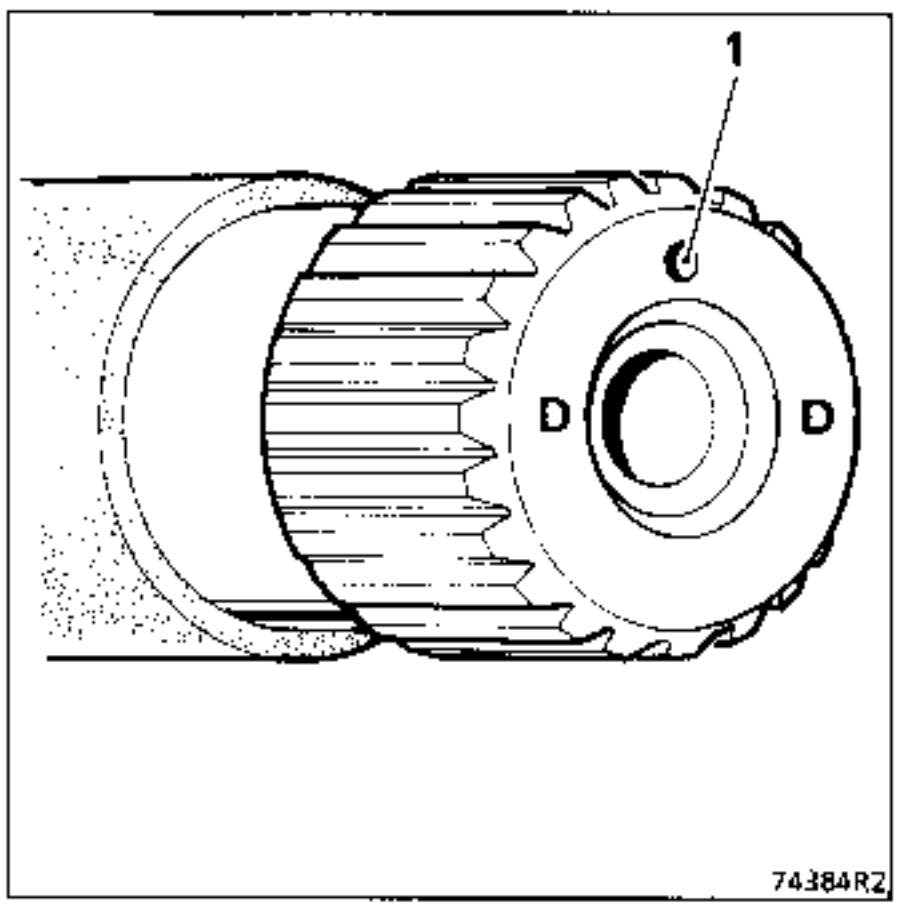


Letter G (lefthand)

RIGHTHAND BAR



3 recesses



Letter D (righthand)

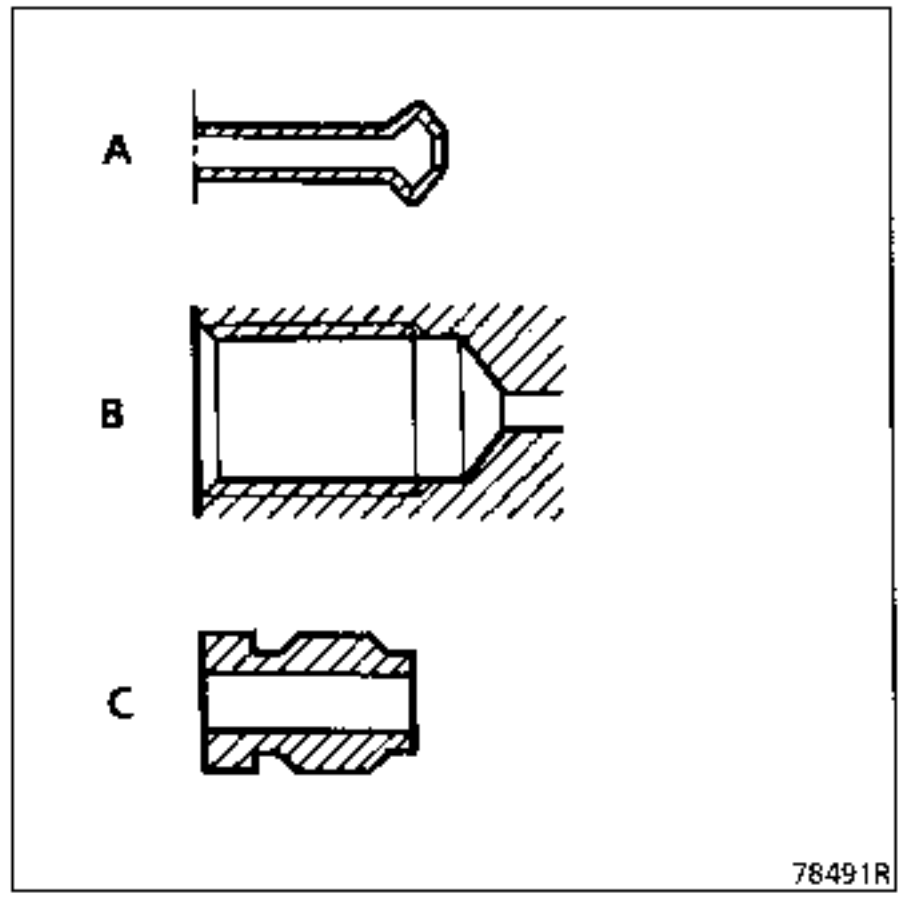
NOTE : the bars have a marking "1" (drill bit), used to position the bar in the bearings.

METRIC THREADS are used on all pipe unions connecting the master cylinder, front callipers, brake limiter and rear wheel or calliper cylinders.

It is therefore important to use only those parts which are shown in the Parts Catalogue or microfiche for this vehicle.

Identification of components :

- **SHAPE** of **PIPE** ends in steel or copper tube (A),
- **SHAPE** of **THREADED BORES** in calliper or wheel cylinder (B),
- **UNIONS** for **GREEN** or **BLACK** pipes : 11 or 12 mm, hexagonal (C).



Influence of angles

Influence of the various front axle angles on holding a straight line and tyre wear.

CAMBER

The relationship between the righthand and lefthand camber angles is important; they should be equal. A difference of more than one degree will cause a pull to one side which will have to be corrected at the steering wheel and this leads to abnormal tyre wear.

CASTOR

The relationship between the righthand and lefthand castor angles is important; they should be equal. A difference of more than one degree will cause a pull to one side which will have to be corrected at the steering wheel and this leads to abnormal tyre wear.

It may be recognised by a pull to the side with the small angle at steady speed.

STEERING BOX HEIGHT SETTING

This adjustment affects parallelism variation when the suspension is working.

Variations in parallelism which differ between righthand and lefthand sides lead to the following (steering wheel in same position) :

- a pull to one side on acceleration,
- a pull to the opposite side on braking,
- difficulty in maintaining a straight line on rough surfaces.

PARALLELISM

This adjustment must be made with the steering in the centre position so as to avoid affecting the vehicle's behaviour.

It should be noted that :

- excess toe-out leads to symmetrical tread wear on the inside edge of both tyres,
- excess toe-in leads to symmetrical tread wear on the outside edge of both tyres.

PRELIMINARY CHECKS

Before checking the angles of an axle, the following points must be checked and adjusted, if necessary :

- symmetry of tyres on any one axle :
  - dimensions,
  - inflation pressures,
  - degree of wear.

- pivot points :
  - condition of silentbloc bushes,
  - ball joint clearance,
  - bearing clearance.

- wheel run out :
  This should not exceed **1.2 mm** (it will be compensated by measuring equipment).

- underbody height symmetry (state of suspension).

DETERMINING THE STEERING CENTRE POINT

When checking or adjusting the front axle, the steering centre point must be determined so as to prevent pulling to one side.

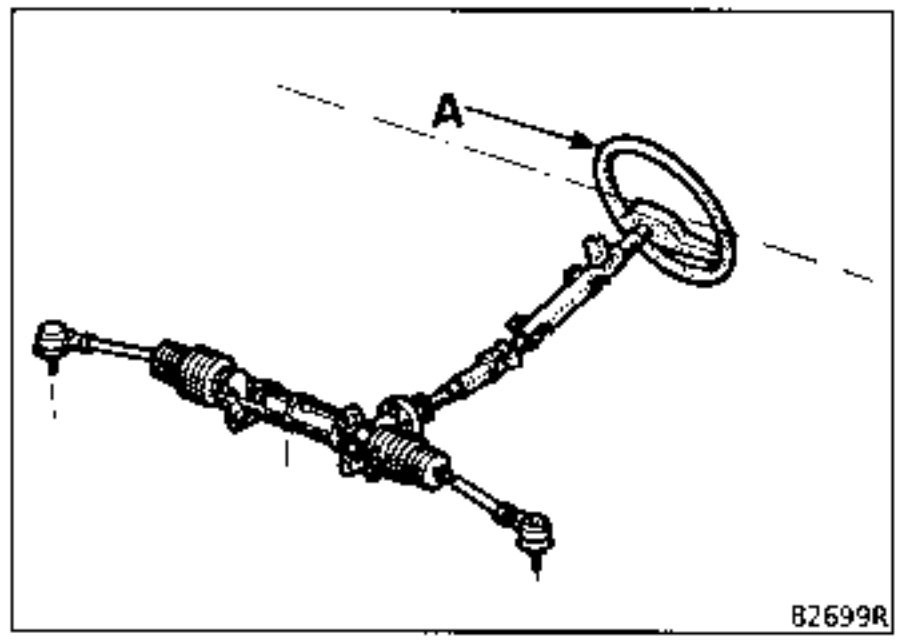
- **Transverse engine**

Turn the steering wheel on full lock in one direction.

Mark the steering wheel rim (**A**) at the top.

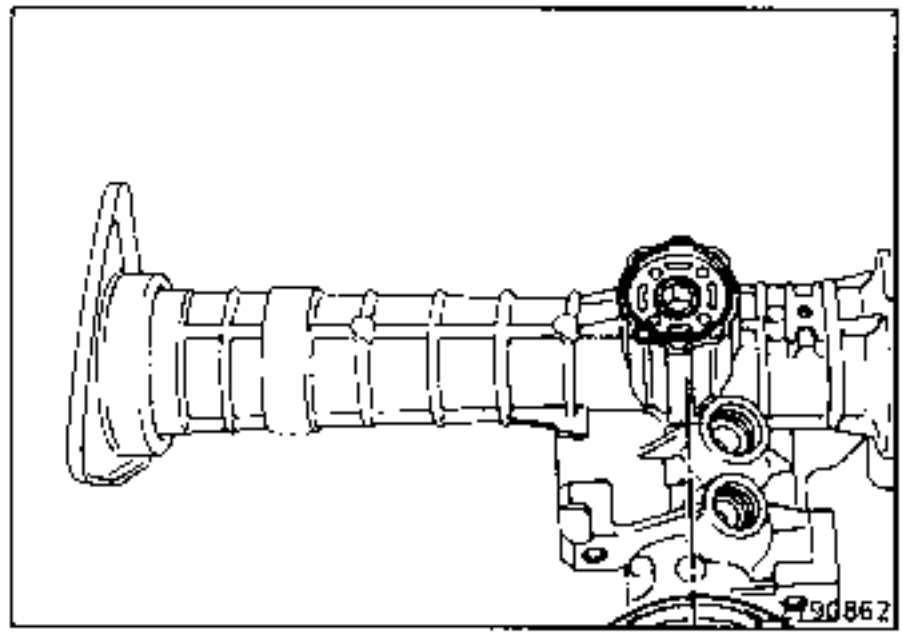
Now turn the steering wheel on full lock in the other direction, counting the number of turns and fractions of a turn.

Turn the steering wheel back half the number of turns and fractions of a turn just counted. This is the steering "**centre point**".



- **Longitudinal engine**

Fit tool Dir. **1 067** in holes **A** and **B** of the steering box and rack.



- **All types**

In this position, fit the measuring equipment and proceed with the test.

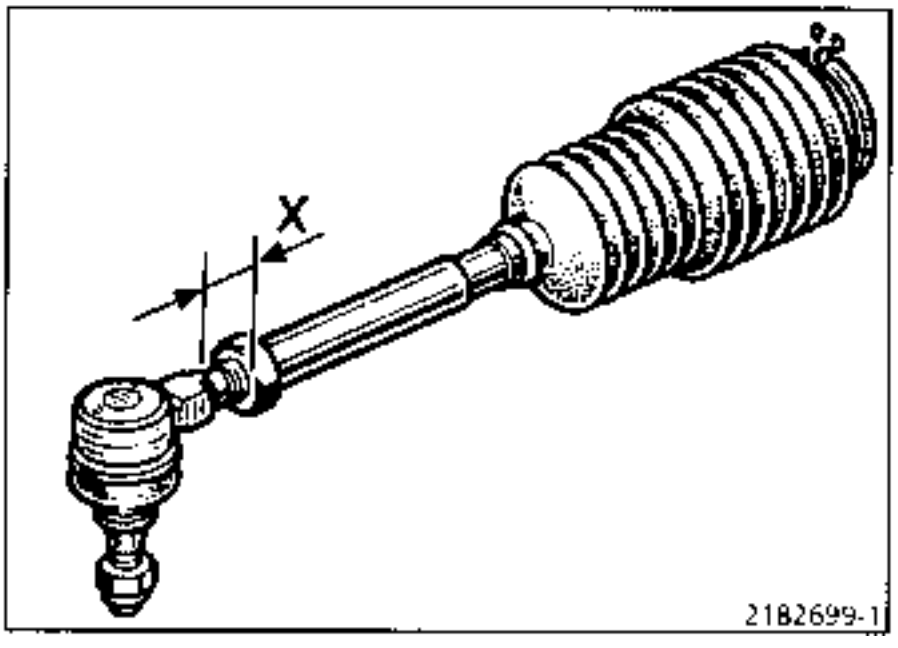
SEQUENCE OF OPERATIONS

Owing to the design of the front axle, a modification to any of the angles (castor, camber, KPI, parallelism or distribution) will affect the other angles to a varying extent. The castor angle has the greatest influence.

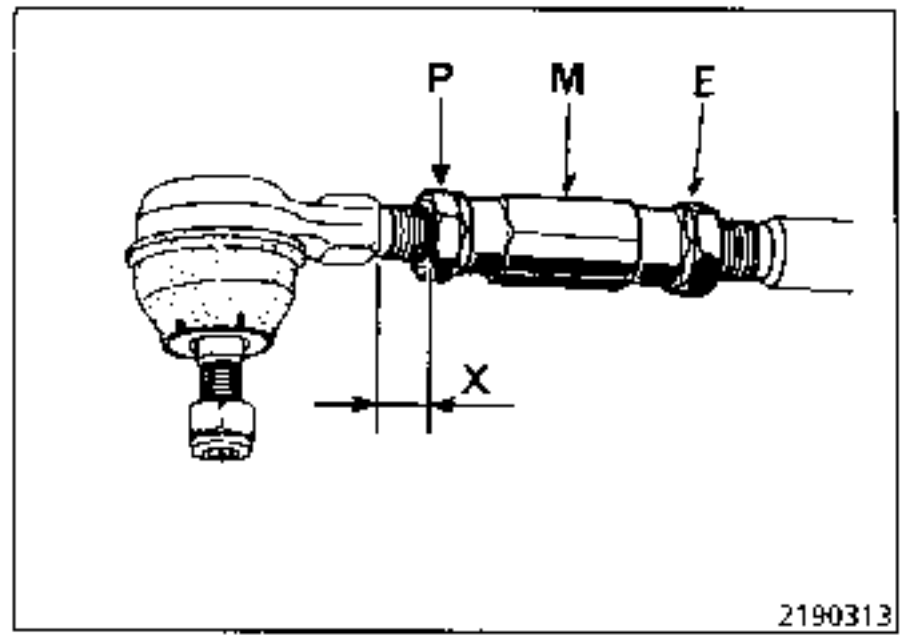
It is, therefore, absolutely essential to perform the following operations in the order given :

- fit the checking apparatus to the vehicle according to the manufacturer's instructions,
- determine the steering centre point (see preceding page) and lock the steering wheel,
- raise the vehicle under the bodyshell,
- cancel the rim run-out,
- lower the vehicle onto turntables,
- fit the brake pedal press,
- move the suspension up and down to settle the vehicle,
- check that the lengths X of the ball joint housings on the steering arms are symmetrical

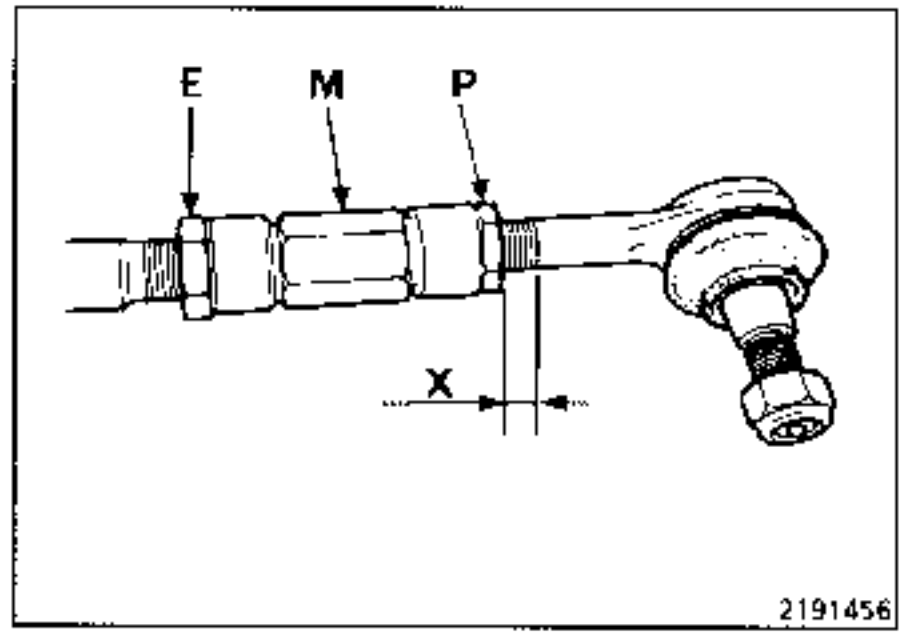
TRANSVERSE



IN-LINE **1st type**



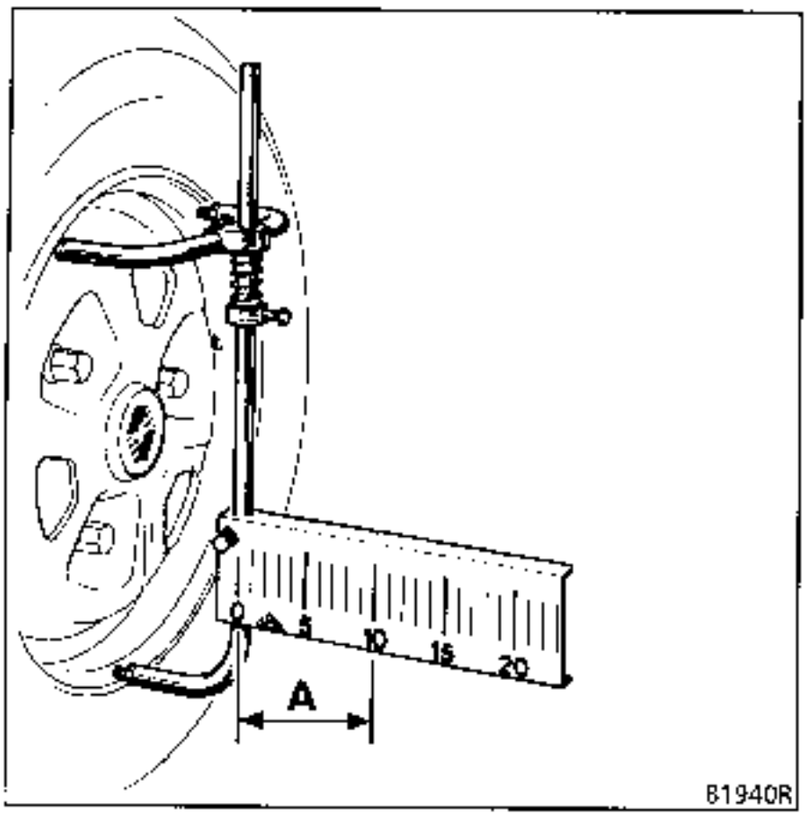
2nd type



When adjusting the parallelism, ensure that the lengths X of the ball joint housings on the steering arms are symmetrical.

(1) **Symmetry of lengths X correct :**

- dimension *A* must be evenly distributed.



(2) **Symmetry of lengths X incorrect :**

- measure dimensions *A* on the righthand and lefthand sides, deduct one from the other and allow half the result for each side.

Example :
Value on righthand side : 16
Value on lefthand side : 10
16 – 10 = 6
6 : 2 = 3

Move the steering arms to balance dimensions *A* on both sides :

A = 13

- in this position, set the turntables to zero,

- check in sequence :
  - castor,
  - KPI,
  - camber,
  - parallelism.

ADJUSTING THE PARALLELISM

Several cases are possible :

Parallelism	Distribution	Correction to be made
(1) CORRECT	INCORRECT	Turn the adjusting sleeve by the same number of turns (or end piece) but in the opposite direction for the lefthand and righthand sides to obtain the same value ***A*** on both sides.
(2) INCORRECT	CORRECT	Adjust the parallelism by the same value on the righthand and lefthand sides, making sure that the value of ***A*** is always the same on both sides.
(3) INCORRECT	INCORRECT	Firstly adjust the distribution so as to balance the values of ***A*** on both sides, then adjust the parallelism as in case n° (2)

Front axle fault-finding

INCIDENTS	POSSIBLE CAUSE
Incorrect castor	- Bent arm - Bent side member
Camber + KPI correct but Camber incorrect KPI incorrect	- Bent arm - Bent side member
Camber good but KPI incorrect	- Bent stub axle carrier
KPI correct but Camber incorrect	- Bent stub axle carrier
Variation in parallelism incorrect	- See Castor Bent arm Bent side member
Parallelism incorrect by more than 6 mm	- Bent righthand or lefthand stub axle carrier

This fault-finding section includes all types of braking systems and components in the current vehicle ranges.

Only those components relating to the vehicle described in this Workshop Repair Manual should be looked at when making a diagnosis.

This section is in two parts to make fault-finding easier :

I **Effect noticed at the brake pedal**
II **Effect noticed in vehicle behaviour.**

I EFFECT NOTICED AT THE BRAKE PEDAL

INCIDENTS	POSSIBLE CAUSE
"Hard pedal" : Great effort needed and only slight deceleration	- **Servo incidents.** - Linings/Pads : . oily, . glazed, not to specification, . overheating (owing to excessive braking on descents) or not to specification. - **Seized piston.** - **Pinched brake line.** - **Linings/Pads worn** : linings/pads almost non-existent, metal starting to rub on metal (very noisy).
"Soft pedal" : **Note** : since the servo system on current vehicles is very effective, the impression may be given that the pedal is "soft". To find out whether an incident has occurred or the braking system is operating normally, two tests must be performed. 1. **Vehicle moving** Assessment test : relation between pedal travel and deceleration. 2. **Vehicle stationary with ignition off** Additional test on pedal travel : depress the brake pedal 5 times to empty the brake servo, before assessing the result of the test.	- **Air in system** : poor bleeding. - **Internal leakage in braking system.** - **Lack of fluid in reservoir** (external leak in braking system).

Long pedal travel Test to be performed with vehicle stationary and ignition off. **Note :** The brake pedal must be depressed 5 times in order to empty the brake servo before taking account of the test result.	- Incorrect shoe adjustment. **Drum brakes** - Manual adjustment : shoes too far from drum surface. **Disc and drum brakes.** - Automatic adjustment : handbrake cable too taut. **Note :** Automatic wear take-up is performed by means of the brake pedal, provided the handbrake is not abnormally tight in the "off" position. - Excessively worn pads/linings or pads/linings not symmetrical (askew or crossed). - Excessive master cylinder operating clearance. - Brake fluid boiling or has heated up.
Pedal to the floor Test to be performed with vehicle stationary and ignition off. **Note :** The brake pedal must be depressed 5 times in order to empty the brake servo before taking account of the test result.	- Hydraulic leakage (check for leaks) - Faulty sealing cup between the two master cylinder circuits. - Brake fluid boiling.

II EFFECT NOTICED IN VEHICLE BEHAVIOUR

INCIDENTS	POSSIBLE CAUSE
Brakes binding	- Chamfer the linings. - Oil or grease on linings. - Fit new return springs.
Brakes grabbing or juddering	- Oval drums. - Excessive disc run-out. - Disc not of even thickness. - Abnormal deposit on discs (corrosion between lining and disc).

Brakes pulling to one side (front)	- Check front axle, suspension and steering. - Piston seized*. - Tyres (worn · incorrect inflation pressure). - Pinched brake-line*. * **WARNING** : On vehicles with front axles with negative off-set, pulling to one side indicates an incident on the opposite side.
Brakes pulling to one side (rear)	- Incorrect compensator or limiter setting or operation - Piston seized. - Incorrect shoe adjustment. Manual adjustment : shoe too far from drum Automatic adjustment : handbrake cable too tight. **Note** : Automatic wear take-up is performed by means of the brake pedal, provided the handbrake is not abnormally tight in the "off" position. - Return spring.
Brakes overheating	- Master cylinder operating clearance insufficient to allow master cylinder to return to neutral position. - Piston seized or not returning properly. - Pinched brake line. - Handbrake mechanism seized. - Incorrect handbrake adjustment.

ESSENTIAL SPECIAL TOOLING		
M.S.	815	Bleeding apparatus

for vehicles fitted with a brake servo, it is important that the unit is not activated during the bleeding operation, whatever method is employed.

- Bleeding is carried out using apparatus **M.S. 815** with the vehicle on a 4-post lift (wheels not free).

- Connect the **M.S. 815** tubes to the bleed screws on :
  - master cylinder,
  - wheel and calliper cylinders,
  - brake compensator or limiter.

- Connect the apparatus to an air line (minimum pressure **5 bars**).

- Connect the fluid re-filling system to the fluid reservoir.

- Open the feed tap. Wait until the fluid reservoir is full (both compartments).

- Turn on the compressed air.

As these vehicles are fitted with braking circuits arranged in "X" formation, proceed as follows :

- Open :

  - the bleed screw on the righthand rear wheel and let the fluid run out for about **20 seconds**,

  - the bleed screw on the lefthand front wheel and let the fluid run out for about **20 seconds**.

- Ignore any bubbles that may appear in the tubes of the apparatus.

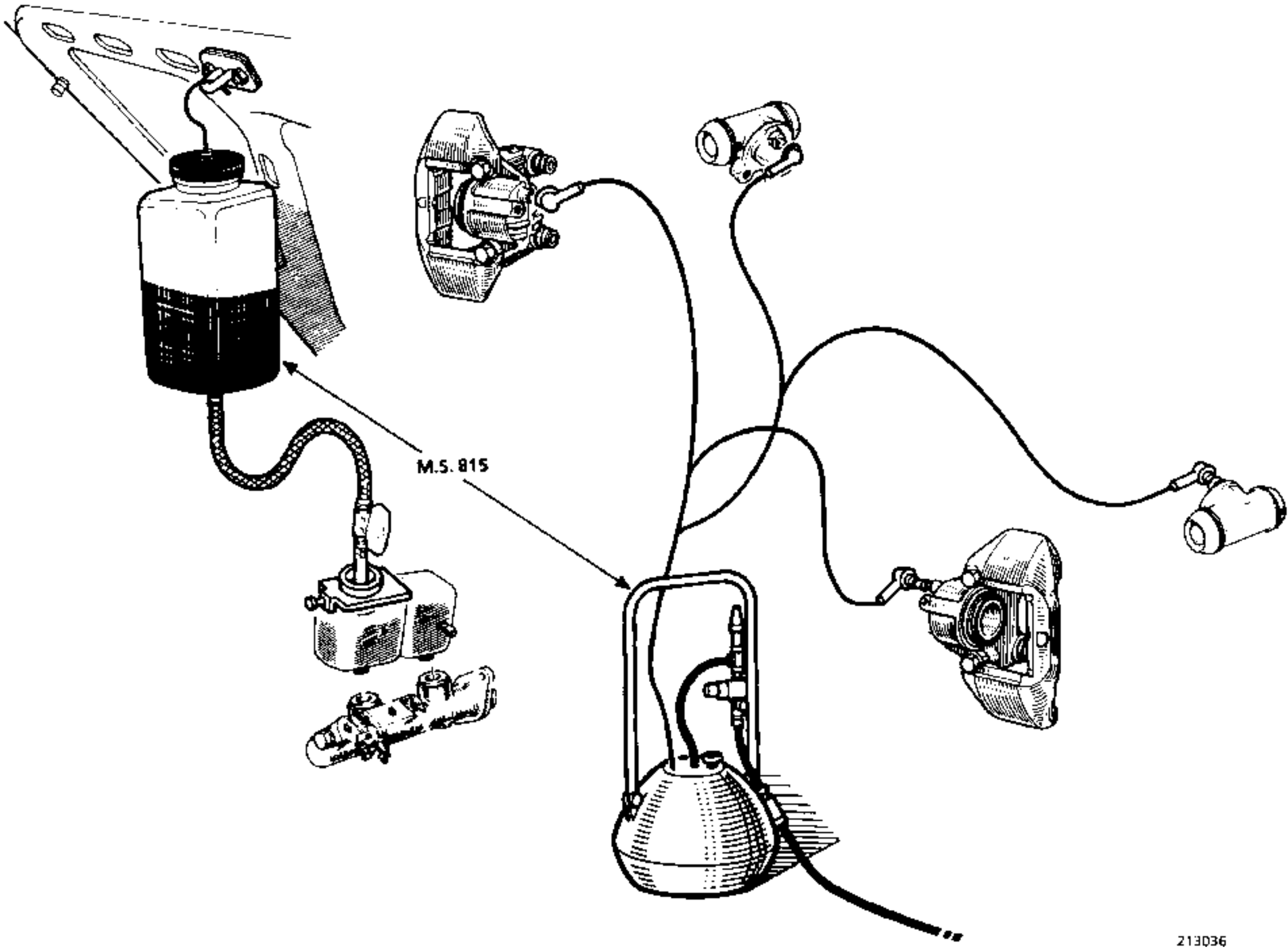
- Proceed in the same way for the rear lefthand and front righthand wheels.

- Check that there is firm resistance when the brake pedal is depressed (operate several times).

- Re-bleed if necessary.

- Top up the fluid in the reservoir after disconnecting the apparatus.

(See **Section 38** for bleeding the **ABS** circuit.).

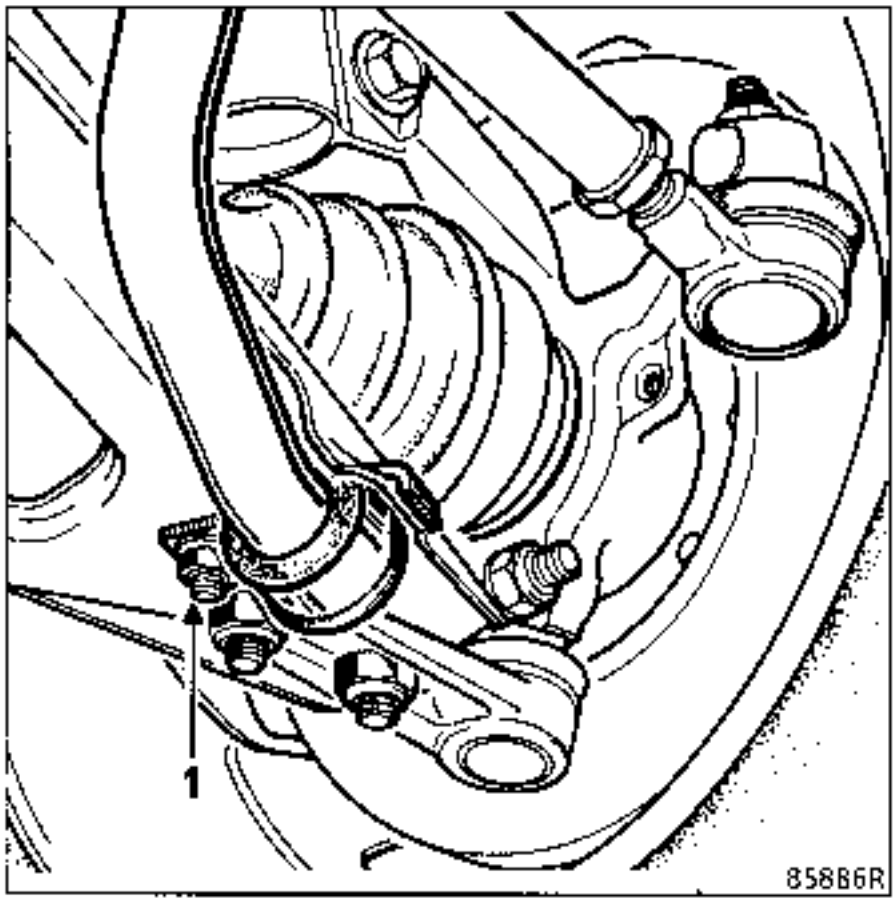

M.S. 815
213036

TIGHTENING TORQUES (in daN.m)	
Nuts securing lower wishbone to cradle	8
Nuts securing key to stub-axle carrier	6
Nuts securing anti-roll bar bearings	3
Lower ball joint nuts	7.5
Wheel bolts	9

REMOVAL

With the vehicle on its wheels, :

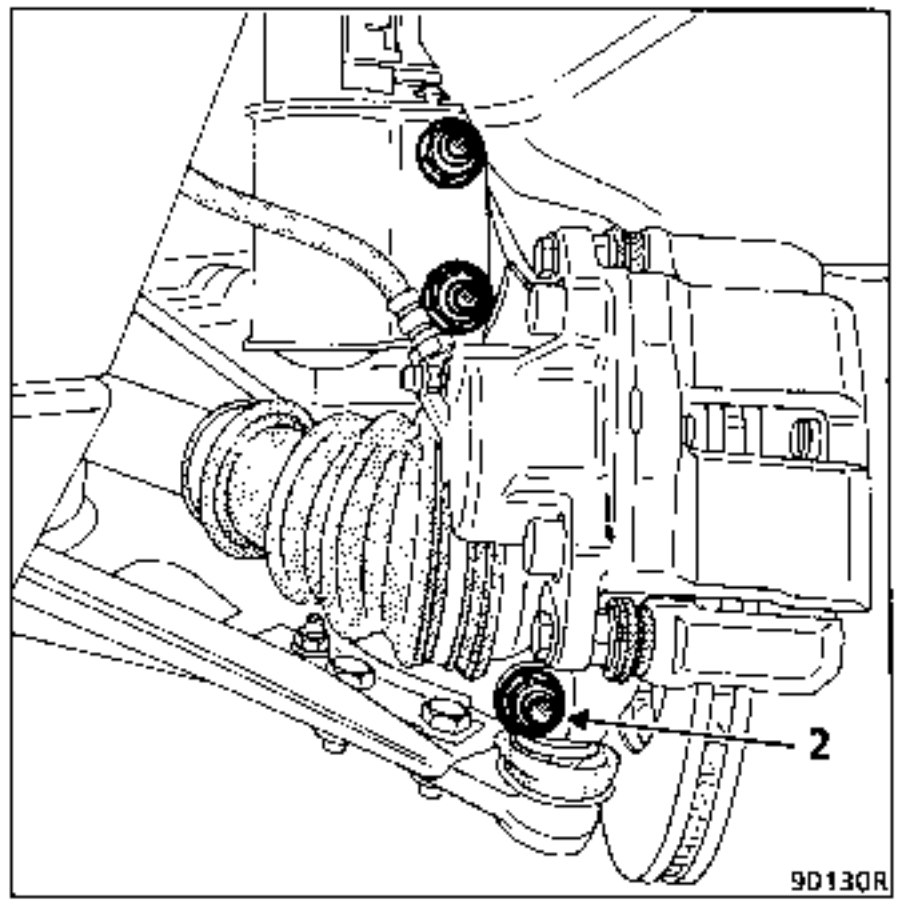
Remove the anti-roll bar bearings (1) from the bottom arms.



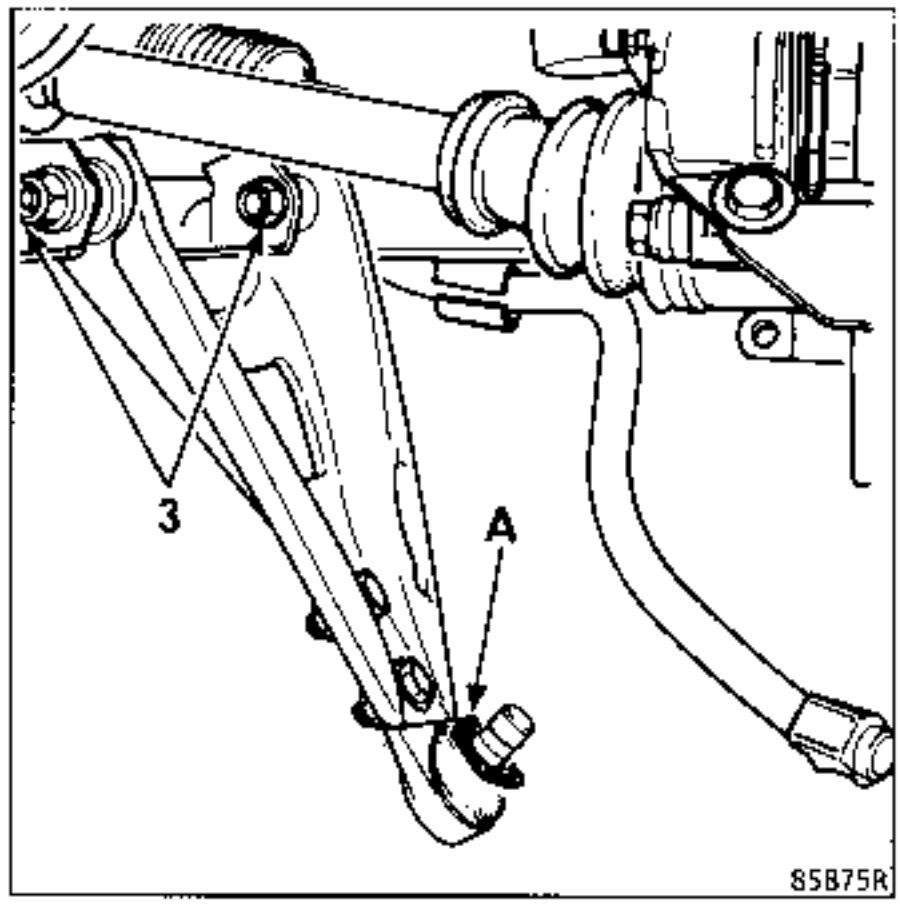
Free the anti-roll bar by pulling it downwards.

With the vehicle on axle stands, remove :

- key-securing bolt and nut (2),



- the two bolts (3) securing the arm to the cradle,



- the arm.

REFITTING

NOTE : Make sure that plastic protection washer A is on the lower ball joint shaft.

Fit in place :
- the arms,
- the two bolts (3) but do not tighten them,
- the ball joint shaft in the stub axle carrier and torque tighten key nut (2).

With the vehicle on its wheels :

Refit the anti-roll bar but do not tighten its bearings.

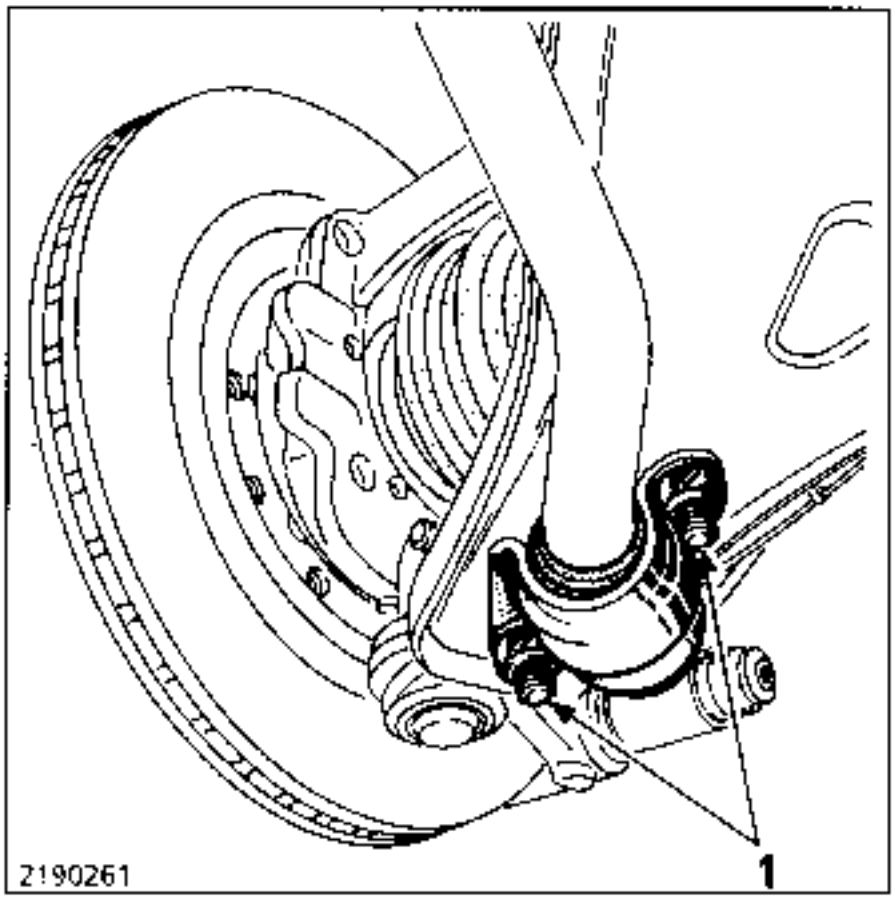
Operate the suspension and torque tighten the arm and anti-roll bar bearing nuts as specified (tightening position : unladen).

TIGHTENING TORQUES (in daN.m)		
Nuts securing lower wishbone to cradle		8
Nuts securing key to stub axle carrier		6
Nuts securing anti-roll bar bearings		8
Lower ball joint nuts		8
Wheel bolts	4 bolts	9
	5 bolts	10

REMOVAL

With the vehicle on its wheels, remove :

- the anti-roll bar bearings (1) from the bottom arms.

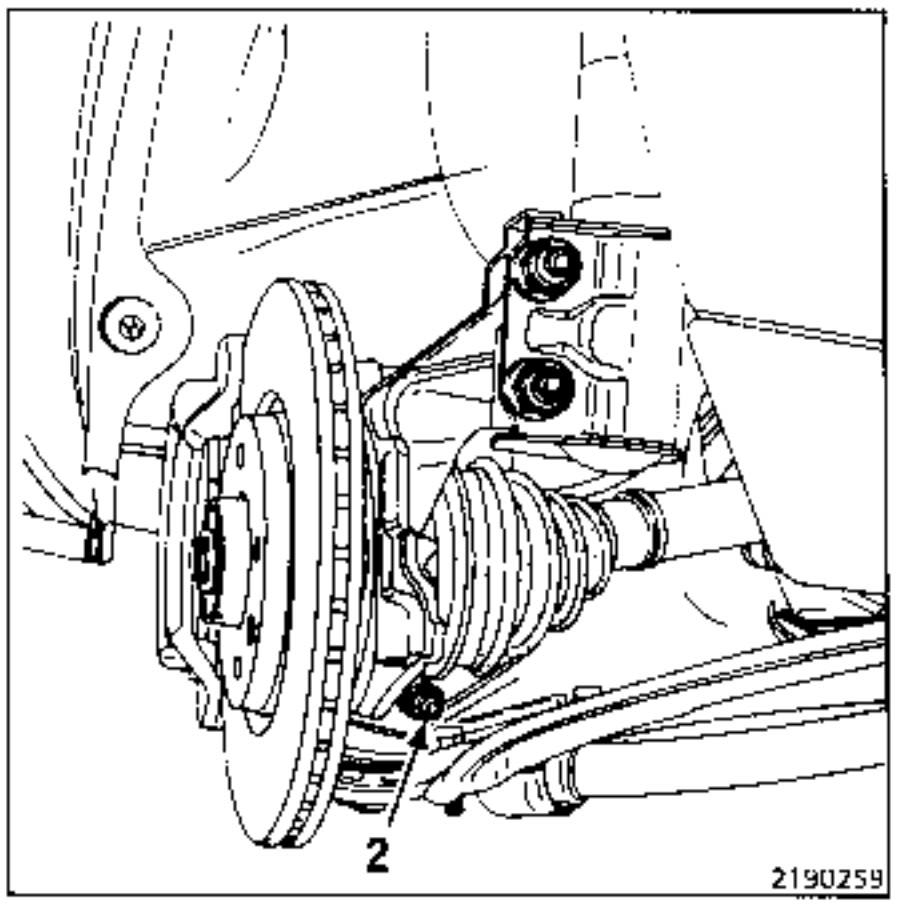


NOTE : The bolts securing the bearing (1) also hold the lower ball joint, so place a nut on one of the bolts to prevent the lower ball joint slipping.

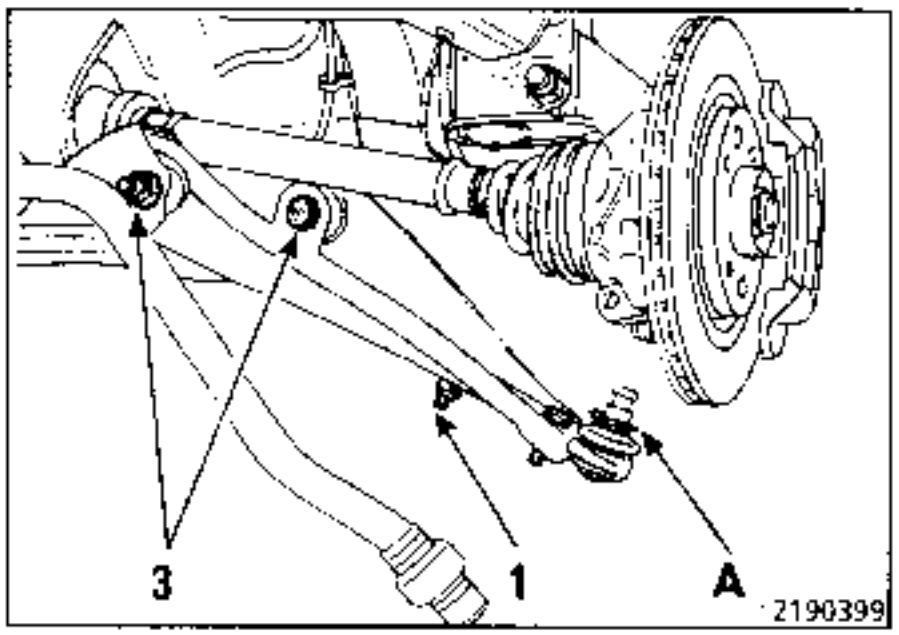
Free the anti-roll bar by pulling it downwards.

With the vehicle on axle stands, remove :

- key-securing bolts and nuts (2),



- the two bolts (3) securing the arm to the cradle,



- the arm.

REFITTING

NOTE : Make sure that plastic protection washer A is on the lower ball joint shaft.

Fit in place :
- the arm,
- the two bolts (3) but do not tighten them,
- the ball joint shaft in the stub axle carrier and torque tighten key nut (2).

With the vehicle on its wheels :

Fasten bearings (1) but do not tighten them after removing the nut holding the ball joint.

Vehicle unladen :

Torque tighten :
- the anti-roll bar bearings,
- the two bolts (3) securing the lower arm to the stub axle carrier.

The rubber bushes must be changed one at a time to maintain their symmetrical position in relation to the pivot pin.

Press out one worn bush first, using a piece of tubing with an outer diameter of 30 mm or 34 mm.

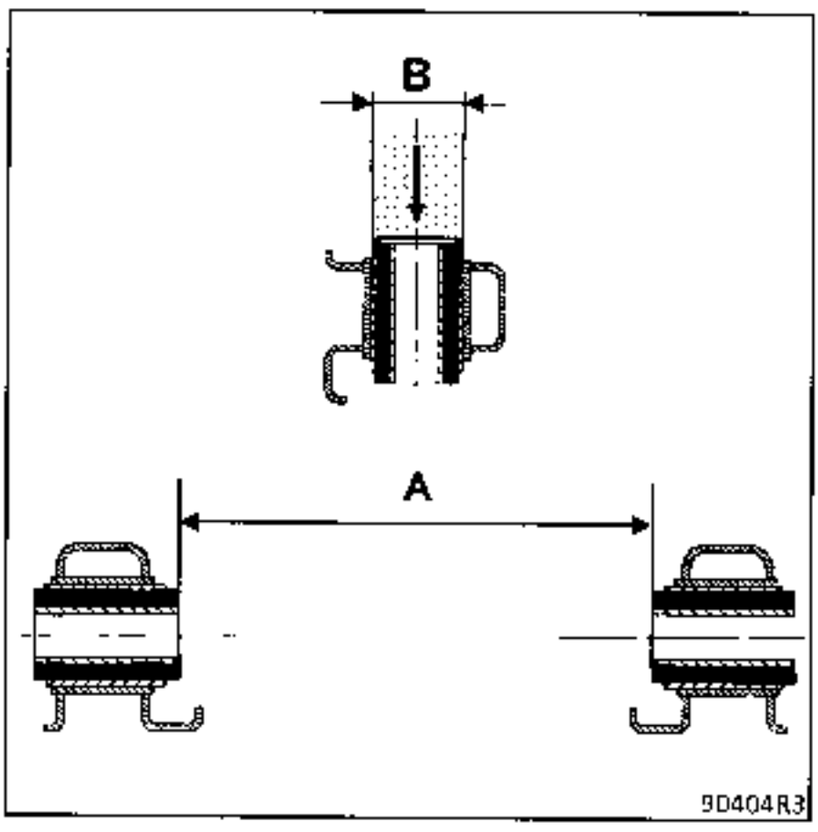
Press in the new bush until dimension A is reached :

190 ± 0.5 mm in-line engine
147 ± 0.5 mm transverse engine

Press out the second worn bush and press in a new bush keeping to the dimensions A :

190 ± 0.5 mm in-line engine
147 ± 0.5 mm transverse engine

Note for in-line engines :
The lower arm front and rear bushes are not identical (see appropriate PR for the vehicle concerned).



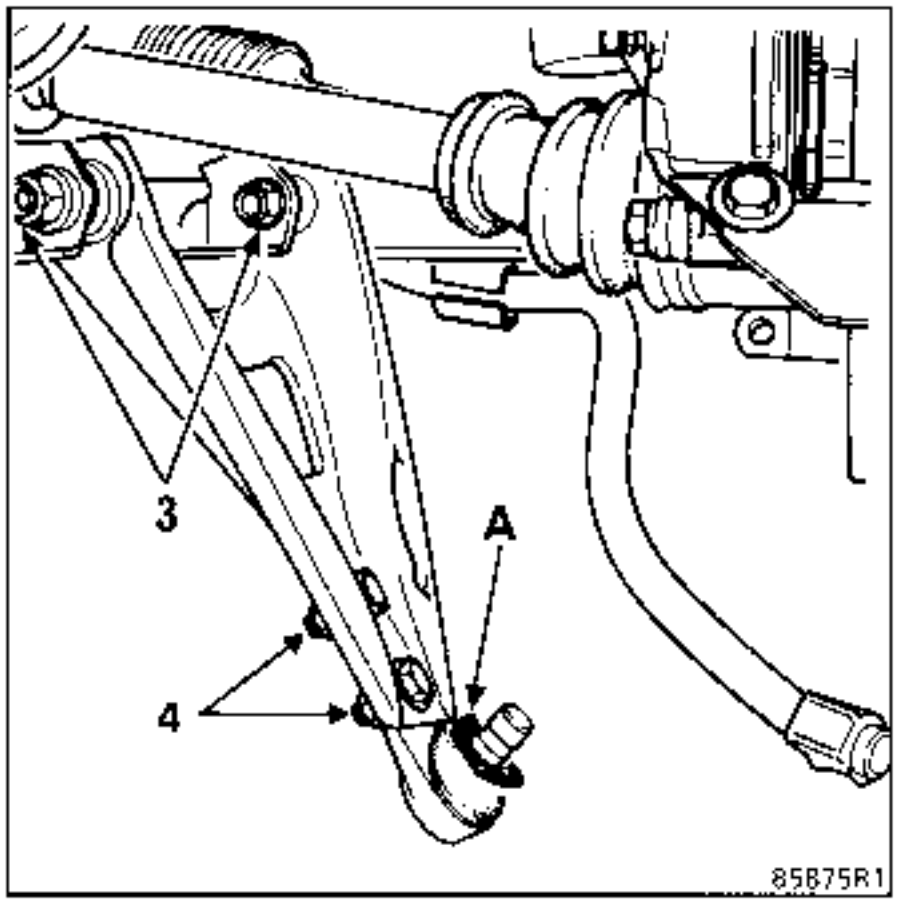
B = ∅ **30** transverse engine
B = ∅ **34** in-line engine

DISMANTLING

If the gaiter is damaged, the entire ball joint must be replaced.

Proceed in the same manner as for removing the lower arm.

Slacken, but do not remove, the two bolts (3) securing the arm to the cradle.



Remove :

- the two bolts (4) securing the ball joint,
- the ball joint.

REFITTING

NOTE : Make sure that plastic protection washer A is on the lower ball joint shaft.

Fit the ball joint in place and torque tighten its mountings.

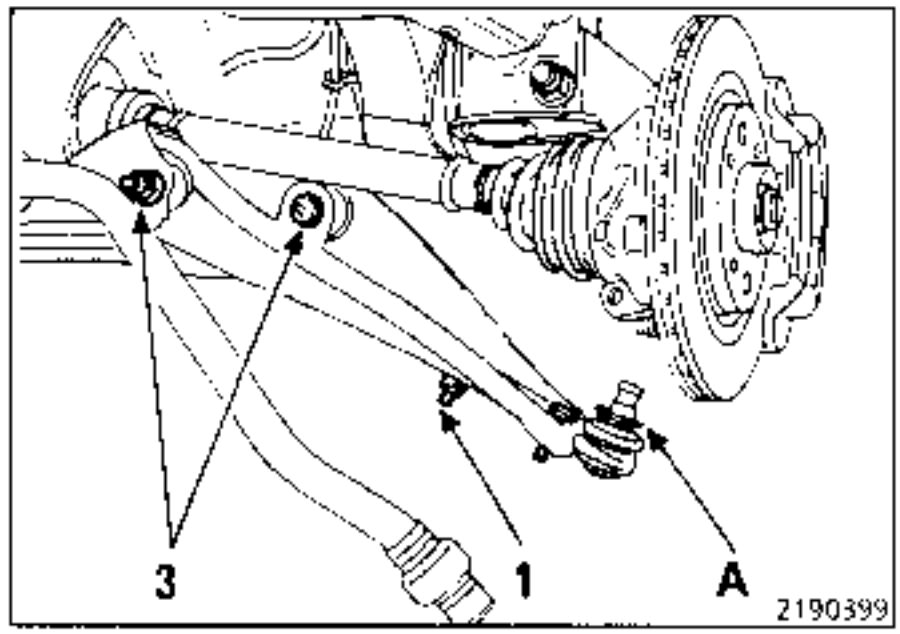
Proceed in the same manner as for refitting the lower arm.

DISMANTLING

If the gaiter is damaged, the entire ball joint must be replaced.

Proceed in the same manner as for removing the lower arm.

Slacken, but do not remove, the two bolts (3) securing the arm to the cradle.



Remove:

- nut (1) securing the ball joint,
- the ball joint.

REFITTING

NOTE : **Make sure that plastic protection washer A is on the lower ball joint shaft.**

Fit the ball joint in place and hold it in place by one of its mountings only (1).

Then proceed in the same manner as for refitting the lower arm.

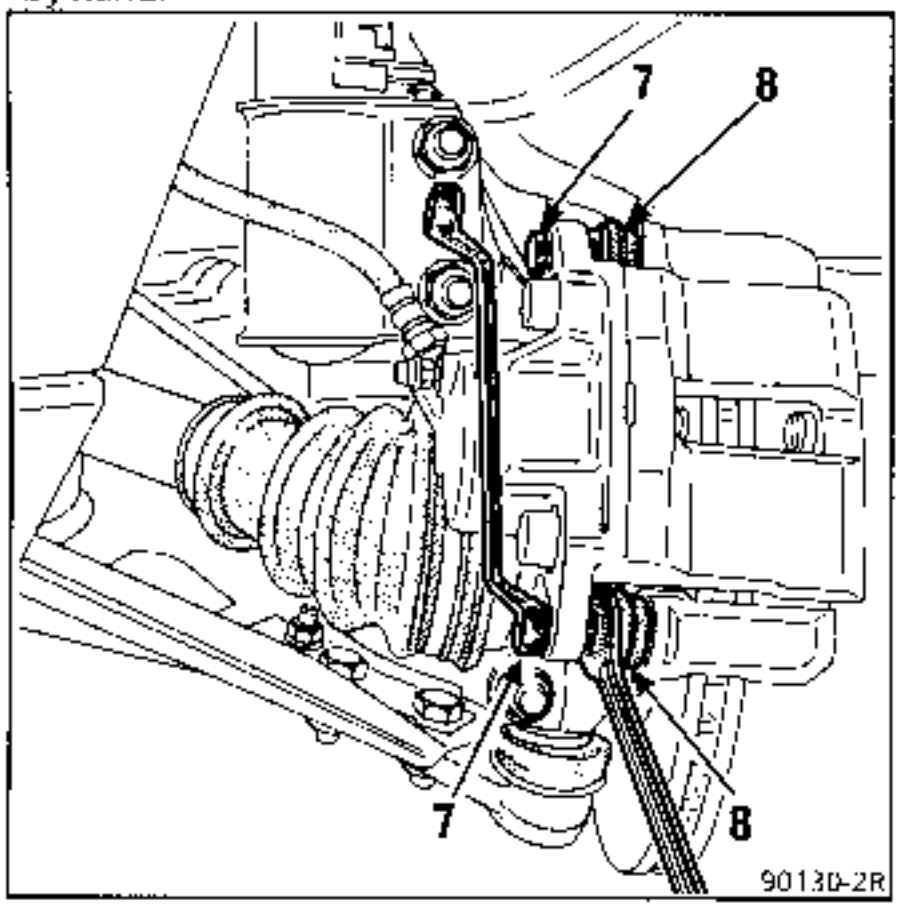
ESSENTIAL SPECIAL TOOLING		
Fre.	823	Piston retractor

TIGHTENING TORQUES (in daN.m)	
Wheel bolts	8
Brake calliper guide bolts	3.5

REMOVAL

Disconnect the brake pad wear warning light wire.

Push the piston in by sliding the calliper outwards by hand.



Remove the guide bolts (7) using two spanners.

Do not clean these bolts.

- Free the sliding calliper,
- Remove the brake pads.

Checks :

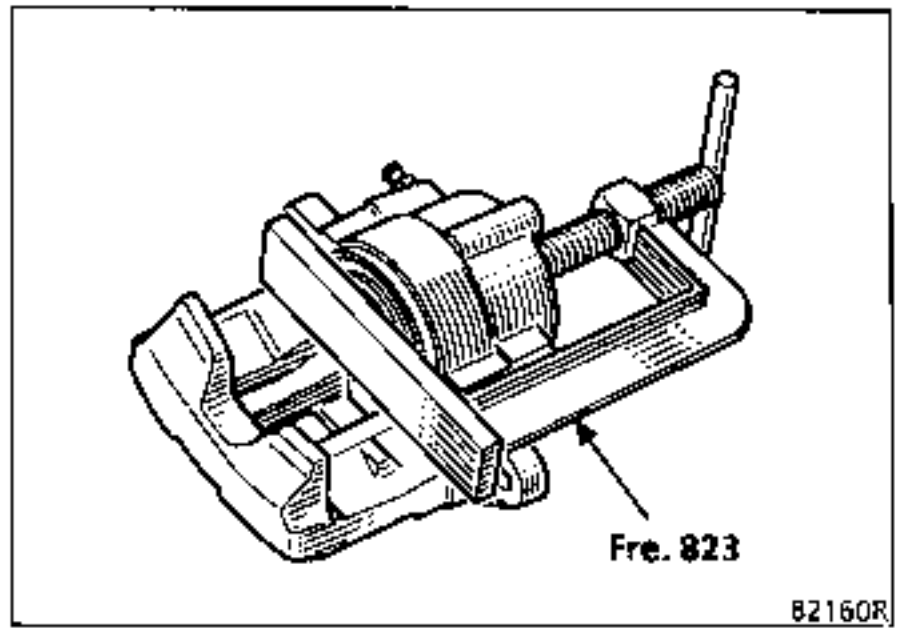
Check :

- that the piston dust cover and retaining ring are in good condition and correctly fitted,

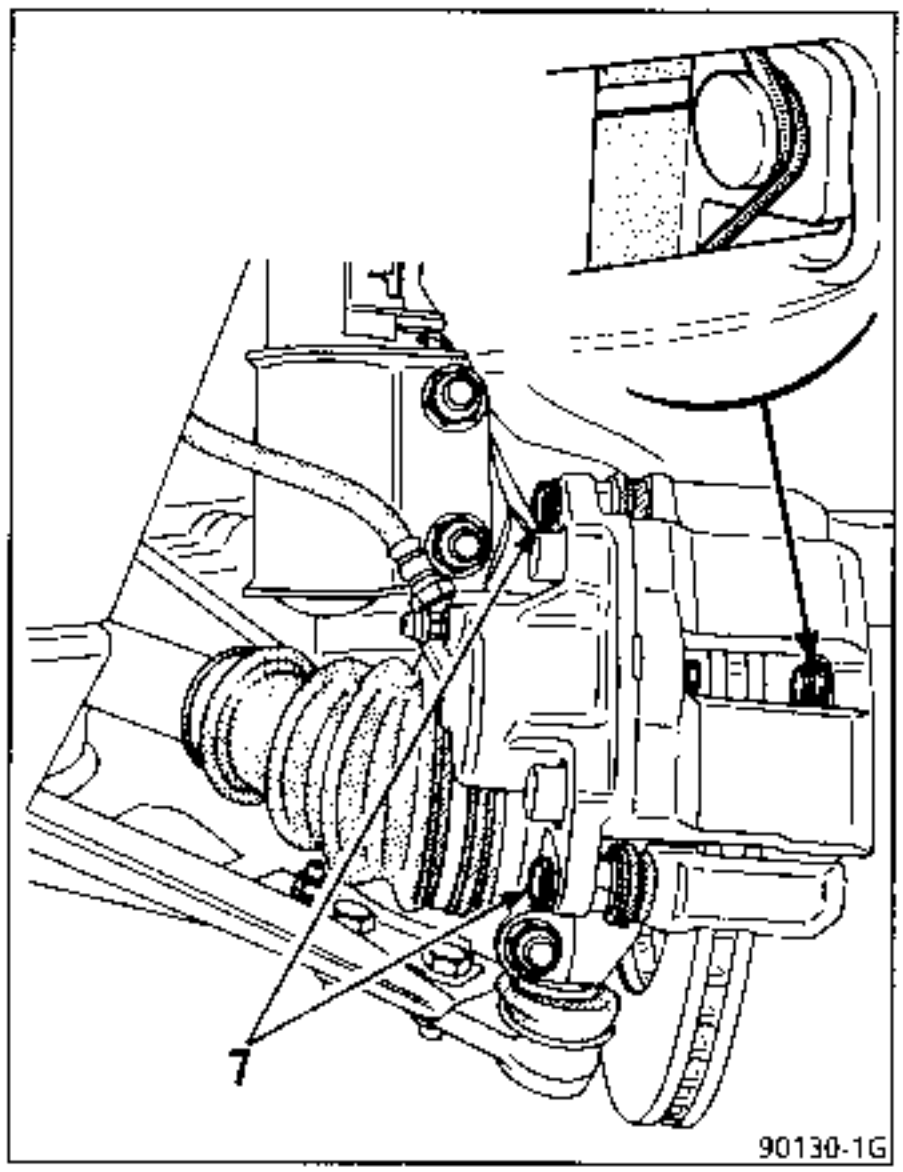
- the condition of the calliper guide dust covers (8).

REFITTING

Push the piston into its housing using tool **Fre. 823**.



Fit the new pads the correct way round and fit the springs.



The pad to which the wear warning light wire is connected is fitted on the inside.

Fit in place the calliper and fit bolt (7) for the lower guide, coated with LOCTITE FRENBLOC.

Press on the calliper and fit the upper guide bolt coated with LOCTITE FRENBLOC.

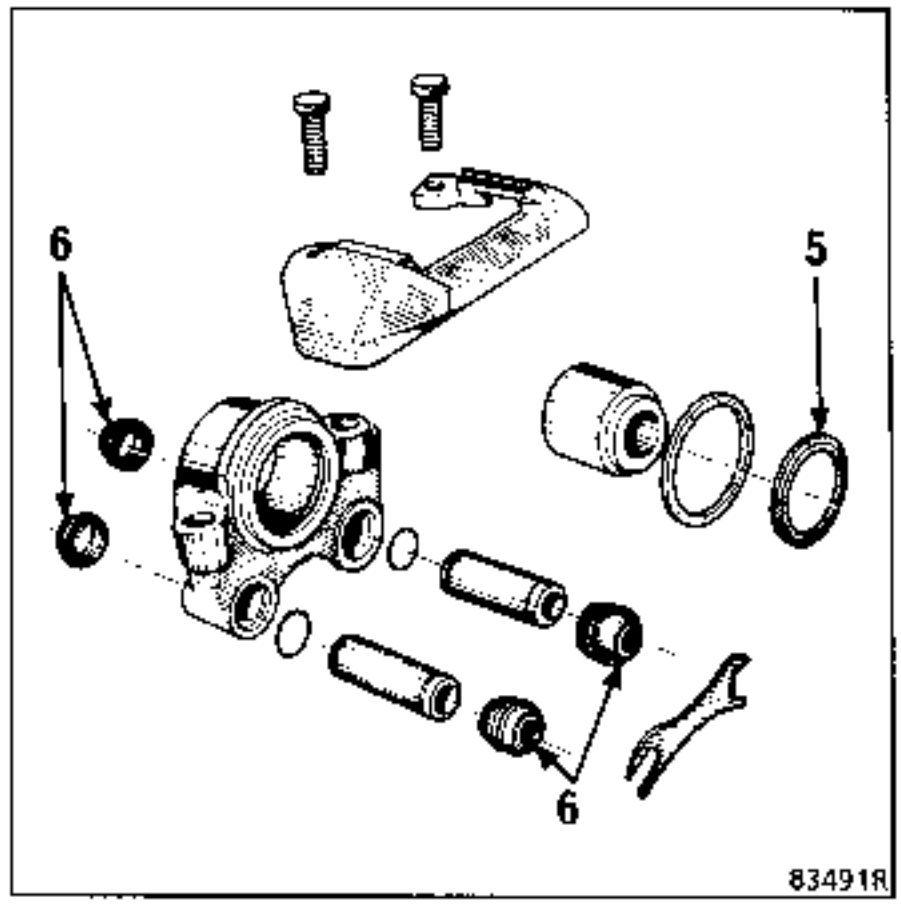
Torque tighten the guide bolts, starting with the lower bolt.

Reconnect the pad wear warning light wire.

Press down several times on the brake pedal to bring the piston into contact with the pads.

ESSENTIAL SPECIAL TOOLS		
Fre.	823	Piston retractor

TIGHTENING TORQUES (in daN.m)	▽
Wheel bolts	8

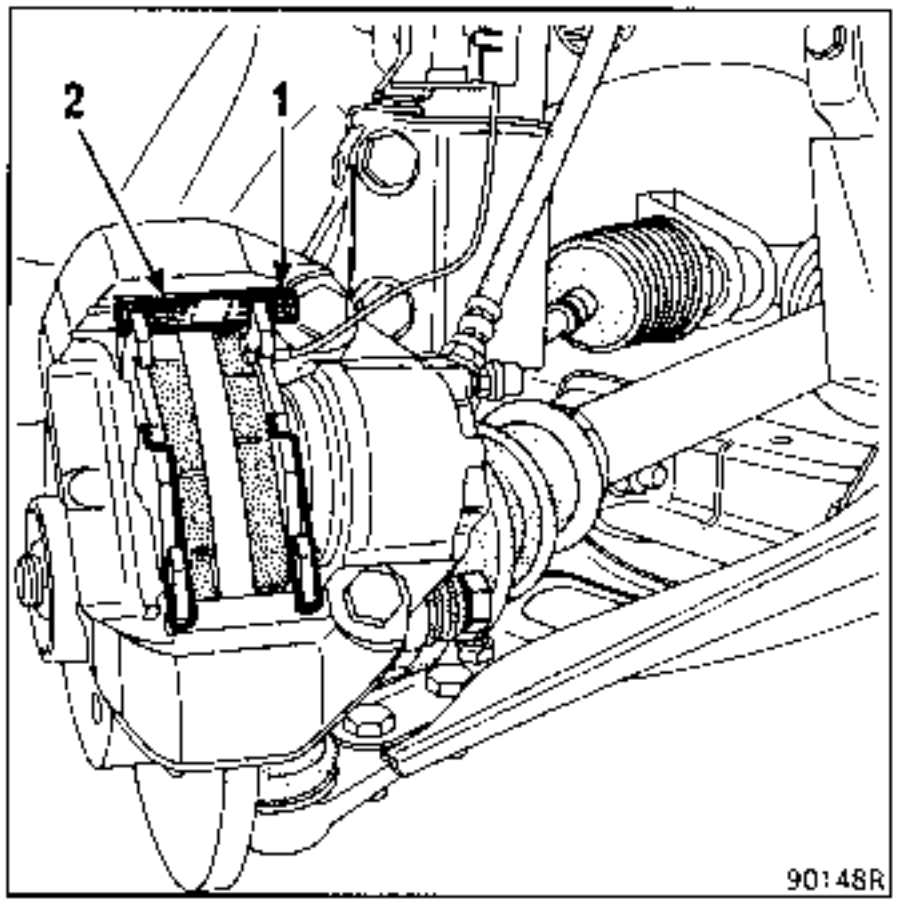


REMOVAL

Disconnect the pad wear warning light wire.

Push the piston in by sliding the calliper outwards by hand :

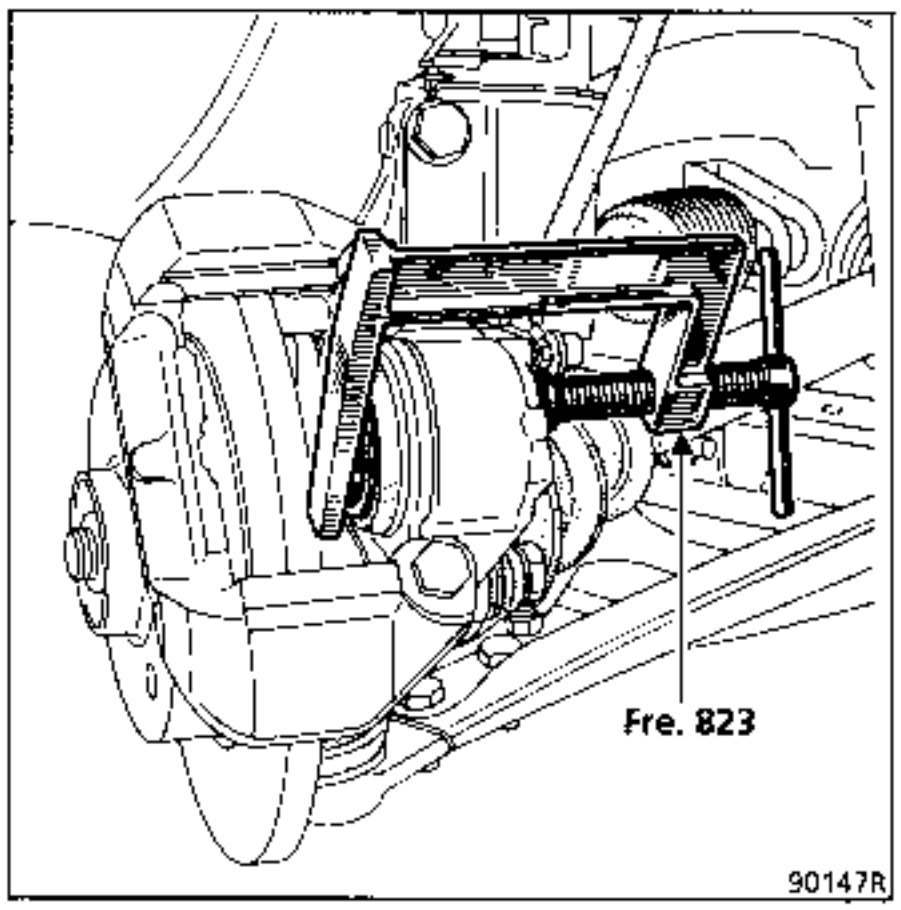
Remove :
- clip (1),
- wedge (2),
- the pads.



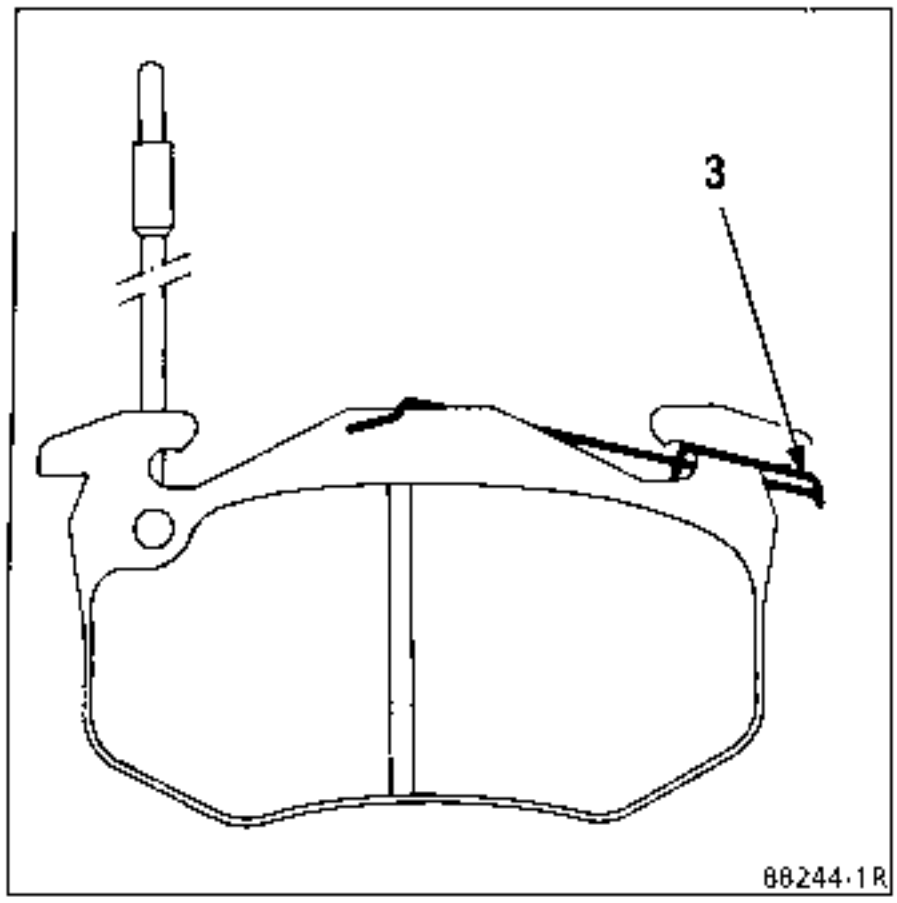
Check the condition of the piston dust cover (5) and gaiters (6) protecting the calliper slides and change them if necessary. If they have to be changed, grease the end of the piston and the two slides, having first cleaned them with methylated spirit.

REFITTING

Push back the wheel cylinder piston using tool Fre. 823.

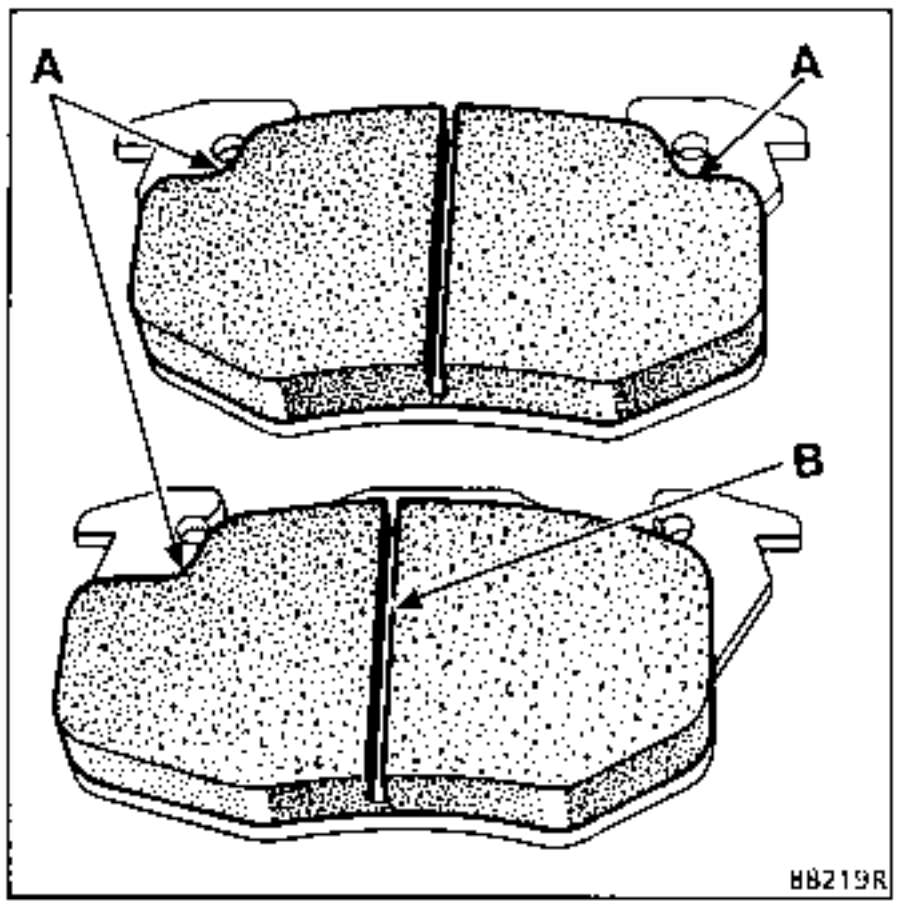


Fit the two anti-rattle springs (3) on the new pads.



NOTE : these vehicles are equipped with pads with offset linings.

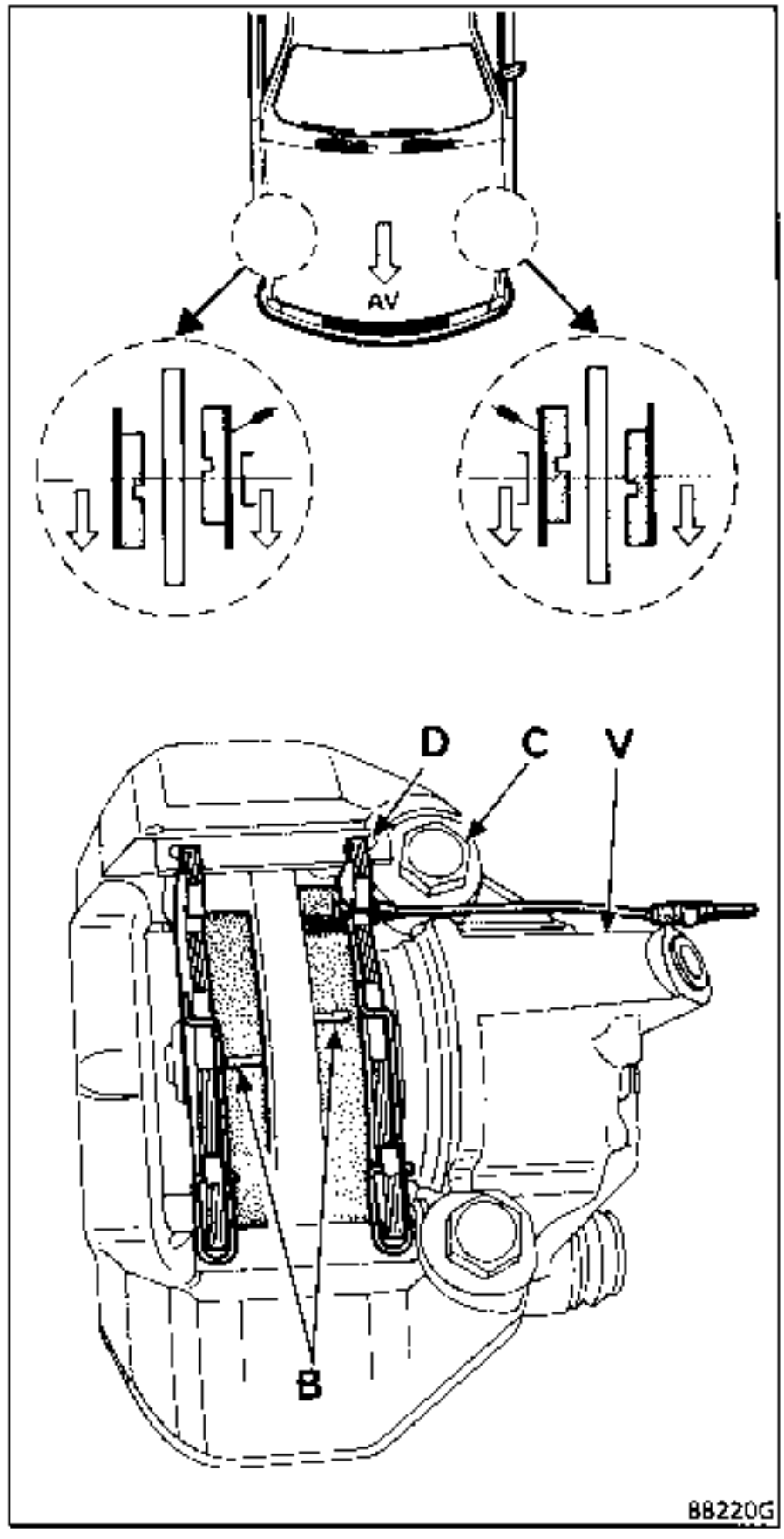
Special point concerning offset brake pads :



- the offset lining has a single shoulder at (A) whereas a symmetrical lining has two shoulders,

- groove (B) is also offset in relation to the symmetrical lining,

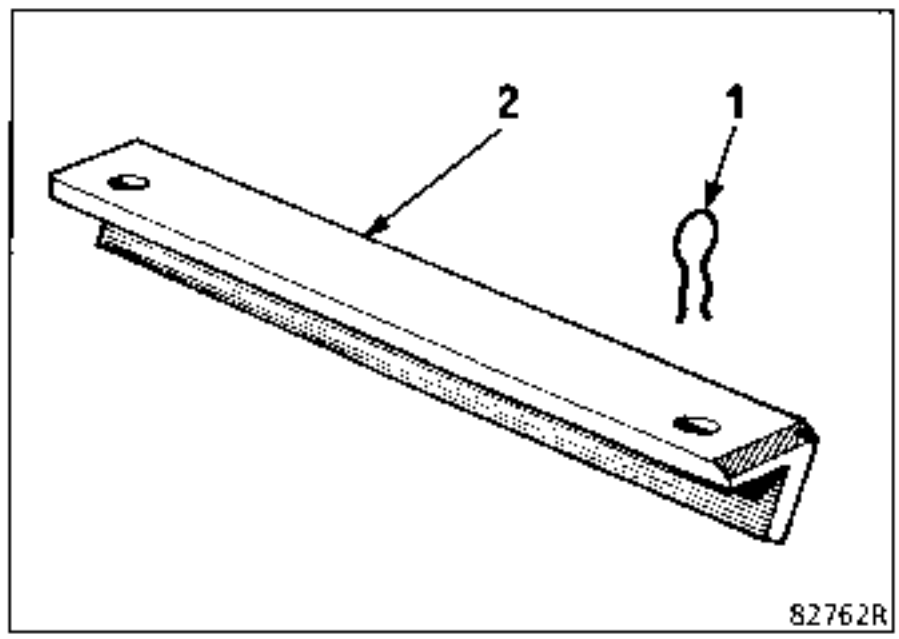
- Direction of fitting :
  - on the outside the linings and groove (B) are offset towards the front of the vehicle,
  - on the inside the linings and groove (B) are offset towards the rear of the vehicle,
  - the pad wear warning light wires must be on the same side as the bleed screws (V).



Position the pads in the calliper and insert wedge (2).

Fit in place clip (1) (one clip only per calliper).

NOTE : The clip is fitted at (D) on the inner side of the calliper, near bolt (C) which holds the calliper bracket.



Reconnect the pad wear warning light wire.

Press down several times on the brake pedal so as to bring the piston into contact with the pads.

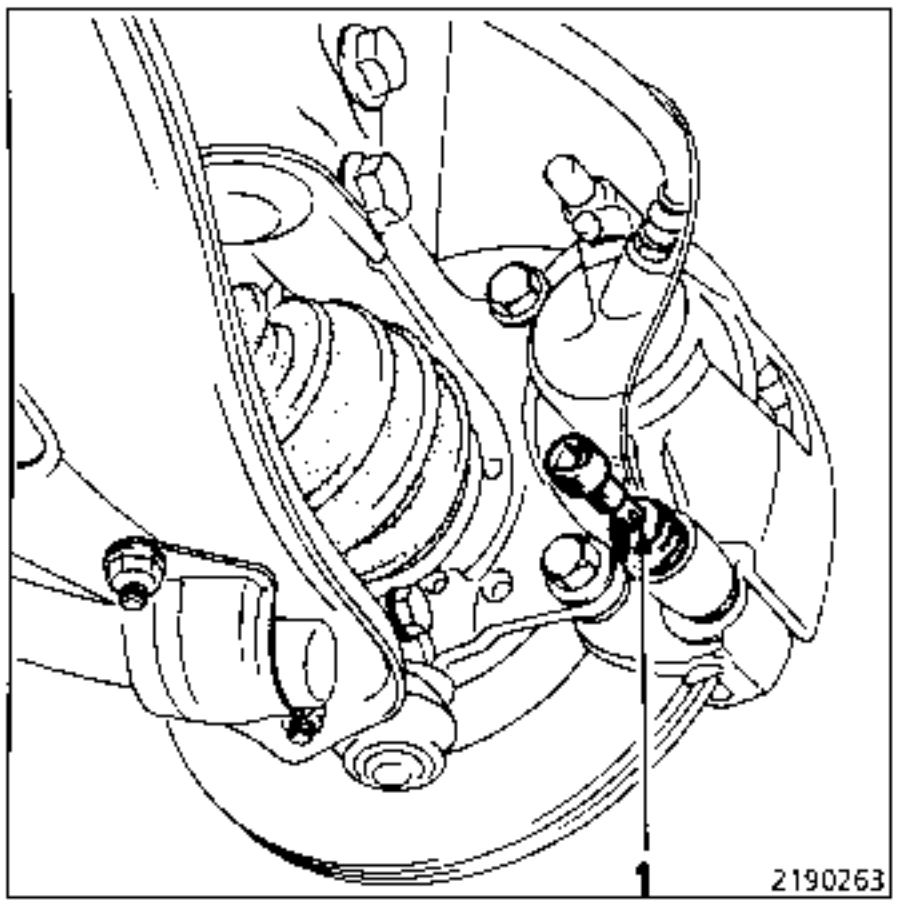
ESSENTIAL SPECIAL TOOLING		
Fre.	823	Piston retractor

TIGHTENING TORQUES (in daN.m)	
Wheel bolts (4 bolts)	9
Wheel bolts (5 bolts)	10
Brake calliper guide bolts	2.5

REMOVAL

Disconnect the pad wear warning light wire.

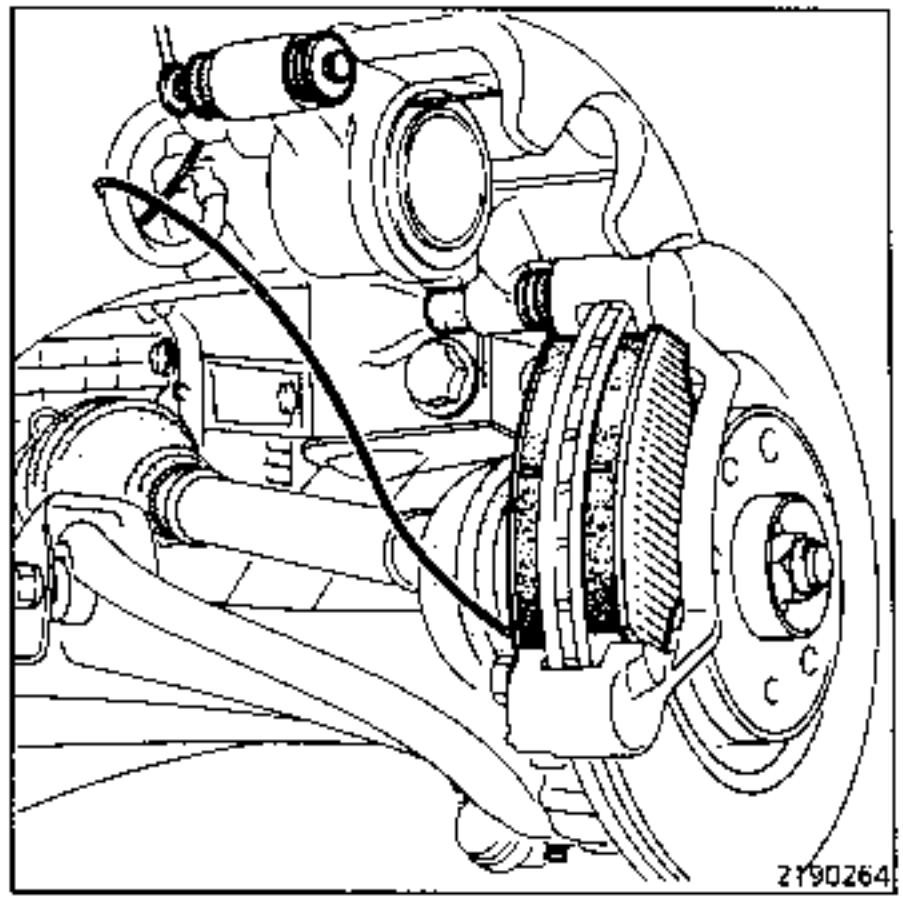
Push the piston in by sliding the calliper outwards by hand.



Unscrew guide bolt (1) and separate it from the calliper bracket.

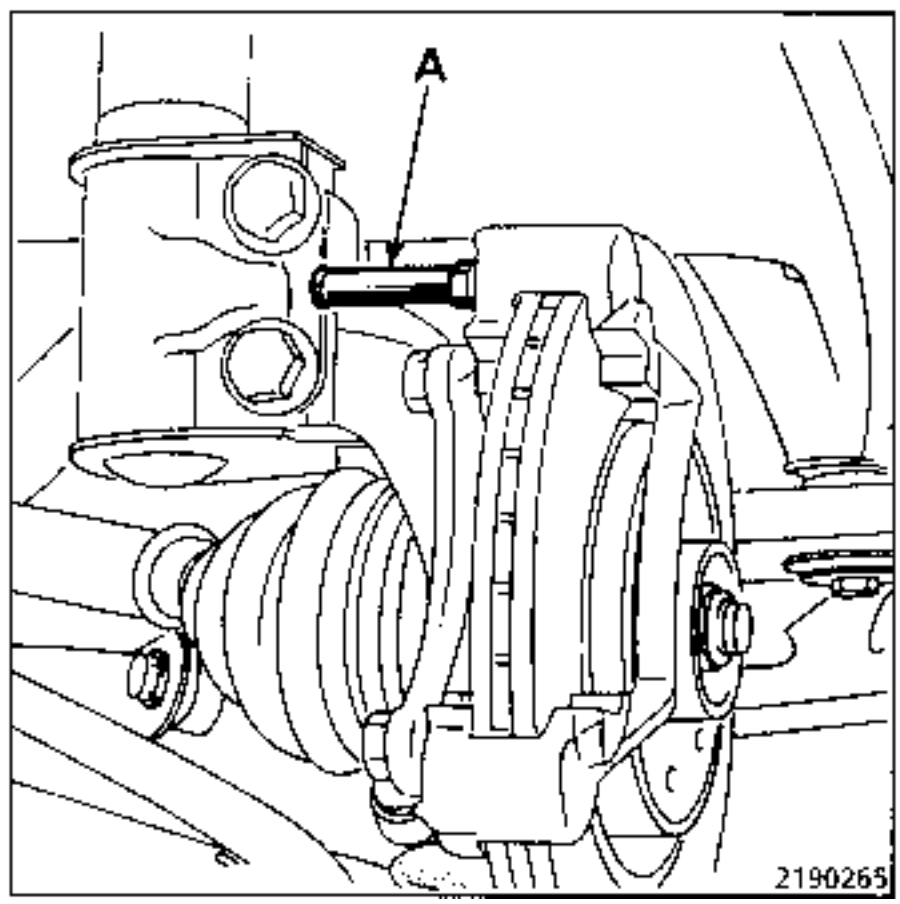
Release :

- the sliding calliper by moving it upwards and remove it from its upper guide,

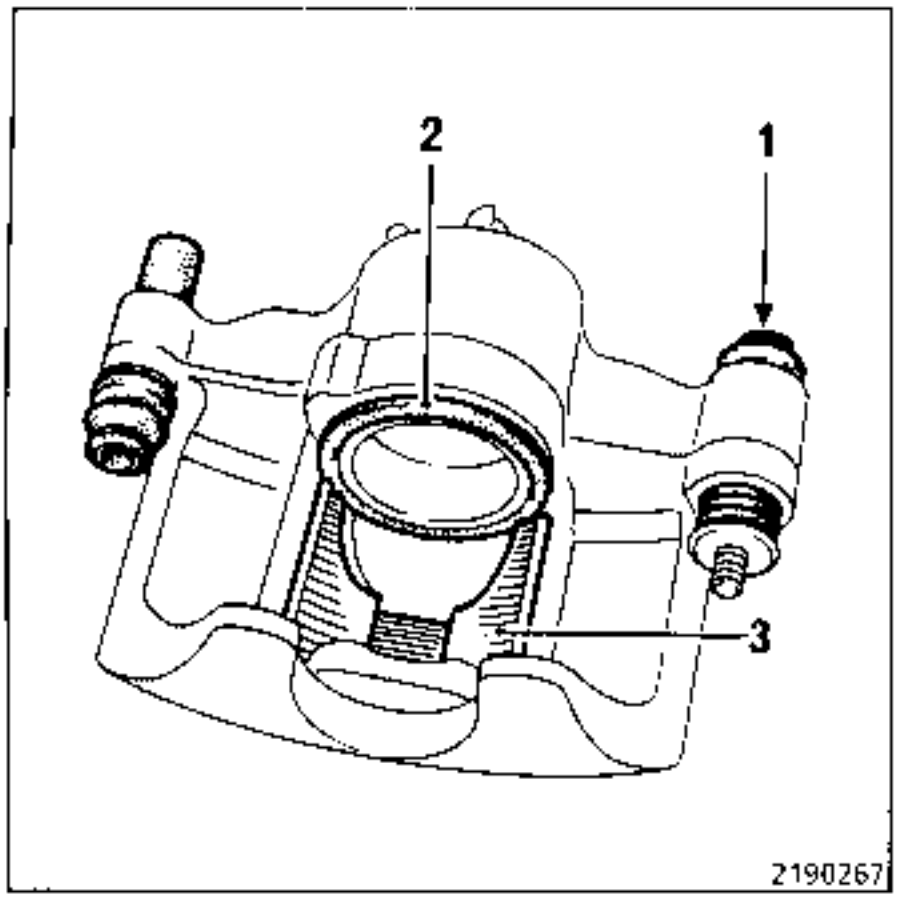


- the pads.

Make sure that upper guide A is in perfect condition. Clean it with methylated spirit, then grease it.

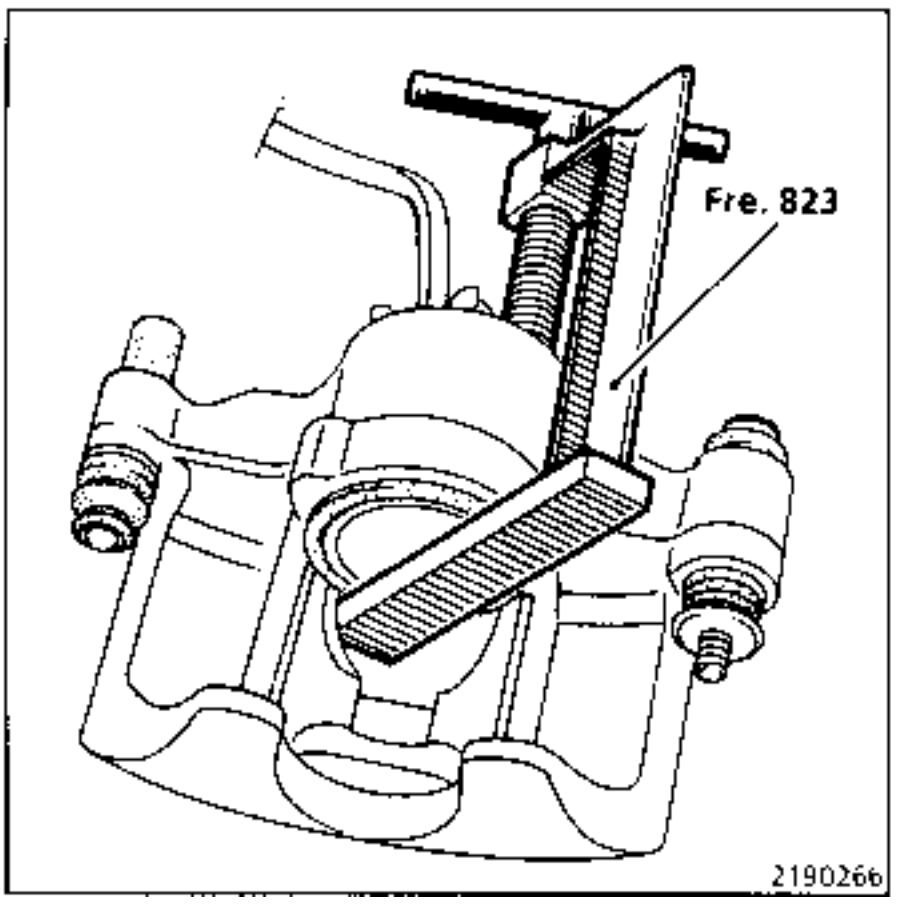


Check :
- that spring (3) is in the correct position,
- the condition of piston dust cover (2), the gaiters protecting bolt (1) and the calliper guide. Change any components if necessary.



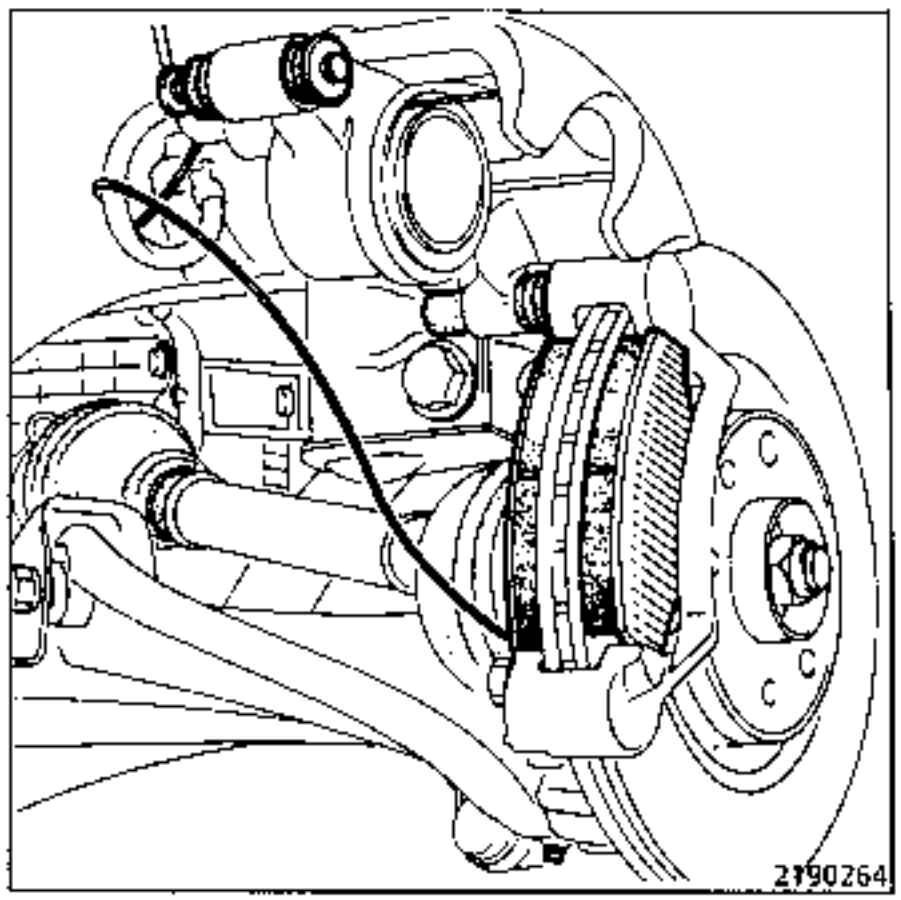
REFITTING

Push back the wheel cylinder piston using tool Fre. 823.



Fit in place :

- the new pads making sure they are fitted the correct way round. The pad to which the wear warning light is connected is to be mounted on the inside,



- fit the calliper on its upper guide and tilt it downwards.

Torque tighten the calliper guide bolt.

Reconnect the pad wear warning light wire.

Press down several times on the brake pedal so as to bring the piston into contact with the pads.

TIGHTENING TORQUES (in daN.m)	
Wheel bolts (4 bolts)	9
Wheel bolts (5 bolts)	10
Calliper securing bolts (BENDIX Series IV)	10
Guide bolts (GIRLING)	3.5
Guide bolts (BENDIX Series IV M)	2.5

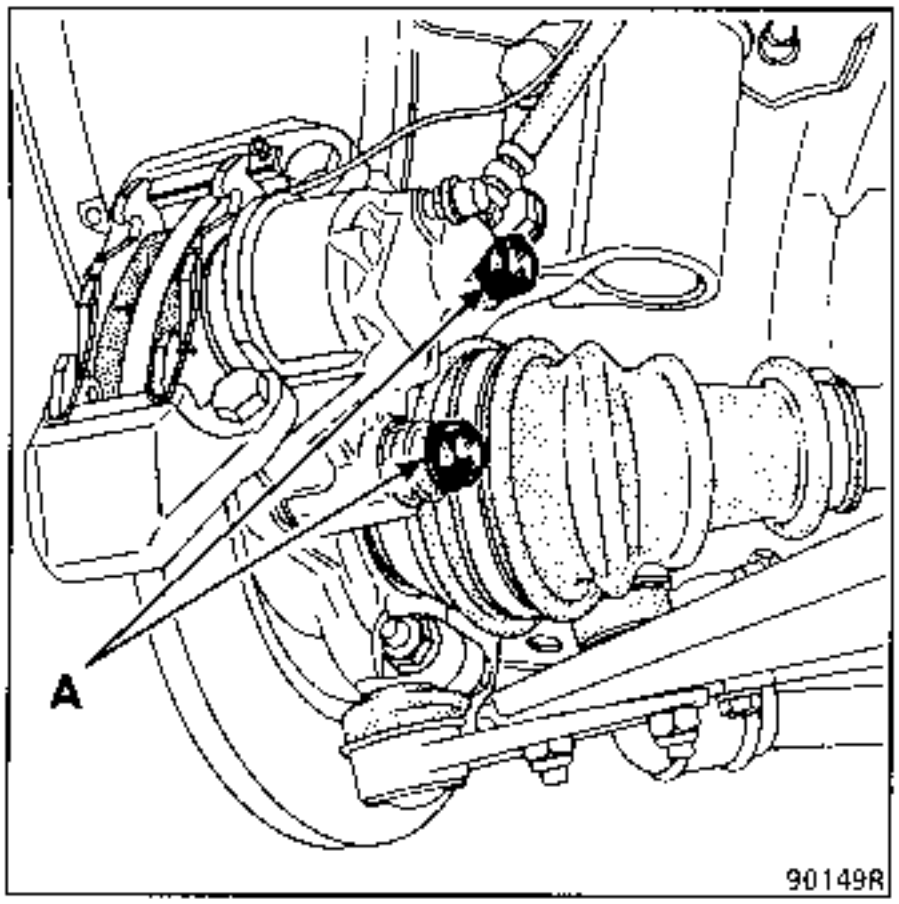
REMOVAL

Slacken the brake hose at the calliper end.

Remove the brake pads (see relevant section).

Special points concerning BENDIX Series IV

Remove the two bolts (A) securing the calliper to the stub axle carrier.



All types

Unscrew the calliper from the brake hose (be ready to catch the draining brake fluid).

Check the condition of the hose and change it if necessary (see section on replacing a brake hose).

REFITTING

Screw the new calliper onto the hose.

Slacken the calliper bleed screw and wait until brake fluid starts to flow out (having first checked that there is sufficient fluid in the reservoir).

Retighten the bleed screw.

BENDIX Series IV

Fit the calliper to the stub axle carrier and torque tighten the two bolts (A).

All types

Check the condition of the brake pads. If they are greasy, change them.

If the brake fluid reservoir has not been completely emptied during the operation, a partial bleeding of the system will be sufficient.

Operate the brake pedal several times in order to push the piston into contact with the brake pads.

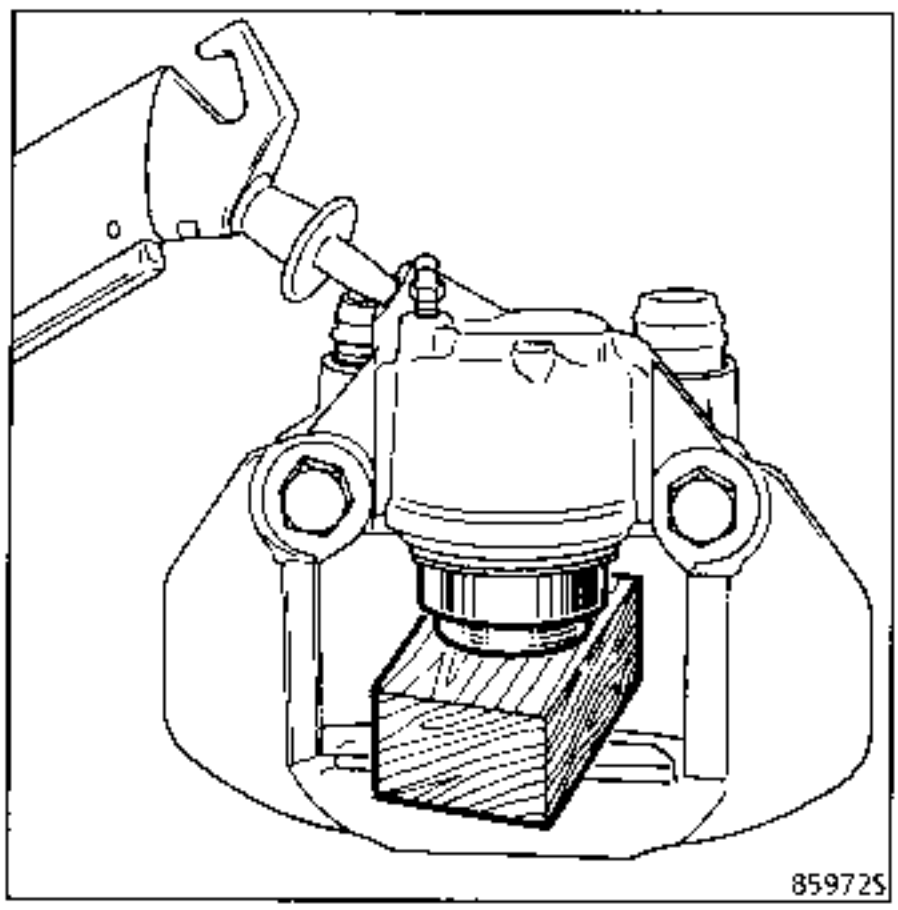
OVERHAULING

The calliper assembly must be changed whenever any scratching or scoring is present in the piston bore.

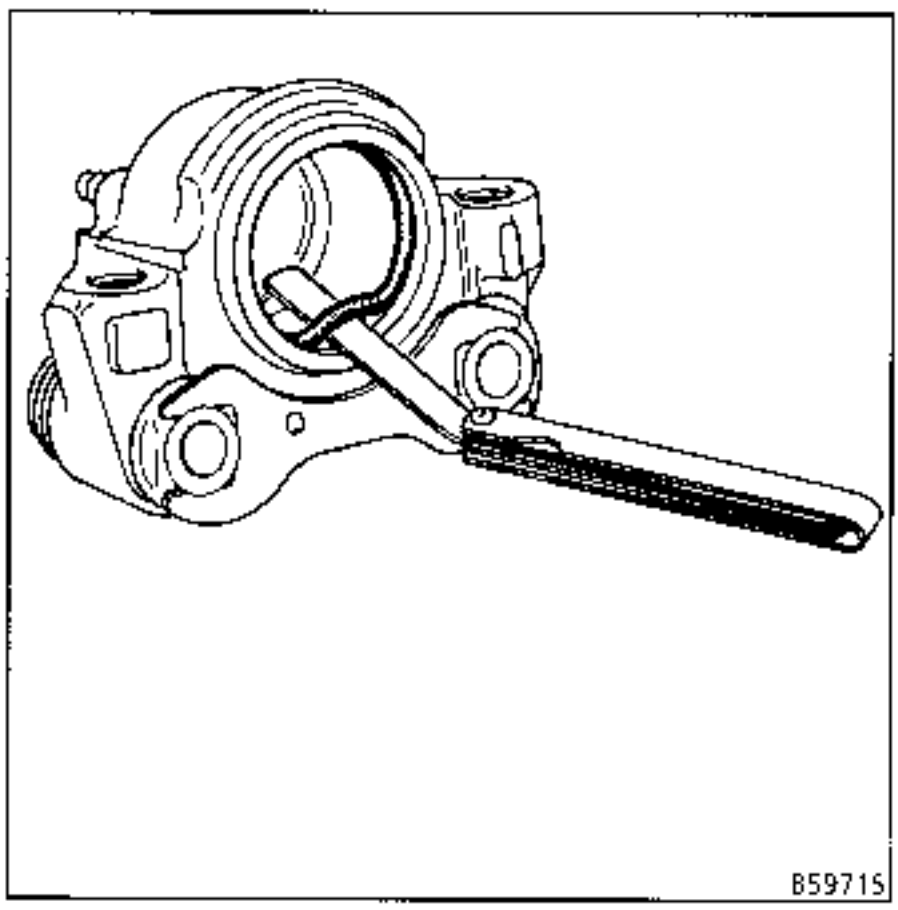
Remove the calliper.

Take off the rubber dust cover retaining ring (for GIRLING brakes).

Expel the piston using an air line and taking care to avoid damaging the piston by inserting a block of wood between the piston and the calliper. The piston must not be re-used if there is any sign of impact damage to the skirt.



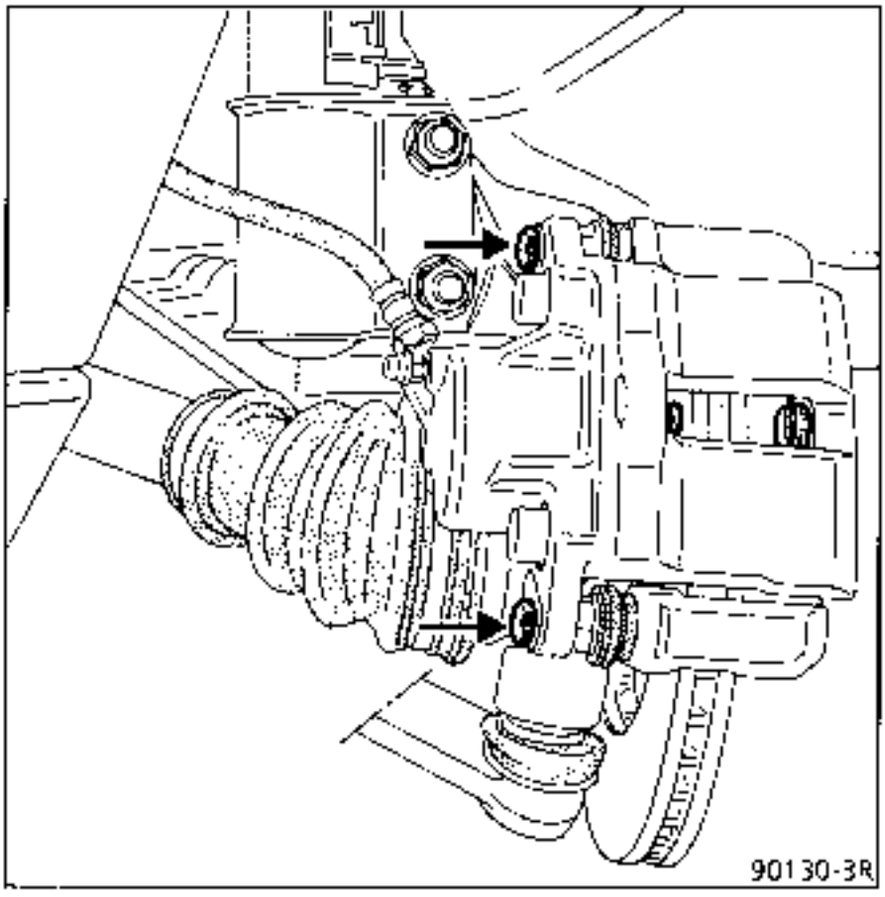
Take out the rectangular section seal from the calliper groove using a round-ended flexible blade (eg, a feeler gauge).



Clean all components in methylated spirit.

All faulty components must be replaced by genuine new parts, then refit the seal, piston and dust cover (with its retaining ring for **GIRLING** brakes).

When changing the brake pads or working on this type of brake calliper, the guide bolts* must be systematically replaced and torque tightened to a torque of **3.4 and 3.8 daN.m** starting with the bottom bolt.



* Bolts supplied in the spare parts kit.

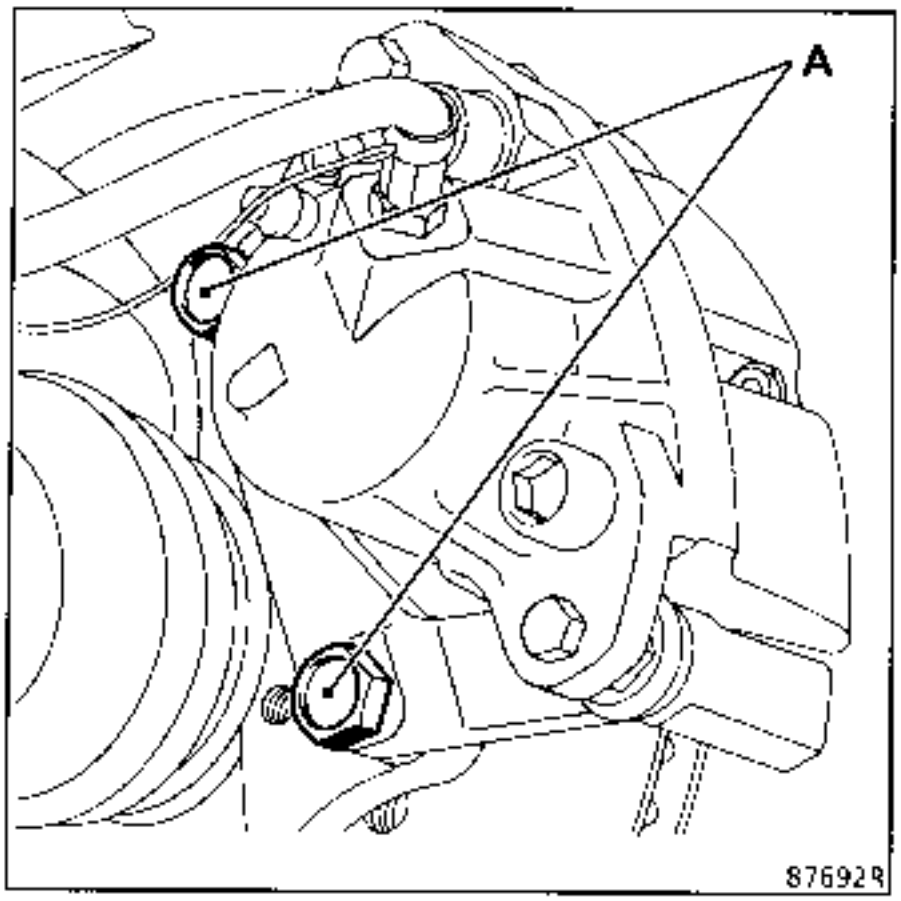
The brake discs must not be re-faced. The part must be changed if excessive wear or scoring is present.

TIGHTENING TORQUES (in daN.m)	▽
Wheel bolts (4 bolts)	9
Wheel bolts (5 bolts)	10
Brake calliper mounting bolts	10
Calliper bracket mounting bolts	
BENDIX Series IV	6.5

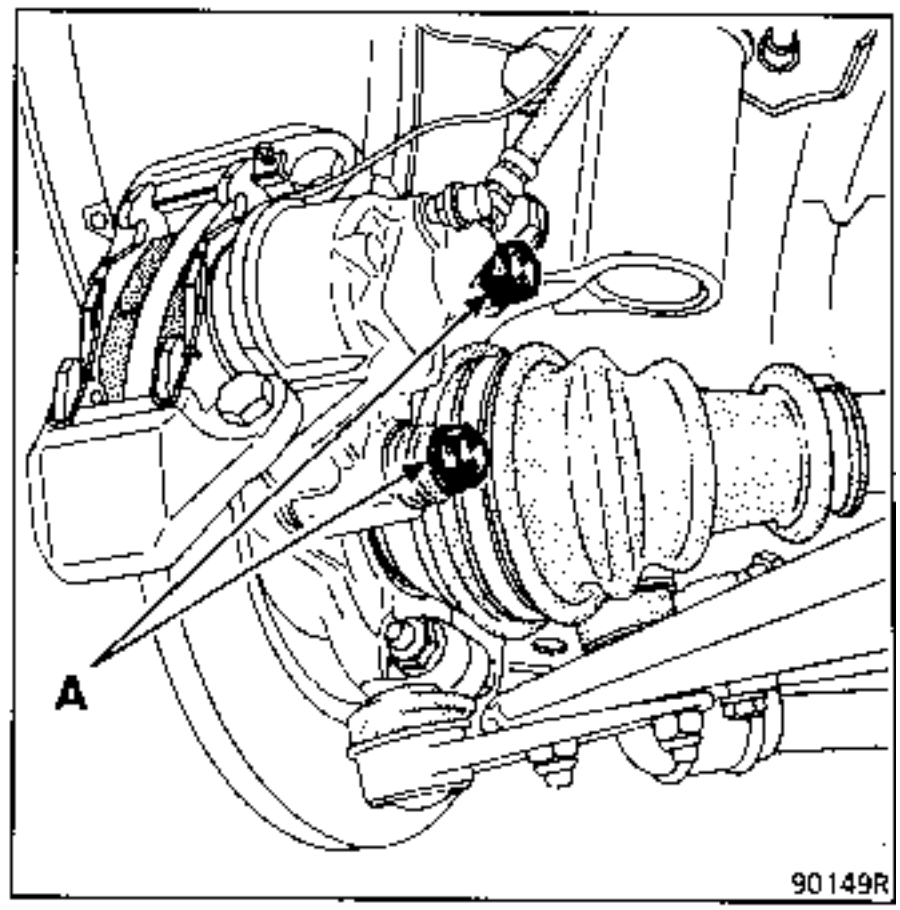
REMOVAL

Remove :
- the two screws (A) securing the brake assembly.

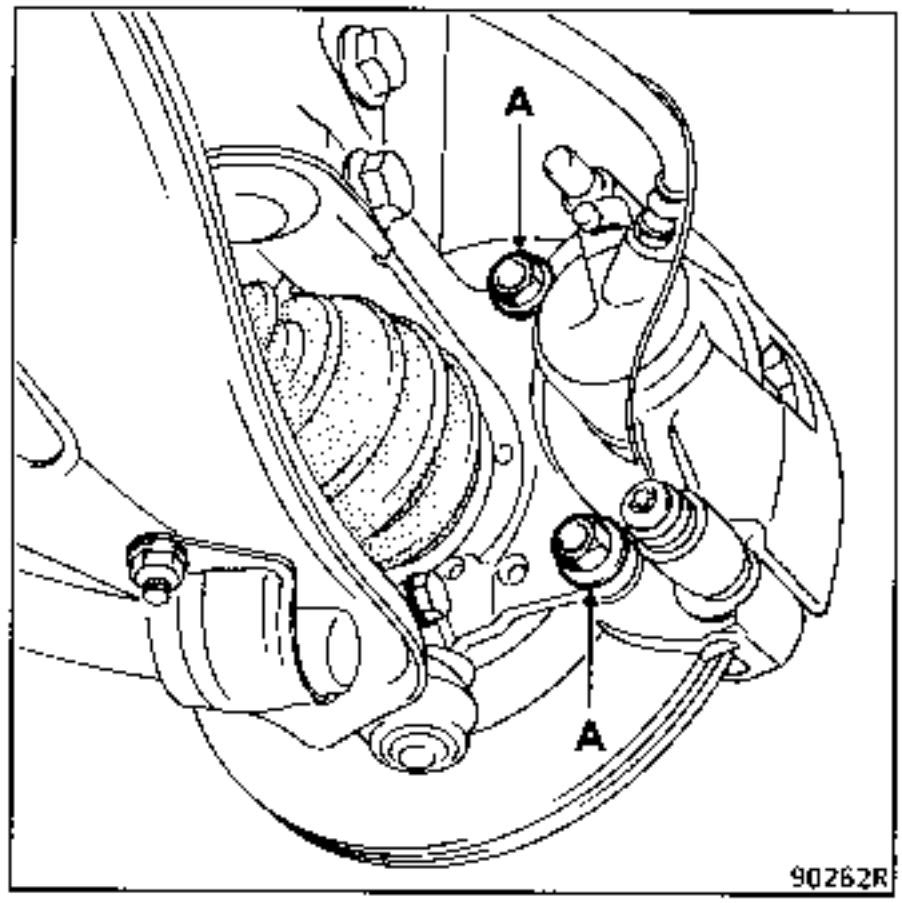
GIRLING



BENDIX Series IV



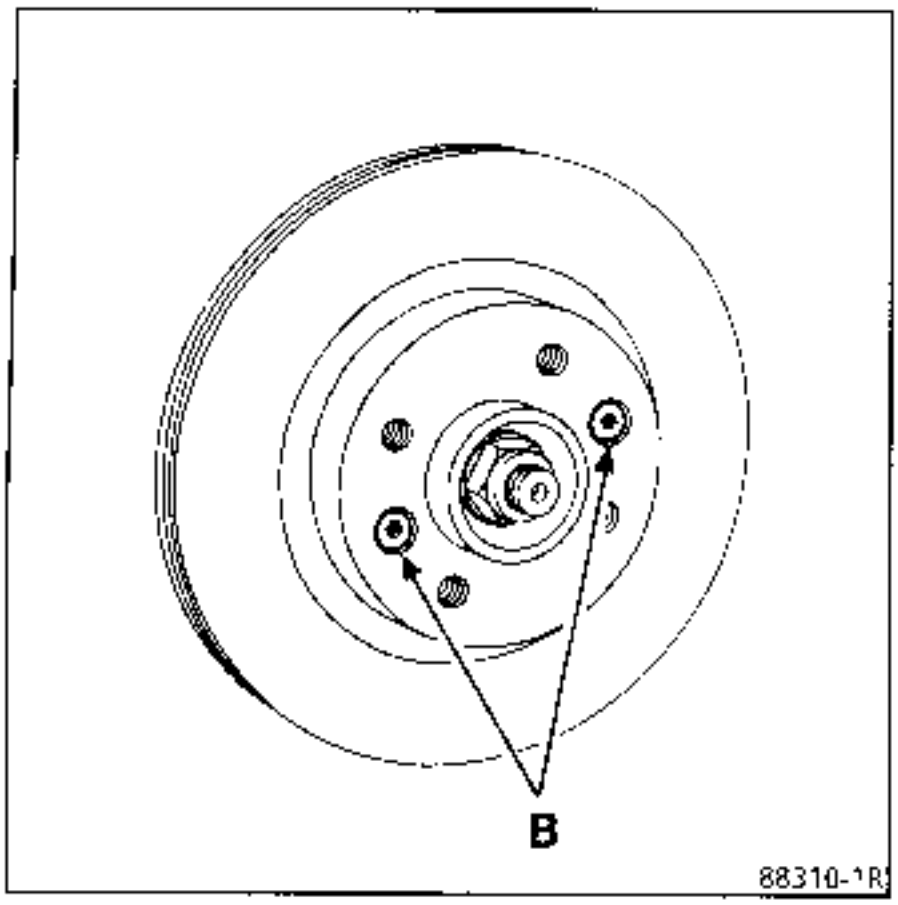
BENDIX Series IV M



- the two bolts (B) securing the disc,
- the disc.

REFITTING

Offer up the disc to the hub and secure it with the two cap bolts (B).



Refit the brake calliper, smear the mounting bolts with **LOCTITE FRENBLOC** and tighten to the specified torque.

Operate the brake pedal several times in order to push the pistons into contact with the brake pads.

CHANGING

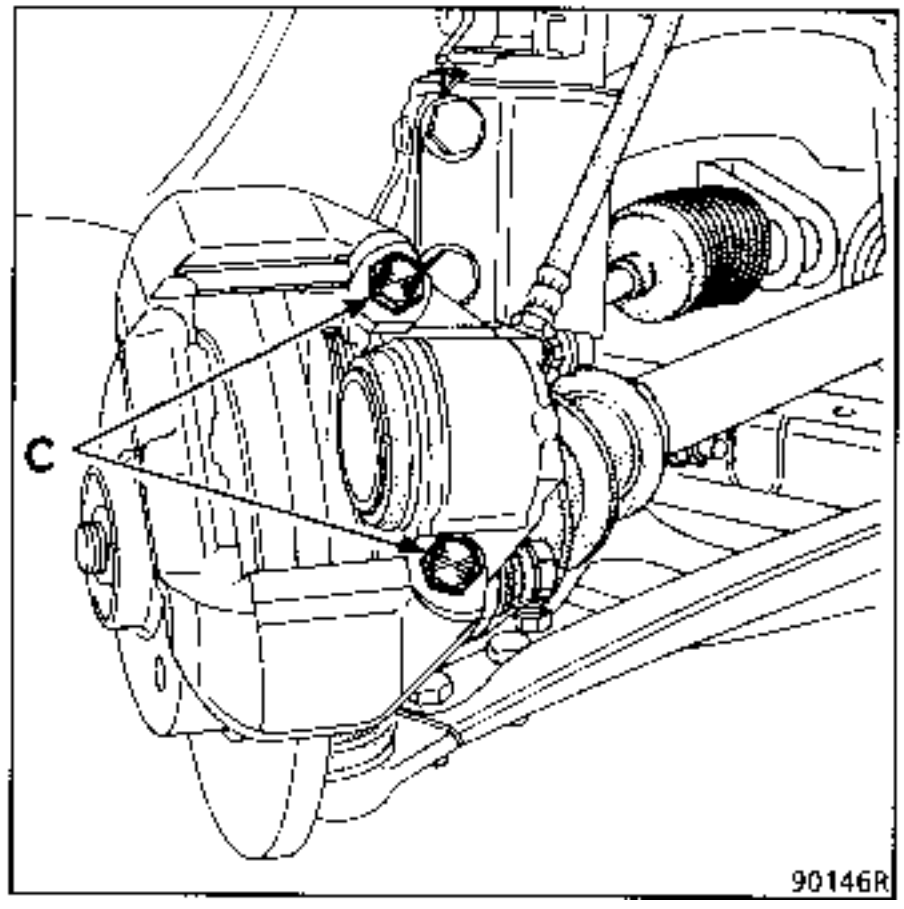
When changing a brake disc, the pads must also be changed.

In this case, it will be necessary firstly to change the pads and secondly to remove the calliper brackets (see "**Removal/Refitting**" section).

Special point concerning BENDIX Series IV

To change the disc, remove :

- the pads,
- the two calliper bracket bolts (C).



ESSENTIAL SPECIAL TOOLING		
M.S.	580	Impact tool
Rou.	15-01	Shaft protecting end piece
Rou.	604-01	Hub locking tool
T.Av.	476	Ball joint extractor
T.Av.	1050-02	Hub extractor

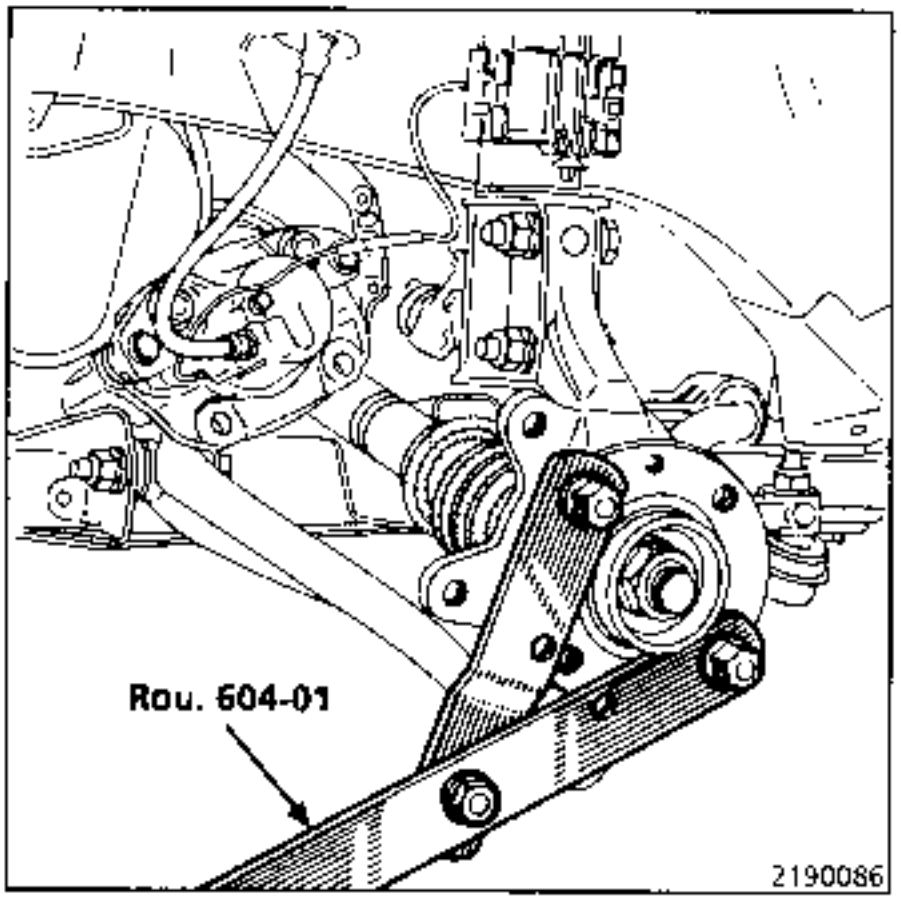
TIGHTENING TORQUES (in daN.m)	
Bolts securing stub axle carrier to shock absorber base	11
Lower ball joint key-securing nuts	6
Steering ball joint nuts	4
Brake calliper securing bolts	10
Driveshaft nuts	25
Wheel bolts	9

Checking the clearance

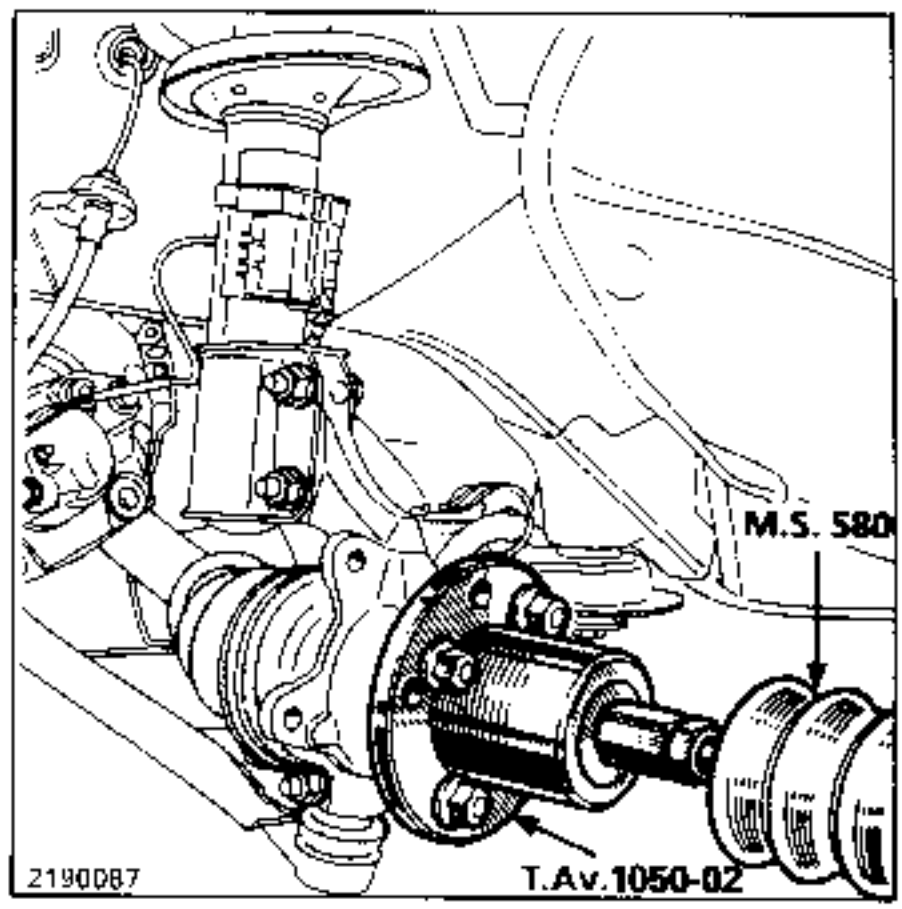
Using a clock gauge on the hub, check that the axial clearance is between : **0 to 0.05 mm**.

REMOVAL

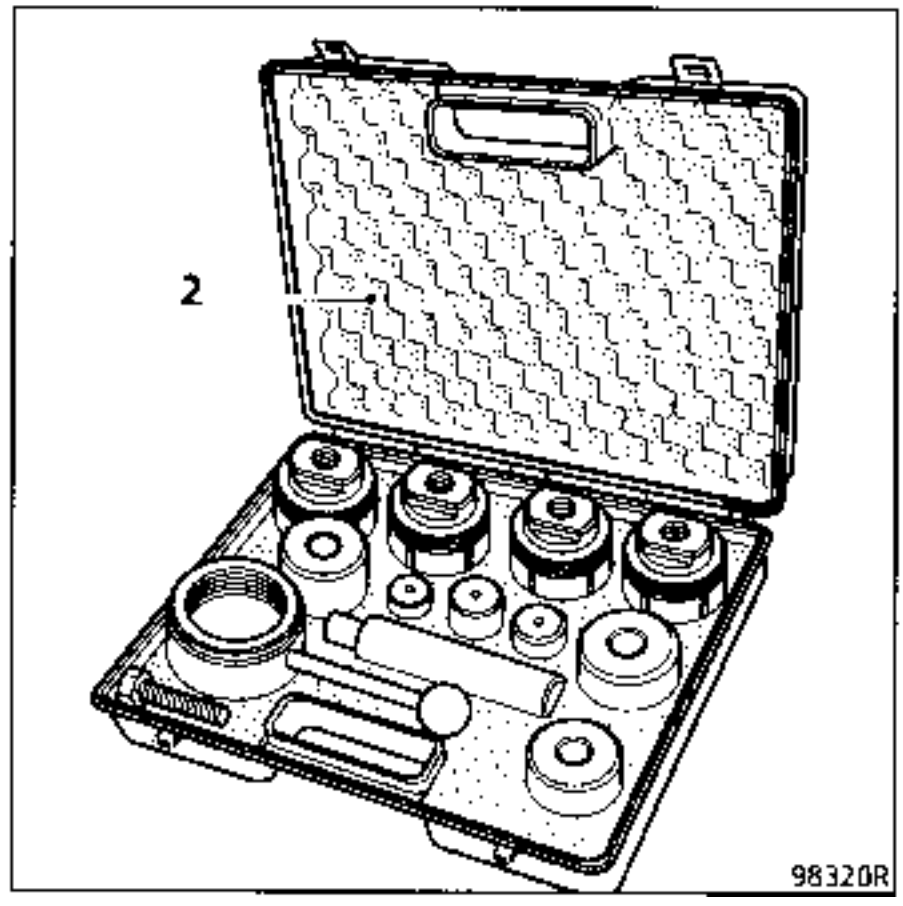
Remove:
- the brake disc (see "**Braking System**" section),
- the driveshaft nut using tool **Rou. 604-01**.

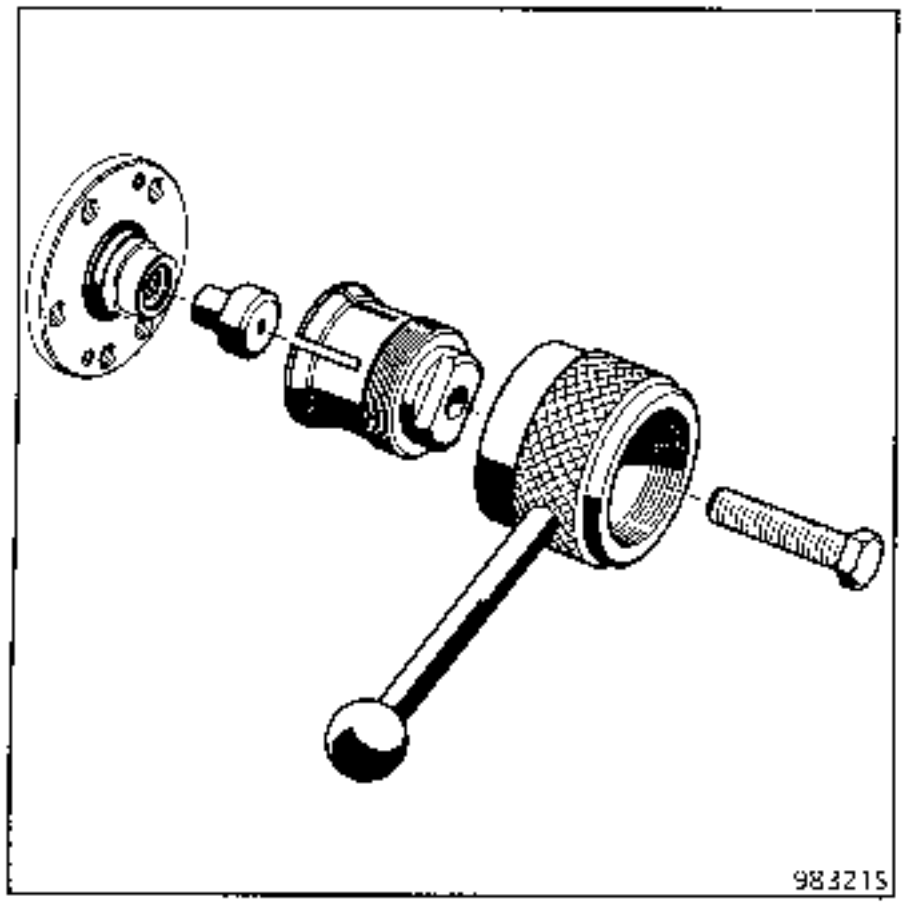


Extract the hub using tool **T.Av. 1050-02 + M.S. 580**.

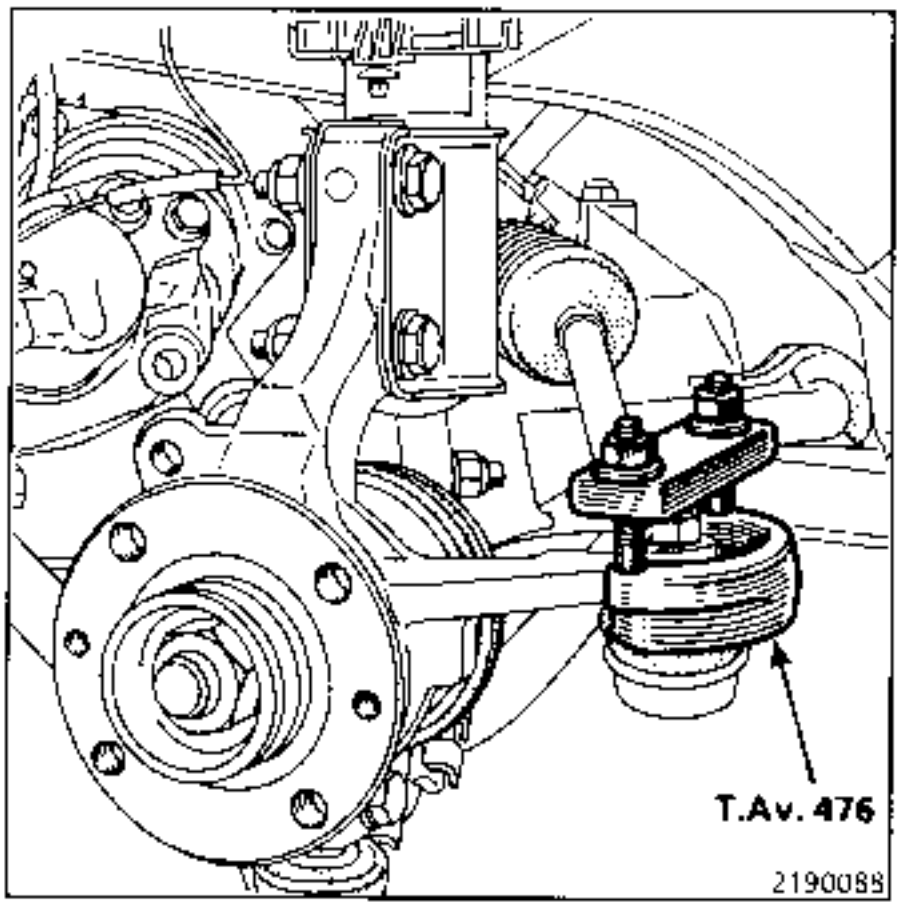


Remove the interior bearing ring using the **hub bearing extractor kit**, see Tooling Catalogue, tool reference **914 0951**.

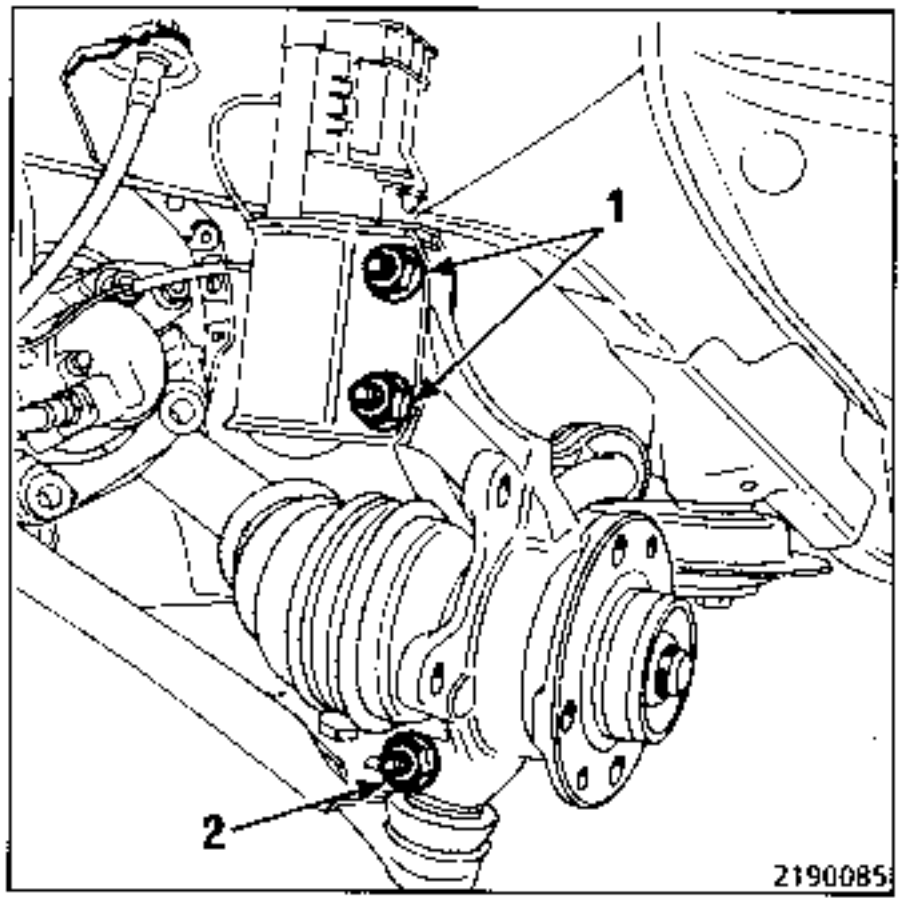




Disconnect the steering arm using tool T.Av. 476.

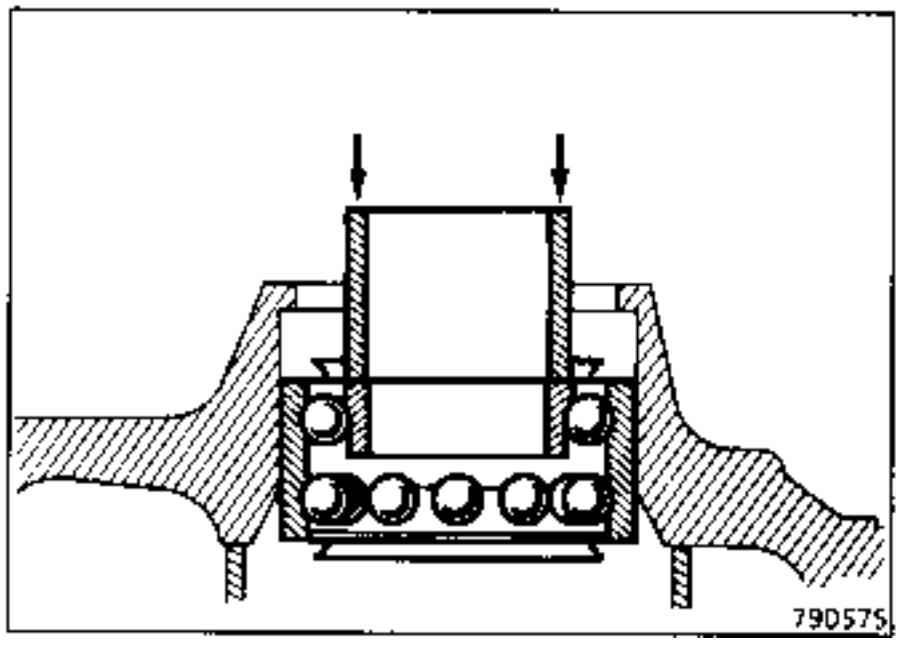


Remove :
- securing bolts (1),
- key-securing bolt and nut (2),

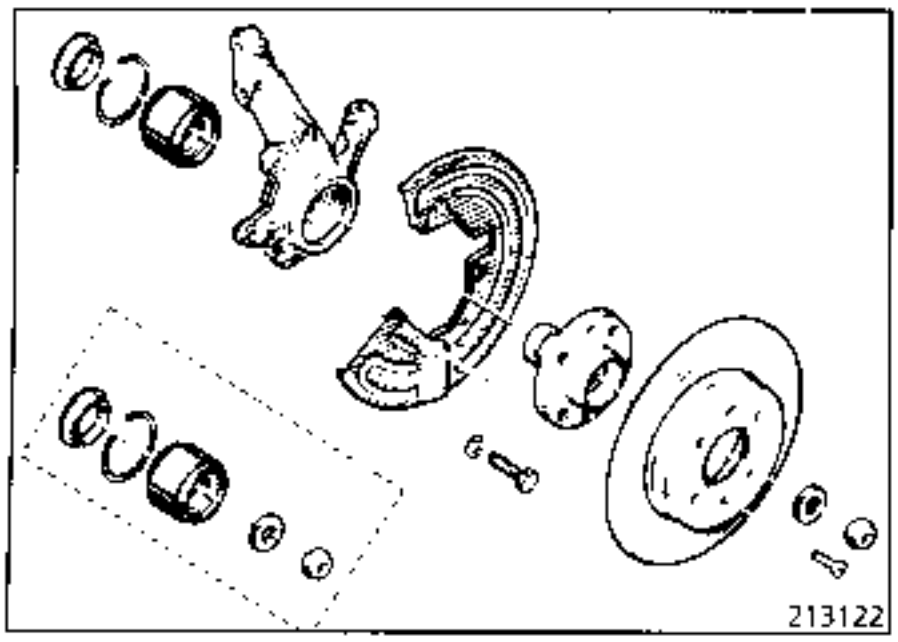


- the lock ring.

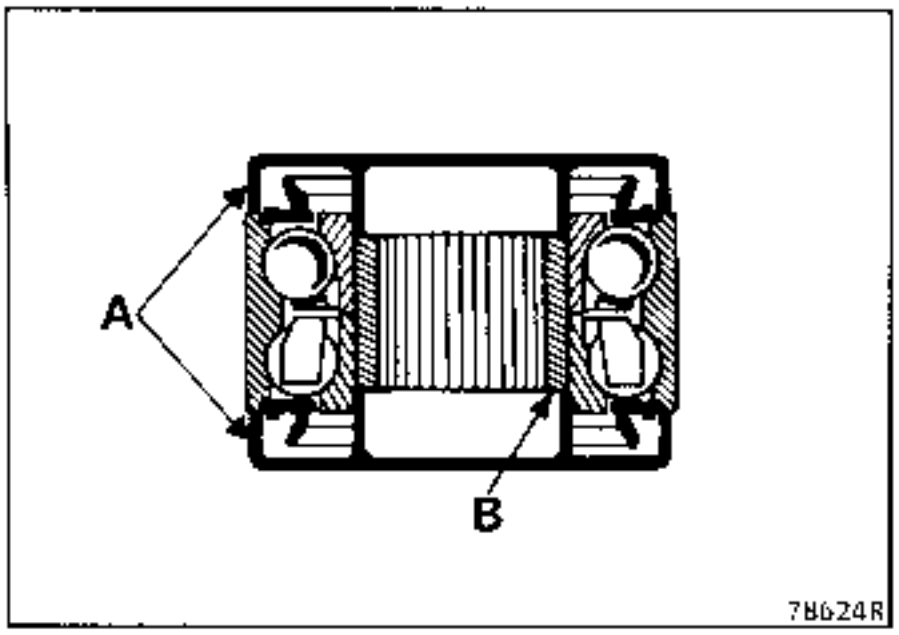
On the press, extract the outer bearing track using one of the two inner bearing tracks for assistance, leaving their ball races and the seals in position.



REFITTING

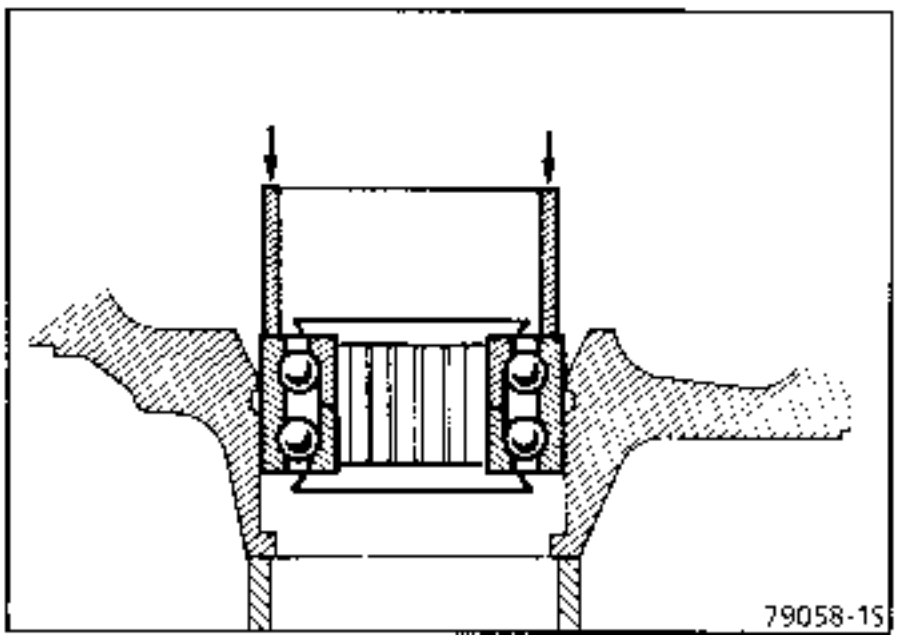


Remove the two plastic protectors (A) from the new bearing.



On the press, fit the bearing with its plastic ring (B) in the stub axle carrier using a piece of tubing with an outer diameter of **71 mm** and a bore of **66 mm**, resting on the outer track bearing.

Do not rest on the inner track bearing or the bearing will be damaged, as great stress must be applied when fitting the bearing.

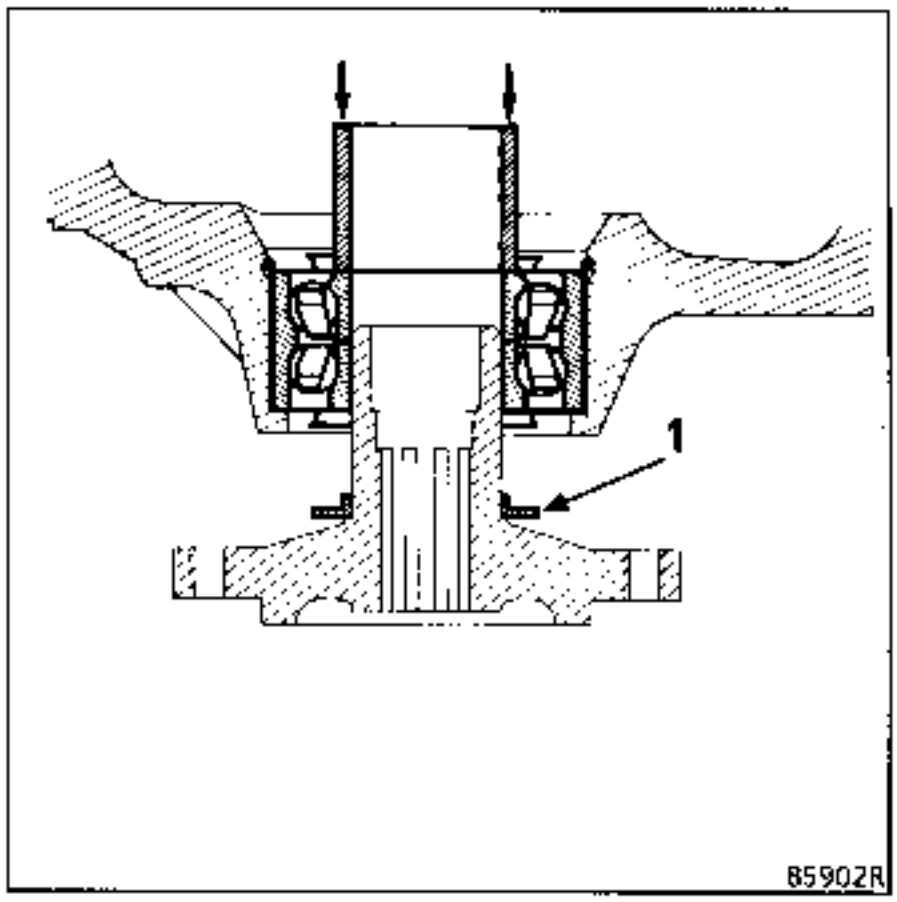


Remove plastic ring (B).

Fit the new lock ring in place.

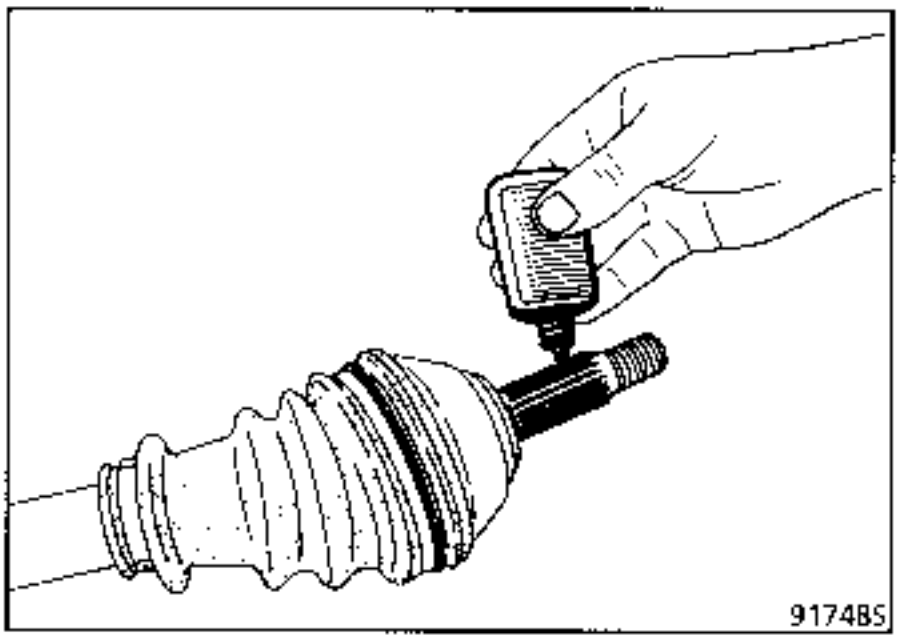
Coat each sealing lip with grease.

Place thrust washer (1) on the hub and fit it on the press using a piece of tubing with an outer diameter of **48 mm** and a bore of **43 mm**, resting on the inner bearing track bearing.



Refit the stub axle carrier to the vehicle.

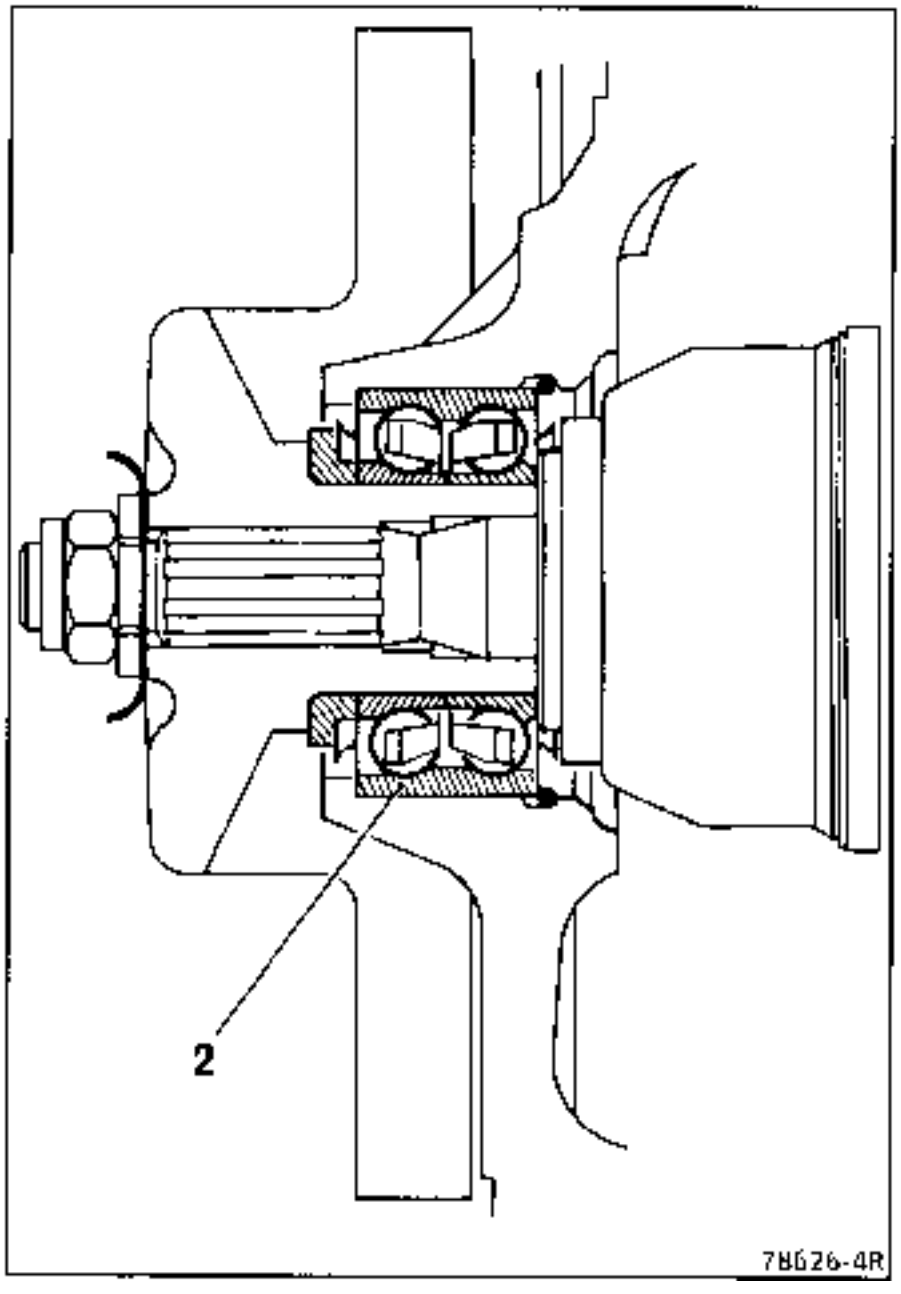
Coat the driveshaft stub axle with **LOCTITE SCELBLOC**.



Proceed in the reverse order to removal and torque tighten the nuts as recommended.

The method for removing and refitting the stub axle carrier is identical to the method for changing the bearing.

NOTE : As the stress applied for fitting the outer track bearing (2) of the bearing in its bore is very great, the entire bearing must be changed when the outer track bearing is removed, since the bearing will have marked a path in the track bearings.

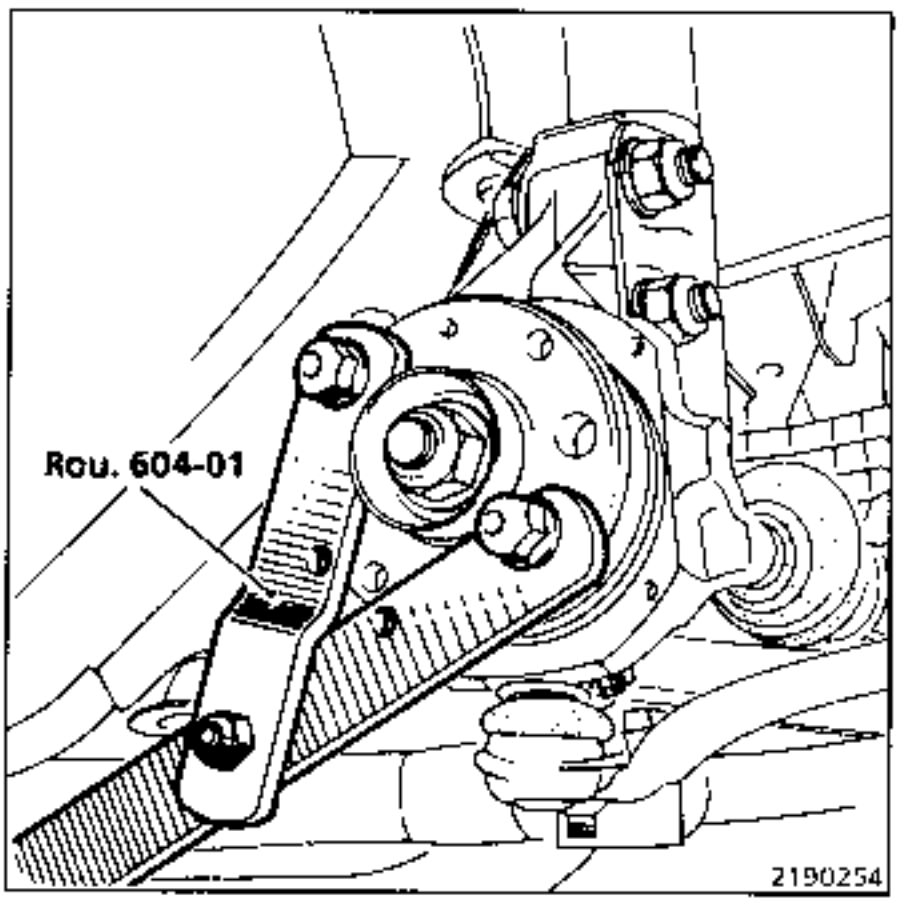


ESSENTIAL SPECIAL TOOLING		
M.S.	580	Impact tool
Rou.	15-01	Shaft protecting end piece
Rou.	604-01	Hub locking tool
T.Av.	1050-02	Hub extractor

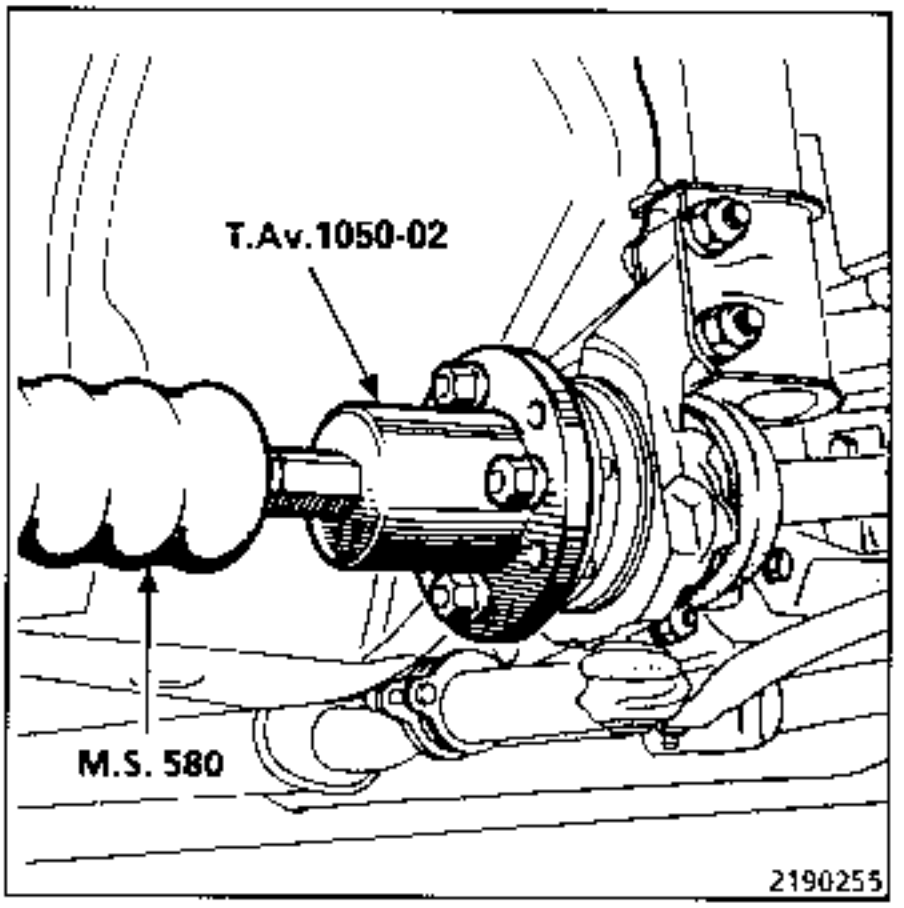
TIGHTENING TORQUES (in daN.m)		
Driveshaft nuts		25
Wheel bolts	4 bolts	9
	5 bolts	10
Brake calliper securing bolts		10
Bearing mounting bolts		2

REMOVAL

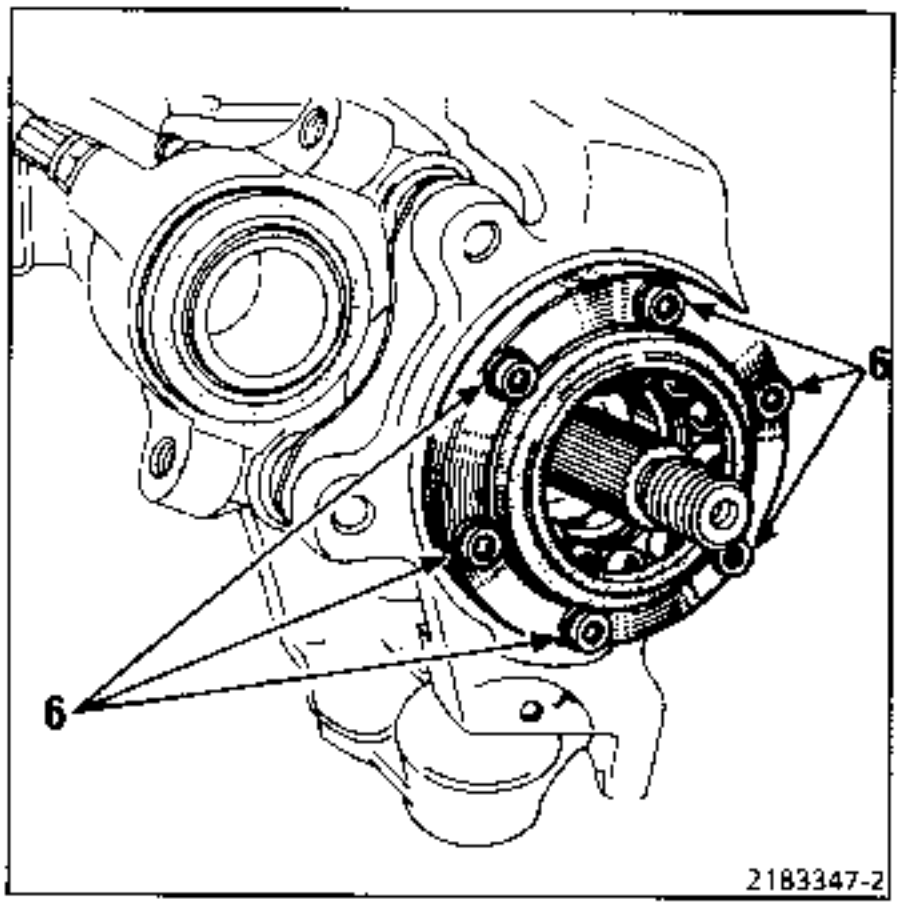
Remove:
- the brake disc (see "**Braking system**" section),
- the driveshaft nut, using tool **Rou. 604-01**.



Extract the hub using tool **T.Av. 1050-02** + **M.S. 580**.

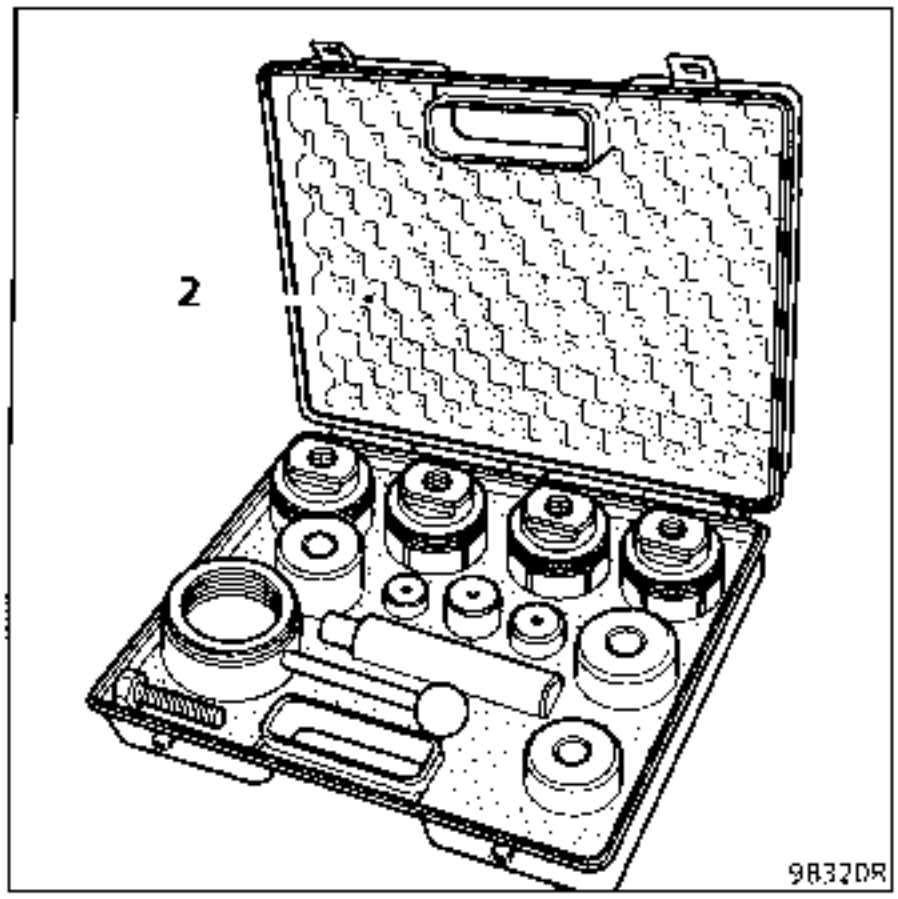


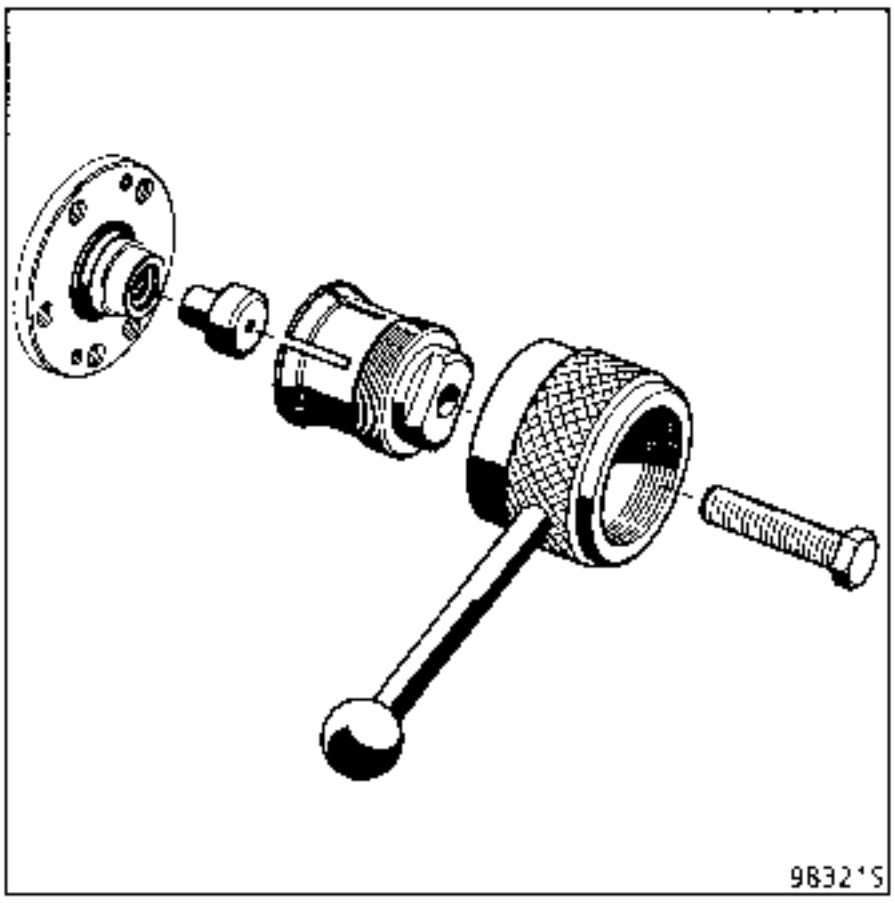
Remove:
- the bolts (6) holding the bearing,



- the bearing and its inner half track bearing remaining on the driveshaft stub axle.

From the hub, extract the other half track bearing using a tool from the hub bearing extractor kit. Refer to Tooling Manual, tool reference **914 0951**.

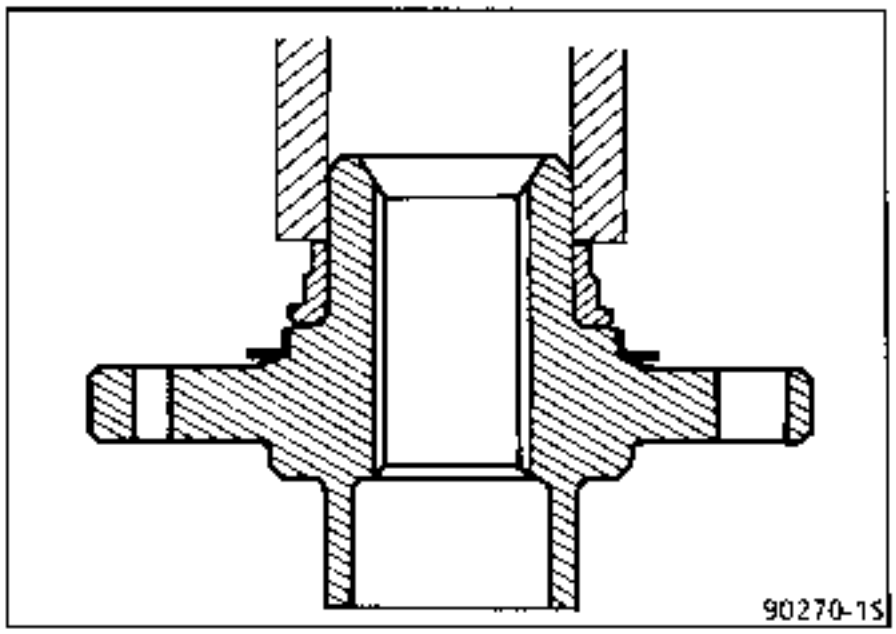




REFITTING

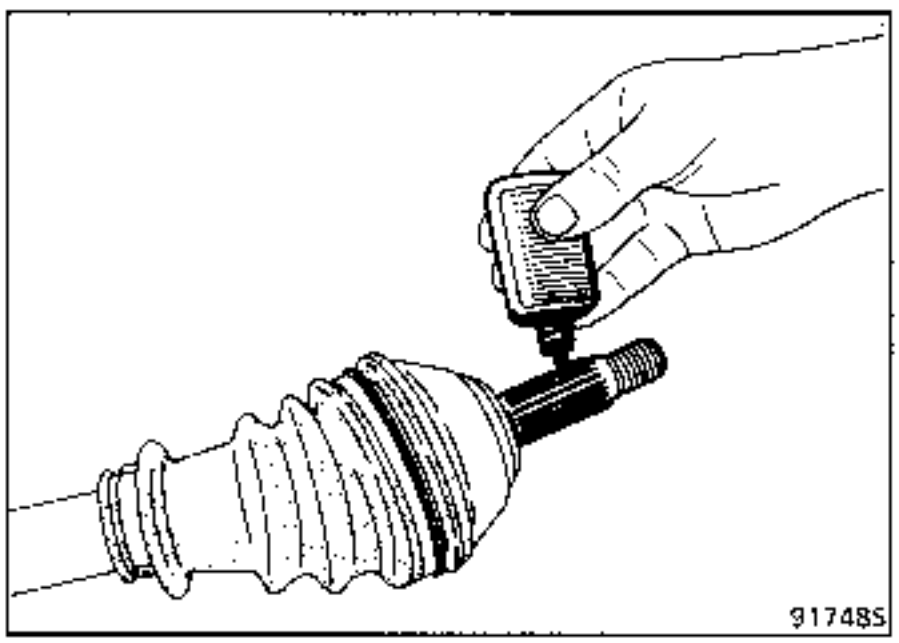
Engage the bearing inner half track bearing on the driveshaft stub axle and secure the bearing on the stub axle carrier

On the press, push the other half track bearing onto the hub using a piece of tubing with a bore of 41 mm.



Coat the ball bearings, the bearing tracks and sealing lips with grease.

Coat the driveshaft stub axle with **LOCTITE SCELBLOC**.



Engage the hub on the driveshaft stub axle (using a mallet if necessary) until the nut can be screwed up by a few threads.

fit in place the hub locking tool **Rou. 604-01** and torque tighten the driveshaft nut.

Refit the braking assembly (see relevant section).

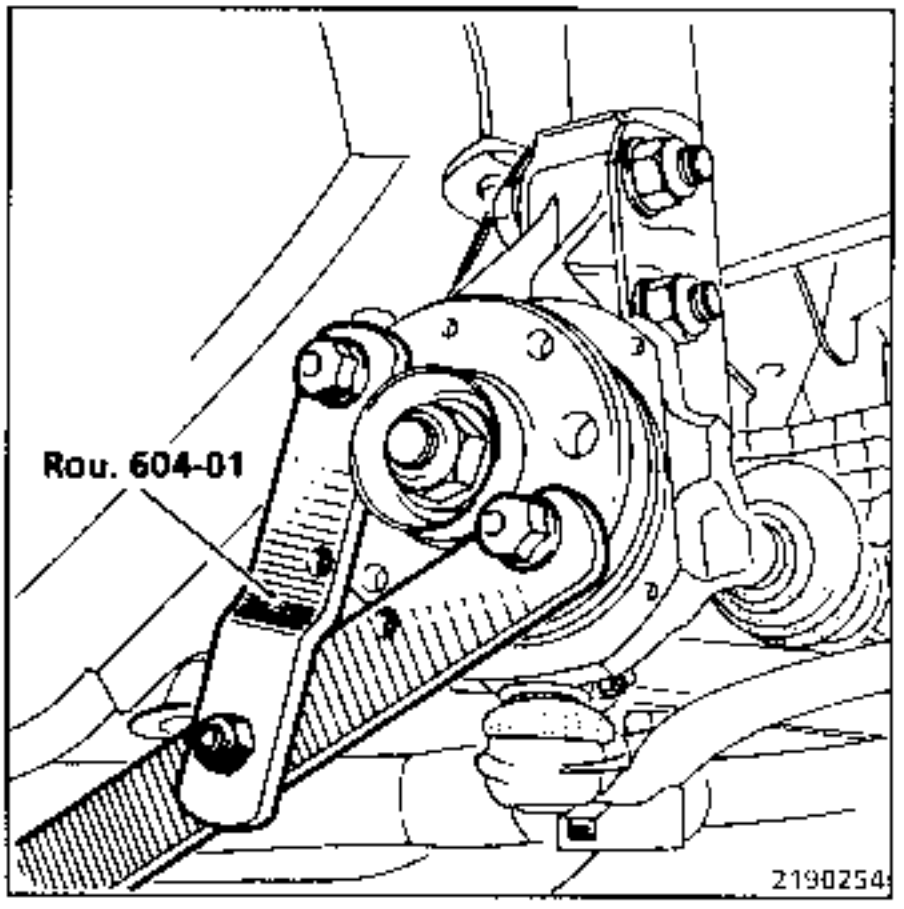
For transverse engines, please refer to the "**Stub axle carrier bearing**" section.

ESSENTIAL SPECIAL TOOLING		
Rou.	604-01	Hub locking tool
T.Av.	476	Hub extractor

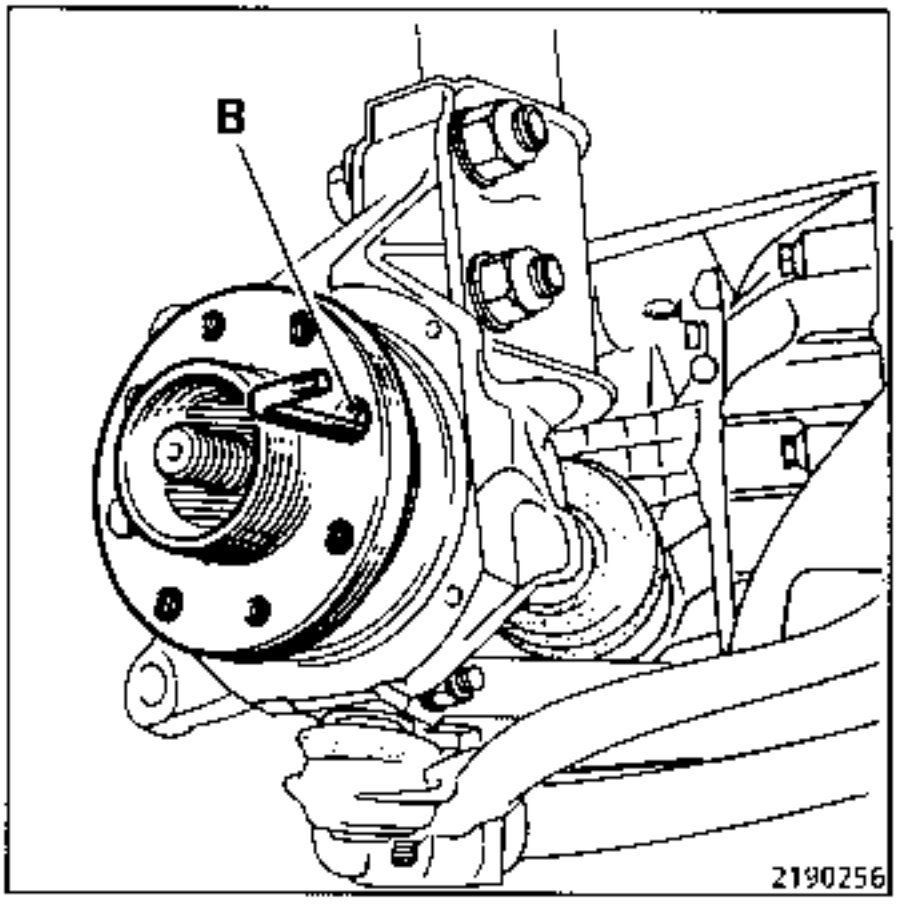
TIGHTENING TORQUES (in daN.m)		
Bolts securing stub axle carrier to shock absorber base		20
Lower ball joint key-securing nuts		6
Steering ball joint nuts		4
Brake calliper securing bolts		10
Driveshaft nuts		25
Wheel bolts	4 bolts	9
	5 bolts	10

REMOVAL

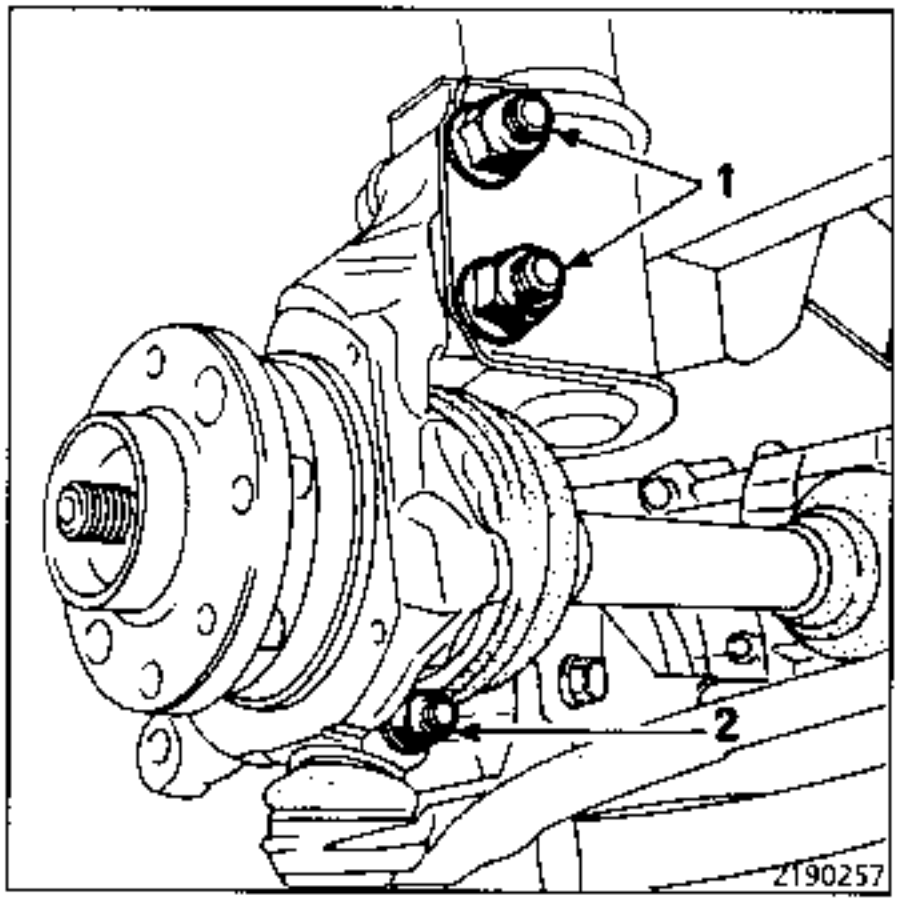
Remove :
- the brake disc (see "**Braking system**" section),
- the driveshaft nut, using tool **Rou. 604-01**.



Through holes (B) in the hub, remove the bearing securing bolts.



Remove:
- the hub-bearing assembly,
- the securing bolts (1),
- the key-securing nut and bolt (2),



- the stub axle carrier.

REFITTING

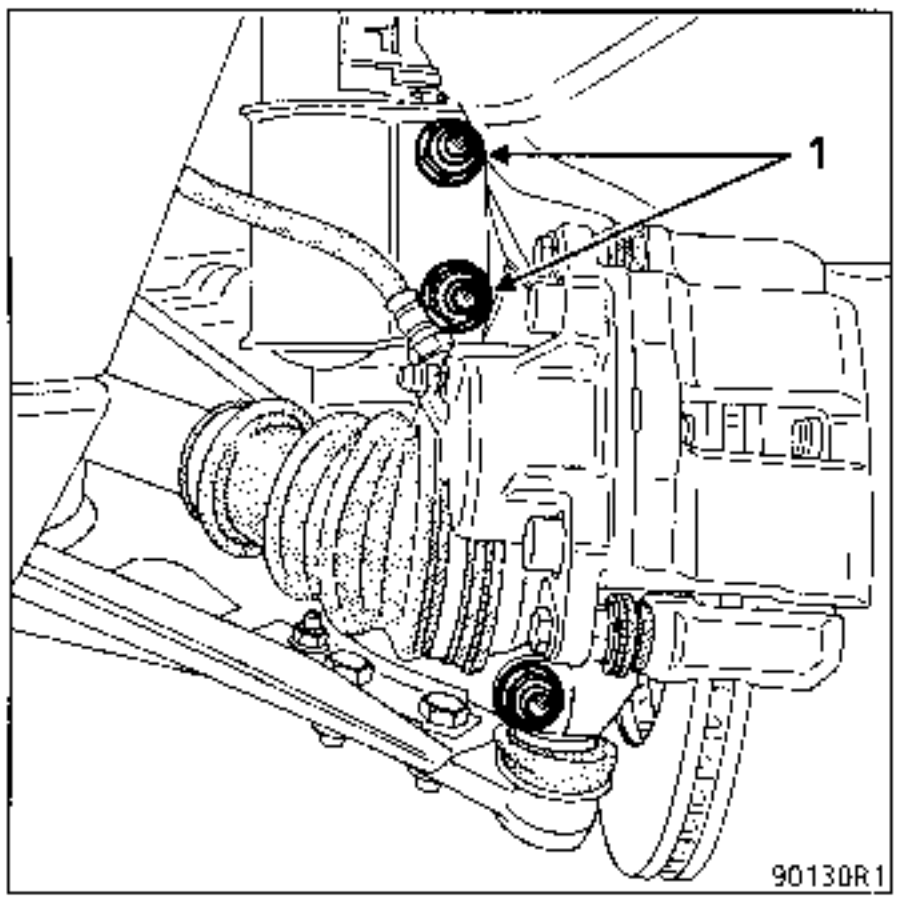
When the stub axle carrier has been secured, reassemble the bearing and braking system, taking care that all components are clean and in good operating order.

TIGHTENING TORQUES (in daN.m)	
Shock absorber piston rod nuts	6
Shock absorber base securing bolts	8
Shock absorber cup securing nuts	2.5
Wheel bolts	9

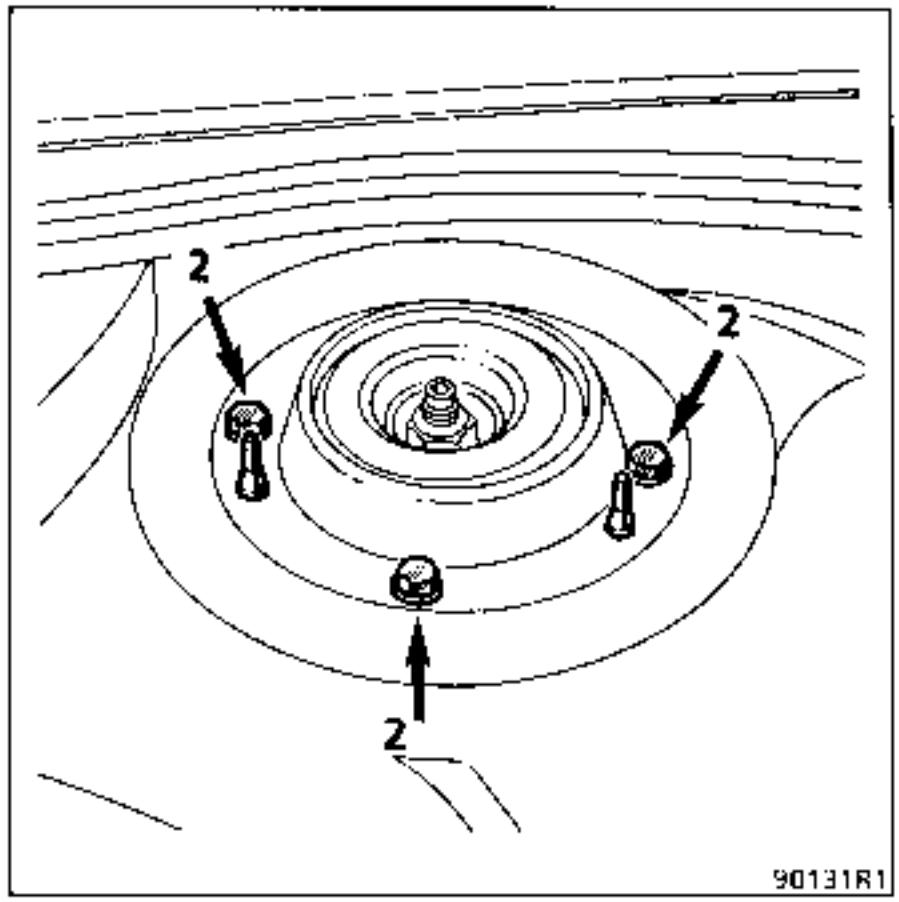
REMOVAL

With the vehicle on stands on the side in question.

Remove:
- the wheel,
- the two bolts (1) securing the bottom of the shock absorber,



- the three upper securing bolts (2),



- the shock absorber, pressing down on the bottom arm to prevent the shock absorber coming into contact with the driveshaft gaiter.

REFITTING

Proceed in the reverse order to removal, **taking care not to damage the driveshaft gaiter.**

Torque tighten :
- bolts (1) securing the bottom of the shock absorber (1),
- upper securing bolts (2).

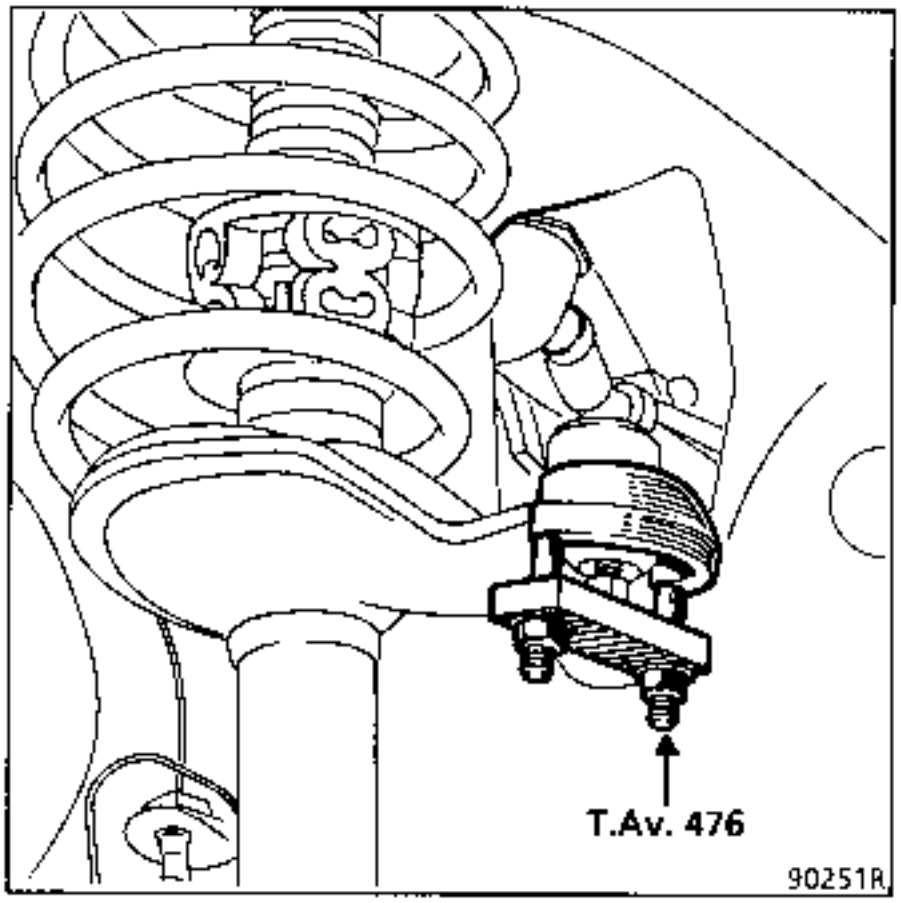
ESSENTIAL SPECIAL TOOLING		
T.Av.	476	Ball joint extractor

TIGHTENING TORQUES (in daN.m)	
Shock absorber piston rod nuts	6
Shock absorber base securing bolts	20
Shock absorber cup securing nuts	2.5
Steering ball joint nut	4
Wheel bolts 4 bolts	9
5 bolts	10

REMOVAL

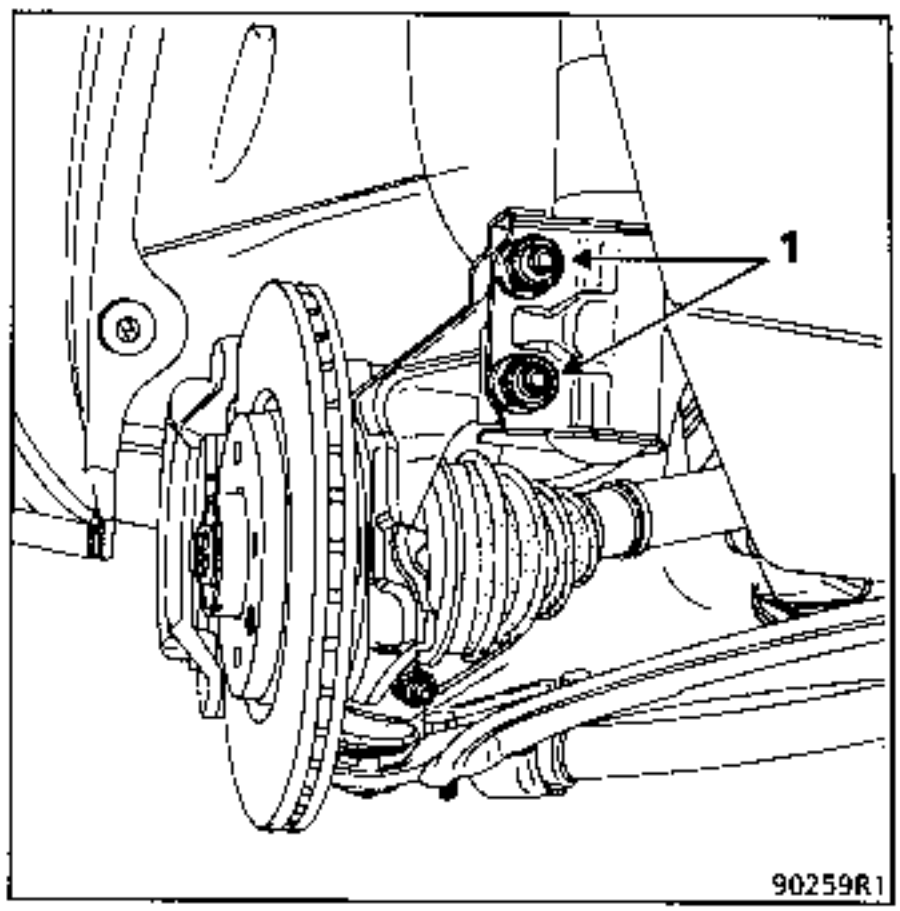
With the vehicle on stands on the side in question.

Remove :
- the wheel,
- the steering ball joint, using tool **T.Av. 476**,

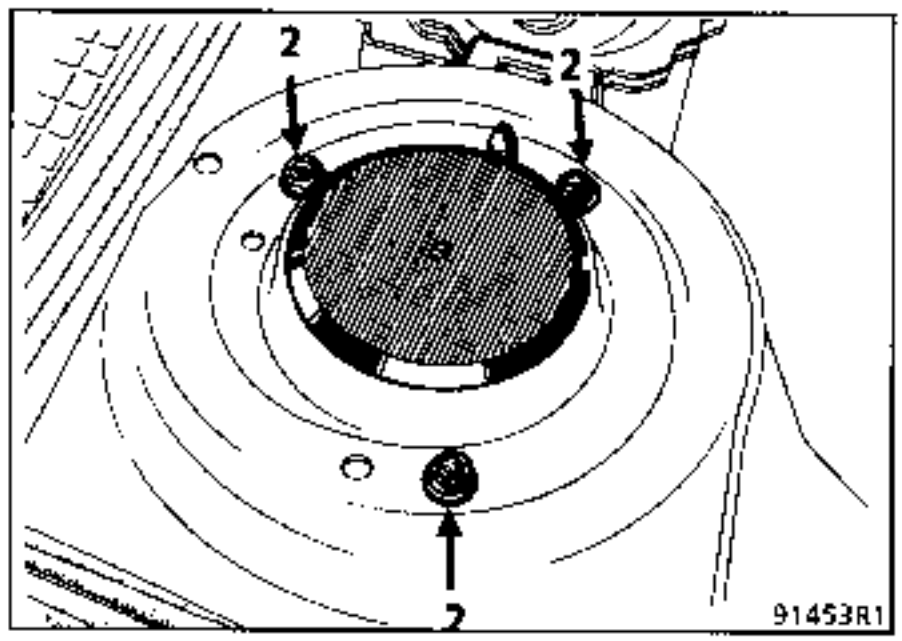


- the two bolts (1) securing the bottom of the shock absorber,

NOTE : The bolts have a splined section so they must be tapped with a mallet for removal.



- the three upper securing bolts (2),



- the shock absorber, by pressing on the bottom arm **to prevent the shock absorber coming into contact with the driveshaft gaiter.**

REFITTING

Fit the shock absorber, taking care not to damage the driveshaft gaiter.

Refit and torque tighten :
- the steering ball joint,
- the bolts (1) securing the bottom of the shock absorber,
- the upper securing bolts(2).

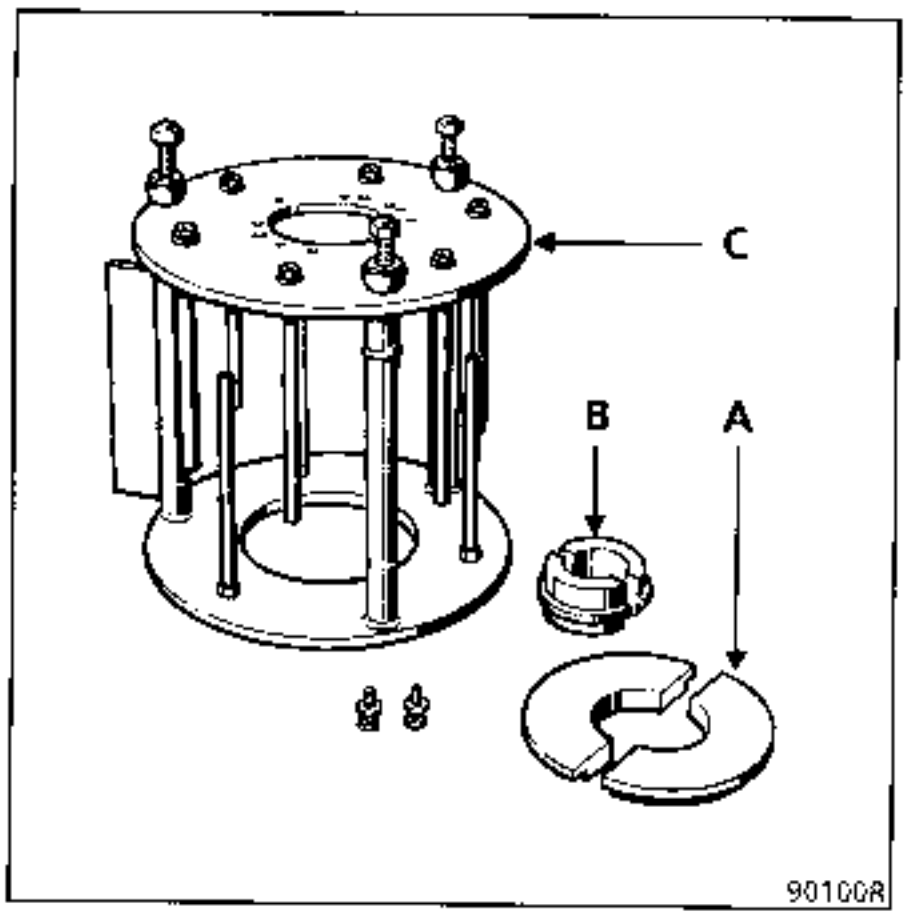
Check and, if necessary, adjust the parallelism.

NOTE : As the steering arm is mounted on the shock absorber body, the parallelism must be checked when the shock absorber has been changed.

In view of the high compression load of the coil springs, it is essential that all suspension tooling is kept in perfect condition.

ESSENTIAL SPECIAL TOOLING	
Sus. 1052	Tooling for operating on front spring and shock absorber

Use components A - C - D - F from tool Sus. 1052.



Upper and lower compression pad assembly.

A Retainer half cups.

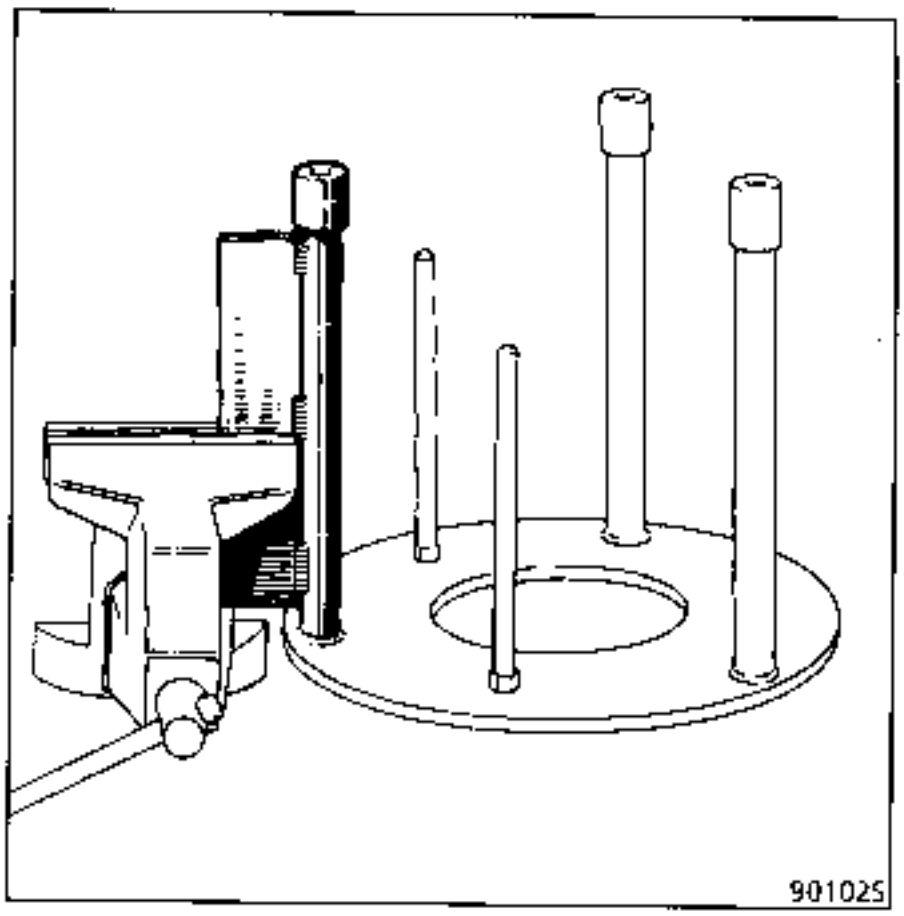
C Half shell marked R21 for retaining 48mm diameter shock absorber body.

D Spigot.

F Half shell marked R9 - R11 for 50 mm diameter shock absorber body.

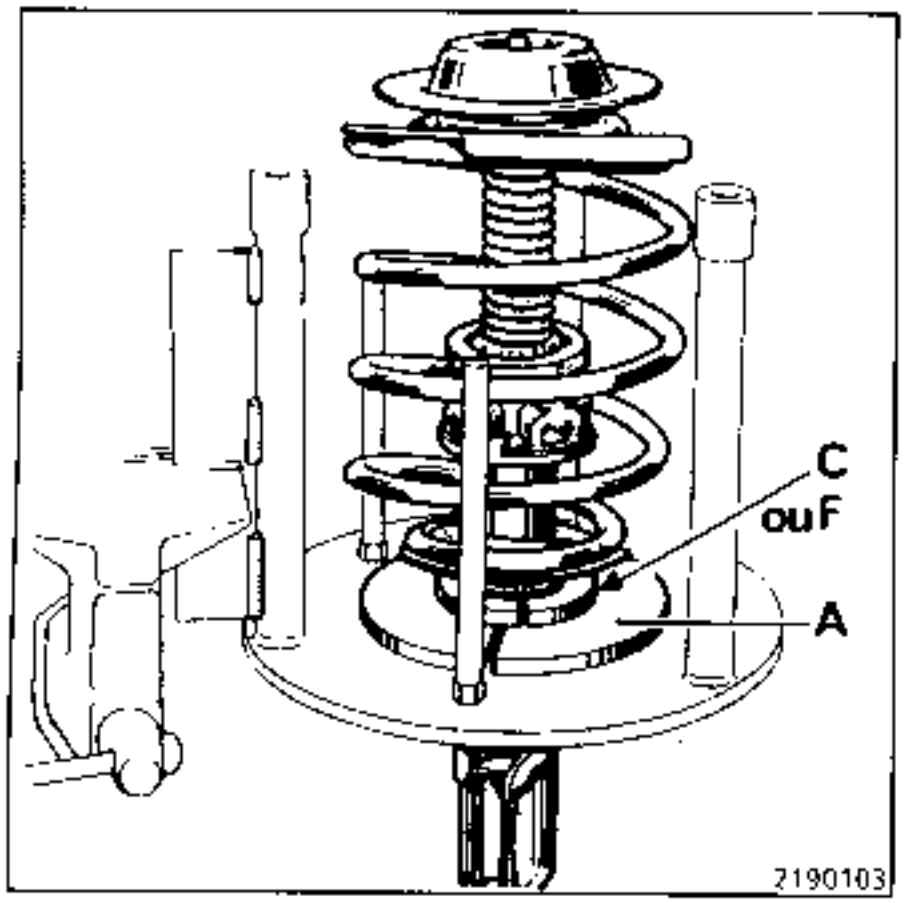
DISMANTLING THE SPRING AND SHOCK ABSORBER

Place the lower pad from tool Sus. 1052 in a vice.

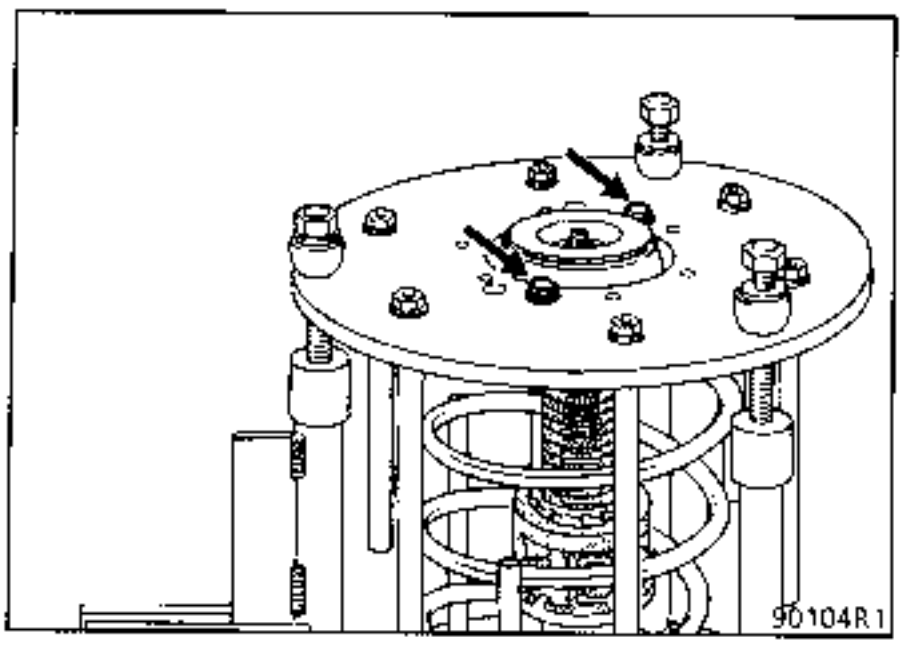


Fit in place :

- the spring-shock absorber assembly, positioning the two half-cups **A** and the two half-shells **C** for the **48 mm** diameter shock absorber or two half-shells **F** for the **50 mm** diameter shock absorber,

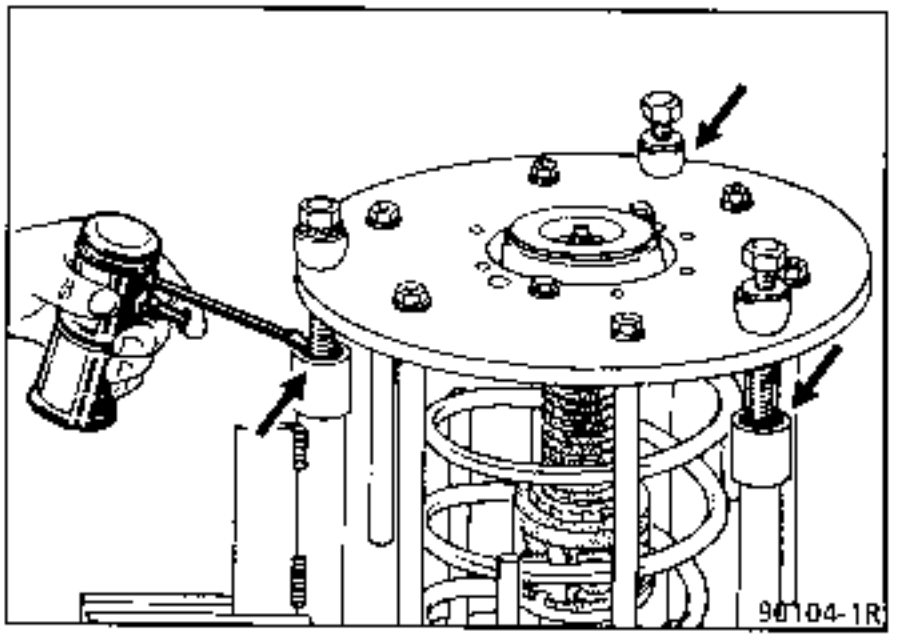


- the upper pad,
- the two bolts, holding the upper shock absorber cup in the marked holes (vehicle markings given on the upper pad),



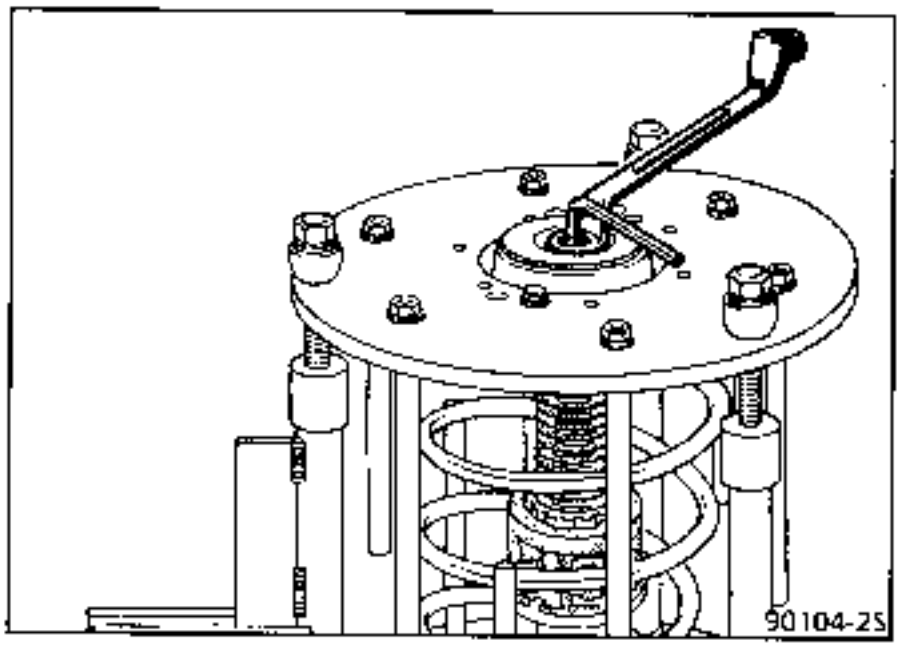
- the three compression bolts, putting plenty of oil in the oil grooves.

NOTE : As the threaded rods of the tool are subject to very great stresses, it is essential for them to be liberally oiled.



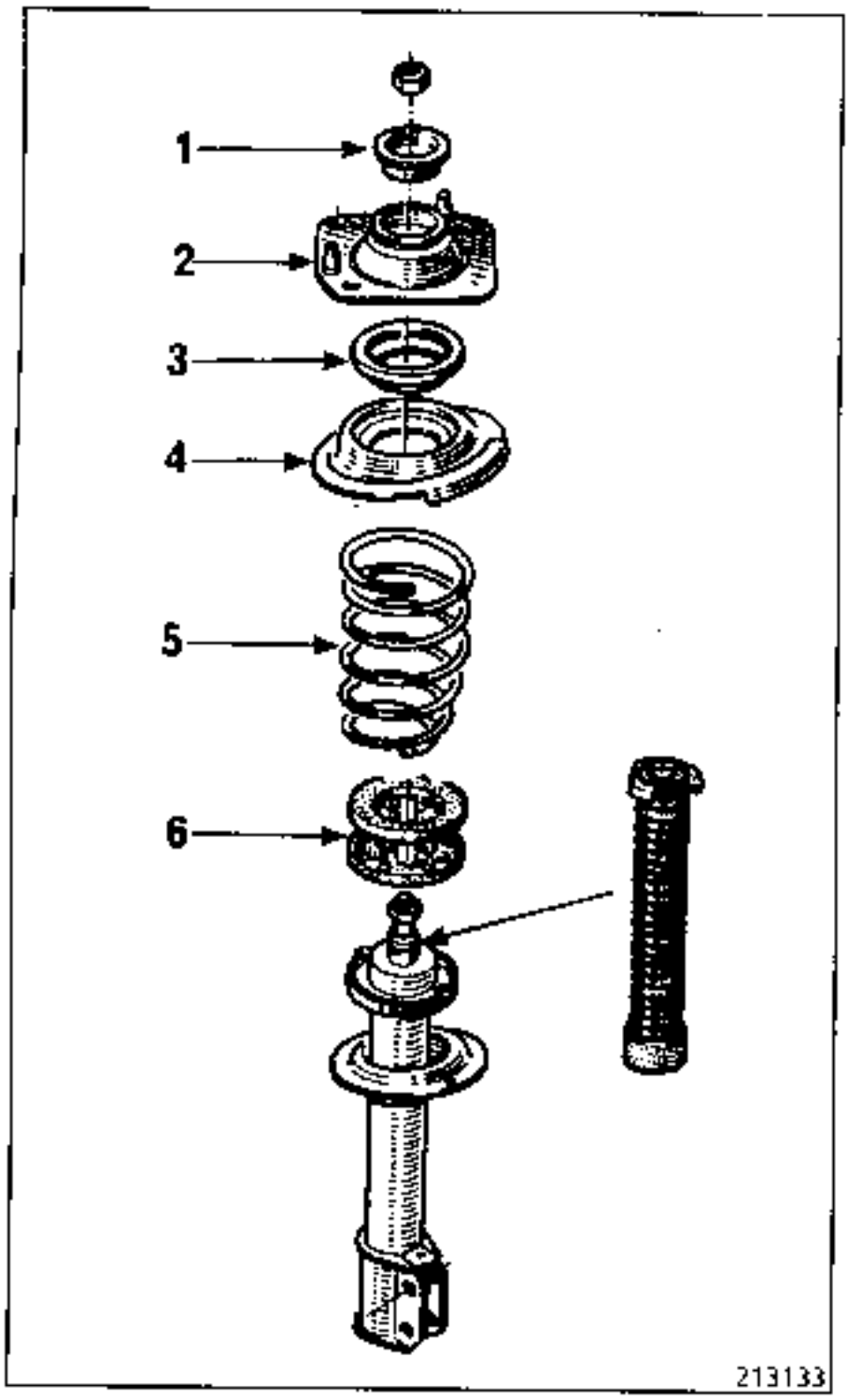
Compress the spring by approximately **10 mm**.

Remove the nut from the shock absorber rod.



Gradually release the pressure from the spring.

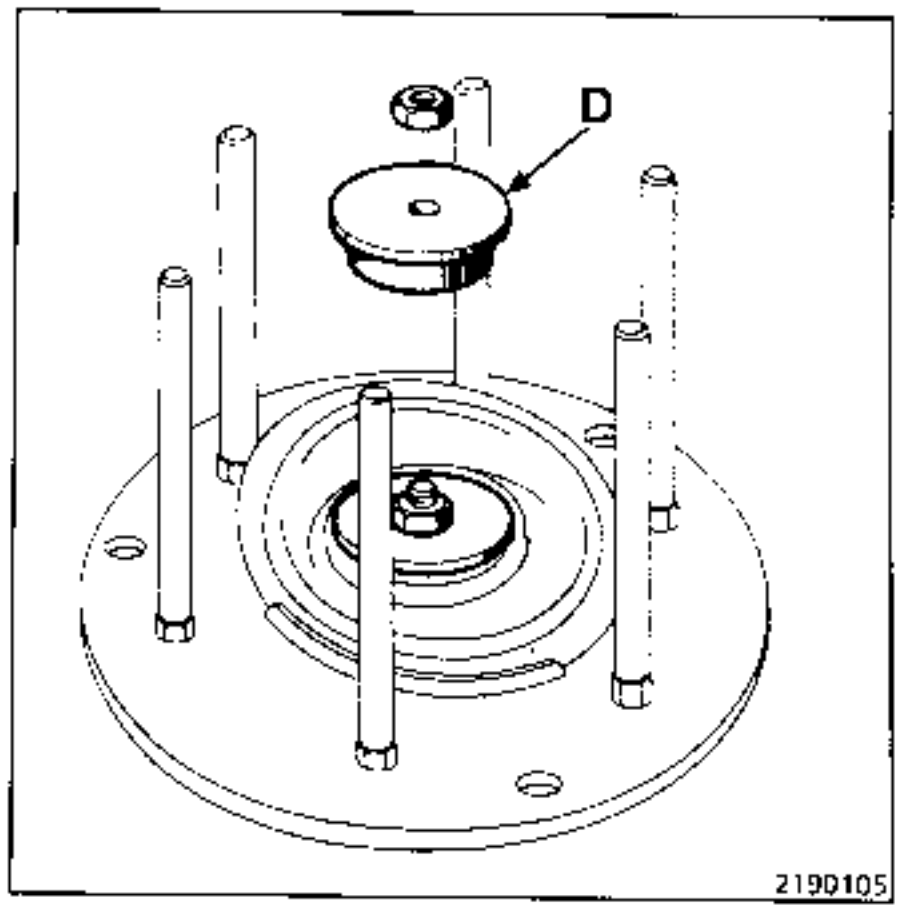
Remove parts **1** to **6** in order.



Parts **3** and **4** form the stub axle carrier pivot assembly.

REFITTING THE SPRING AND SHOCK ABSORBER

Fit spigot **D** in place on the upper pad of tool **Sus. 1052** so as to hold assembly **2 - 3 - 4** in position.



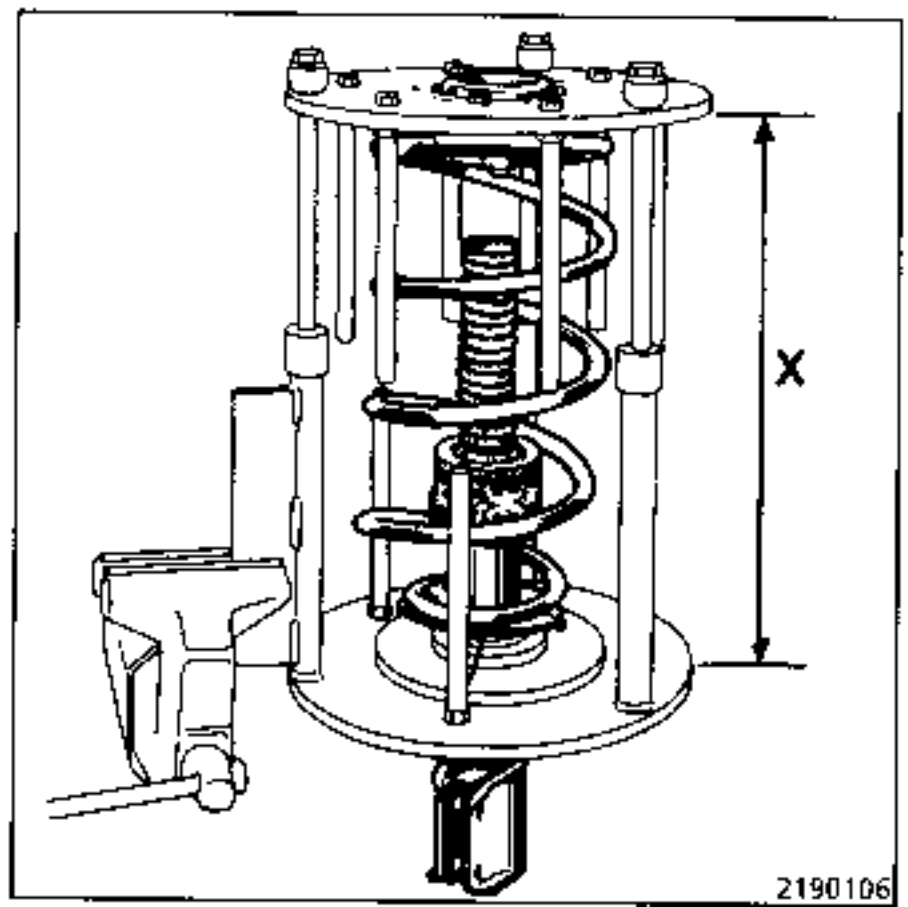
Position :

- the shock absorber,
- the spring on the lower shock absorber cup so that it is positioned correctly on the retaining stop,

  the upper pad/spigot assembly with the markings opposite one another.

Make sure that the spring is against the upper stop.

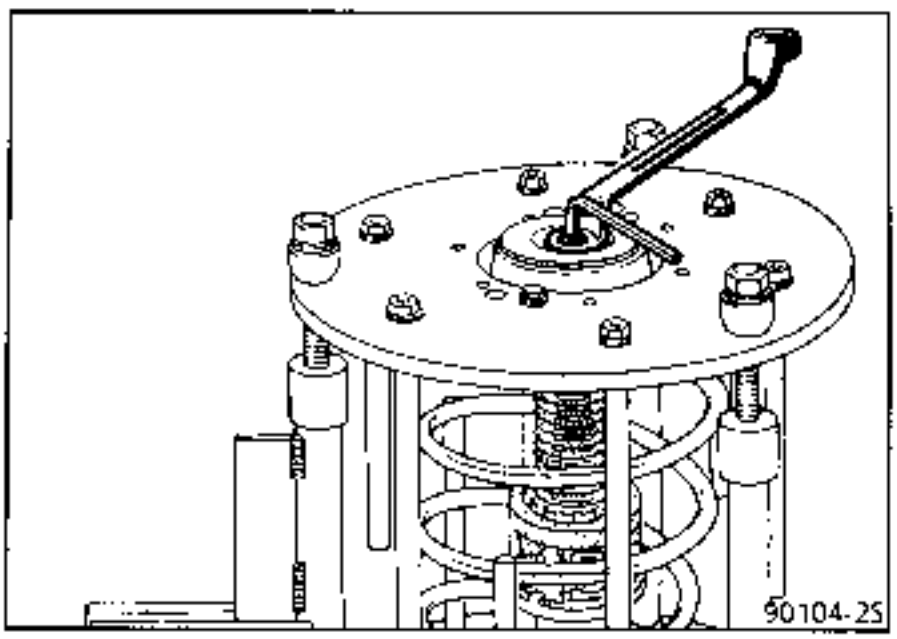
Compress the assembly to a height X of **approximately 400 mm**.



Remove the spigot.

Compress the assembly and insert the shock absorber rod.

Fit in place :
- cup (1),
- the nut.



Torque tighten the nut.

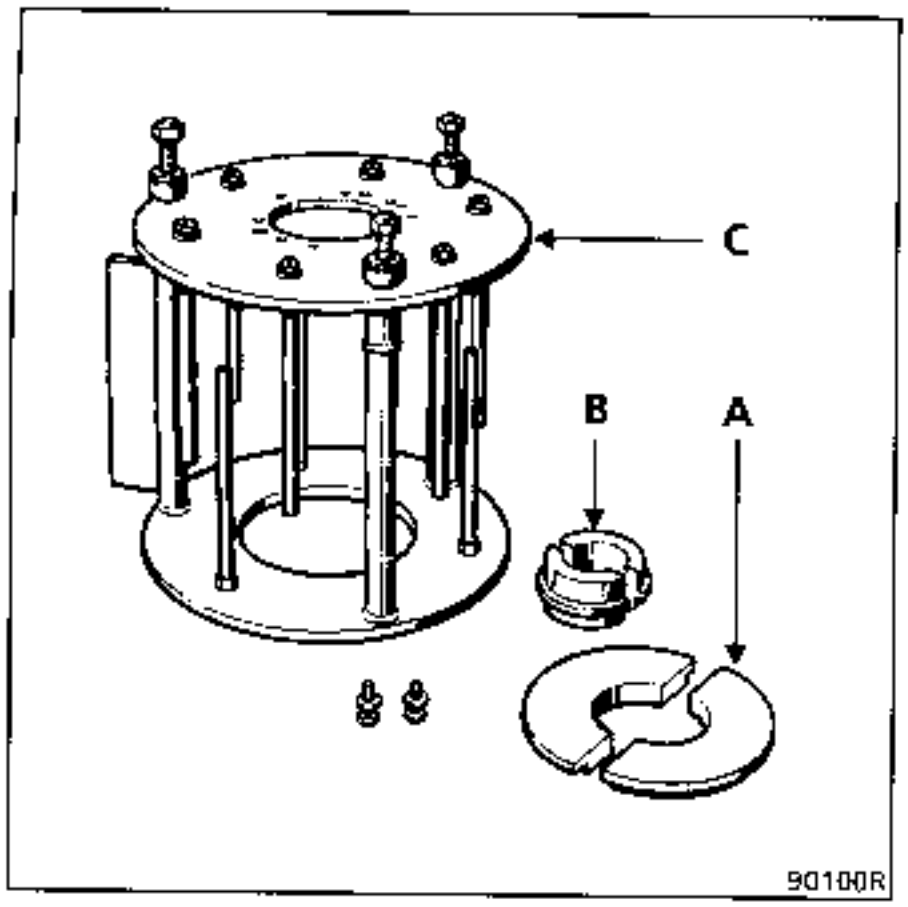
Gradually release the pressure from the spring.

Remove:
- the upper pad from the tool,
- the spring-shock absorber assembly from the compression tool.

In view of the high compression load of the coil springs, it is essential that all suspension tooling is kept in perfect condition.

ESSENTIAL SPECIAL TOOLING	
Sus. 1052	Tooling for operating on front spring and shock absorber

Use components A - D - E from tool Sus. 1052.



90100R

Upper and lower compression pad assembly.

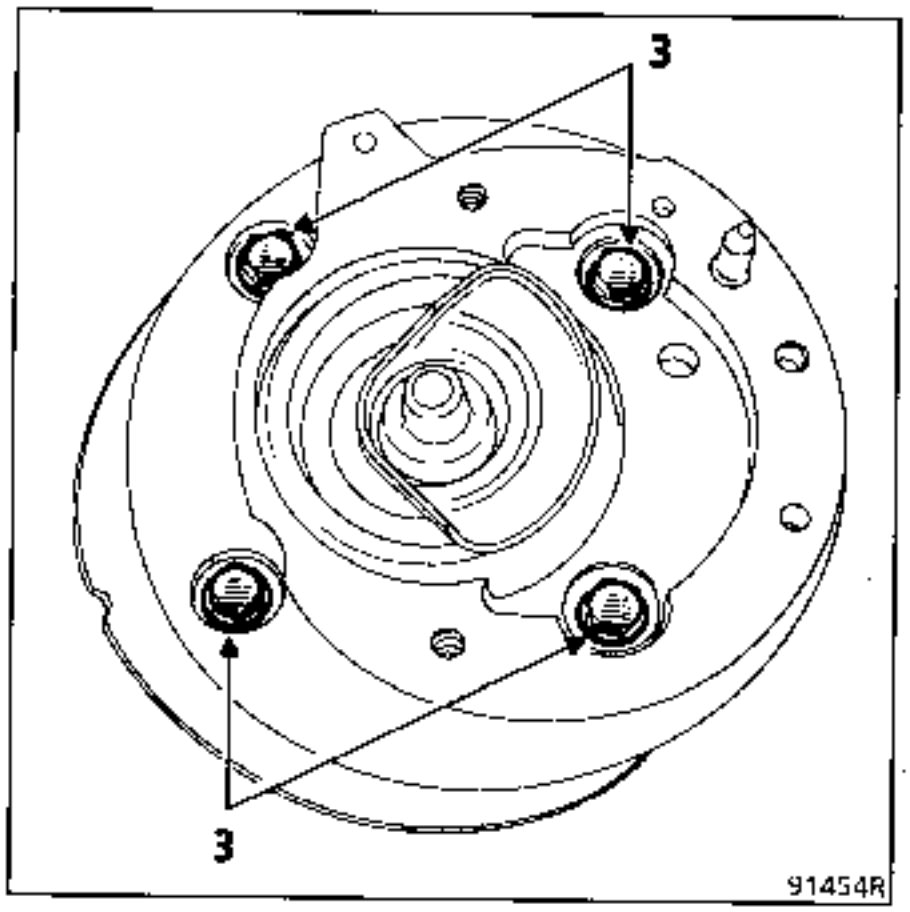
A Retainer half cups.

D Spigot.

E Half shell marked **R21**.

Special feature of L485

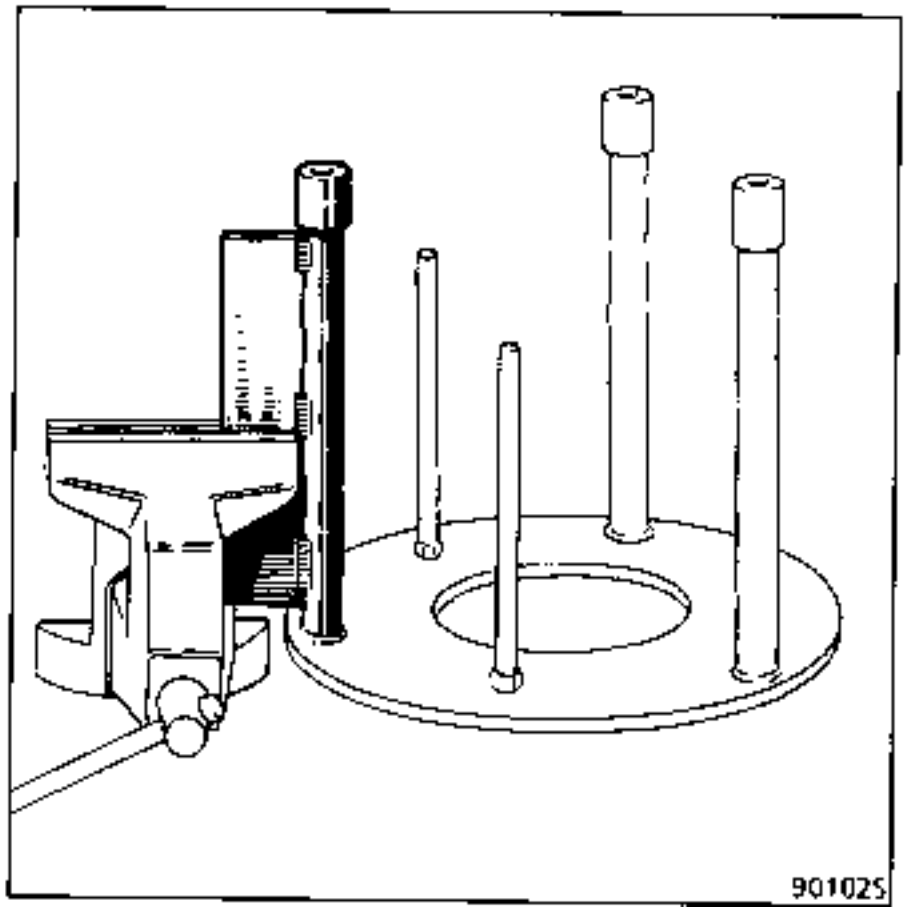
Remove the upper pad (four mounting bolts **3**) from the spring-shock absorber assembly.



91454R

DISMANTLING THE SPRING AND SHOCK ABSORBER

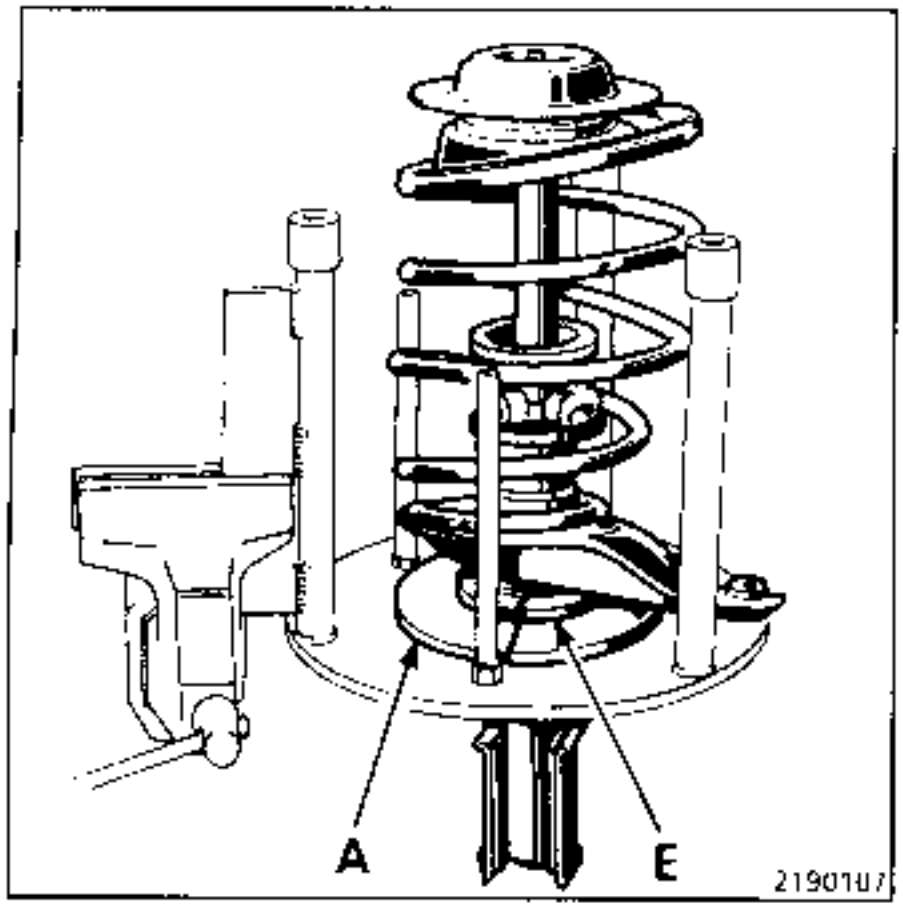
Place the lower pad from tool **Sus. 1052** in a vice.



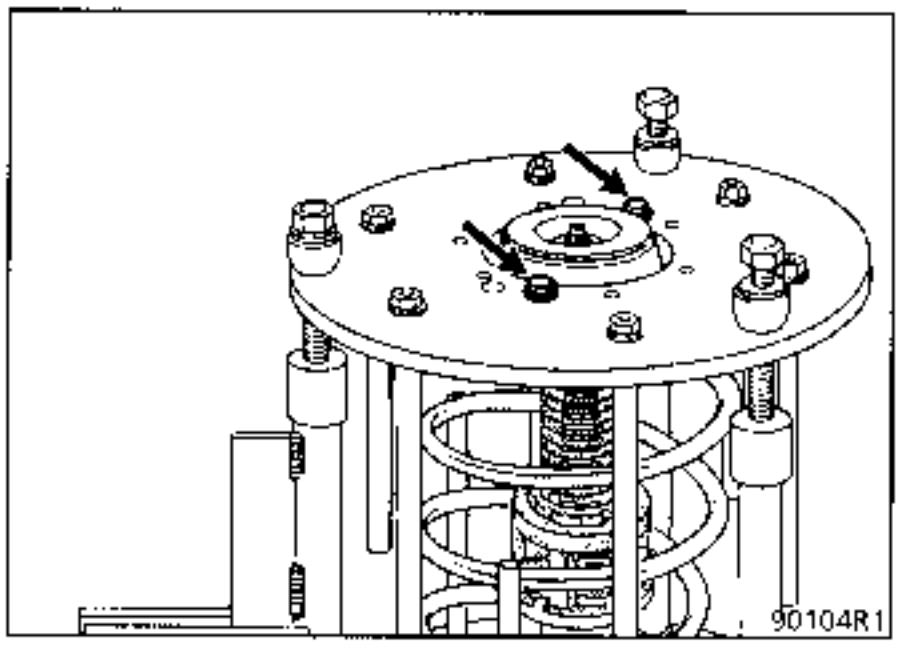
90102S

Fit in place :

- the spring-shock absorber assembly, positioning the two half cups (A) and the two half-shells (E) as shown in the drawing,

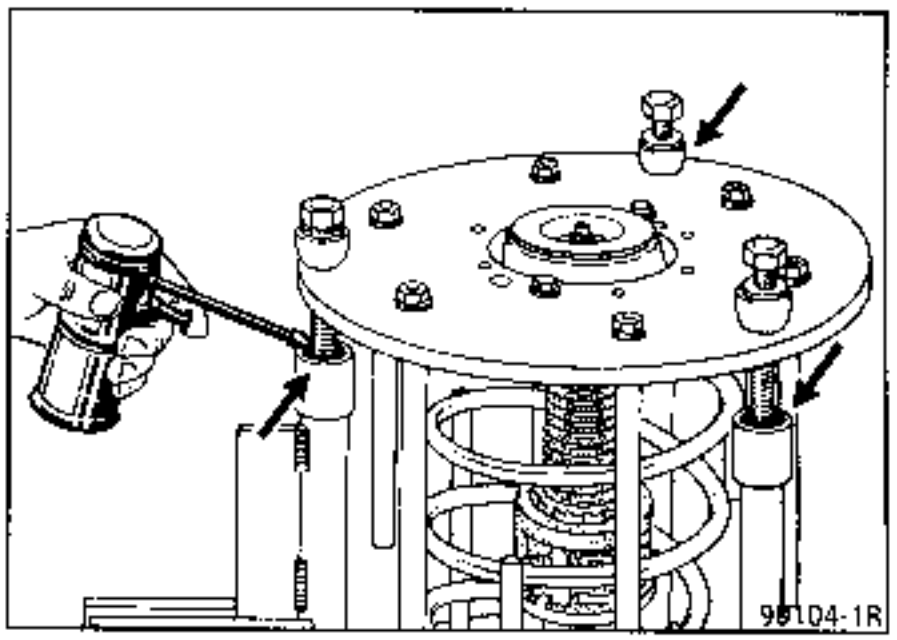


- the upper pad,
- the two bolts holding the upper shock absorber cup in the marked holes (vehicle markings stamped on the upper pad),



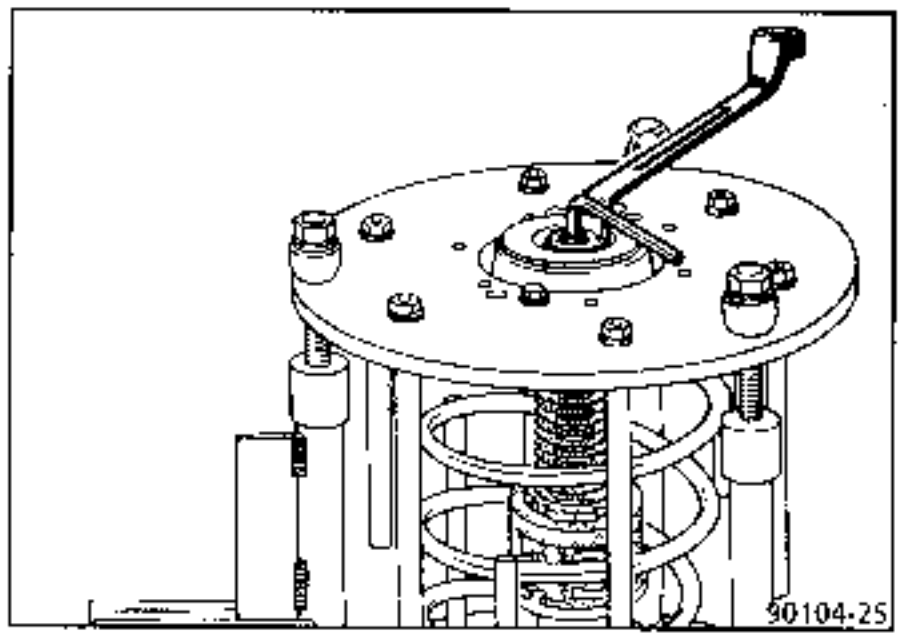
- the three compression bolts, putting plenty of oil in the oil grooves.

NOTE : As the threaded rods of the tool are subject to very great stresses, it is essential for them to be liberally oiled.



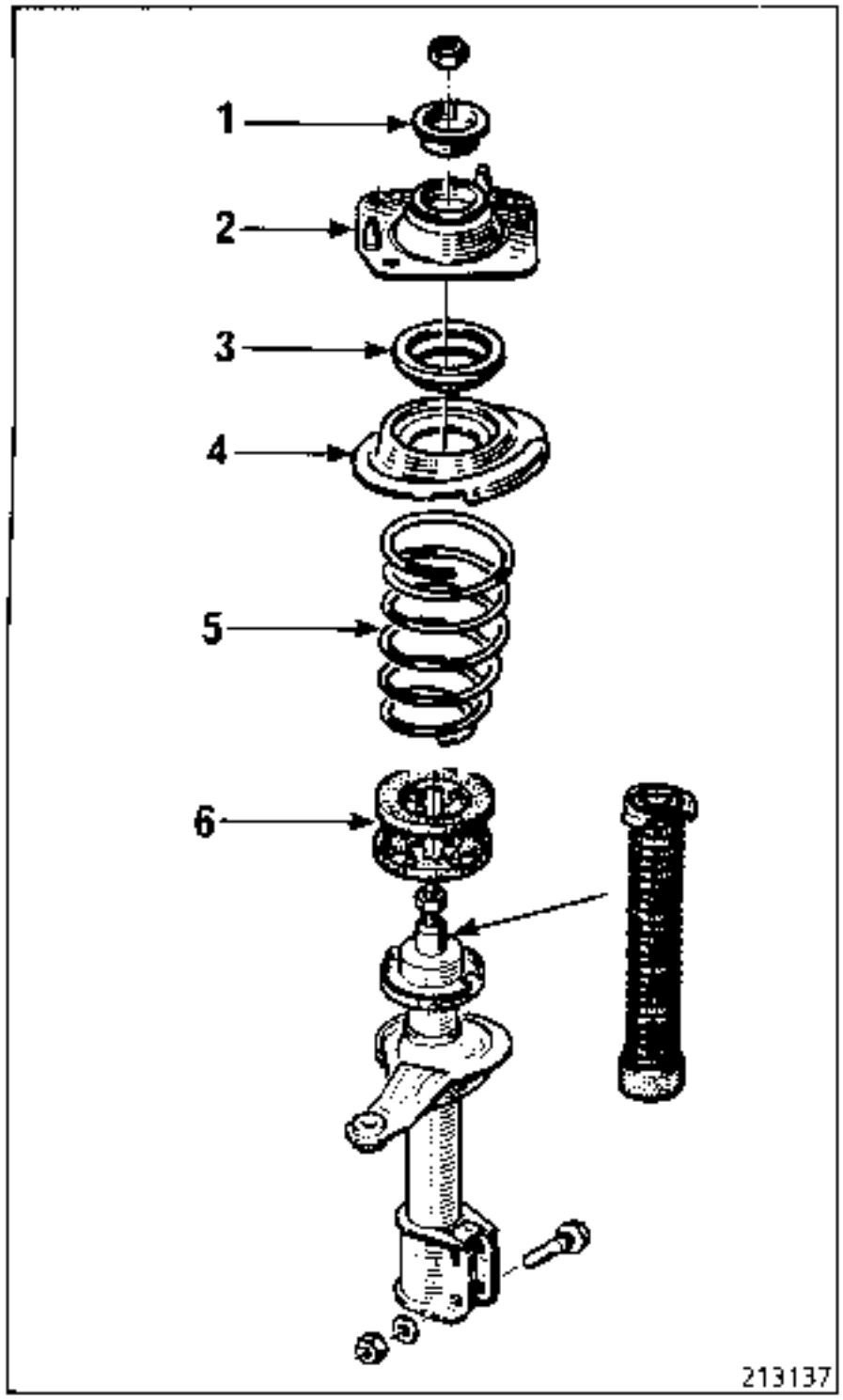
Compress the spring by approximately 10 mm.

Remove the nut from the shock absorber rod.



Gradually release the pressure from the spring.

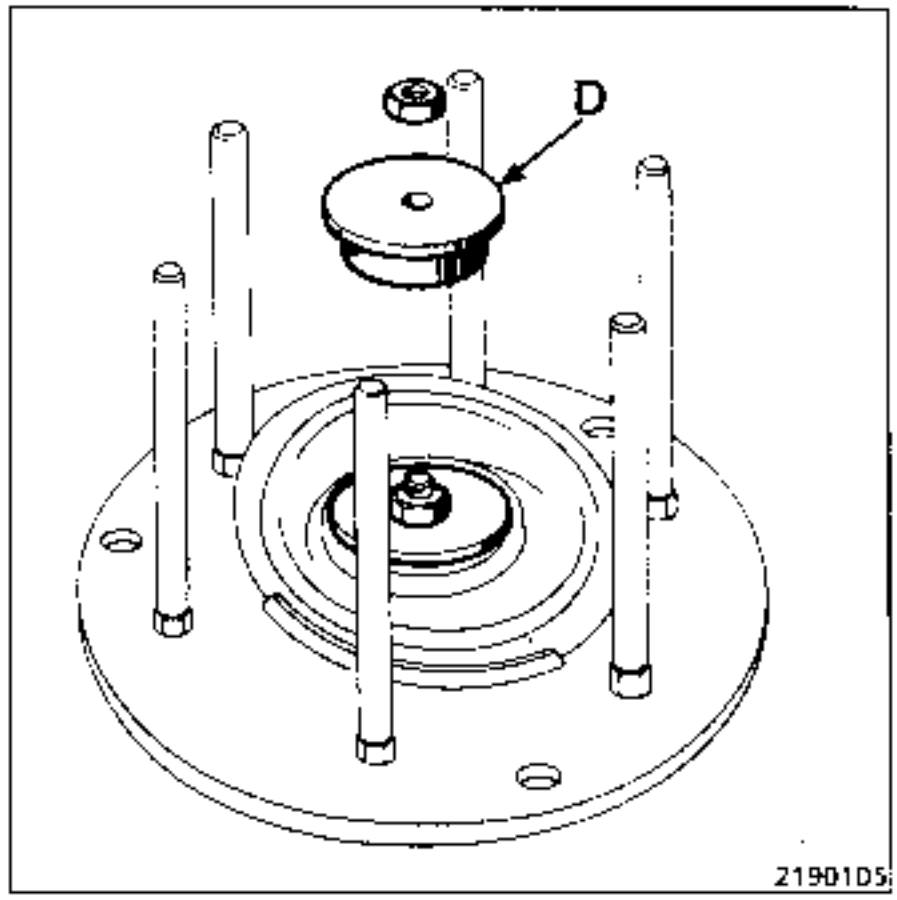
Remove parts 1 to 6 in numerical order.



Parts **3** and **4** form the stub axle carrier pivot assembly.

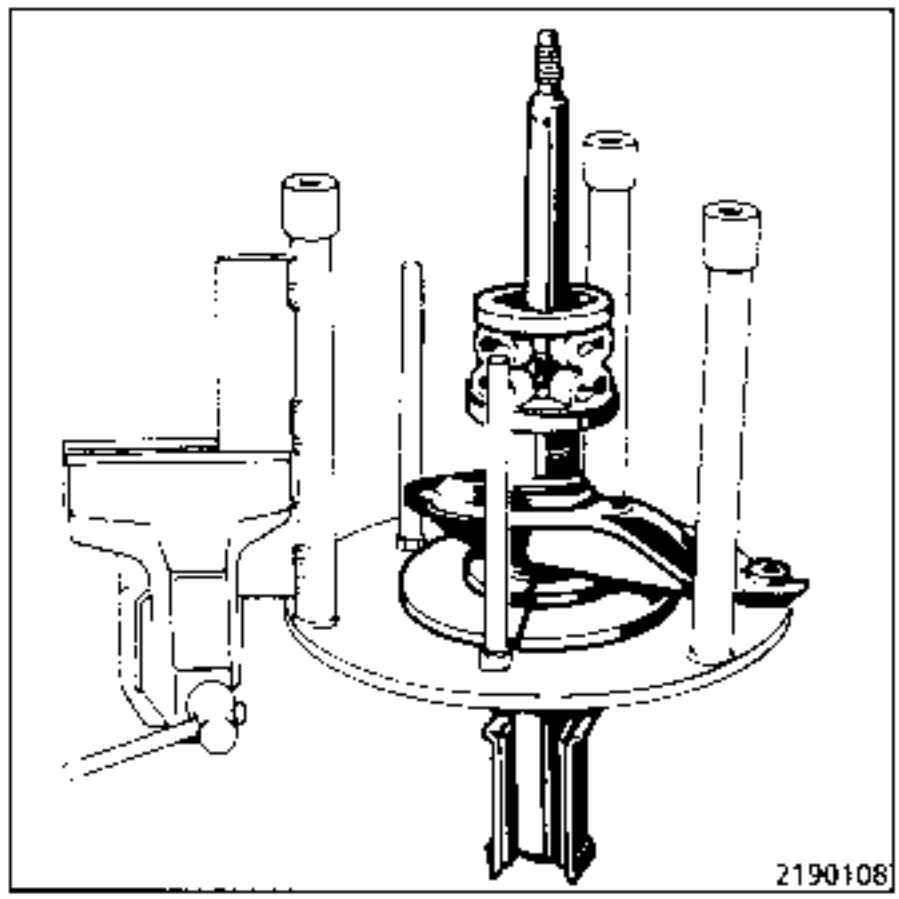
REFITTING THE SPRING AND SHOCK ABSORBER

Fit spigot **D** in place on the upper pad of tool **Sus. 1052** so as to hold assembly **2 - 3 - 4** in position.



Position:

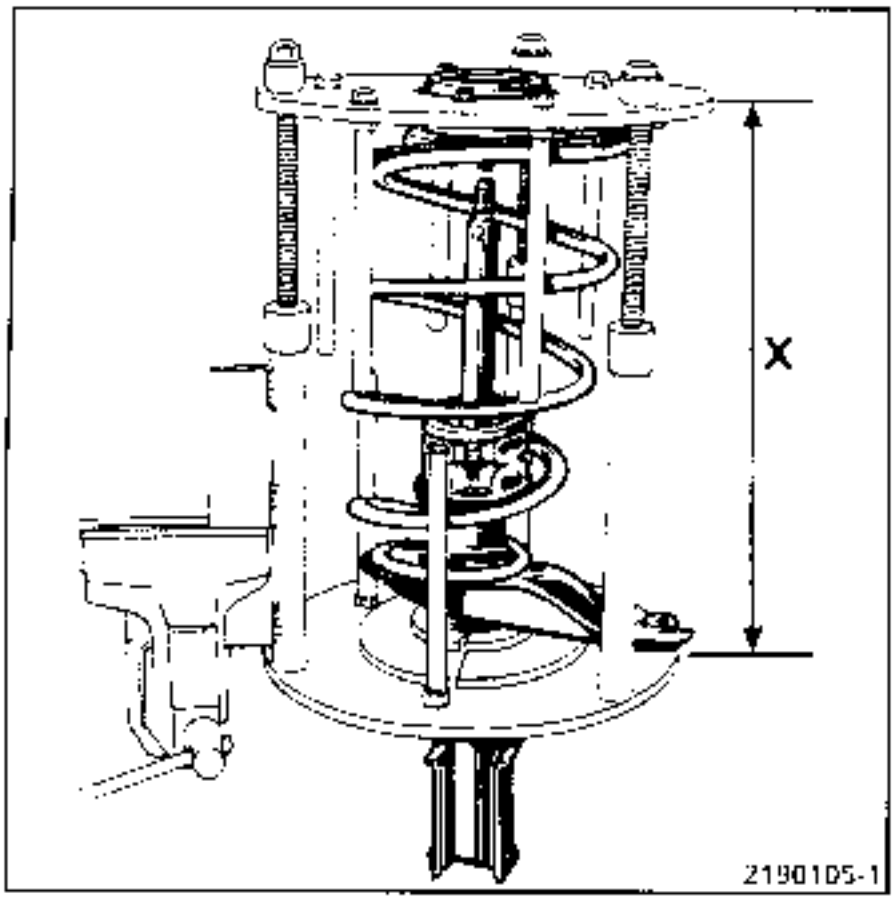
- the shock absorber, as shown in the drawing,



- the spring on the lower shock absorber cup so that it is positioned correctly on the retaining stop,
- the upper pad/spigot assembly with the markings opposite one another.

Make sure that the spring is against the upper stop.

Compress the assembly to a height X of approximately **400 mm** and ensure that the spring is correctly positioned in the upper cup.

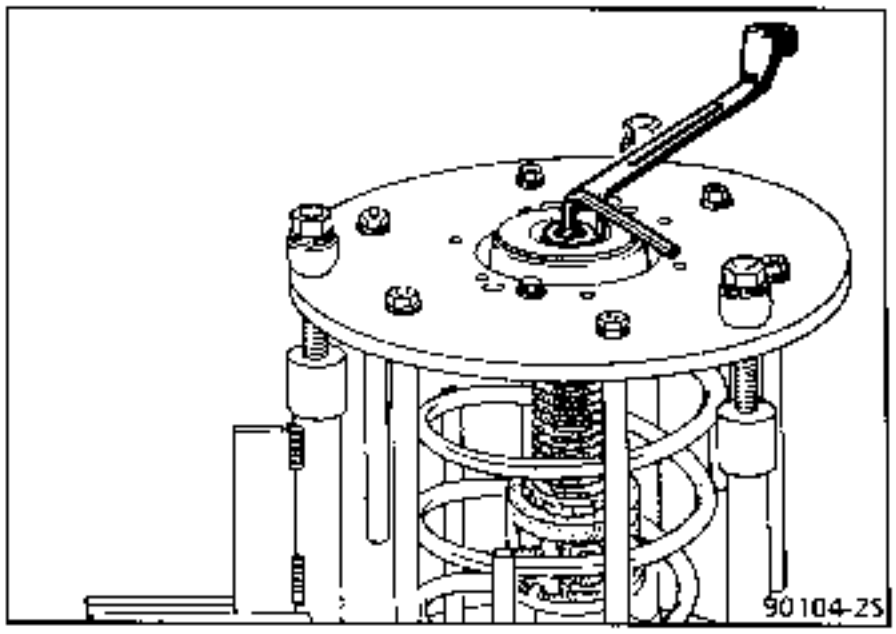


Remove the spigot.

Compress the assembly and insert the shock absorber rod.

NOTE : If the parts do not align correctly, use a **6 mm** diameter rod centred in the hexagonal socket to guide the shock absorber.

Fit in place :
- cup (**1**),
- the nut.



Torque tighten the nut.

Gradually release the pressure from the spring.

Remove:
- the upper pad from the tool,
- the spring-shock absorber assembly from the compression tool.

Special point for L485

Fit the upper pad to the spring-shock absorber assembly.

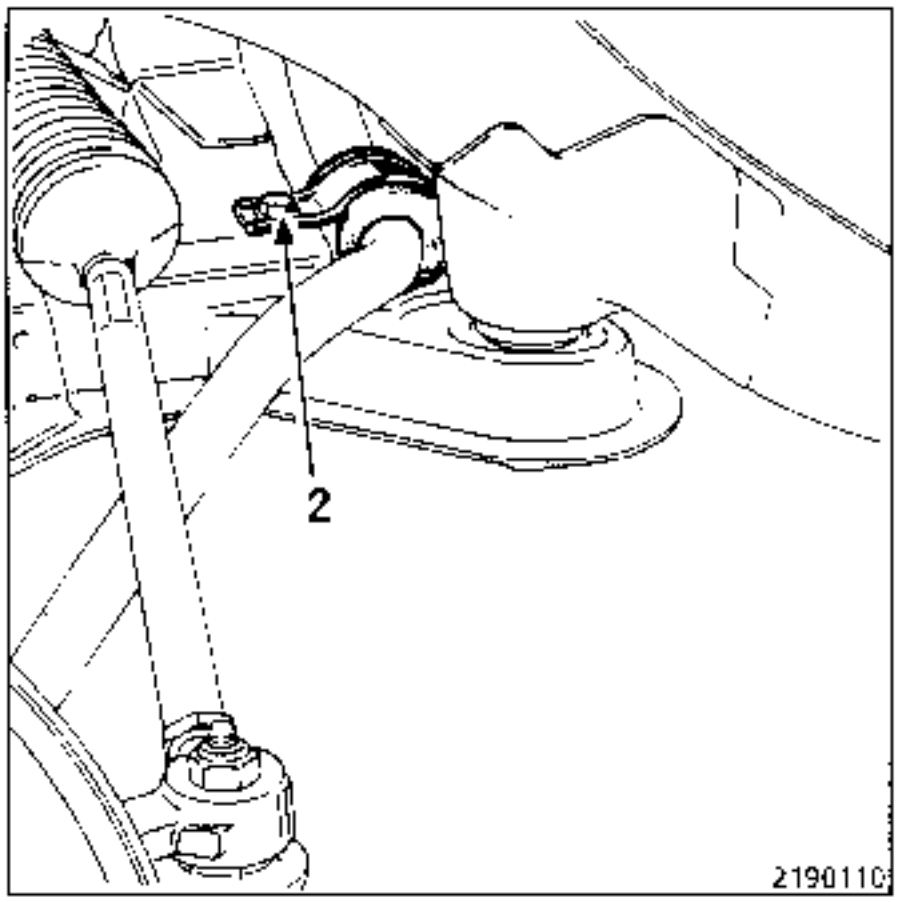
TIGHTENING TORQUES (in daN.m)	
Nuts securing bearings to cradle	3
Nuts securing bearings to arm	3

REMOVAL

With the vehicle on its wheels.

Remove:

- bearings (2) from the cradle,



- bearings (1) from the bottom arms.

Raise the lefthand side and remove the wheel :
- take out the anti-roll bar.

Check the condition of the bushes and change them if necessary.

REFITTING

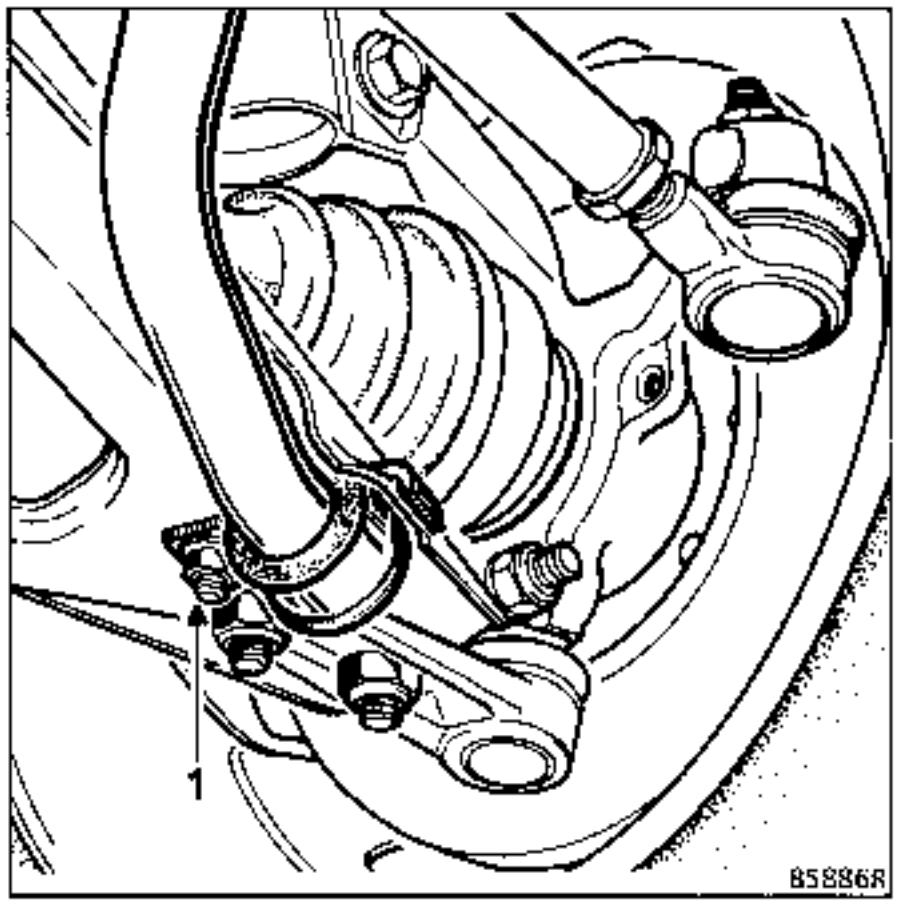
Coat the bushes with MOLYKOTE 33 Medium grease.

Fit the anti-roll bar in place.

Secure the two bearings (2) on the cradle but do not tighten them.

Place the vehicle on its wheels and compress the front.

Secure the bearings (1) on the bottom arms.



Vehicle unladen :
- torque tighten the four bearings.

Whenever carrying out an operation on the anti-roll bar for these vehicles, only the bushes on the arms (1) are to be coated in MOLIKOTE 33 Medium grease.

Never coat the bushes on the cradle (2) with grease (risk of the bar sliding and causing noises).

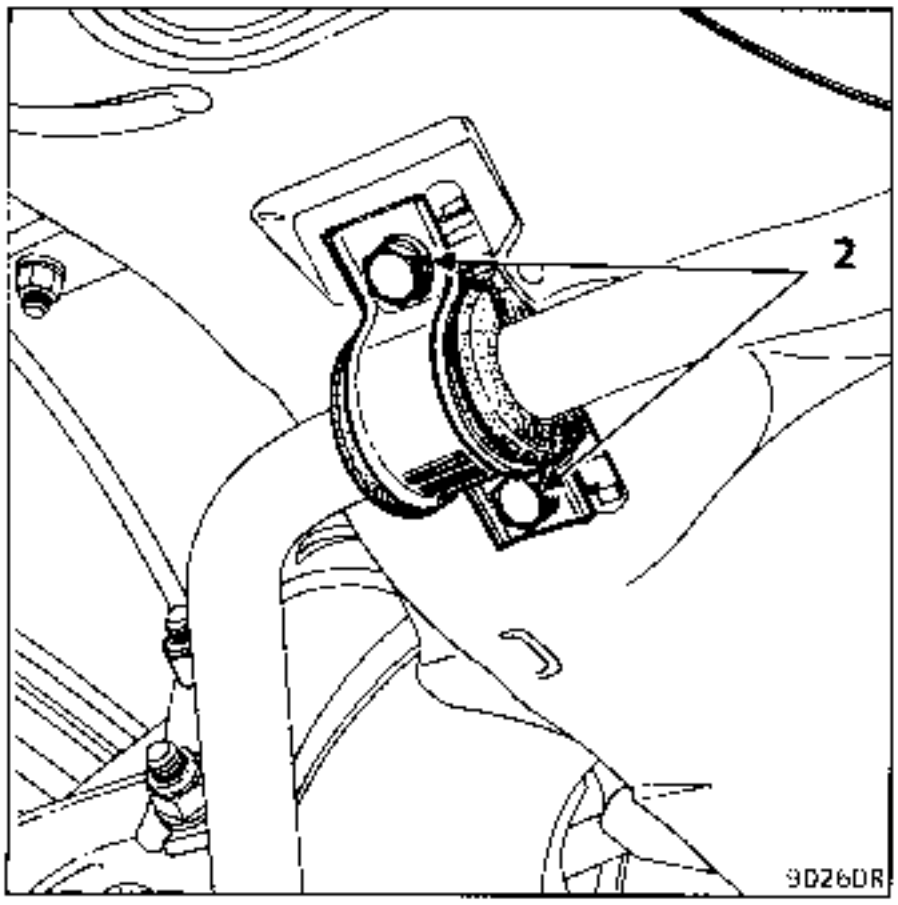
TIGHTENING TORQUES (in daN.m)	
Nuts securing bearings to cradle	3
Nuts securing bearings to arm	8

REMOVAL

With he vehicle on its wheels.

Remove:

- bearings (2) from the cradle,



- bearings (1) from the arms,
- the anti-roll bar.

NOTE : Bolts (1) securing the bearing also retain the lower ball joint. Place a nut on one of the two bolts to ensure that the ball joint does not move.

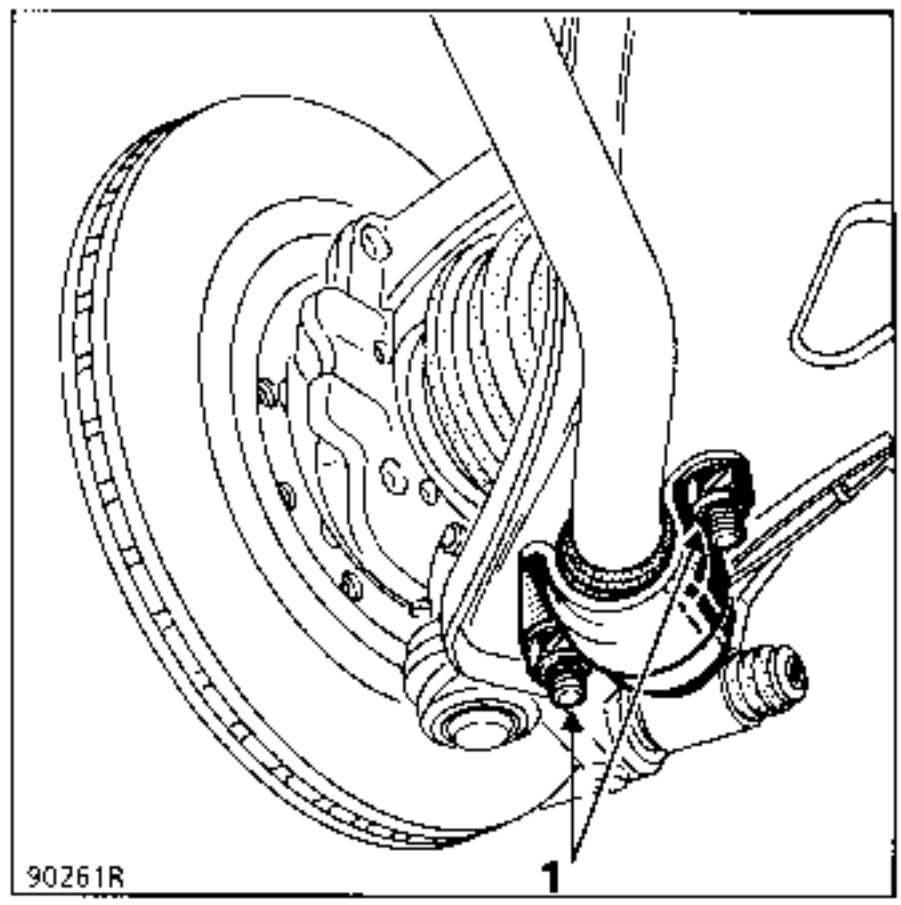
Check the condition of the bushes and change them if necessary.

REFITTING

Coat the bushes with **MOLIKOTE 33 Medium** grease.

Fit the anti-roll bar in place.

Fit the bearings (1) without tightening them, after removing the nut holding the ball joint.



Compress the front of the vehicle and secure the two bearings (2) on the cradle.

Vehicle unladen :
- torque tighten the four bearings.

Whenever carrying out an operation on the anti-roll bar for these vehicles, only the bushes on the arms (1) are to be coated in **MOLIKOTE 33 Medium** grease.

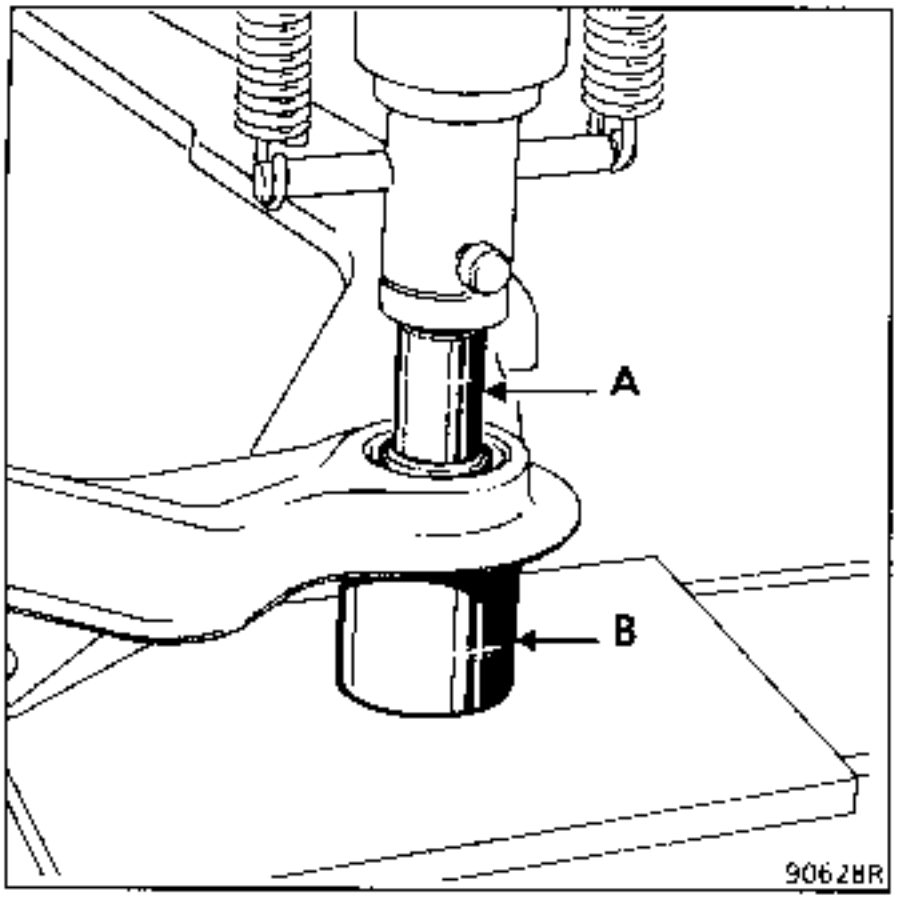
Never coat the bushes on the cradle (2) with grease (risk of the bar sliding and causing noises).

REMOVAL-REFITTING CONNECTION STUDS ON REMOVED CRADLE

REMOVAL

On the press, remove the connection stud using a piece of tubing (A) and a shaft (B).

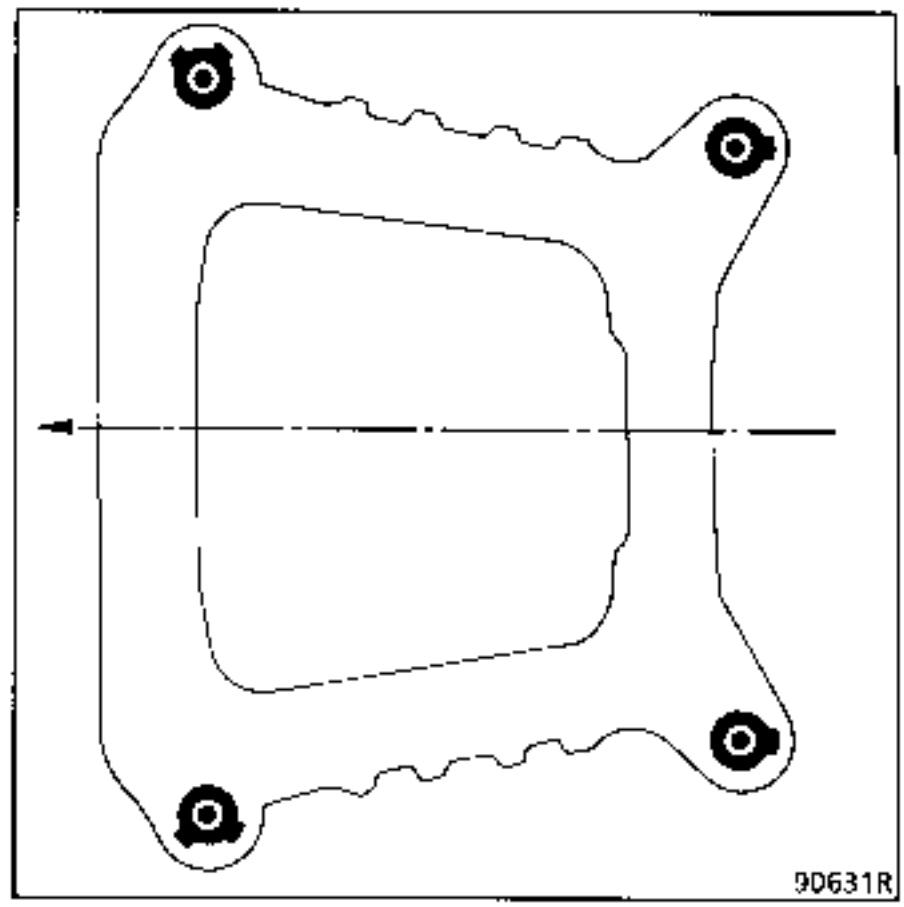
Dimensions: Tube (A) int. diameter 72 ± 1 mm
ext. diameter 80 ± 1 mm
Shaft(B) ext. diameter 30 ± 5 mm



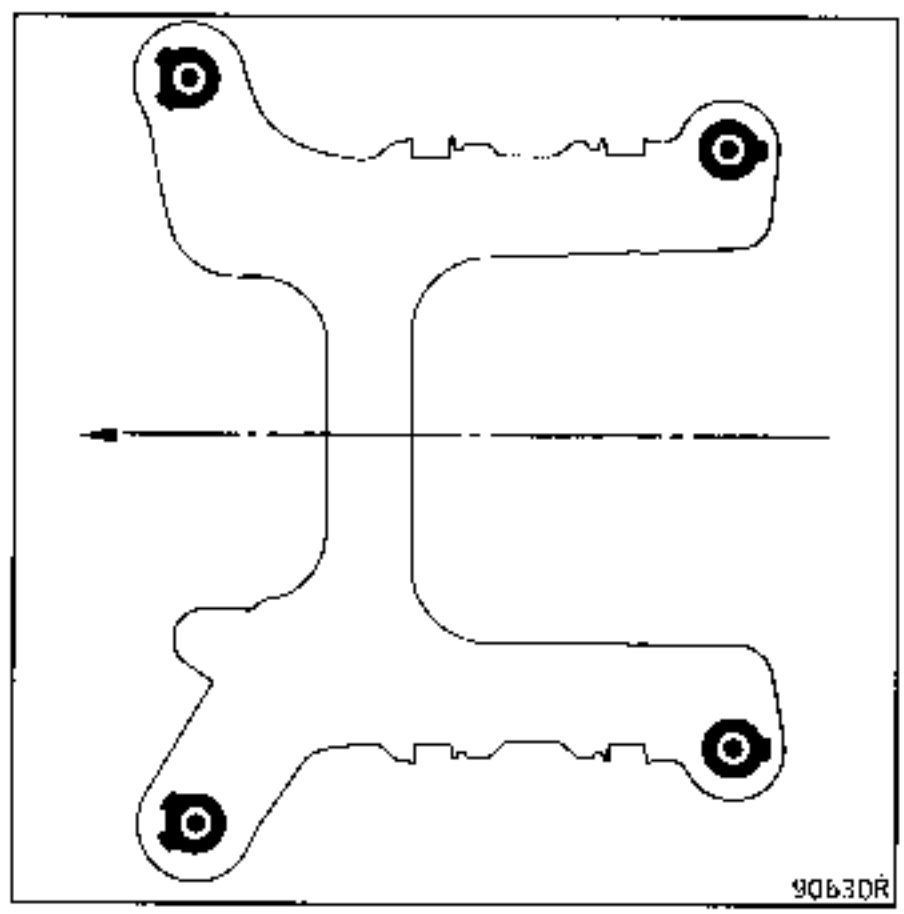
REFITTING

Ensure that the studs are positioned correctly (check lugs are in correct direction) - see following diagrams.

Transverse engine



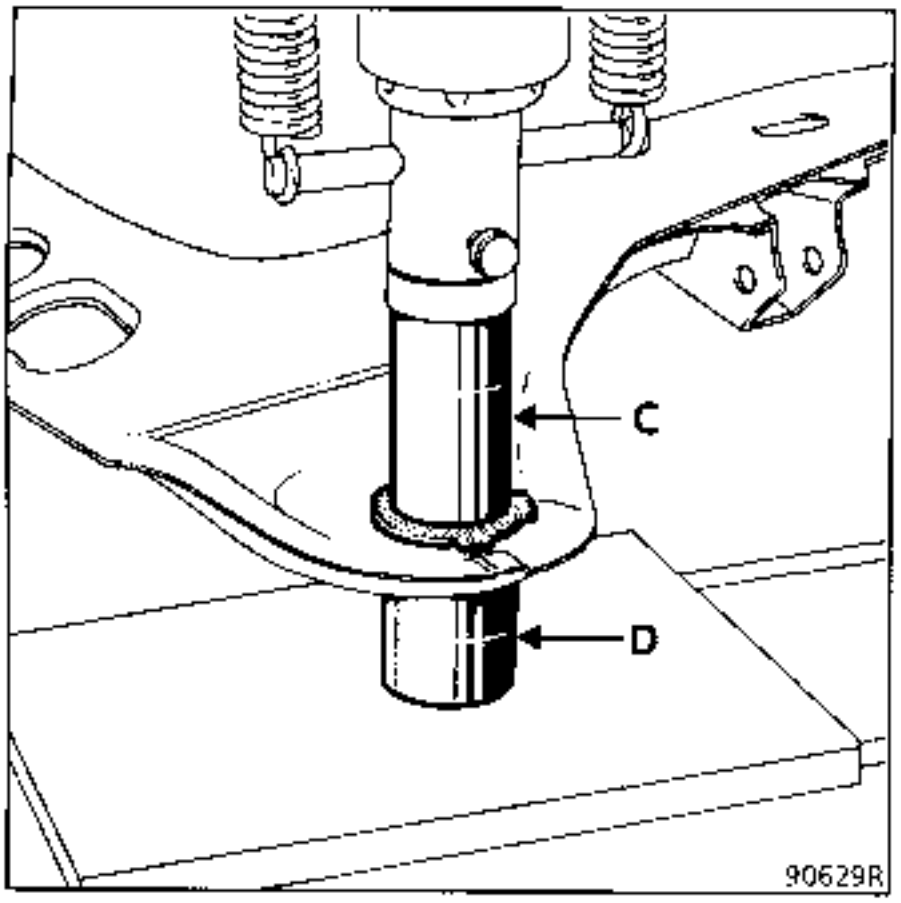
In-line engine



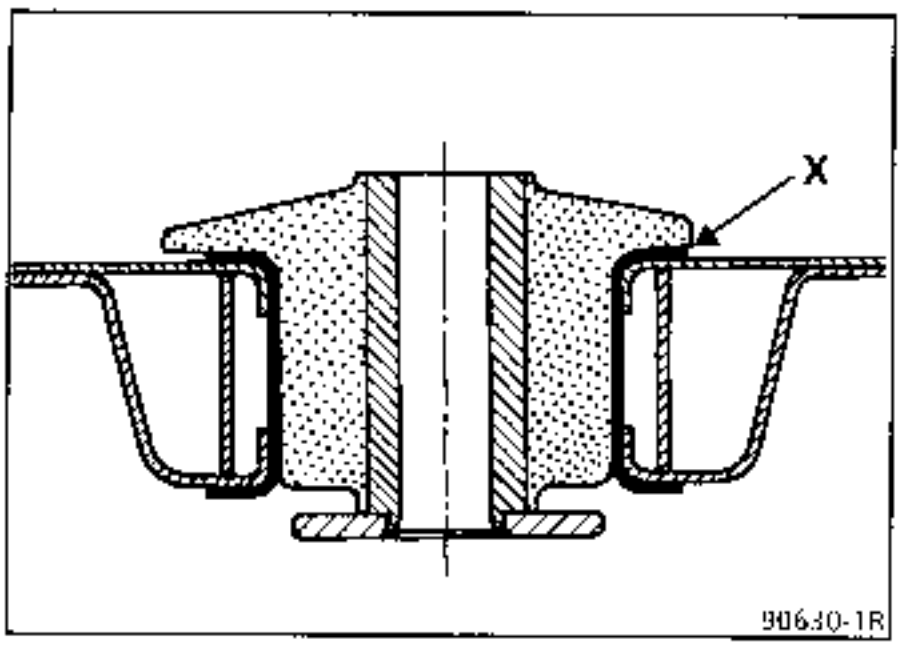
← Vehicle front and centre line

On the press, fit the connection stud previously coated with soapy water (and no other product) using two pieces of tubing (C) and (D).

Dimensions : Tube (C) int. diameter 40 ± 1 mm
ext. diameter 50 ± 1 mm
Tube (D) int. diameter 52 ± 1 mm
ext. diameter60 ± 1 mm



Position of fitted studs



X = 0.3 mm : maximum clearance after fitting between studs and cradle.

REMOVAL-REFITTING CONNECTION STUDS WITH CRADLE IN-SITU

ESSENTIAL SPECIAL TOOLING	
Mot. 1179	Stud removal and fitting tool

TIGHTENING TORQUES (in daN.m)	
Cradle mounting bolts	8.5

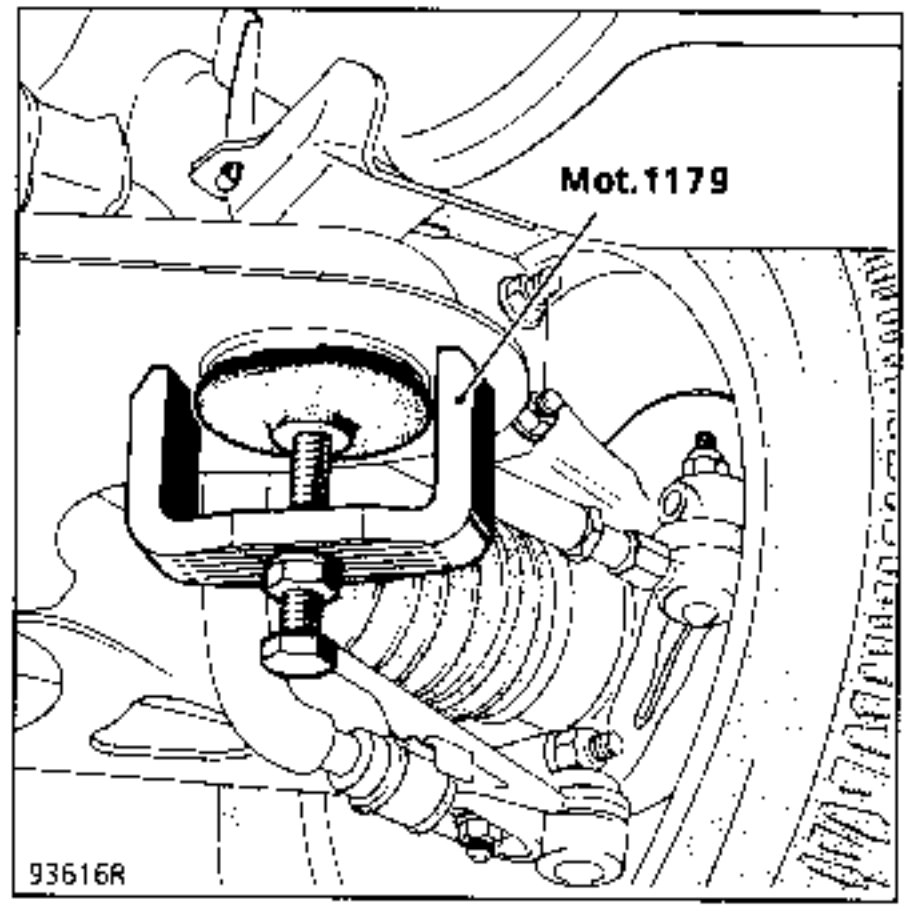
WARNING : As the cradle supports the engine, the studs can only be replaced one at a time.

REMOVAL

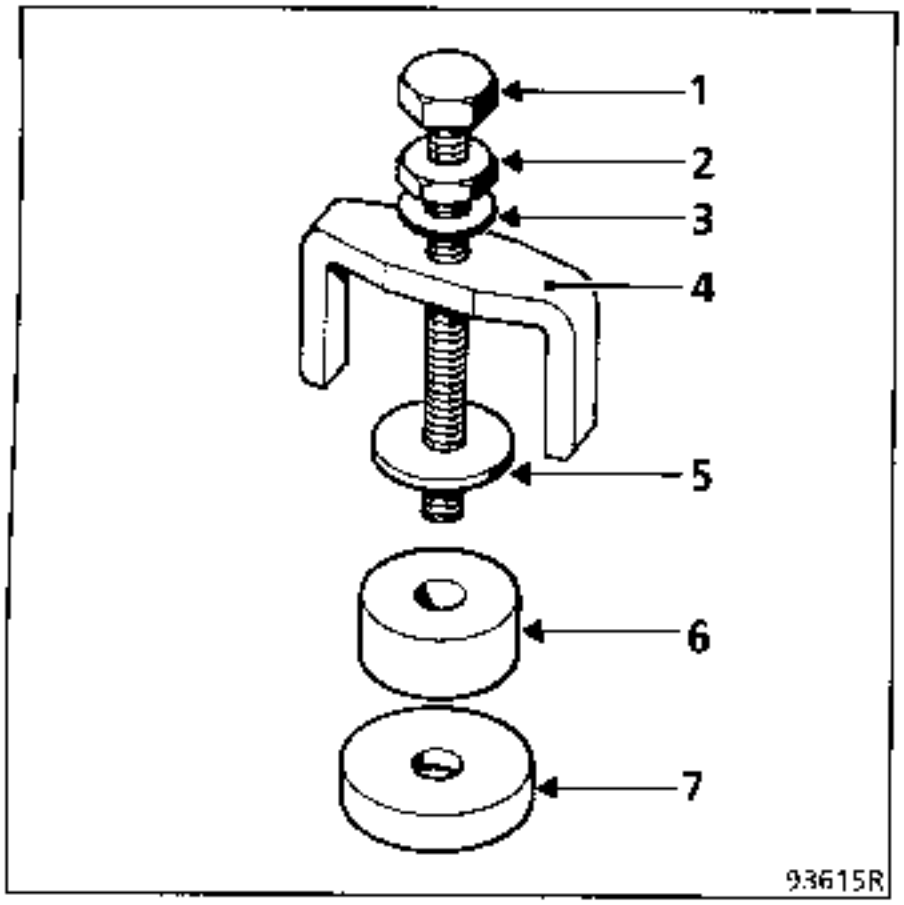
Place the vehicle on a lift.

Slacken and remove the cradle mounting bolt from the stud to be replaced.

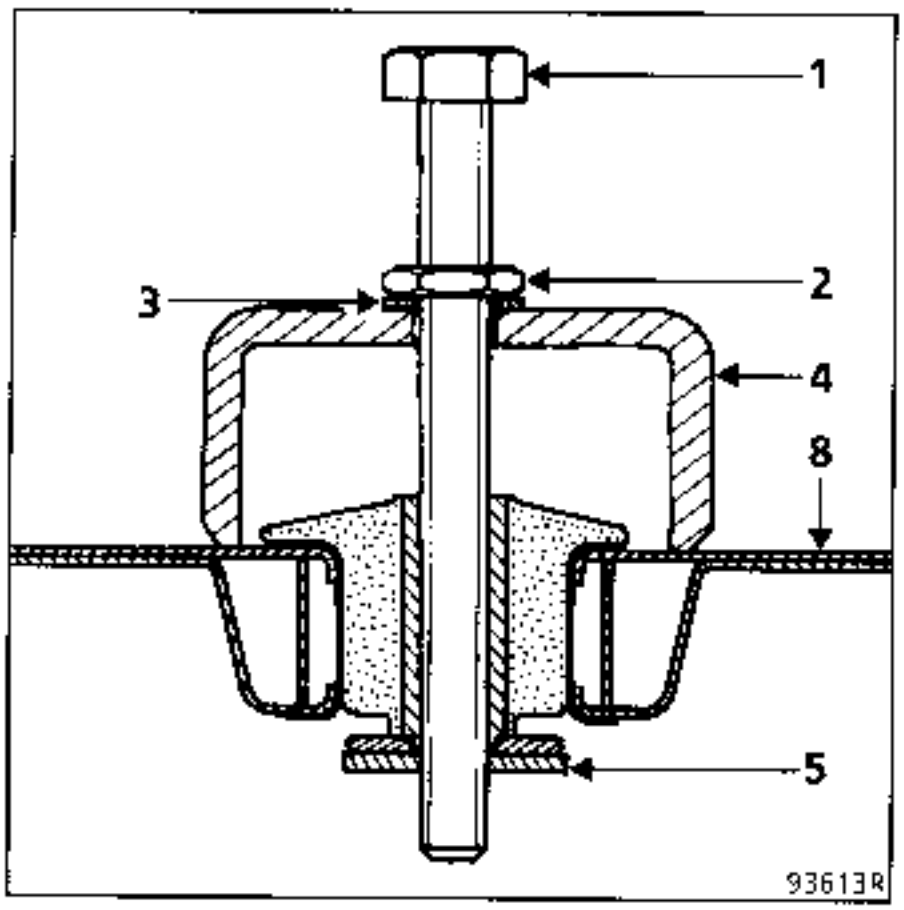
Fit in place tool Mot. 1179.



Description of tool **Mot. 1179**.



The extraction operation is performed using parts (1), (2), (3), (4), (5).



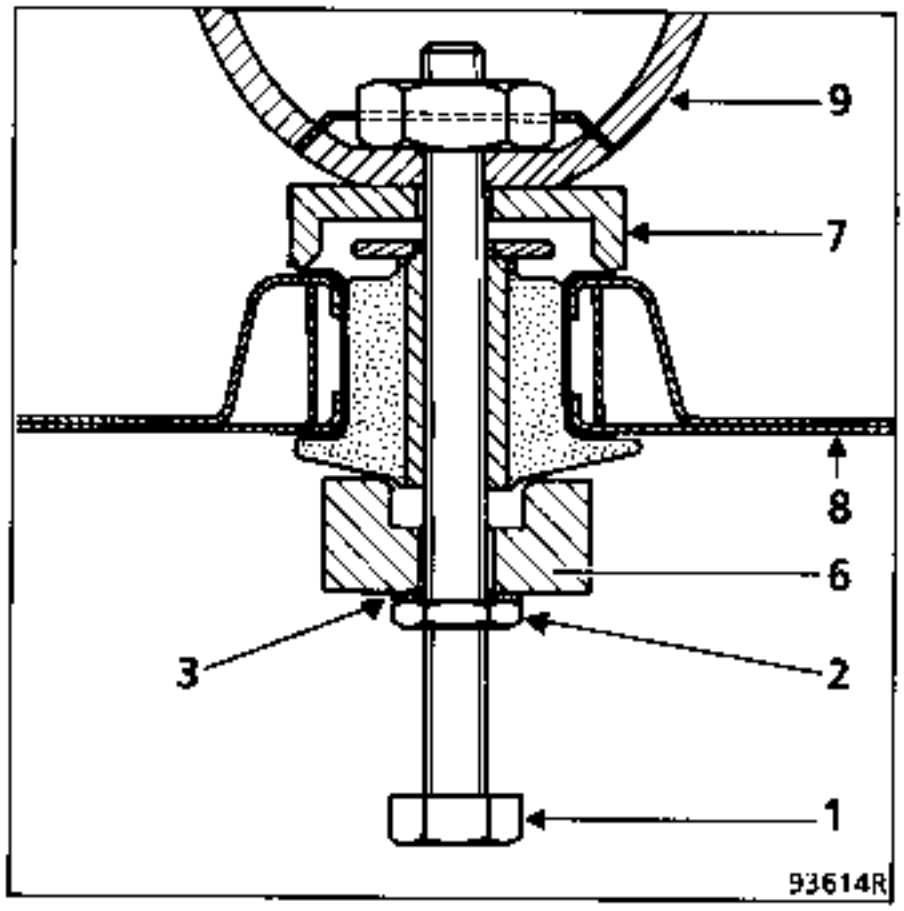
Fit threaded washer (5) between cradle (8) and chassis (9).

Run up bolt (1) by 4 or 5 threads..

Tighten the lock nut until the stud is removed.

REFITTING

Refitting is performed using parts (1), (2), (3), (6), (7).



Coat the connection stud with soapy water **and no other type of product.**

Fit spacer (7) between chassis (9) and cradle (8).

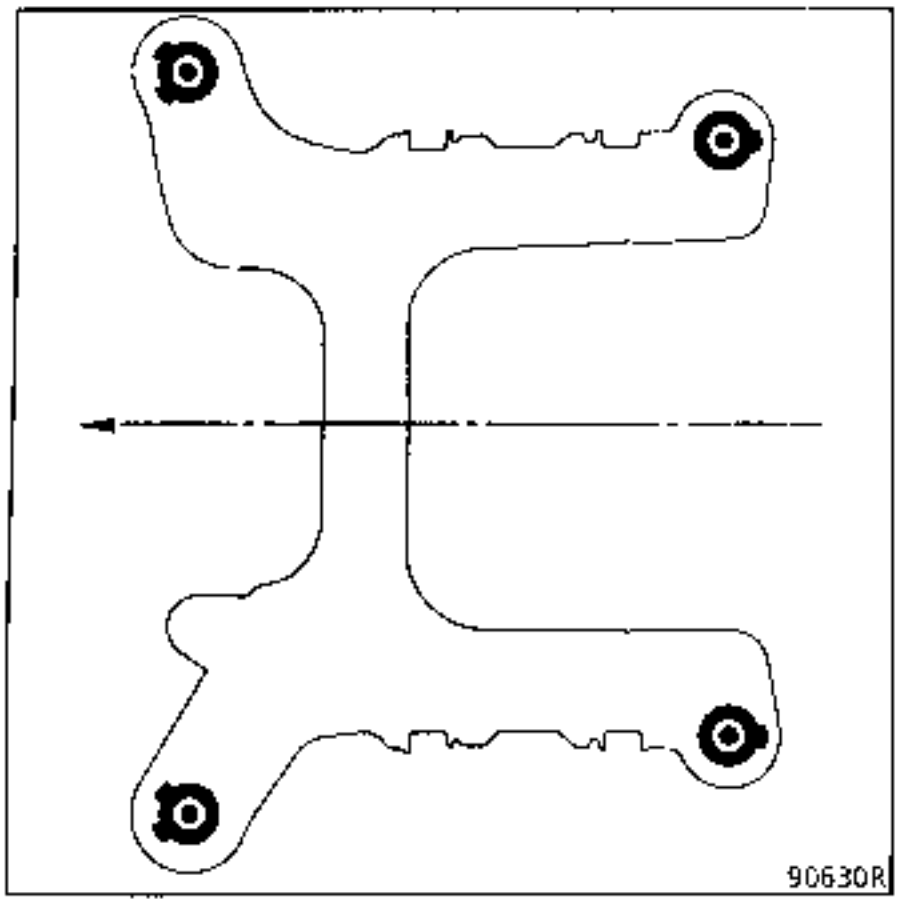
Run up bolt (1) on the chassis cage nut by 6 or 7 threads.

Tighten lock nut (2) until the stud is fully fitted (ensure that the lugs are facing the right way and **check the maximum fitting clearance**).

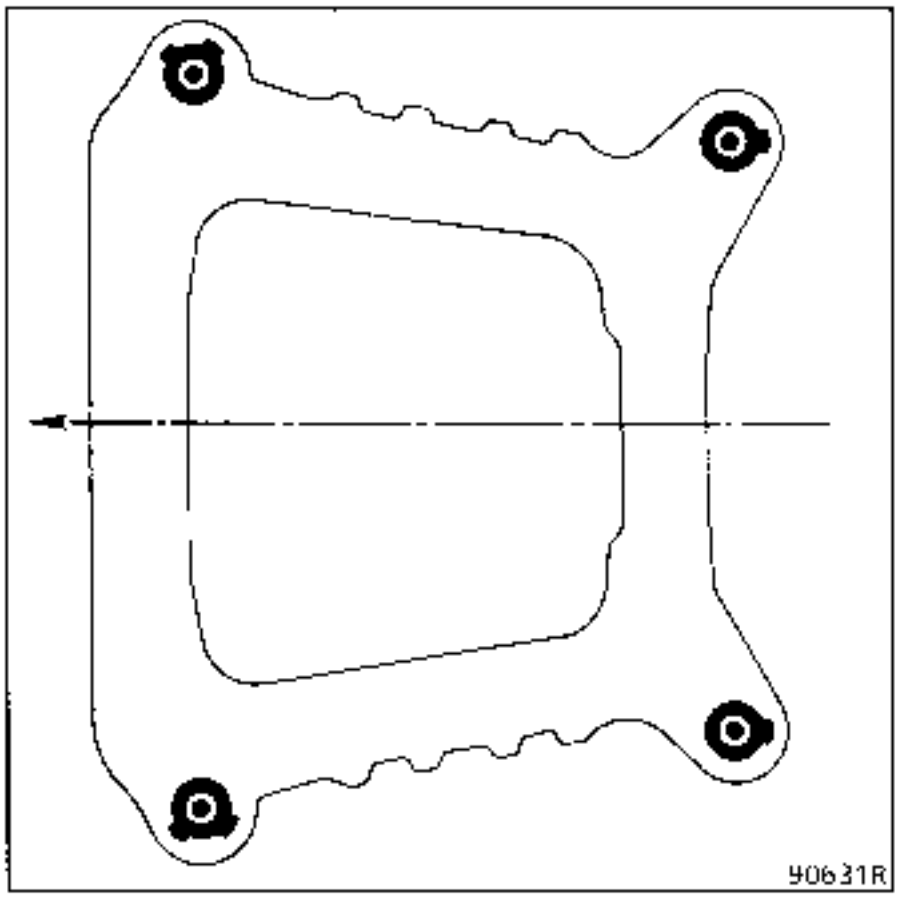
Remove the fitting tool (remembering to remove spacer (7)).

Refit the cradle mounting bolt and torque tighten it.

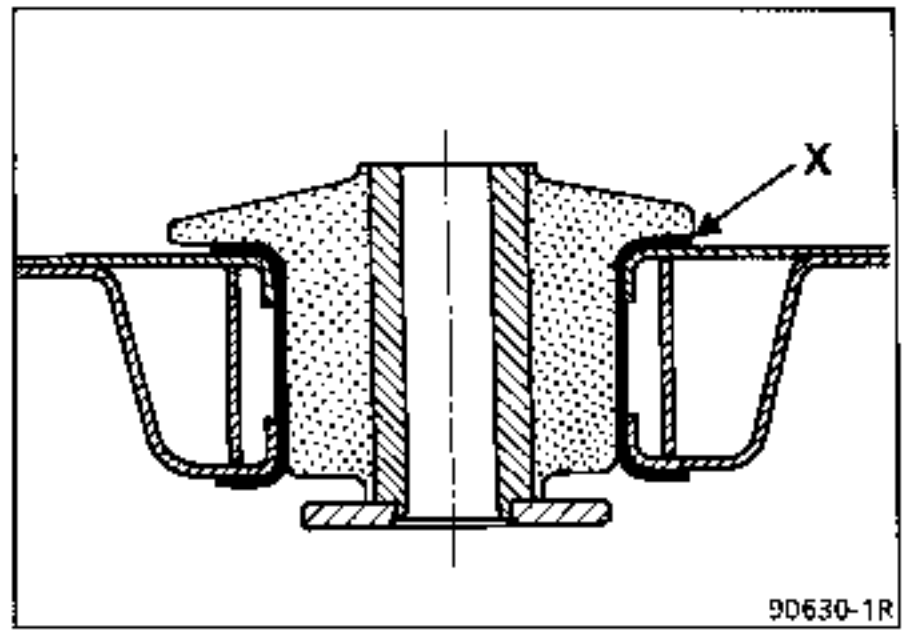
In-line engine



Transverse engine



Position of fitted studs



X = 0.3 mm : maximum clearance after fitting between stud and cradle.

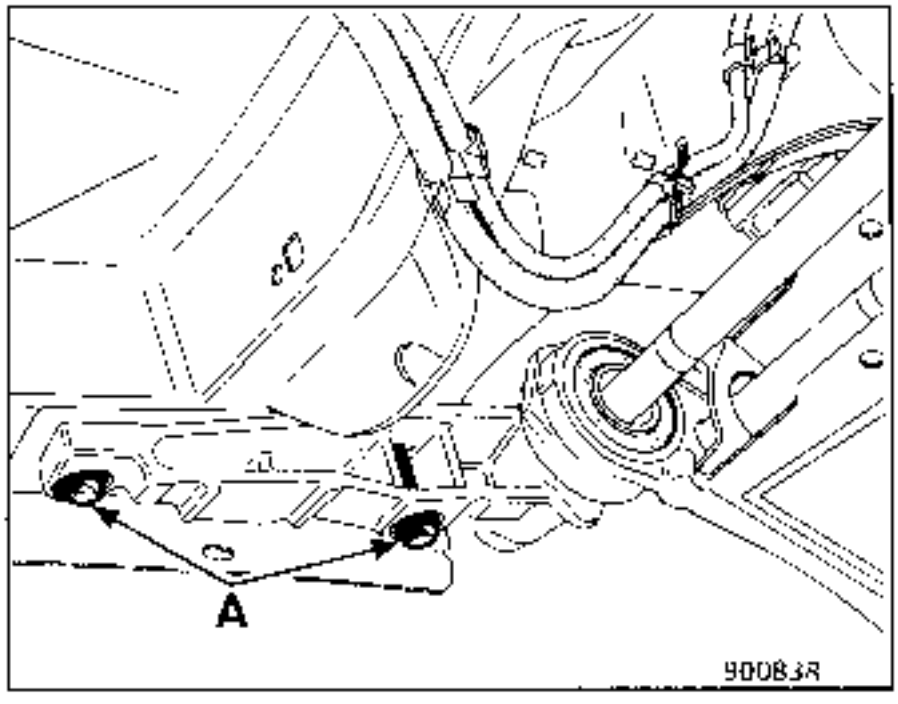
TIGHTENING TORQUES (in daN.m)		
Bearing securing nuts		8.5
Wheel bolts	4 bolts	9
	5 bolts	10
Shock absorber bottom bolts		8.5

As these vehicles are equipped with rear axles having four bars, the operation for removing the assembly does not require any action to be taken with respect to the torsion bars

REMOVE

Place the rear of the vehicle on axle stands.

Remove:
- the shock absorbers (see relevant section),
- the handbrake secondary cables,
- the brake hoses,
- the compensator control (depending on version),
- the four bolts (A) securing the bearings,



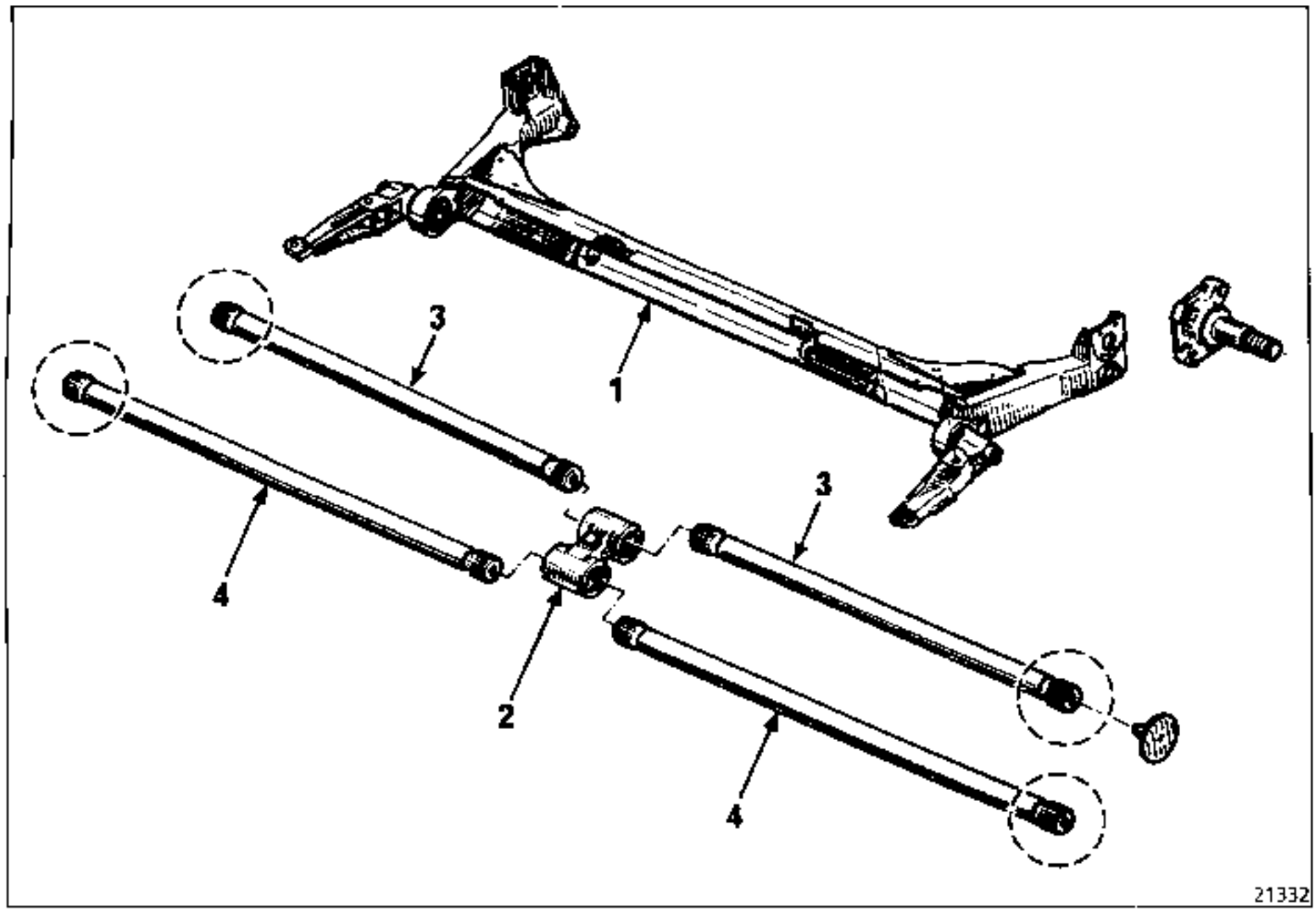
- the rear axle assembly.

REFITTING

Proceed in reverse order to removal.

Bleed the brake circuit and adjust the compensator if necessary (see **"Braking system"** section).

EXPLODED VIEW



21332

The rear axle consists of :

- two arms connected by a V-shaped section (1) cannot be dismantled. If any components are deformed in any way, the entire assembly must be replaced;

- two anti-roll bars (3),

- two suspension bars (4),

- a link block (2) connecting the bars.

The assembly is connected to the body by means of two bearings fitted on silentbloc bushes.

NOTE : It is prohibited to use a jack under the V-shaped section (1) to raise the vehicle.

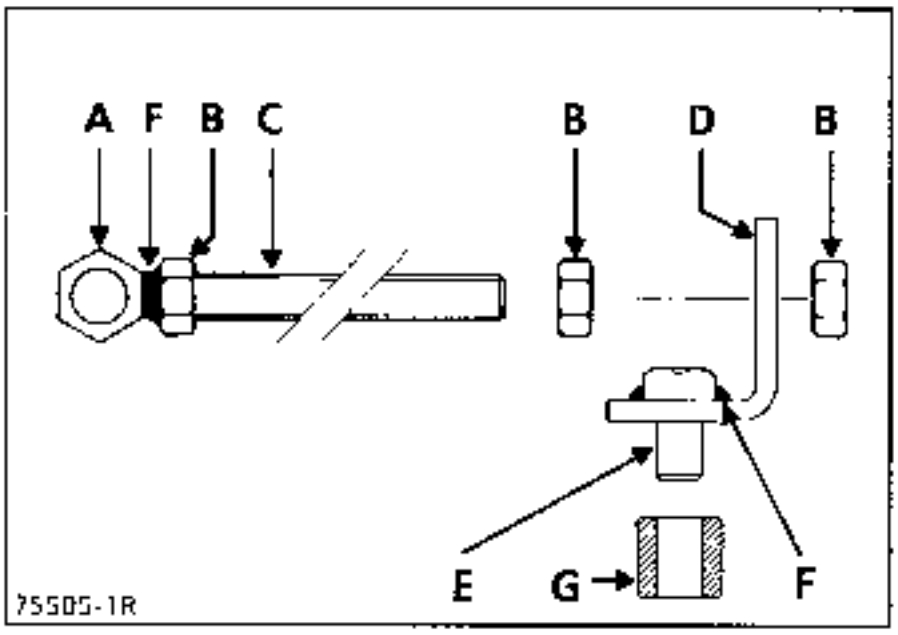
REPLACEMENT

The Parts Department supplies bare rear axles in service exchange; it is, therefore, necessary to retain the bars and link block from the old axle so as to prepare the assembly.

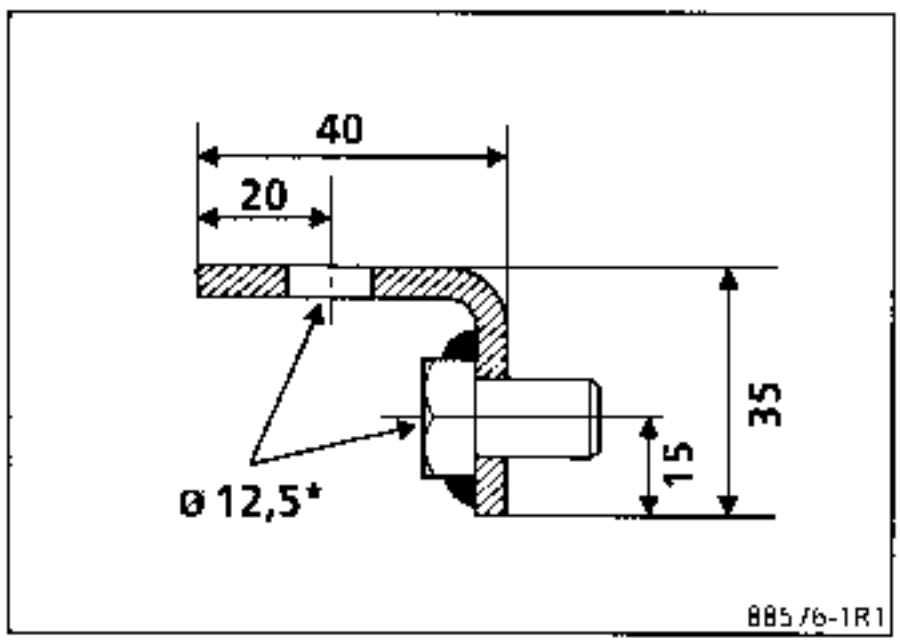
Fit in place on the vehicle the rear axle, without its torsion bars or the link block.

So as to be able to fit the arms in such a way that the torsion bars can be positioned correctly, two tools must be made up locally in accordance with the drawing below.

A **14 mm** diameter nut
B **12 mm** diameter nut
C **12 mm** diameter threaded rod, **660 mm** in length
D Flat iron bracket **30 x 5 mm**
E **12 x 60 mm** bolt cut to **20 mm**
F Solder
G Spacer from tool **T.Ar. 1056**



Bracket D



* Drilling diameter

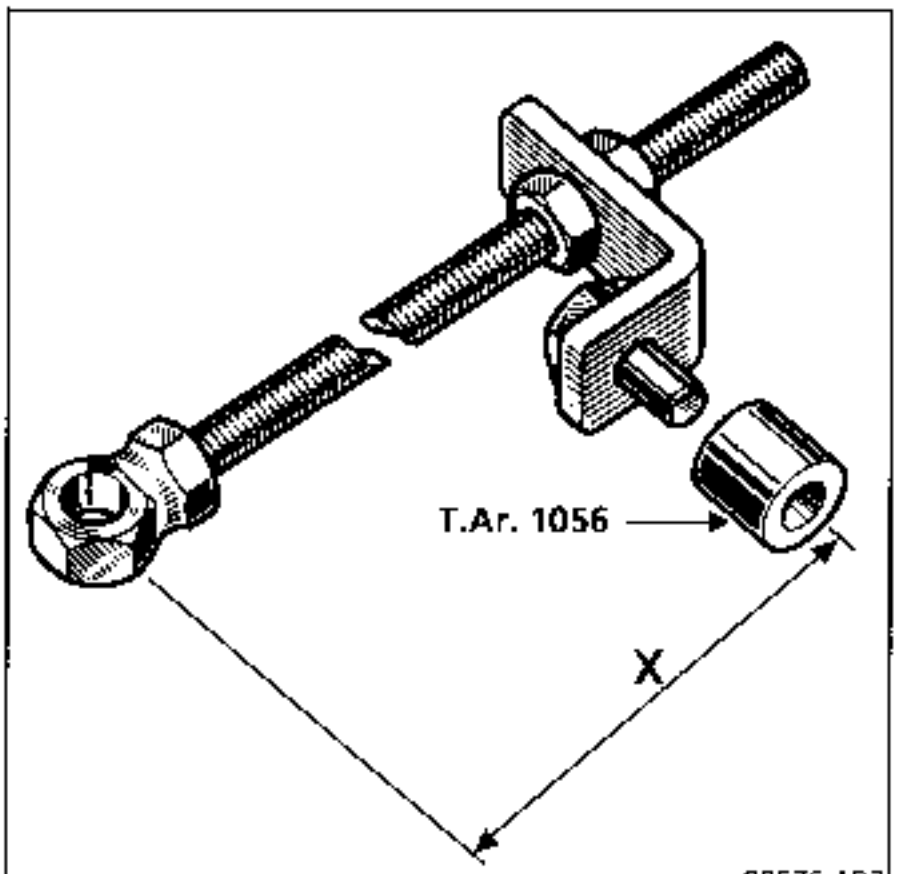
First set the two tools to obtain the correct dimension for X.

GOOD ROADS

B481 - B482 - B48E - B48F - B48J L481 - L482 - L48E - L48F - L48J L48M - L48 N - B48D - L48D B48I - L48 I - B484 - L484	**X = 496 mm**
B483 - B 486 - B488 - B48K - B48A - L48A L483 - L486 - L488 - L489 - L48K B48V - B48W - L48W - L48V - B487 L487 - B48C - L48C - B48P - L48P B480 - L480 - B48O - L48O	**X = 485 mm**
L485 - L48L	**X = 445 mm**
B48Q - L48Q - B48R B48Y - L48Y - L48R	**X = 480 mm**
K481 - K482 - K483 - K486 - K488 - K48R K48E - K48F - K48J - K48K - K48 M K48N - S481 - S482 - S486 K48H - S48H - K48V - S48V - K480 K48A - K48I - K48O - K487 - K489	**X = 475 mm**

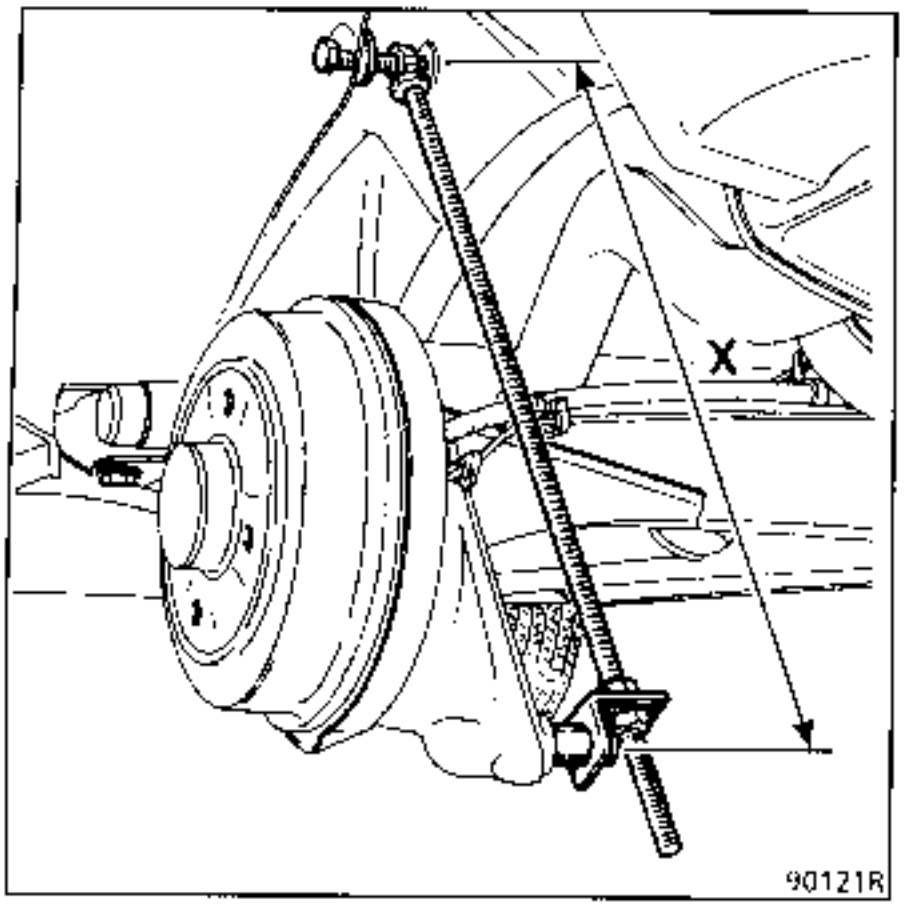
UNMADE ROADS

L481 - L48 J	**X = 508 mm**
K48 J	**X = 475 mm**

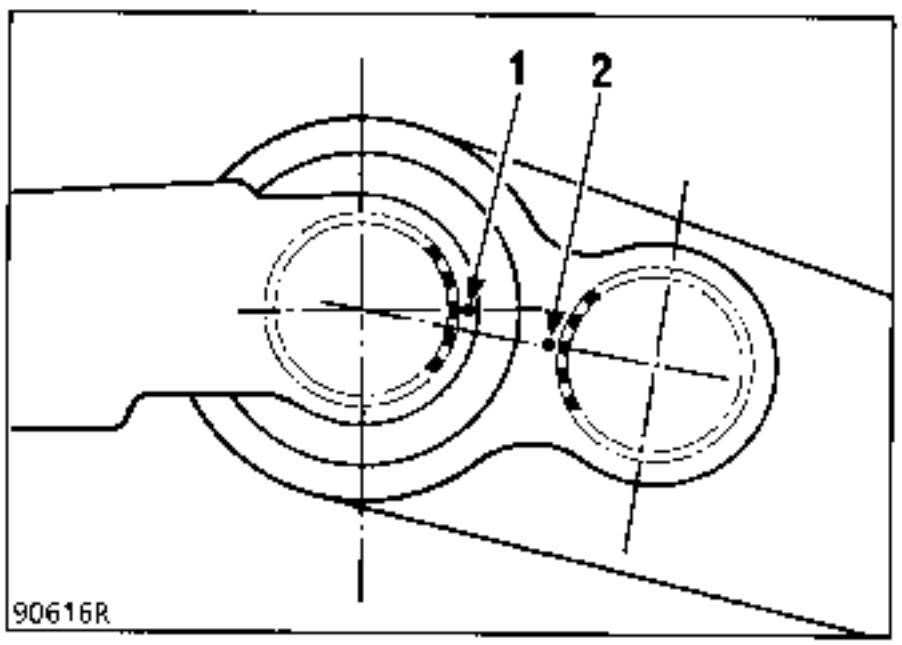


REPLACEMENT

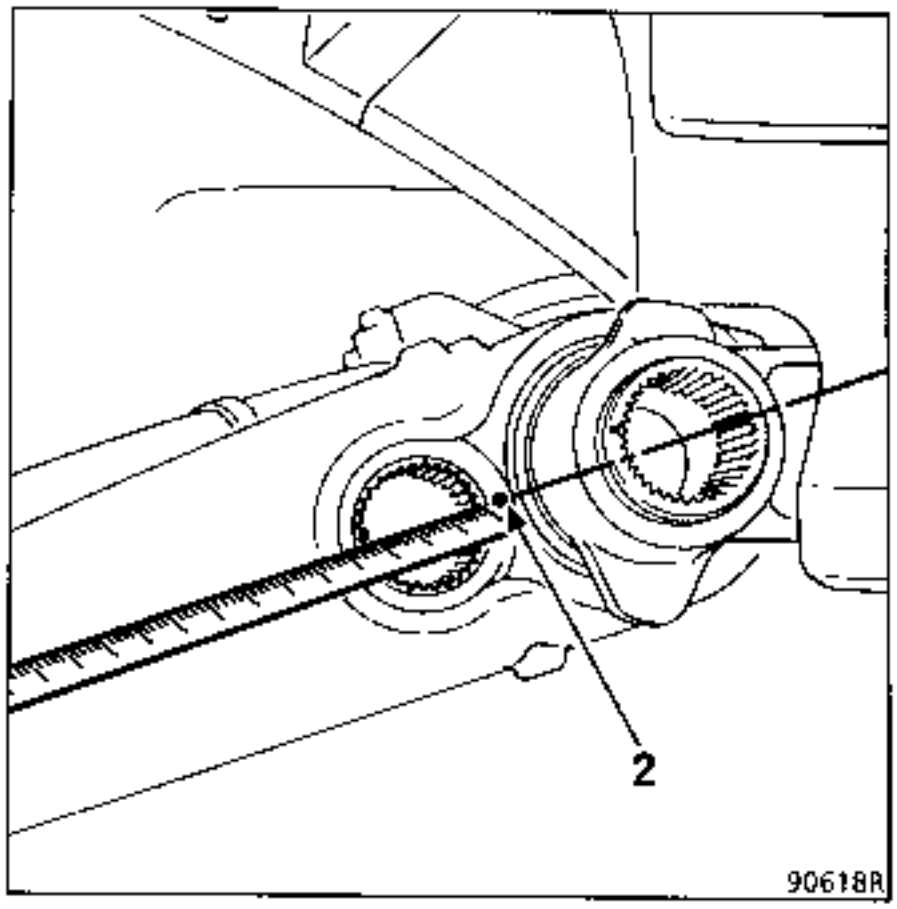
Fit the two tools in place of the shock absorbers.



The bearings have a mark (1) enabling the suspension bars to be initially positioned, but mark (2) must be made on the external anchorages of the anti-roll bars.



To do this: place a ruler on the centreline of the two anchorages and make a mark (2) (at the bottom of a tooth).

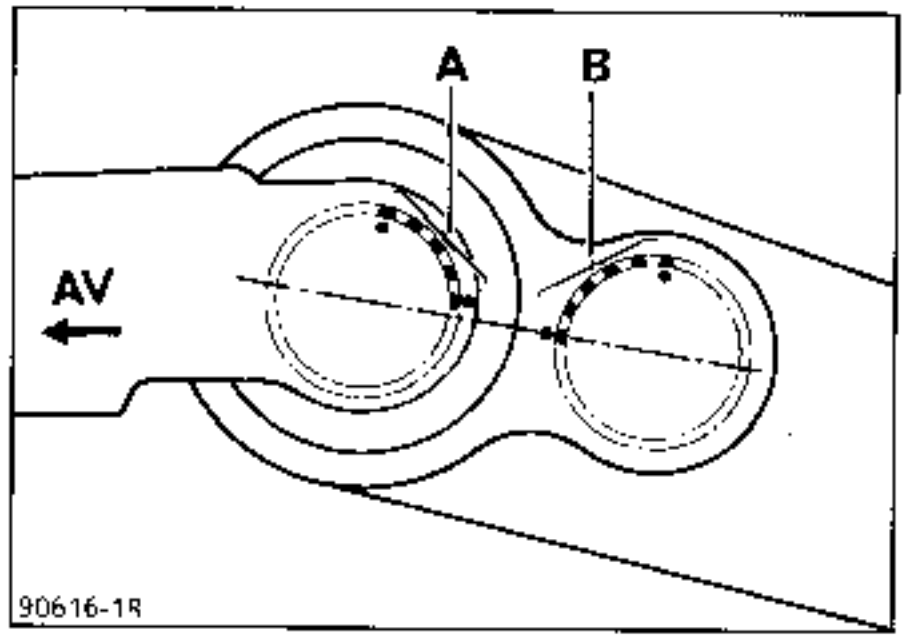


I - TRANSVERSE ENGINE (B and L48)

Fit in place (anchorages greased) :

- one anti-roll bar with the mark offset by five teeth, as shown in the drawing,

LEFT-HAND SIDE



A = 4 teeth B = 5 teeth

- the link block, centring it in the V-shaped section,
- the second anti-roll bar offset by the same number of teeth in the opposite direction to the first anti-roll bar (as viewed from the outer anchorage end),
- one suspension bar, with the mark offset by four teeth, as shown in the drawing.

NOTE: Raise the link block to make it easier to fit the suspension bar.

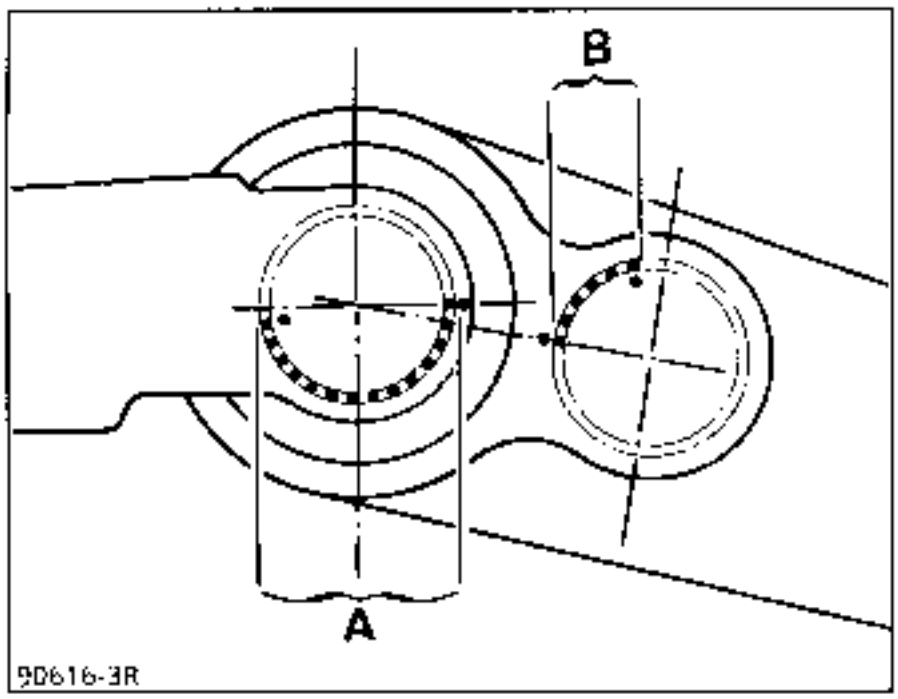
REPLACEMENT

- Fit the second suspension bar offset by the same number of teeth in the opposite direction to the first suspension bar (as viewed from the outer anchorage end).

Transverse engine (K48)

Fit in place (anchorages greased):
- an anti-roll bar with the mark offset by five teeth, as shown in the drawing,

LEFT-HAND SIDE



A = 13 teeth B = 5 teeth

- the link block, centring it in the V-shaped section,
- the second anti-roll bar offset by the same number of teeth in the opposite direction to the first anti-roll bar (as viewed from outer anchorage end),
- one suspension bar, with the mark offset by thirteen teeth, as shown in the drawing.

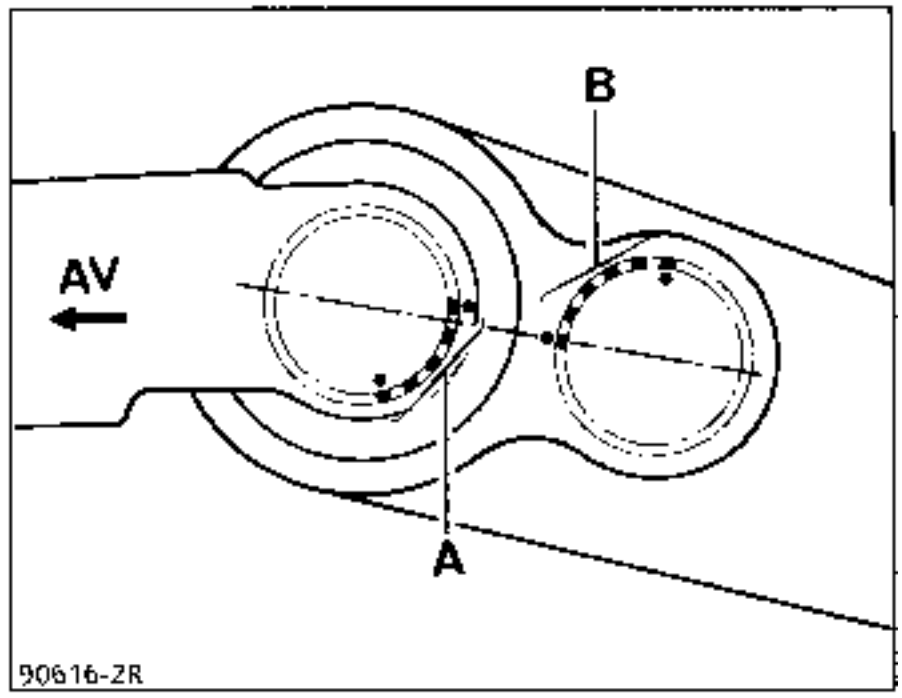
NOTE: Raise the link block to make it easier to fit the suspension bar.

- Fit the second suspension bar offset by the same number of teeth in the opposite direction to the first suspension bar (as viewed from the outer anchorage end).

II - LONGITUDINAL ENGINE (B and L48)

Fit in place (anchorages greased) :
- one anti-roll bar with the mark offset by five teeth as shown in the drawing,

LEFT-HAND SIDE



A = 4 teeth B = 5 teeth

- the link block, centring it in the V-shaped section,
  the second anti-roll bar offset by the same number of teeth in the opposite direction to the first anti-roll bar (as viewed from outer anchorage end),
- one suspension bar, with the mark offset by four teeth, as shown in the drawing.

NOTE: Raise the link block to make it easier to fit the suspension bar.

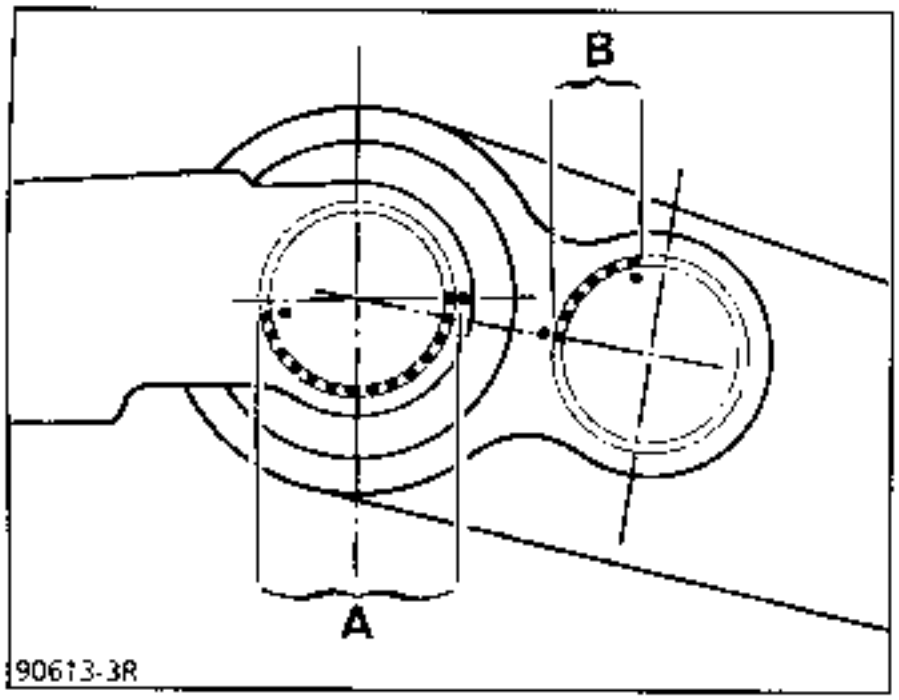
- Fit the second suspension bar offset by the same number of teeth in the opposite direction to the first suspension bar (as viewed from the outer anchorage end).

REPLACEMENT

Longitudinal engine (K and 548)

Fit in place (anchorages greased):
- one anti-roll bar with the mark offset by five teeth, as shown in the drawing,

LEFT-HAND SIDE



A = 13 teeth B = 5 teeth

- the link block, centring it in the V-shaped section,
- the second anti-roll bar offset by the same number of teeth in the opposite direction to the first anti-roll bar (as viewed from the outer anchorage end),
- one suspension bar, with the mark offset by thirteen teeth, as shown in the drawing.

NOTE: Raise the link block to make it easier to fit the suspension bar.

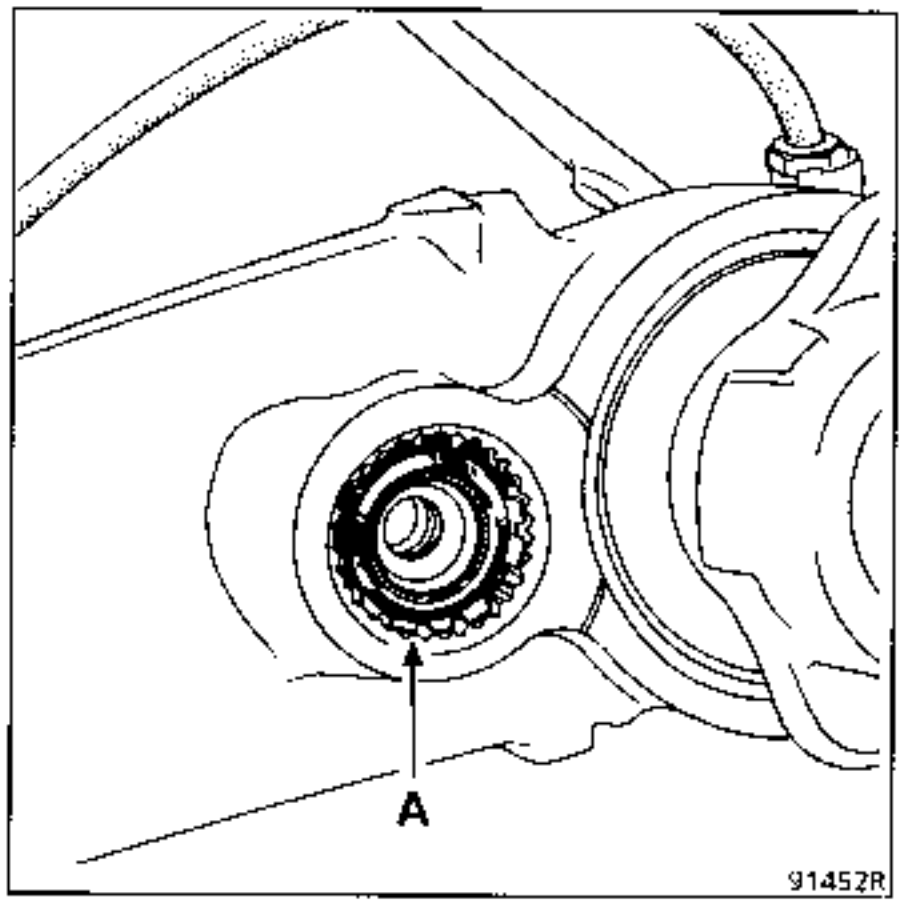
- Fit the second suspension bar offset by the same number of teeth in the opposite direction to the first suspension bar (as viewed from the outer anchorage end).

ALL TYPES

Remove the tools and refit the shock absorbers.

Place the vehicle on its wheels and measure the underbody heights (see chapter on "**Checking and adjusting the underbody height**").

If the vehicle height is correct, fit new clips (A) in the torsion bar anchorages.



Check and adjust if necessary :

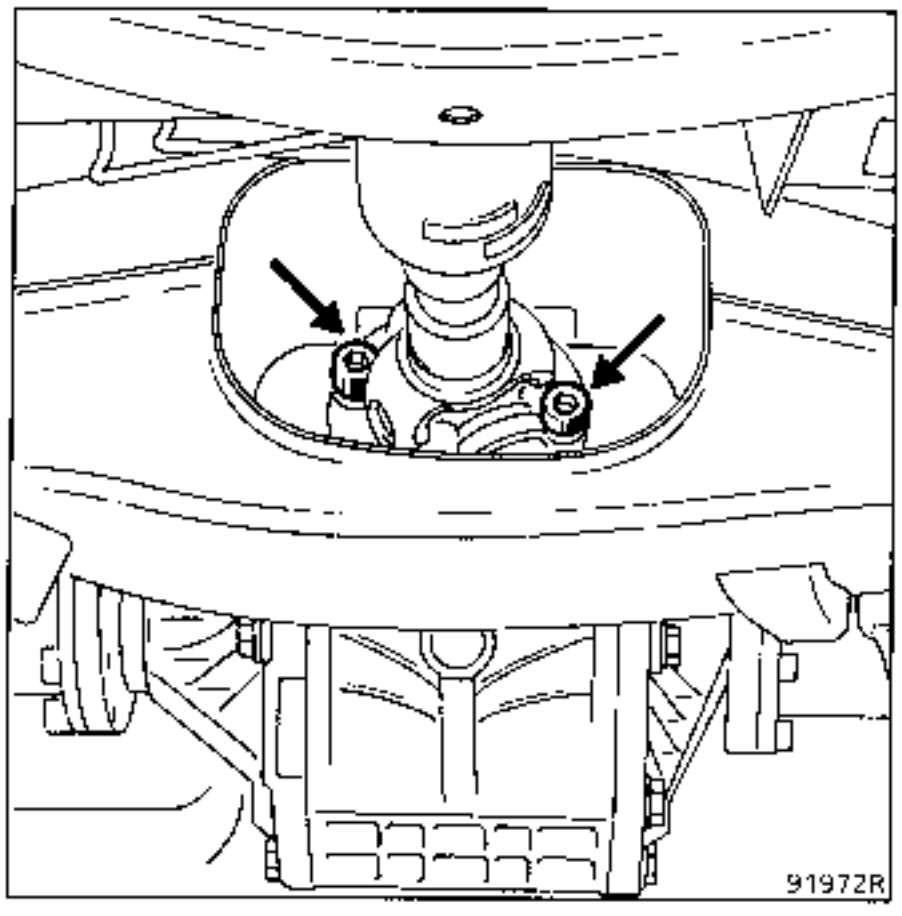
- the brake compensator (depending on version),
- the headlight beam setting.

ESSENTIAL SPECIAL TOOLING		
Rou.	604-01	Hub locking tool

TIGHTENING TORQUES (in daN.m)		
Shock absorber bottom bolts		5.5
Anti-roll bar securing bolt		5.5
Bolts securing drive shaft to sun wheel		6
Final drive flange bolts		5
Final drive rear mounting		8
Bolt securing cross member to:		
	bush	12
	carrier panel	8
Wheel bolts	4 bolts	9
	5 bolts	10

REMOVING

With the vehicle on its wheels remove:
- the bolts securing the final drive flange,



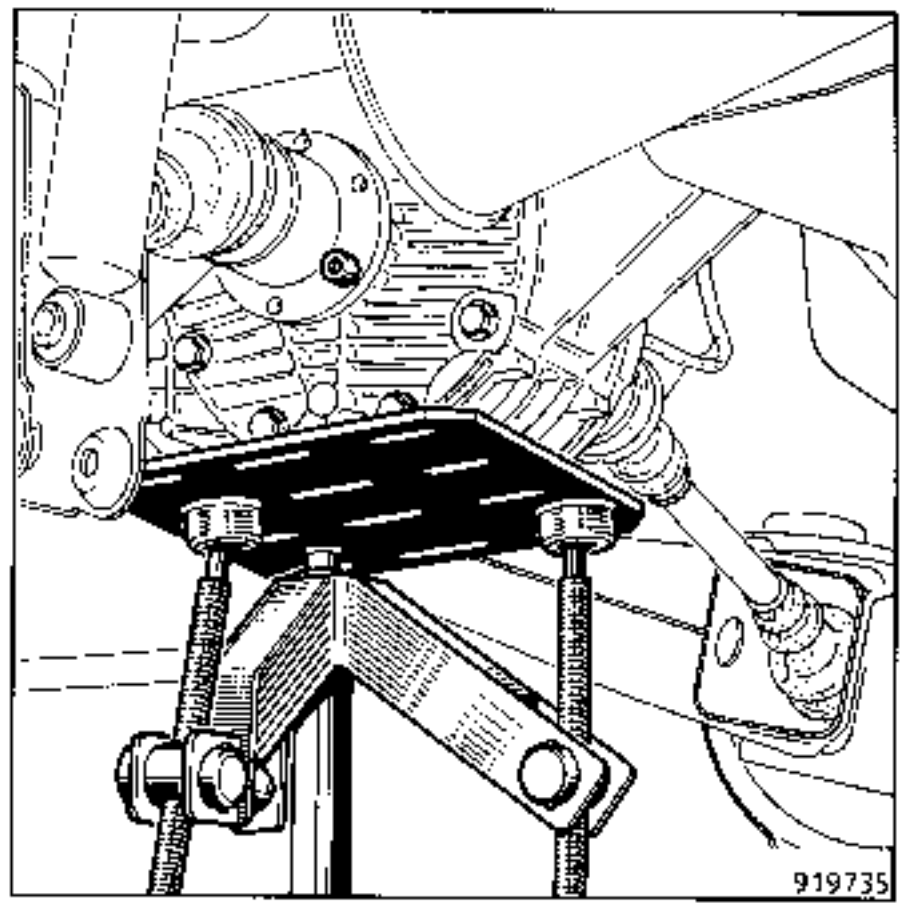
- the brake drums (see the relevant section),
- the handbrake cables and disengage them from the guides on the arms.

Refit the drums but do not tighten.

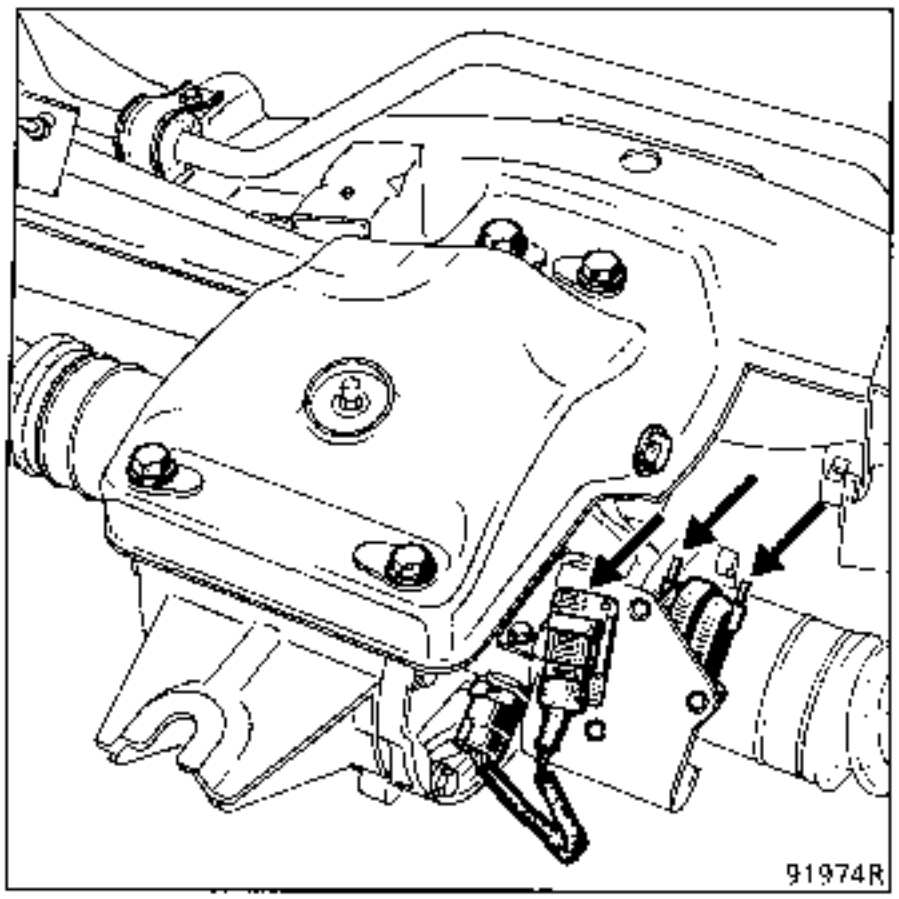
Remove the springs (see relevant section).

Refit but do not tighten:
- the drive shafts,
- the anti-roll bar link arm pins.

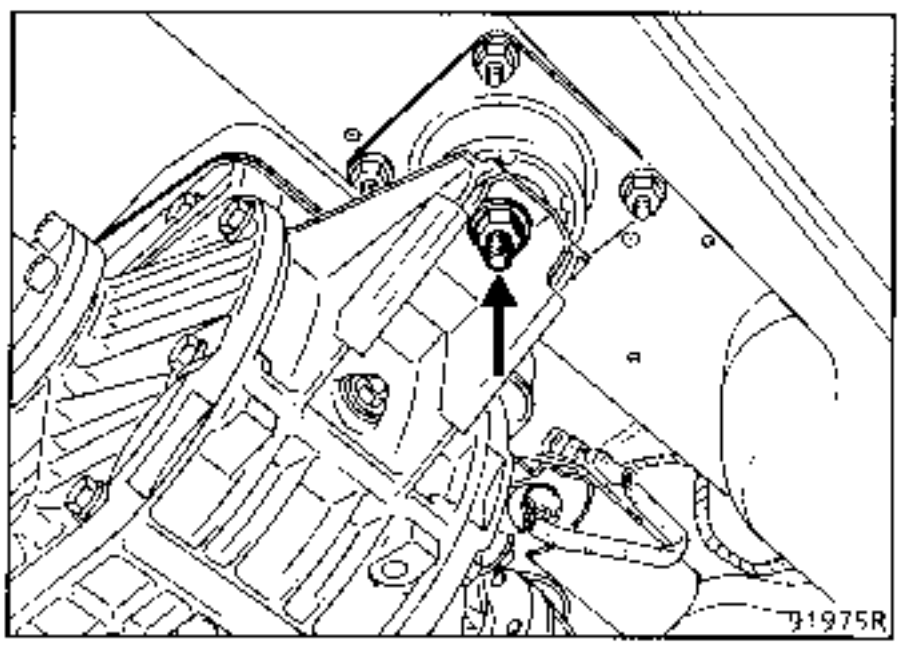
Support the rear axle using a jack.



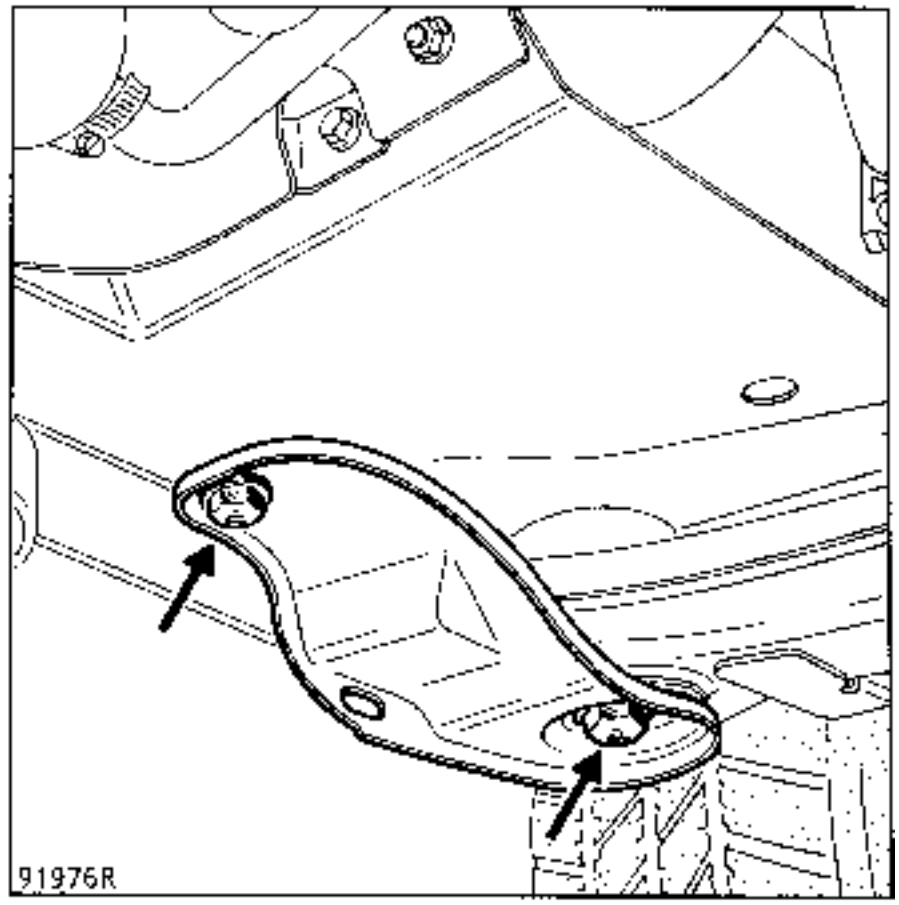
Remove:
- the pneumatic controls for the dog clutch and the switch connector,



- the rear mounting for the final drive on the body,



- the front mountings for the final drive mounting cross member.



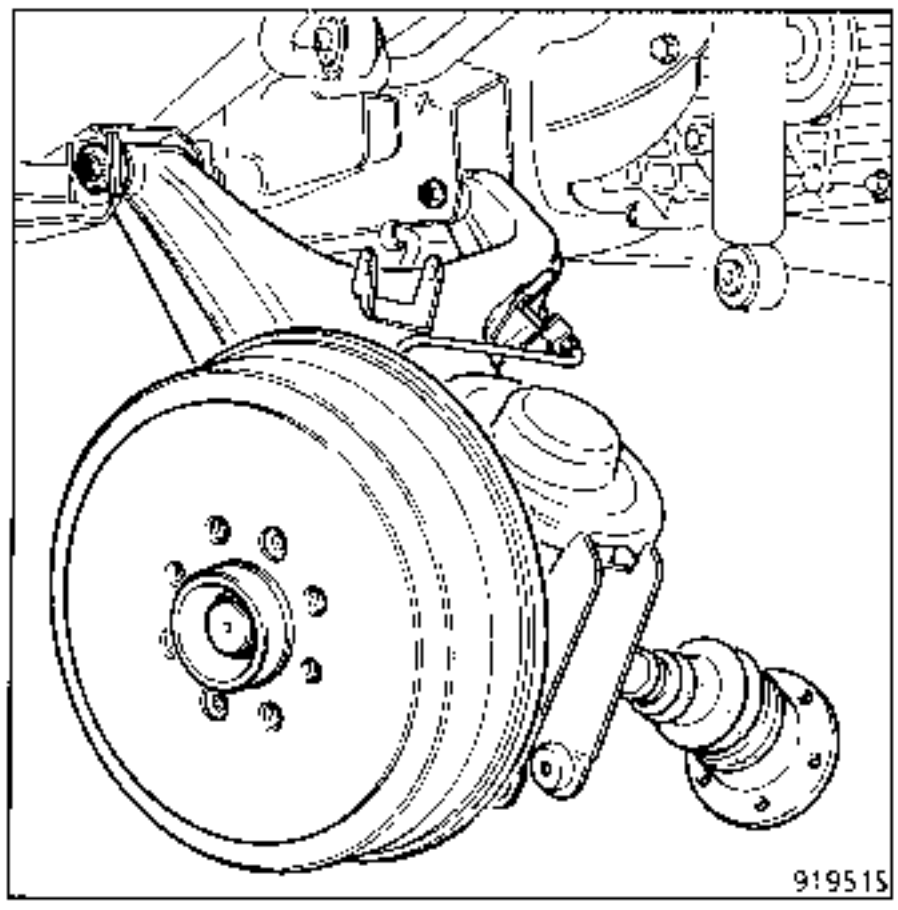
Lower the strut, disengaging the prop shaft from the cross member.

Remove the assembly.

REFITTING

Fit in place :
- the rear axle assembly on the vehicle, engaging the prop shaft in the cross member,
- the final drive rear mounting and torque tighten it,
- the front mountings for the final drive mounting cross member and torque tighten them,
- the dog clutch controls and the connector.

Place a jack under the swing arms and remove:
- the pins from the anti-roll bar link arm,
- the drive shafts from the sun wheels.



Fit in place :
- the springs (see the relevant section),
- the final drive flange,
- the handbrake cables.

With the vehicle on its wheels, torque tighten the final drive flange.

Bleed the brake circuit, check and adjust the brake compensator, if necessary.

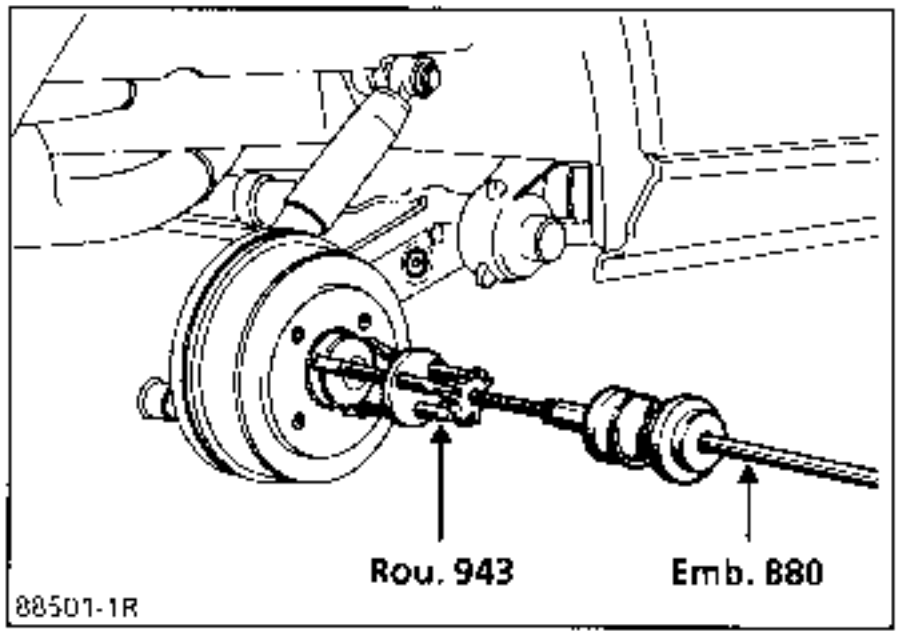
The two drum brakes must be of the same diameter. Therefore, if one drum is refaced, then the other drum must also be refaced. A maximum metal removal of 1 mm on the diameter is permitted.

ESSENTIAL SPECIAL TOOLING		
Emb.	880	Inertia extractor
Rou.	943	Hub centre cap extractor

TIGHTENING TORQUES (in daN.m)	
Wheel bolts	9
Hub nuts	16

REMOVING

Remove:
- the hub centre cap using tools **Rou. 943** and **Emb. 880**.

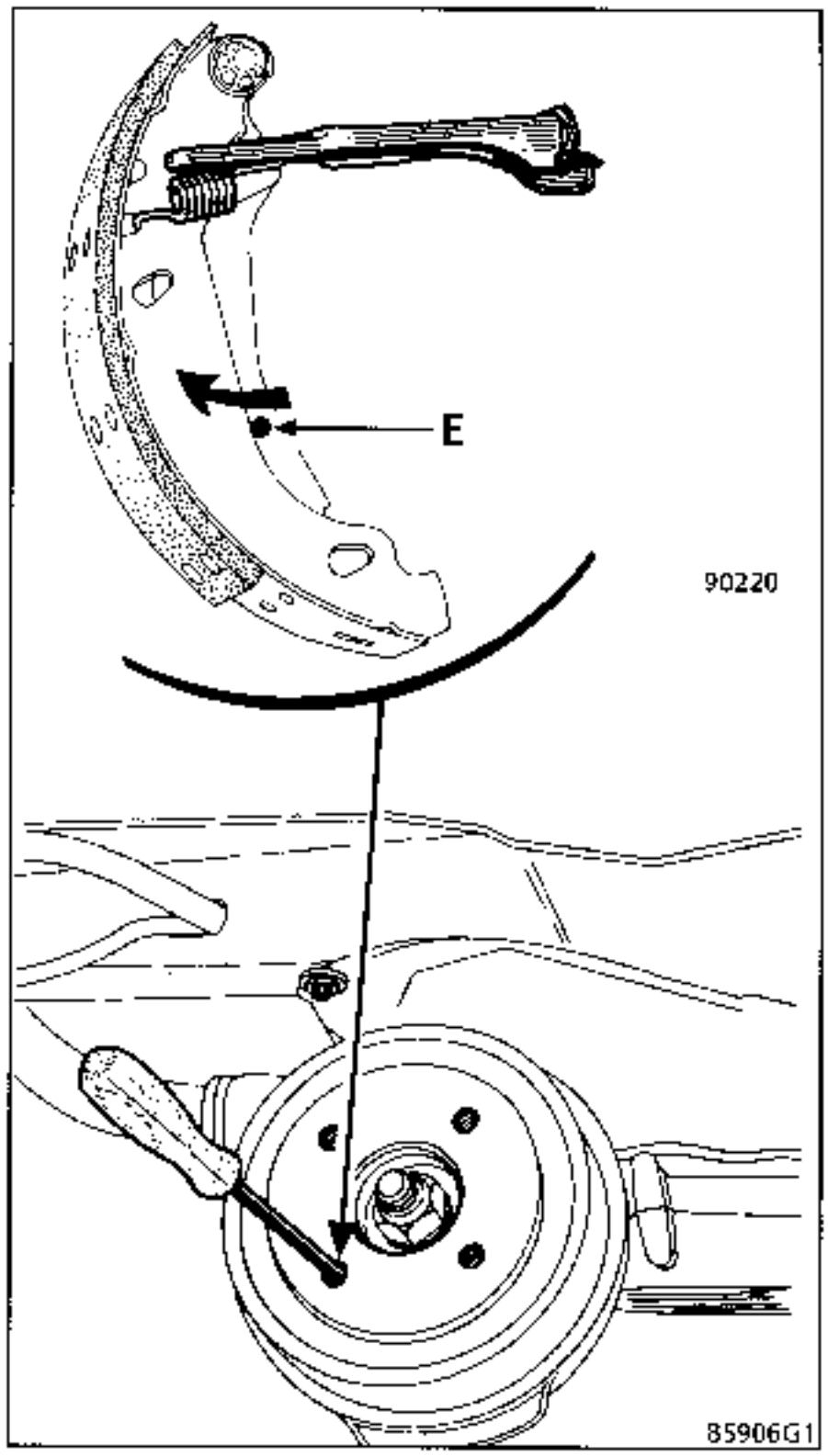


Release the handbrake.

Slacken off the secondary handbrake cables so that the lever can move back.

Pass a screwdriver through one of the wheel-securing holes on the drum and press down on the handbrake lever so as to free the stud on the brake shoe (E).

Help the lever to release itself by pushing it towards the rear.



Remove:
- the flange nut,
- the drum.

REFITTING

Clean the drum and linings using a brake cleaner.

Fit in place:
- the drum,
- the nut, torque tightening it,
- the hub centre cap.

Adjust the shoe positions by pressing down repeatedly on the brake pedal.

Adjust the handbrake.

The two drums must be of the same diameter, therefore refacing of one drum means the other drum must be refaced. A maximum metal removal of 1 mm on the diameter is permissible.

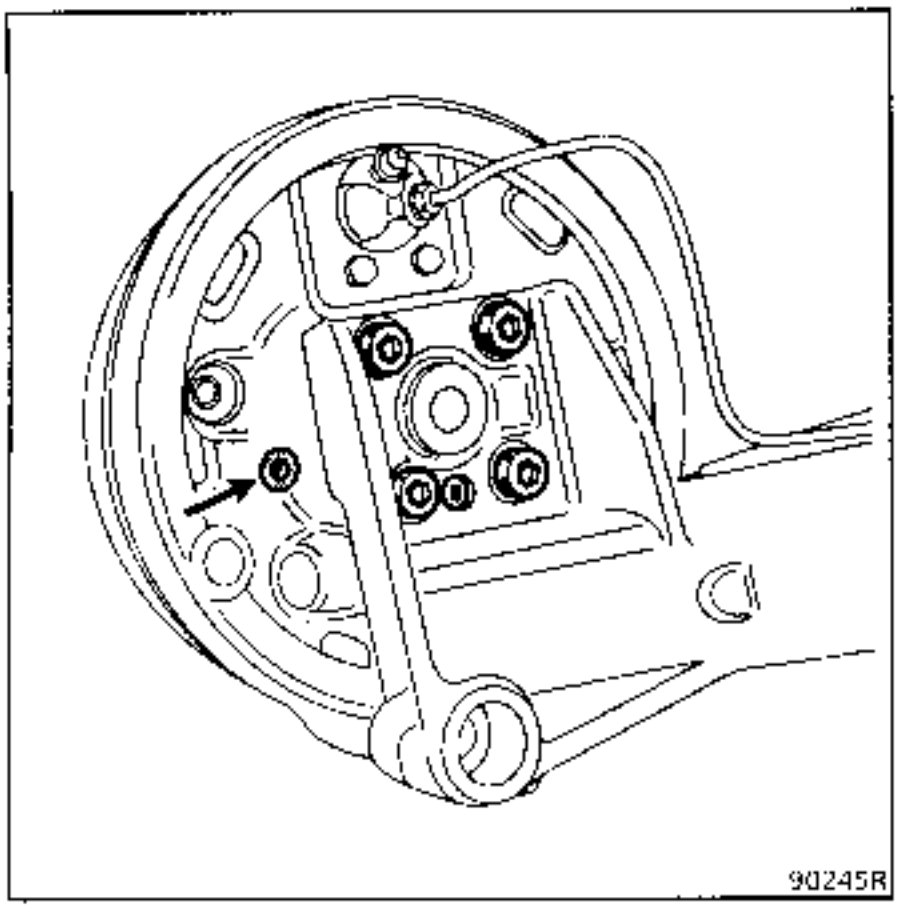
TIGHTENING TORQUES (in daN.m)	
Wheel bolts	9
Hub securing nut	16

REMOVING

Release the handbrake

Slacken off the secondary cables to allow the operating lever to move rearwards.

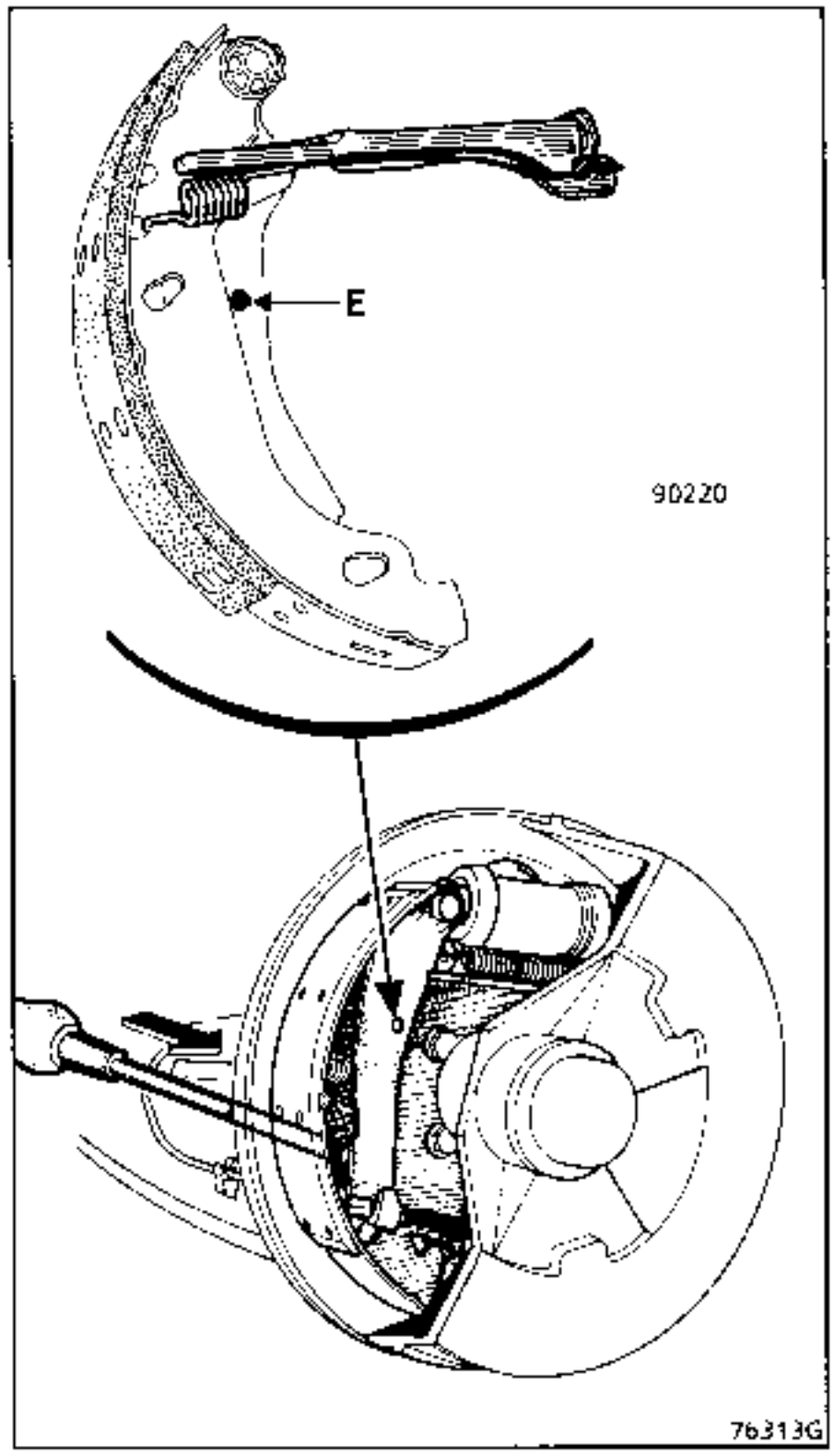
Remove the back plate blanking plug so that the automatic wear take-up mechanism may be released.



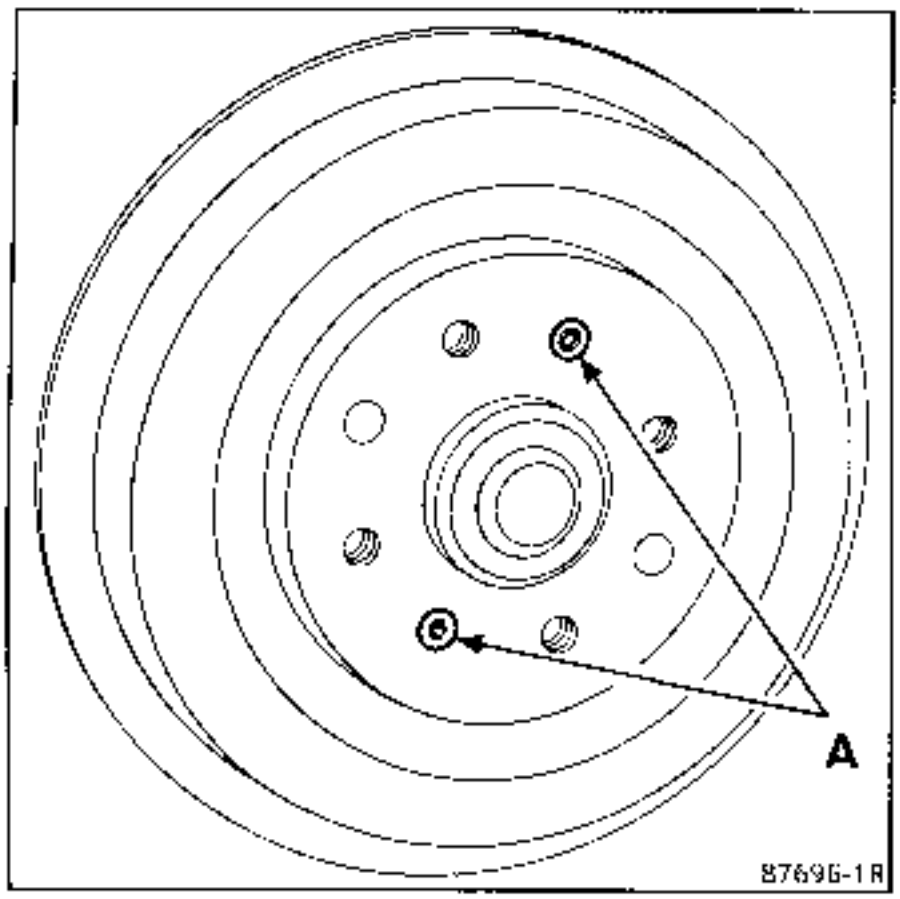
Insert a screwdriver and push against the handbrake lever to release stud (E) from the brake shoe.

NOTE: There are holes in the back plate and the brake shoe to provide access to the lever which is on the other side of the shoe

Once the stud is freed, the lever may be pushed to the rear.

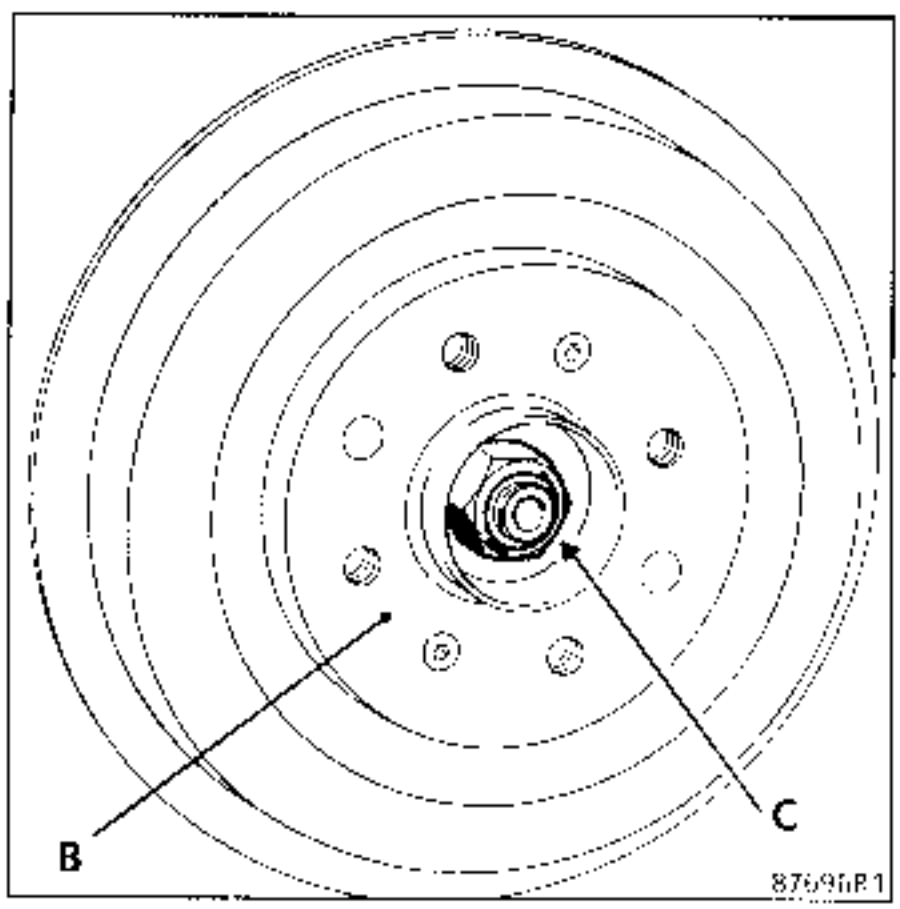


Remove :
- the two brake drum securing bolts (A),
- the brake drum.



Special points concerning changing of linings.

Remove :
- the hub centre cap,
  nut (C),



- the hub - drum assembly (B).

REFITTING

Clean the drum and linings using a brake cleaner.

Fit in place:
- the drum,
- the nut and torque tighten it (according to removal),
- the centre cap.

Adjust the shoe position by pressing down repeatedly on the brake pedal.

Adjust the handbrake.

Refit the blanking cover to the back plate.

These vehicles may be fitted with fixed compensators incorporated in the wheel cylinders: if there is any defect in the operation of the wheel cylinder or compensator, the entire assembly must be changed, any repair being forbidden.

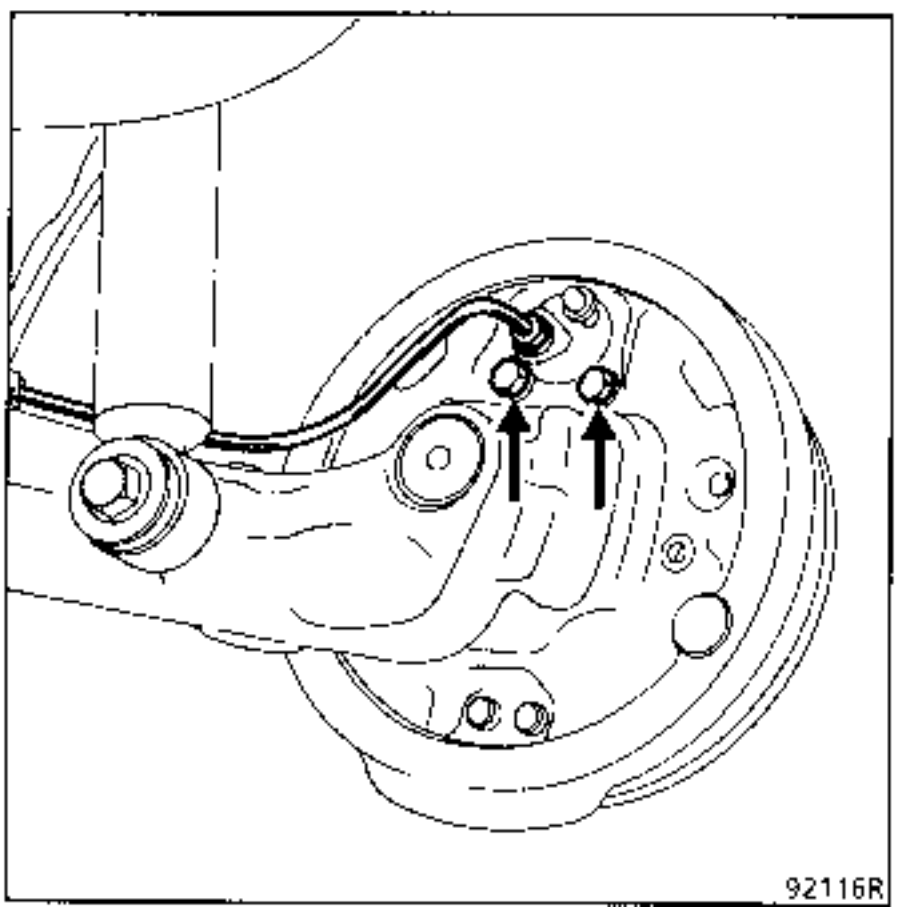
TIGHTENING TORQUES (in daN.m)	
Wheel bolts	**9**
Hub securing nuts	**16**
Bleed screws	**0.8**
Brake pipe union bolts	**1.3**

REMOVING

Remove :
- the drum (see relevant section),
- the brake shoes (see "**Brake pads**" section).

Unscrew:
- the rigid pipe union from the wheel cylinder using a pipe spanner,
- the two bolts securing the cylinder to the anchor plate and remove the cylinder.

Check the condition of the shoes; change them if there are any traces of oil on them.



REFITTING

Dust out the drums and linings.

Refit the components in the reverse order to removal (see "**Brake pads**" section).

Bleed the brake system.

Adjust the shoe position by pressing down repeatedly on the brake pedal.

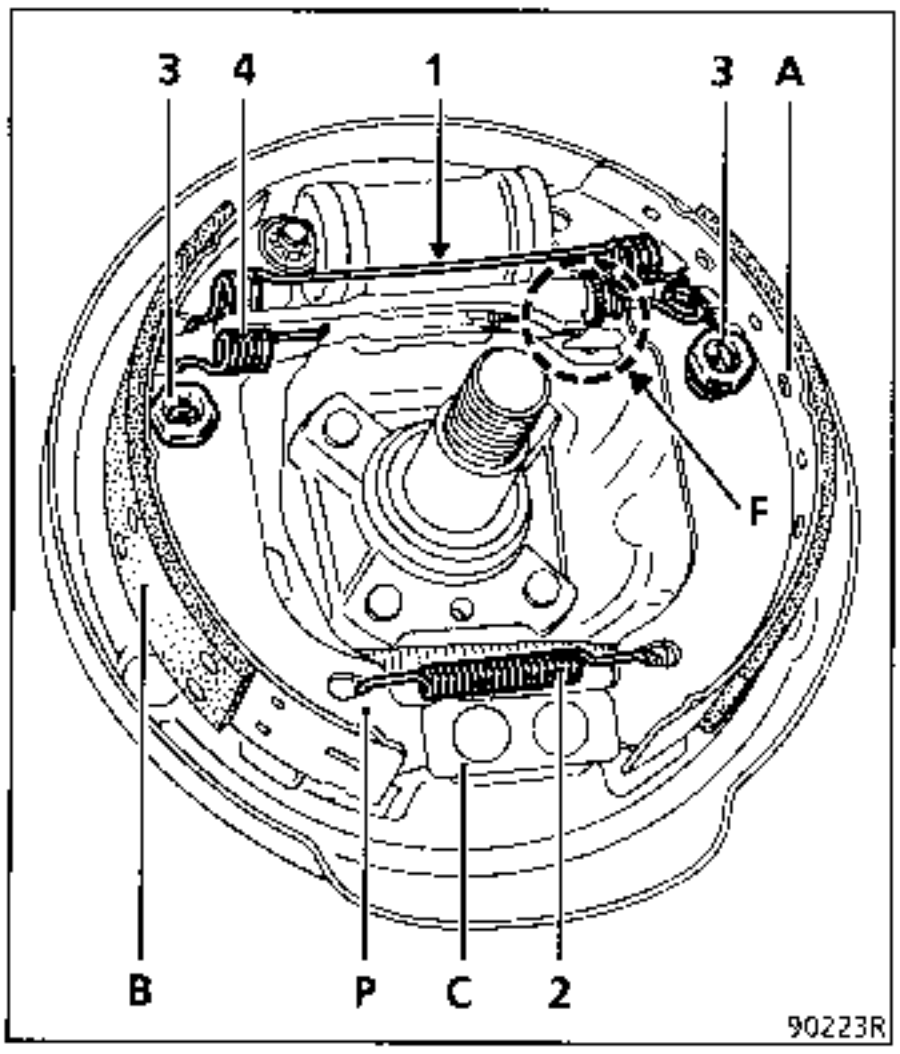
Vehicles with integral compensators :

Check the cut-off pressure (see relevant paragraph).

ESSENTIAL SPECIAL TOOLING		
Emb.	880	Inertia extractor
Rou.	943	Hub centre cap extractor

TIGHTENING TORQUE (in daN.m)	
Wheel bolts	9
Hub securing nuts	16

Composition of **BENDIX 180 x 40 RAI** brake (incremental automatic take-up).

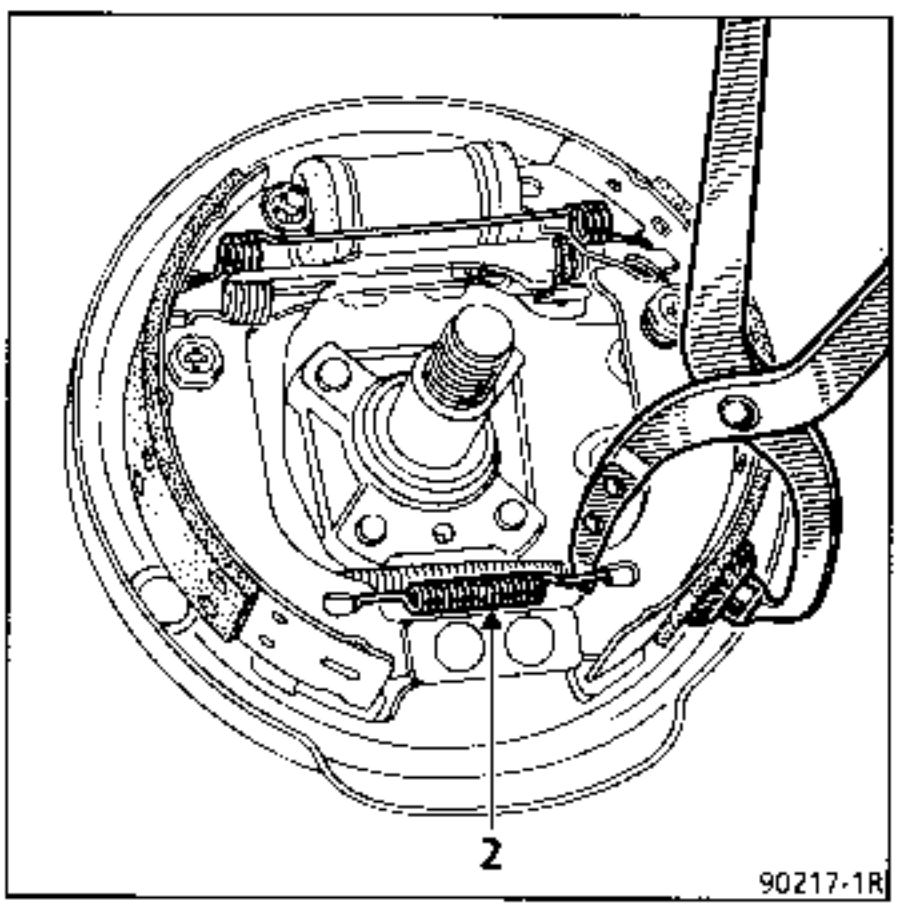


A Leading shoe
B Trailing shoe
C Fixed point
P Brake shoe foot
F RAI
1 Upper return spring
2 (Base) lower return spring
3 Side fastening
4 Handbrake lever return spring

REMOVING

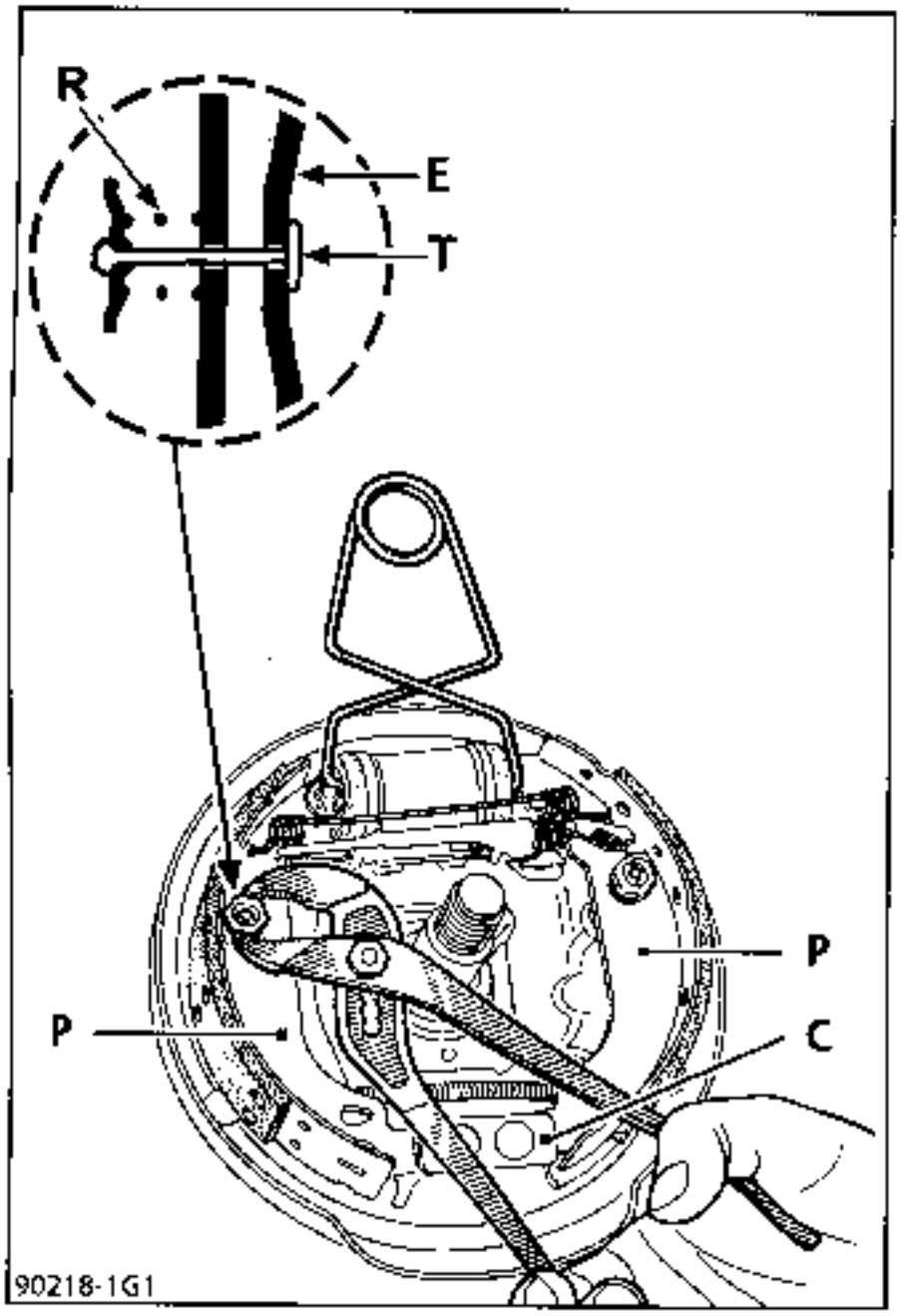
All the shoes on any given axle are to be replaced at the same time. Always fit shoes with linings of the same make and grade.

Remove lower spring (2) using brake shoe grips.



Fit a clamp to the wheel cylinder pistons.

Using multiple joint pliers and keeping connecting link (T) in contact with brake back plate (E), remove springs (R) laterally holding the trailing shoe.

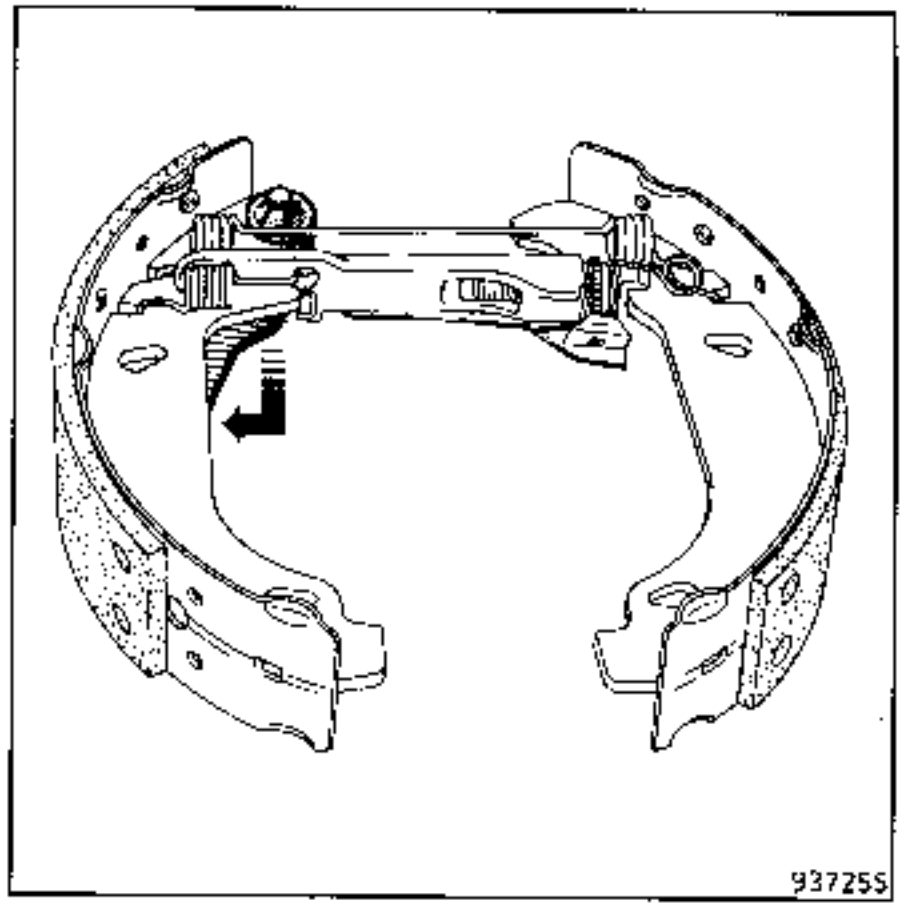


Pass each shoe base (P) above fixed point (C). alternately. Tighten the shoe bases with respect to one another to move the tips away at the wheel cylinder.

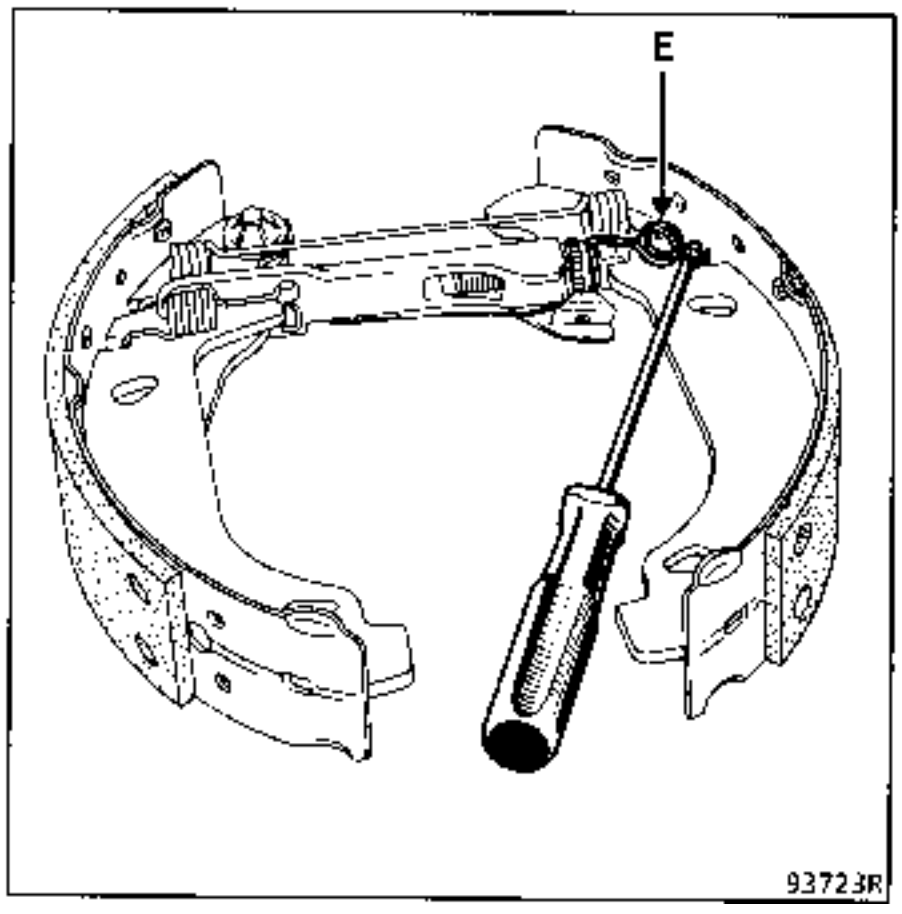
Move the assembly (RAI and shoes) away from the brake back plate then remove it, after first unfastening the handbrake cable.

On the work bench, dismantle the RAI and shoe assembly.

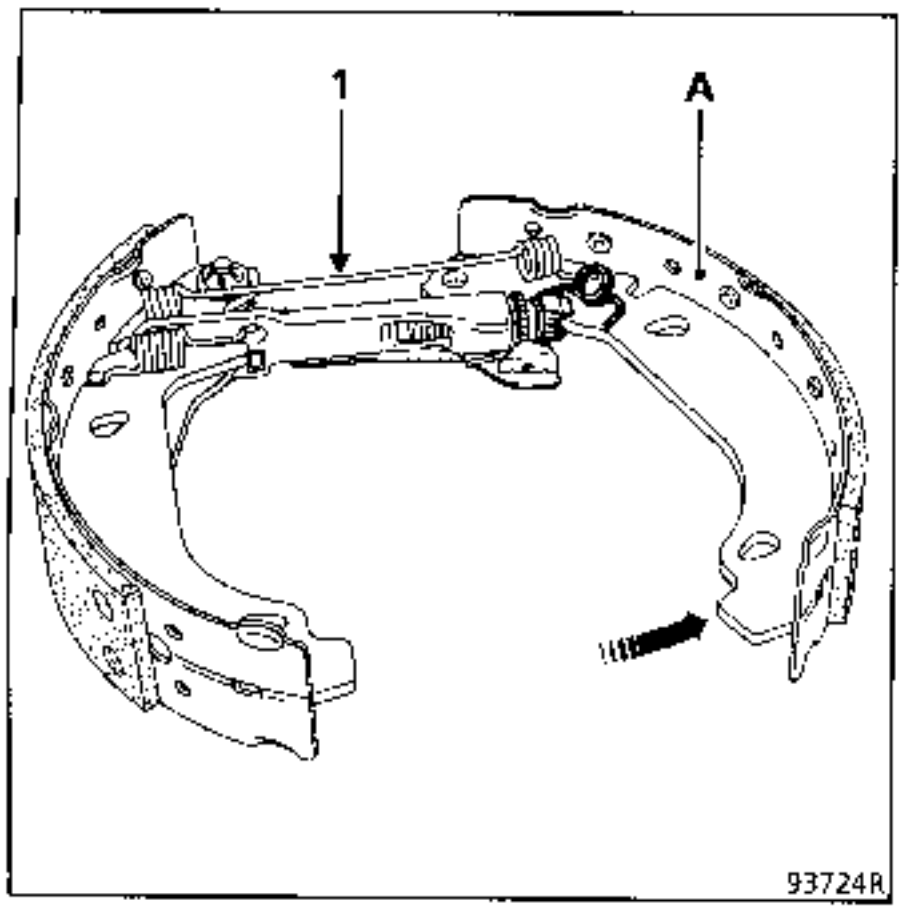
Disarm the handbrake lever.



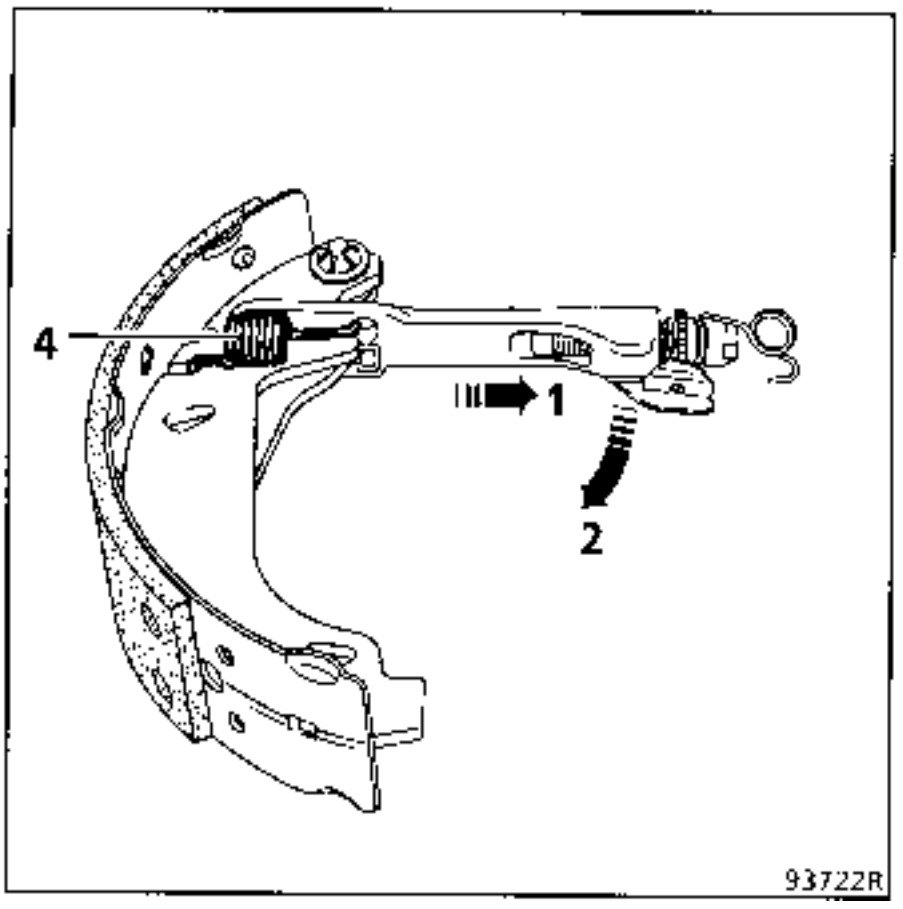
Using a small screwdriver, unfasten clip (E).



Pivot leading shoe (A), as shown by the arrow so as to release the head of the RAI screws. This will enable upper spring (1) to be removed easily.

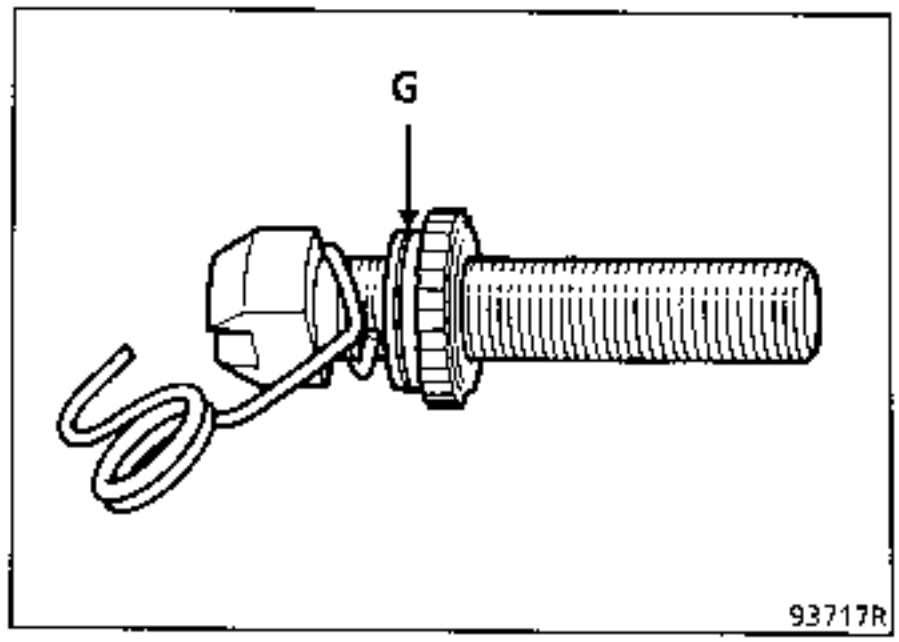


To remove the RAI assembly, pull in the direction of arrow (1) then turn in the direction of arrow (2). Remove spring (4) and the handbrake lever.



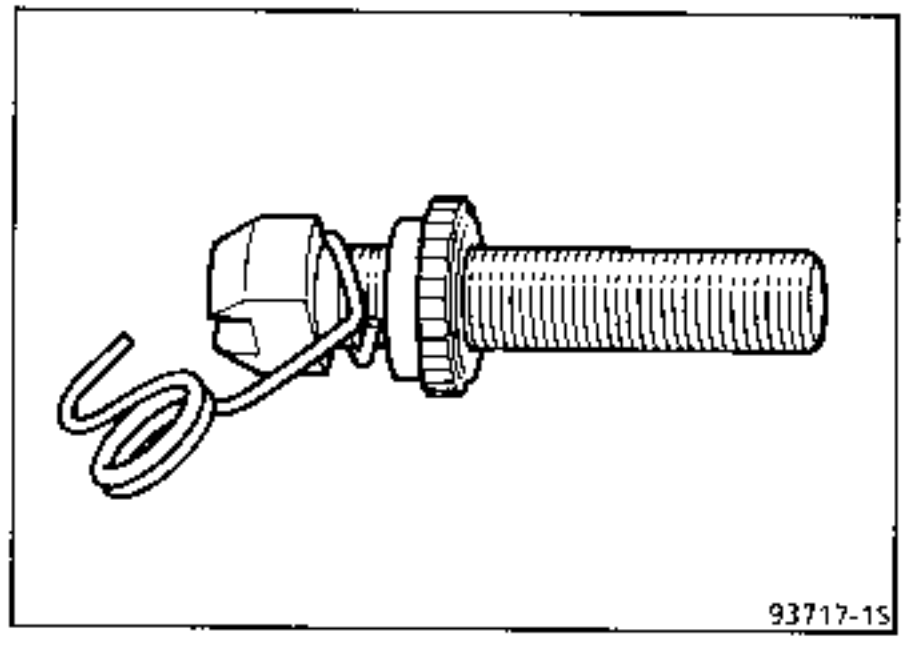
Marking and reassembly of the parts constituting the RAI system.

Left-hand bolt and notched nut



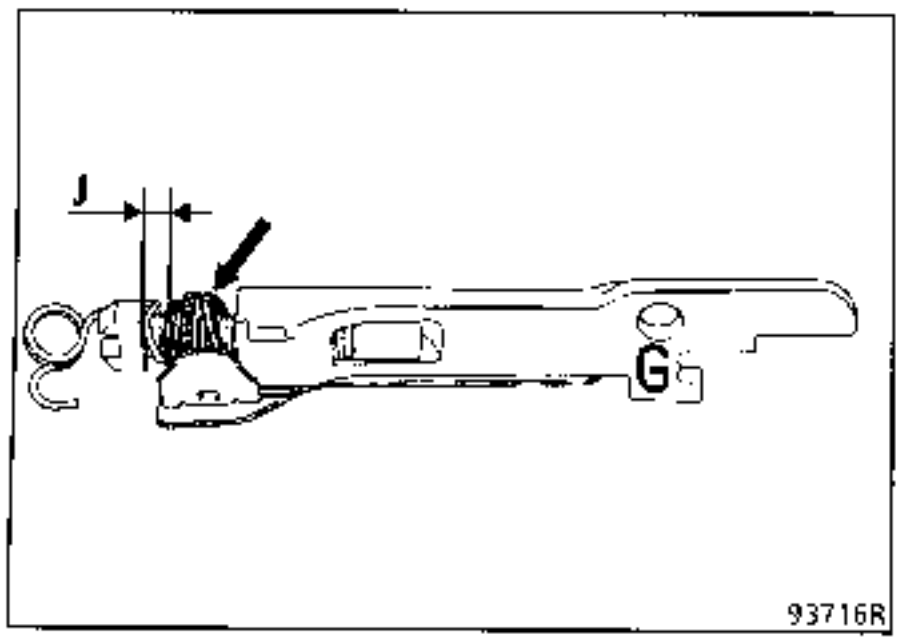
The bolt has a left-hand thread, the notched nut has a groove (G) and the clip is not painted.

Right-hand bolt and notched nut



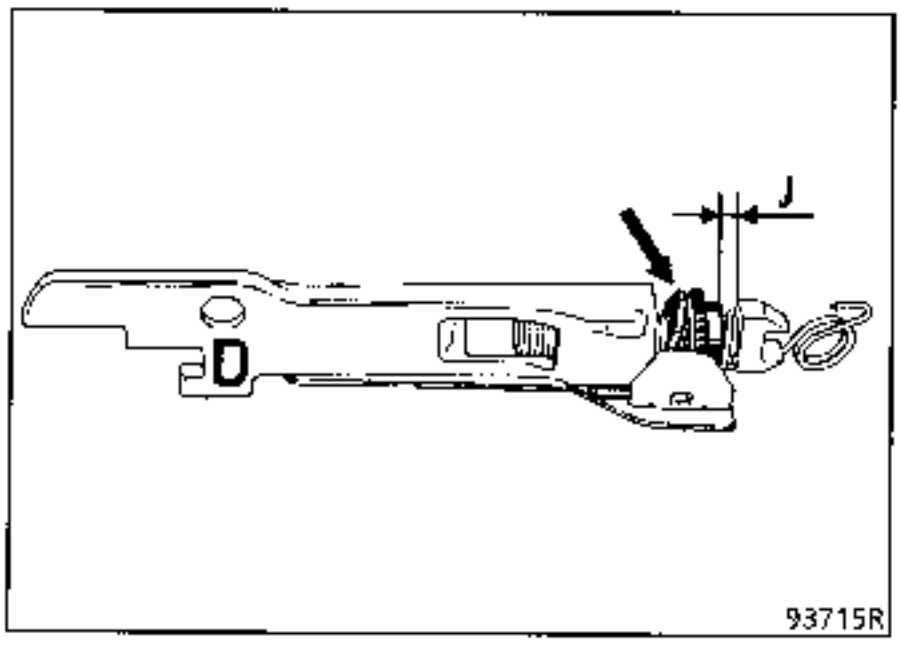
The bolt has a right-hand thread, the notched nut does not have a groove and there are dabs of paint on the clip.

Left-hand RAI assembly



Note the G (left-hand) stamped on the part and the position of the bracket.

Right-hand RAI assembly



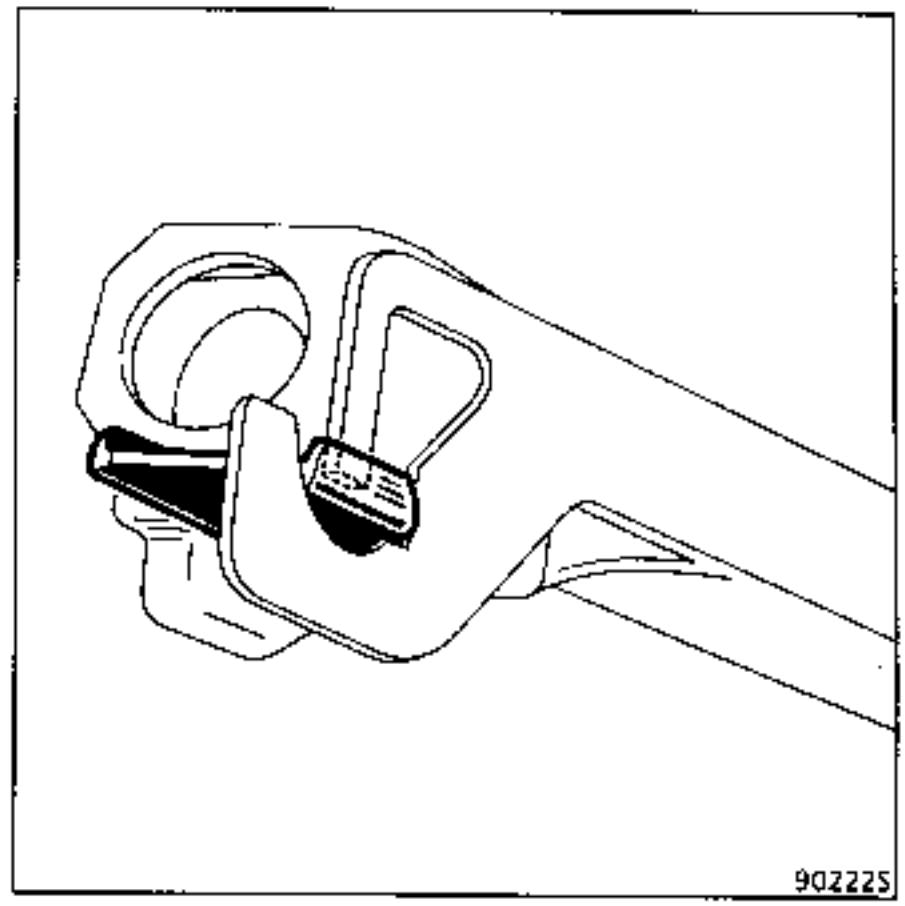
Note the D (right-hand) stamped on the part and the position of the bracket.

In both cases, the clip fastening must not be jammed between the bolt head and the notched nut; a slight clearance (J) must be left (J).

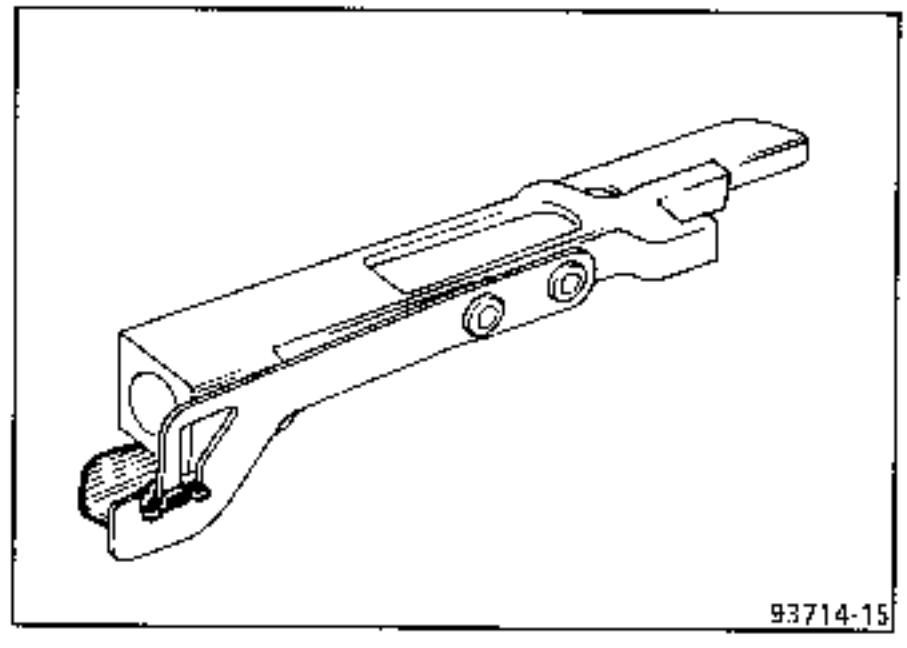
Reassembling the RAI assembly

Ensure that the catch is positioned correctly.

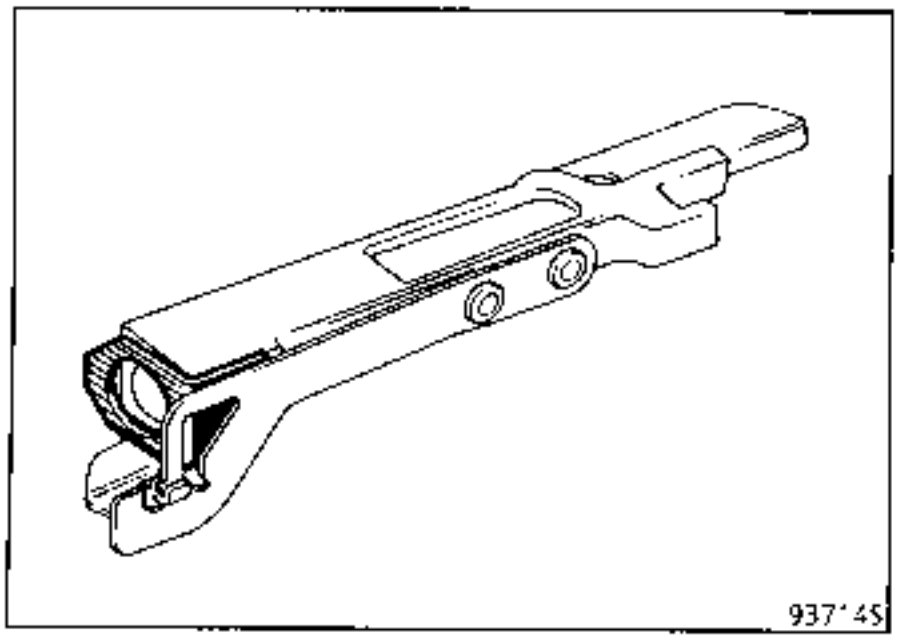
1ST TYPE



2ND TYPE



Refit the bracket, the solid section should be placed between the blade and the link arm.

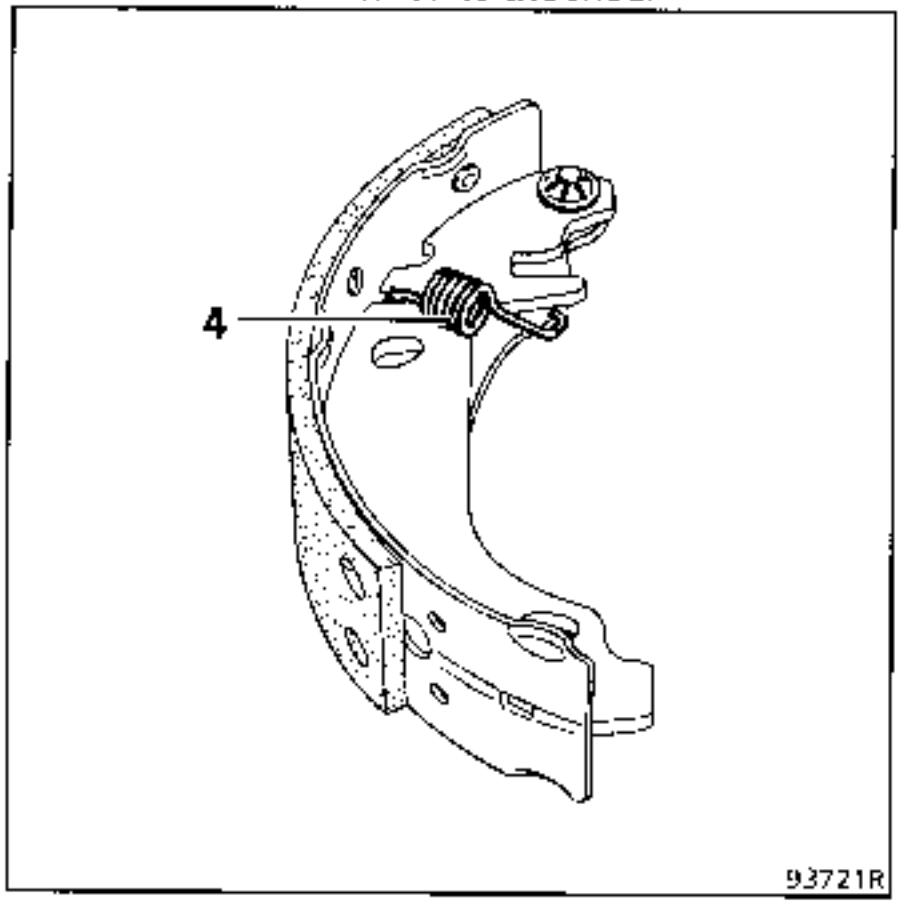


Then assemble the link arms with their respective bolts and nuts, with the right-hand bolt, clip and nut in the right-hand link arm, passing through the hole in the bracket and likewise for the left-hand RAI.

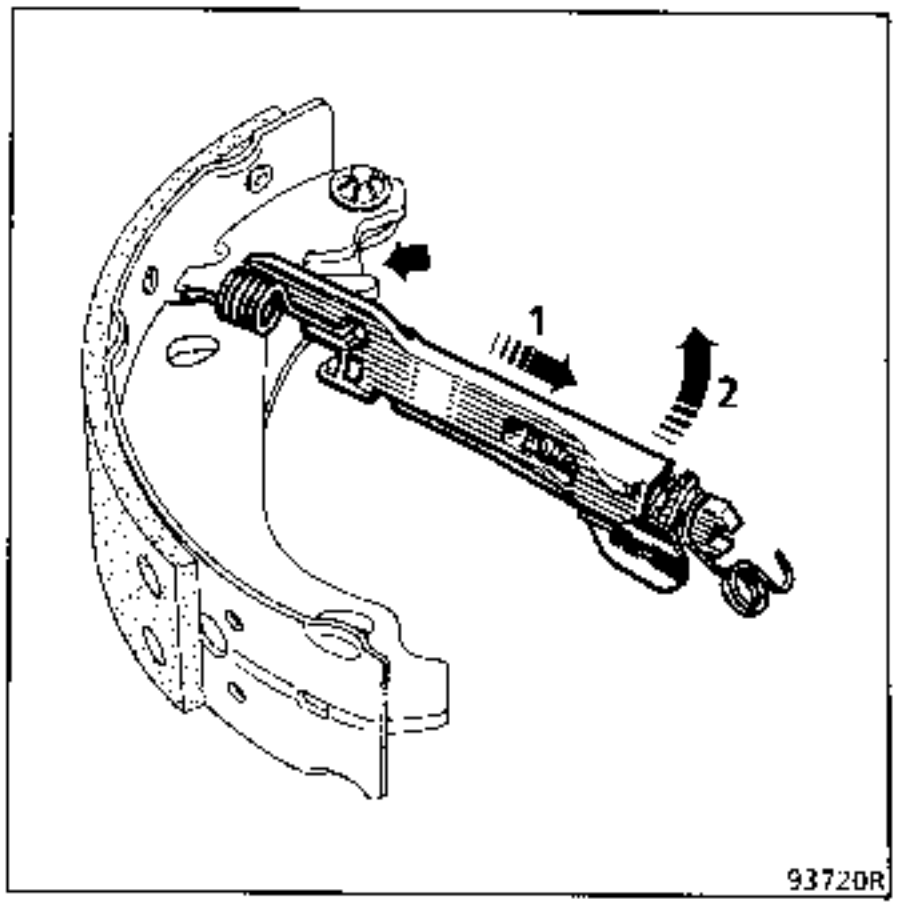
On the repair bench, refit the RAI and shoe assembly.

Refit the handbrake lever to the trailing shoe with a new clip, then disarm the lever.

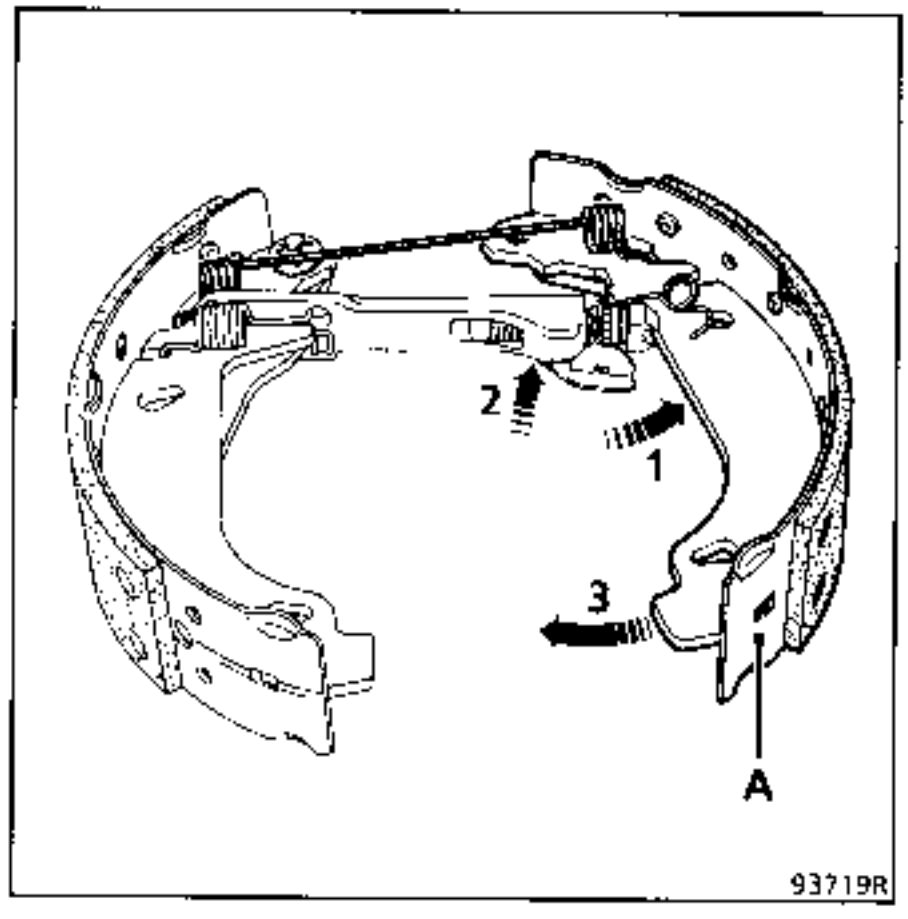
Position spring (4) in the notch in the shoe taking care that it is fitted in the correct direction with the shorter hook secured to the shoe.



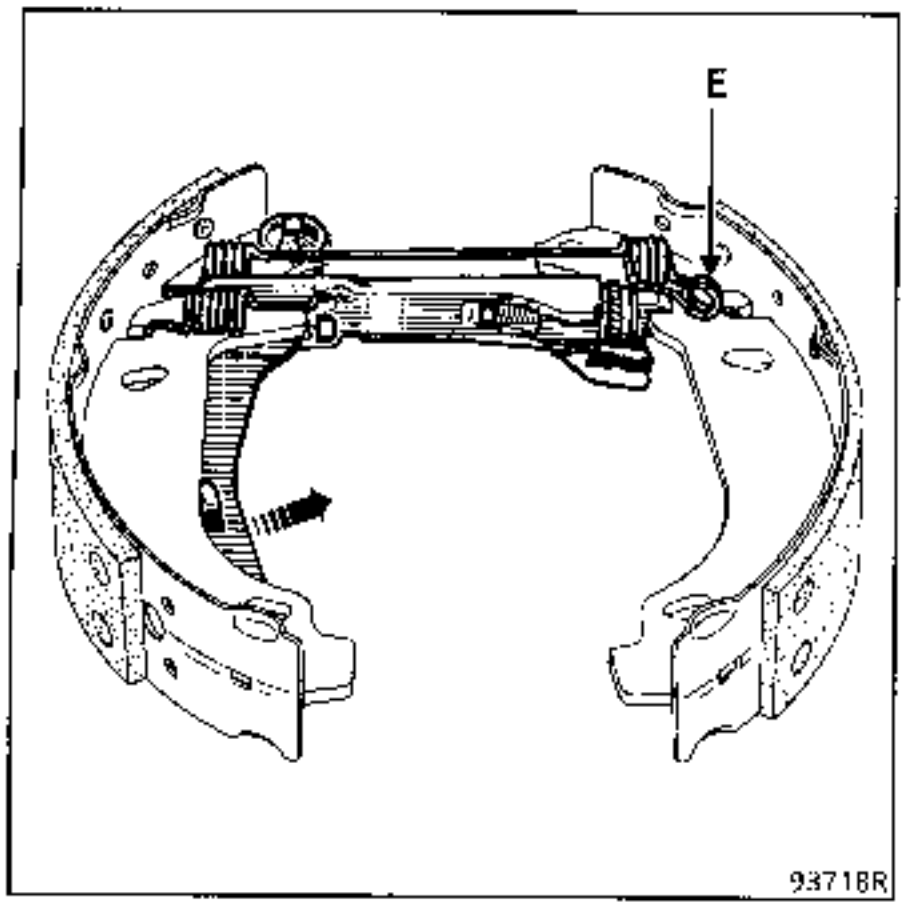
Attach the RAI assembly to spring (4) then pull in the direction shown by the arrows and the RAI moves automatically into its operating position.



Position the upper spring (1) in the notches in the two shoes, then pull in the direction shown by the arrows and the recess on the bolt should locate in that of the leading shoe (A).



Attach clip (E) and rearm the handbrake lever.



REFITTING

Offer the assembly up to the vehicle.

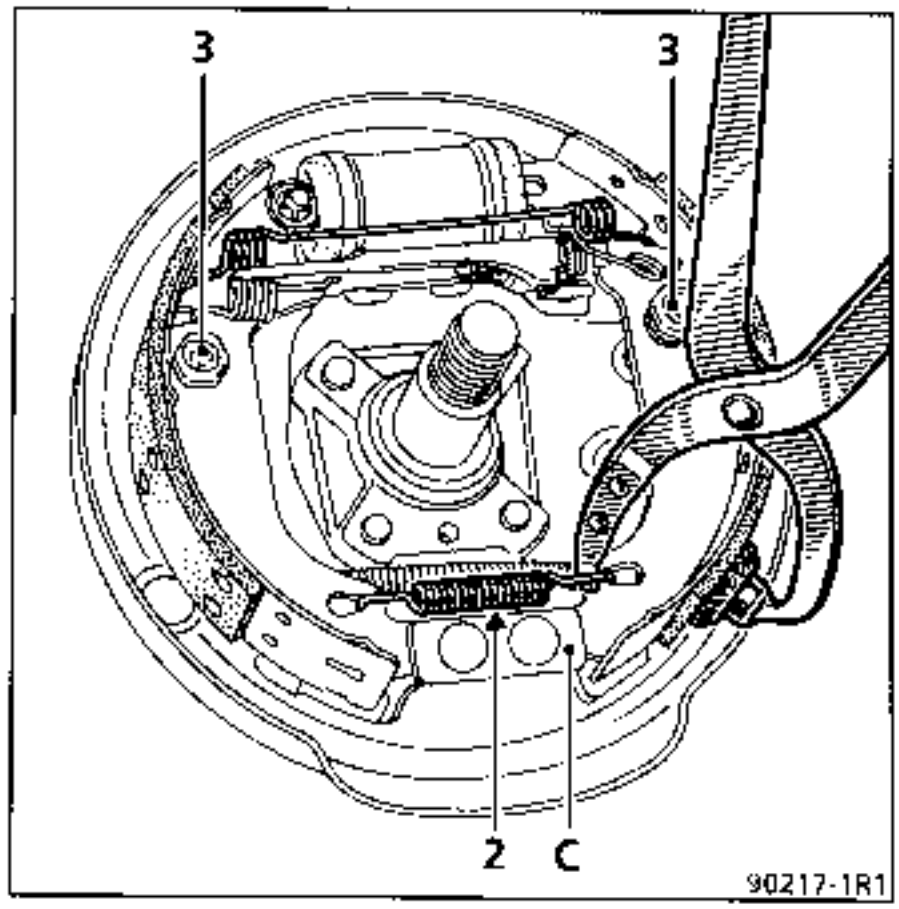
Attach the handbrake cable to the lever.

Tighten the bases of the brake shoes and position the tips on the wheel cylinder pistons. Take care not to damage the caps.

Position the shoes on fixed point (C).

Fit in place the side retaining devices (3).

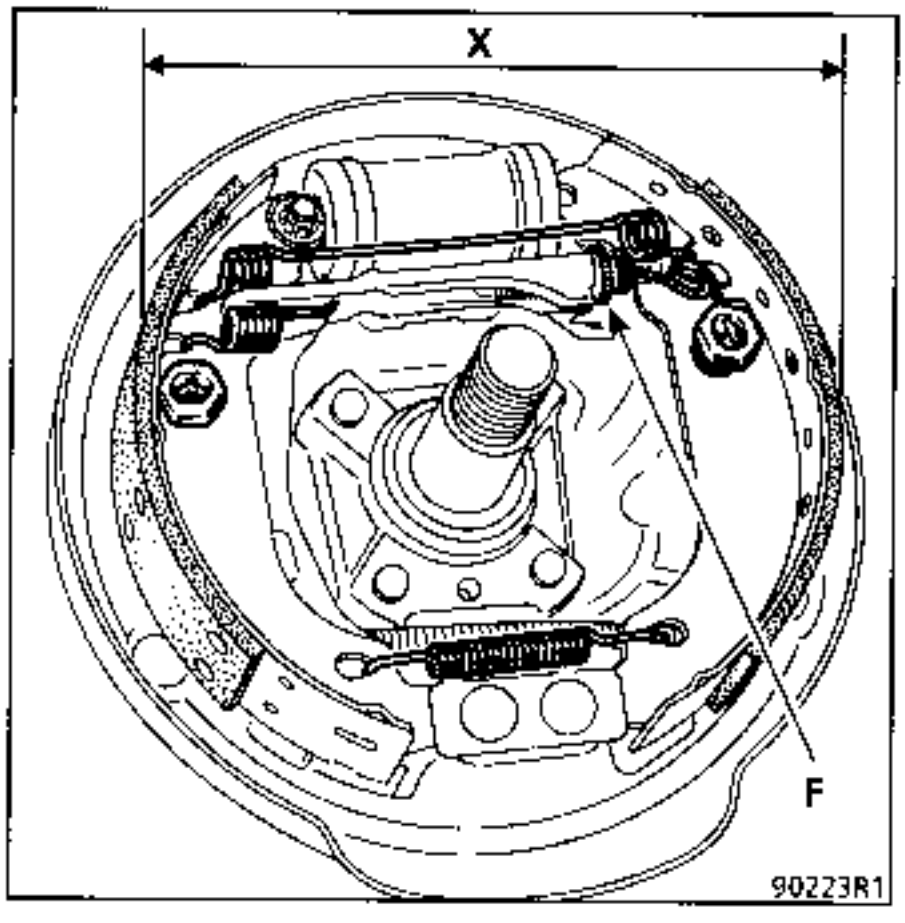
Remove the clamps from the wheel cylinder pistons then refit the lower spring (2).



ADJUSTING

Using a screwdriver, adjust the diametric setting of the shoes via notched sector (F) in order to obtain a diameter (X) between:

179.2 mm and 179.5 mm



Adjust the other brake anchor plate in the same way.

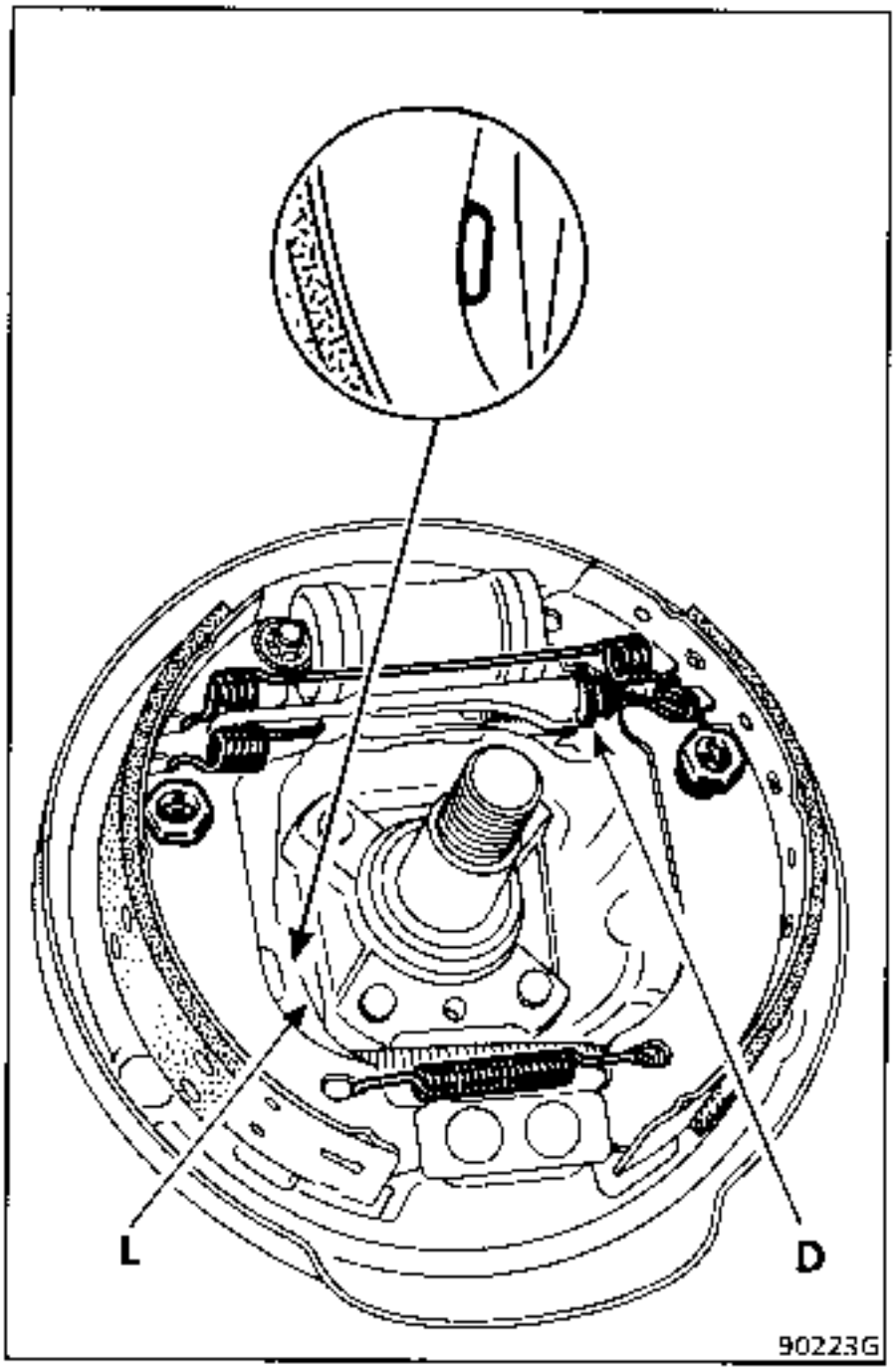
Refit the drums but do not tighten the nuts.

Adjust the linings by pressing down repeatedly on the brake pedal (approximately 20 times).

Ensure that the RAI operates correctly (a characteristic "click" will be heard from the drums).

Remove the drums.

Ensure :
- that the cables slide correctly,
- that the handbrake levers (L) bear correctly on the shoes.



Gradually tension the cables at the central adjusting point so that levers (L) **lift off between the first and second notches** of the control lever travel and remain lifted off at the second notch.

Tighten the lock nut at the central adjusting point.

Refit :
- the drums and torque tighten the nuts to **16 daN.m,**
- the plugs.

ESSENTIAL SPECIAL TOOLING		
Fre.	573-01	Handbrake cable clamp

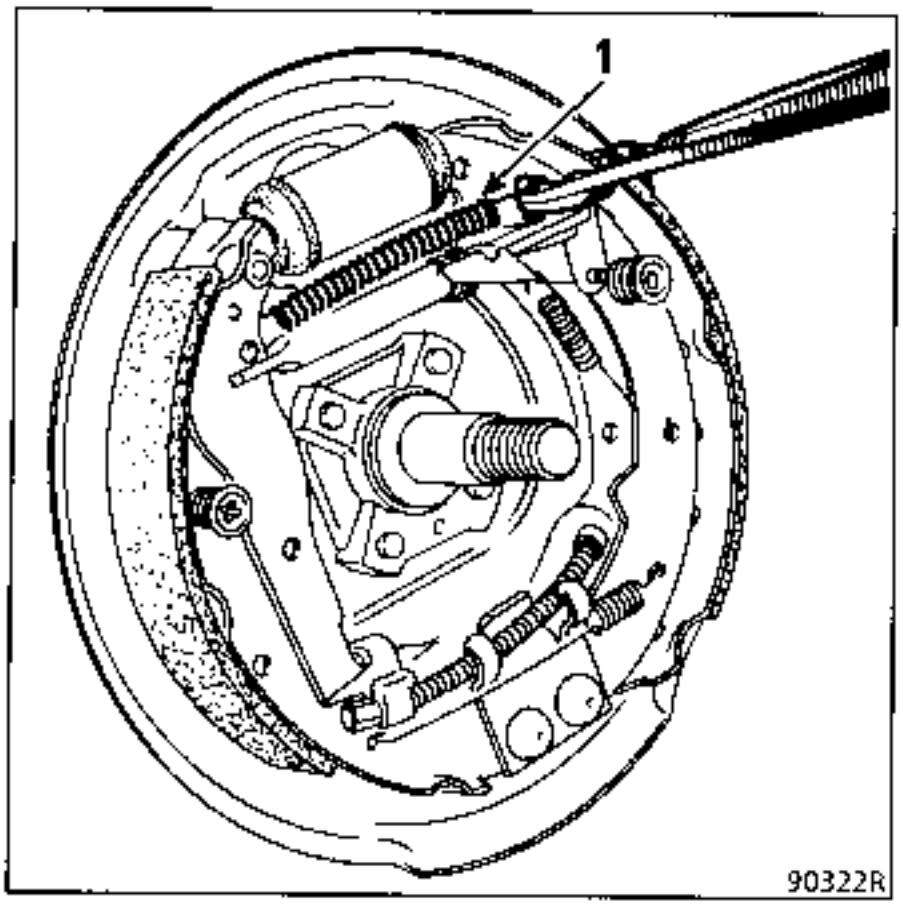
TIGHTENING TORQUE (in daN.m)	
Wheel bolts	9
Hub securing nuts	16

All the shoes on any given axle are to be replaced at the same time. Always fit shoes with linings of the same make and grade.

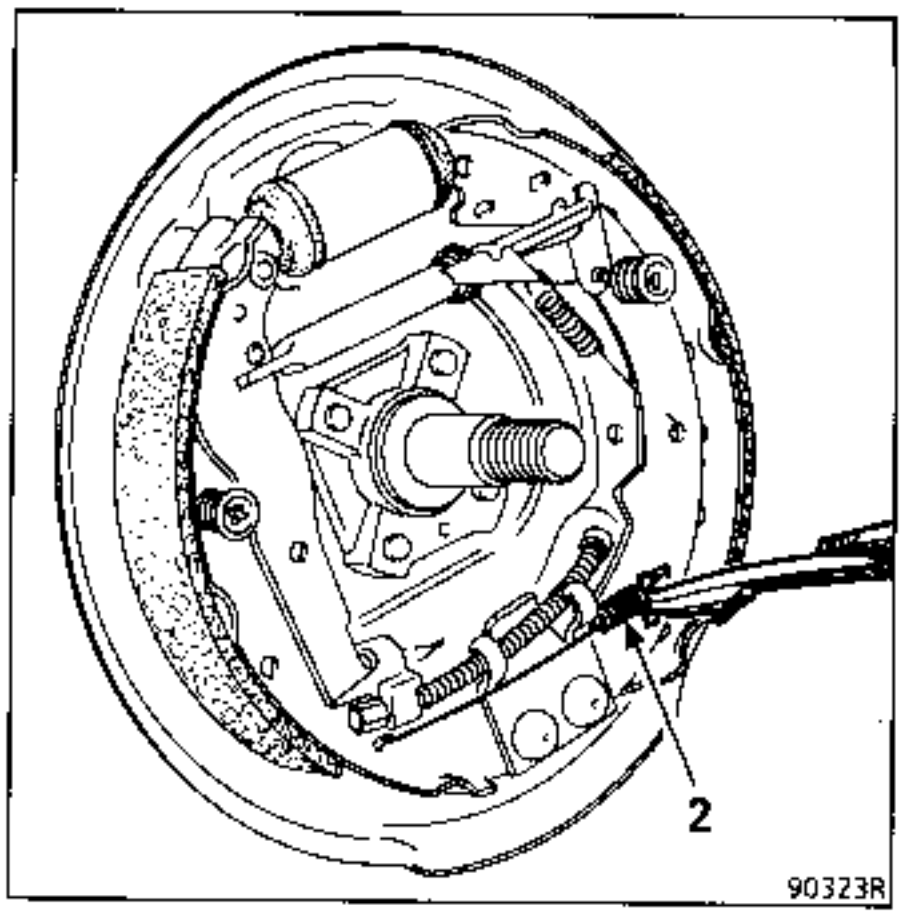
REMOVING

Remove the brake drum (see relevant section).

Remove :
- the upper spring (**1**) using brake shoe grips,

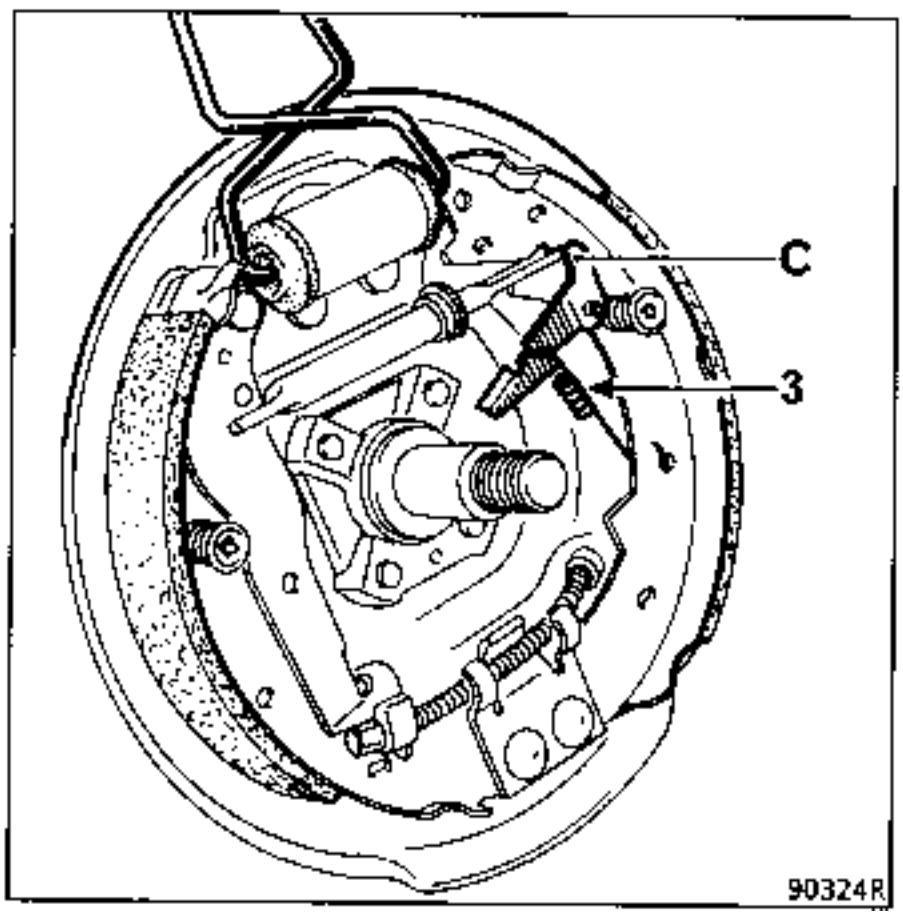


- the lower spring (**2**) using brake shoe grips.

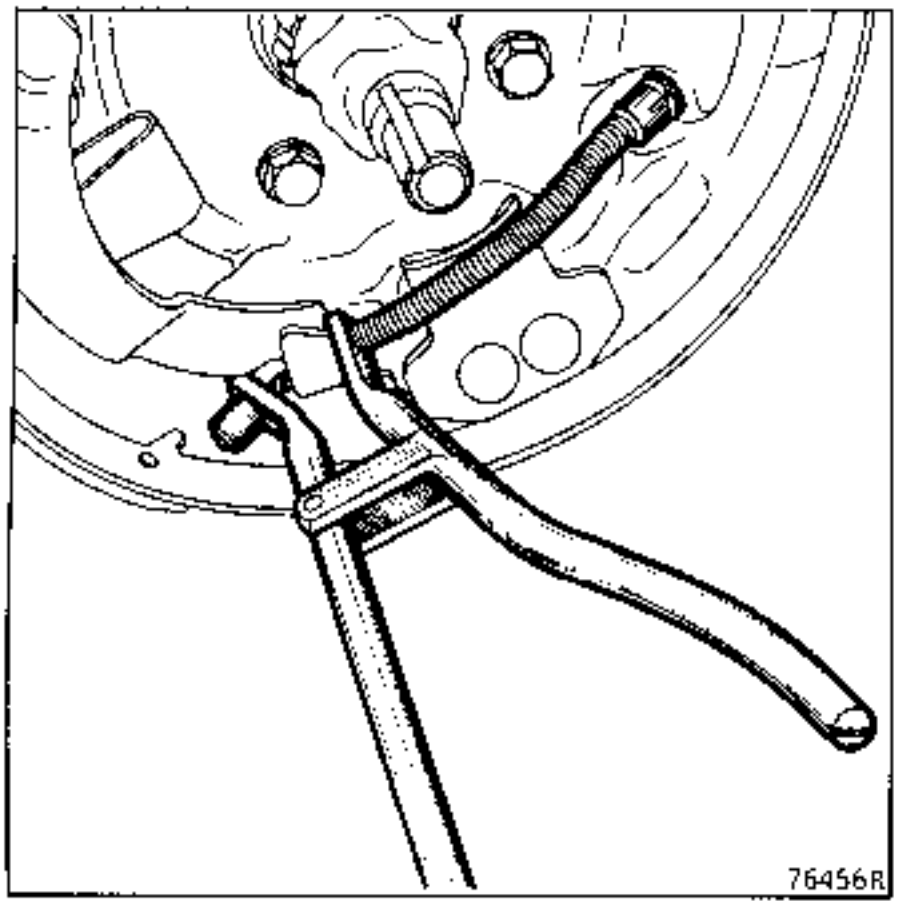


Fit clamp to the wheel cylinder piston.

Remove :
- spring (**3**) and adjusting lever (**C**),

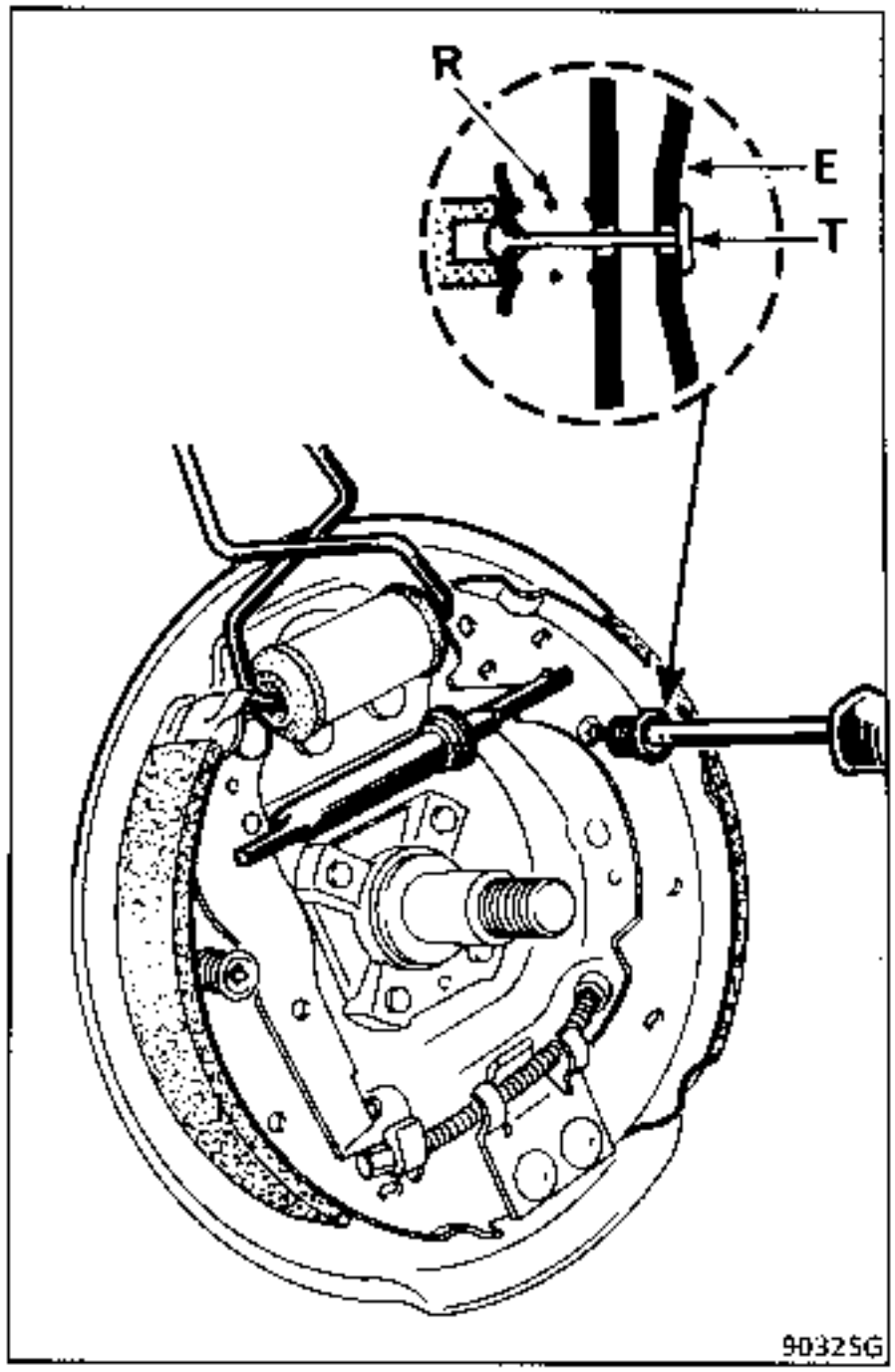


- handbrake cable using tool Fre. 573-01.

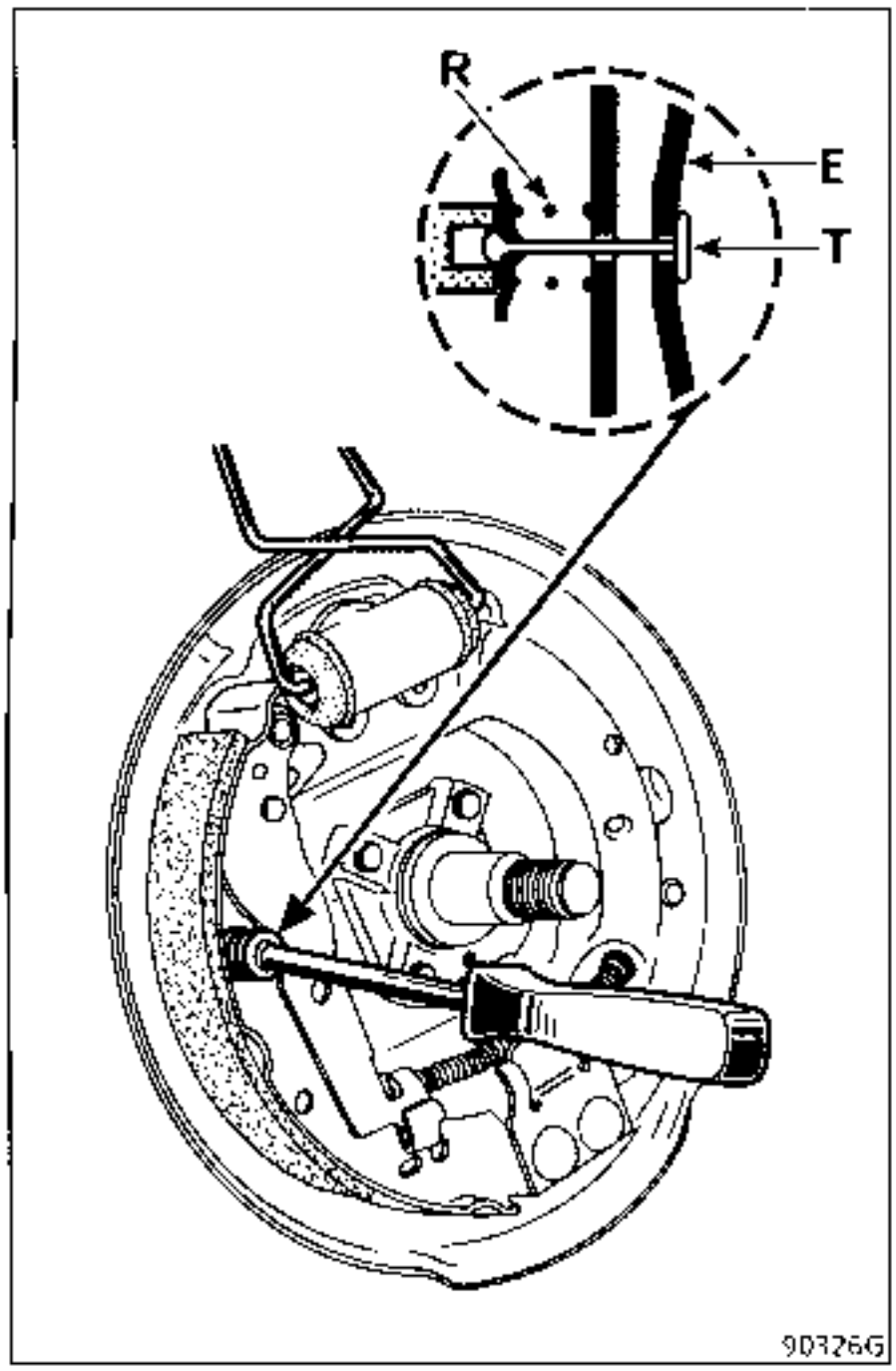


Using a tool such as the end of a valve adjusting spanner, remove lateral shoe spring (R), holding connecting rod (T) against brake back plate (E).

Remove :
- the leading shoe - thrust link assembly.



- spring (R) holding the trailing shoe,
- the trailing shoe.



Dust out the drums and back plates using dust removal equipment.

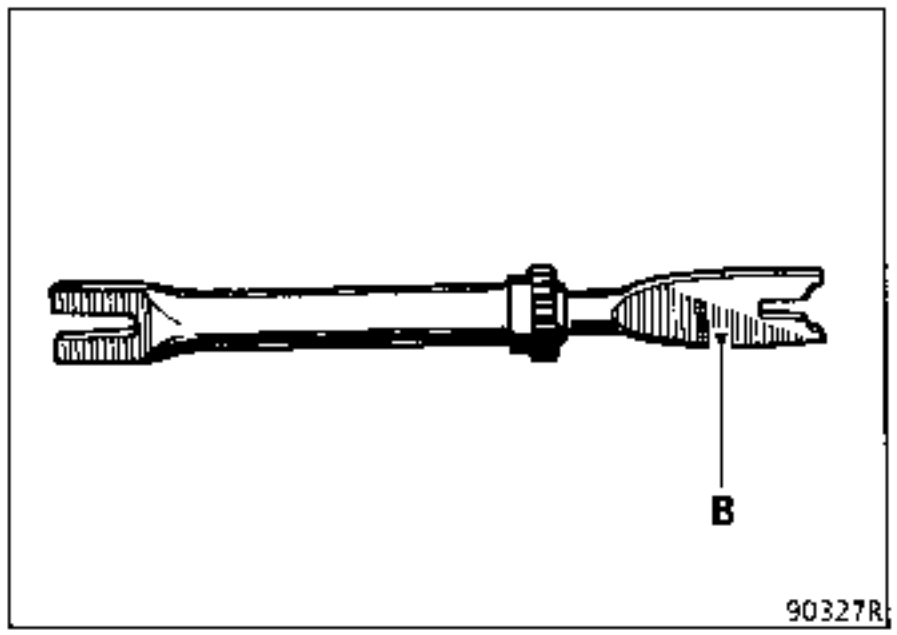
REFITTING

NOTE: The component parts of the brakes are different for the left-hand and right-hand sides so it is essential not to interchange them.

Lightly grease the thread on the thrust link and mark it.

On the left-hand brake : the screw thread is right-hand.

The screw end (B) is **METALLIC SILVER** in colour.

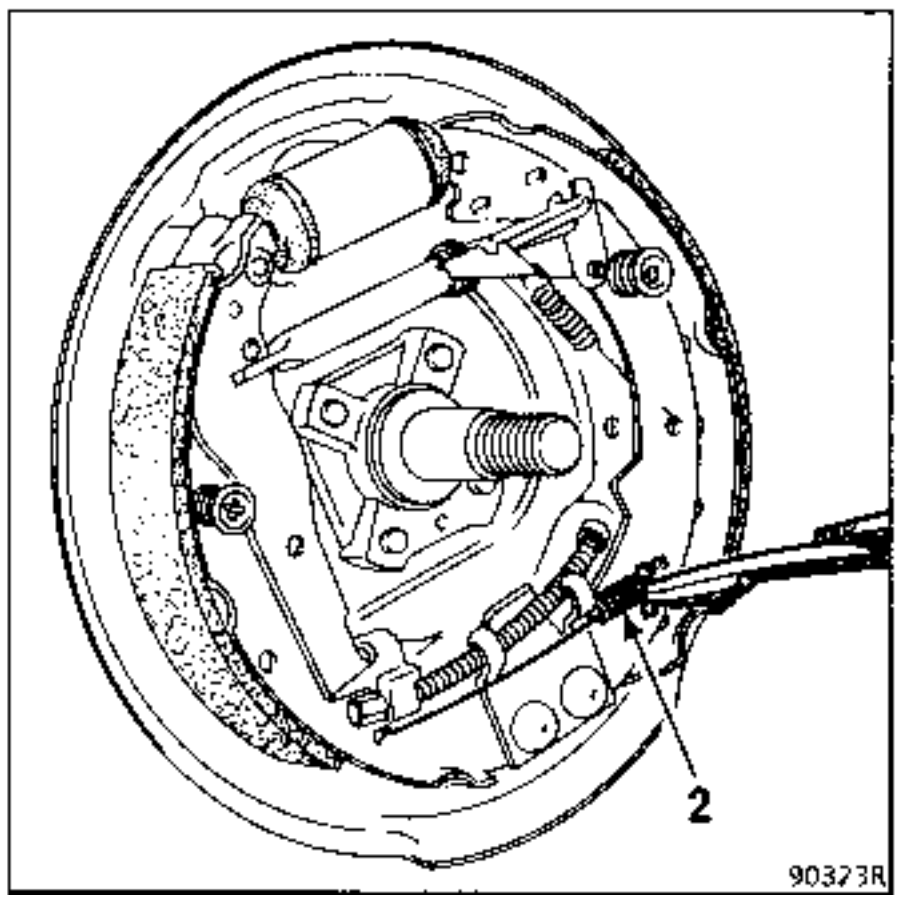


On the right-hand brake: the screw thread is left-hand.

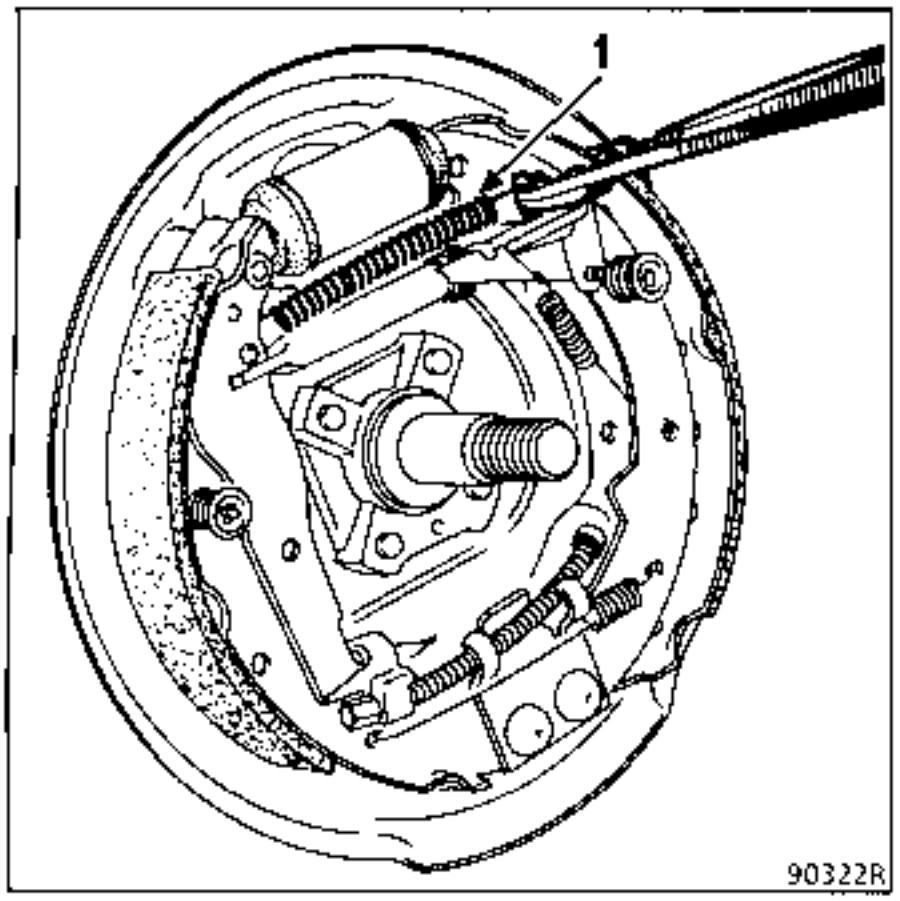
The screwed end (B) is **GOLD** in colour.

Fit in place:
- the trailing shoe and secure it,
- the thrust link,
- the leading shoe and secure it,
- spring (3) and adjusting lever (C).

Remove the clamps from the wheel cylinder pistons then refit:
- lower spring (2),



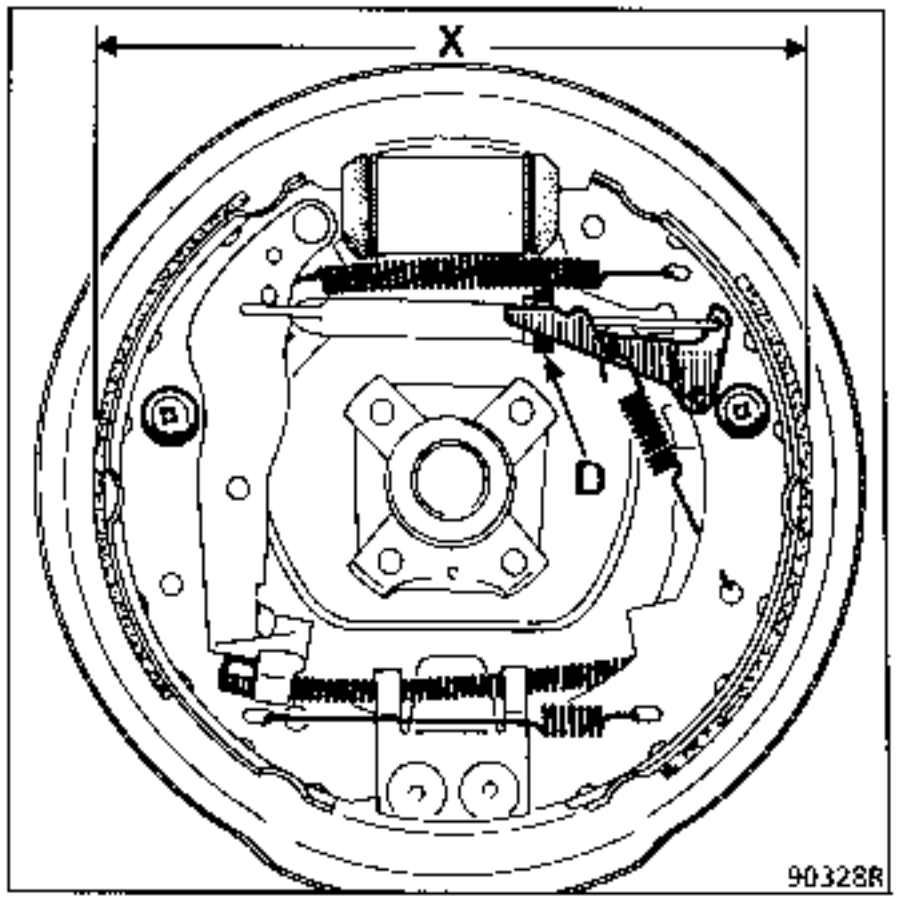
- upper spring (1).



ADJUSTING

Using a screwdriver, adjust the diametral positions of the shoes via toothed quadrant (D) so that diameter (X) is between:

227.9 mm and 228.5 mm.



Perform the same adjustment on the other anchor plate.

Refit the drum.

Adjust the positions of the brake linings by pressing down repeatedly on the brake pedal.

Adjust the handbrake (see relevant paragraph).

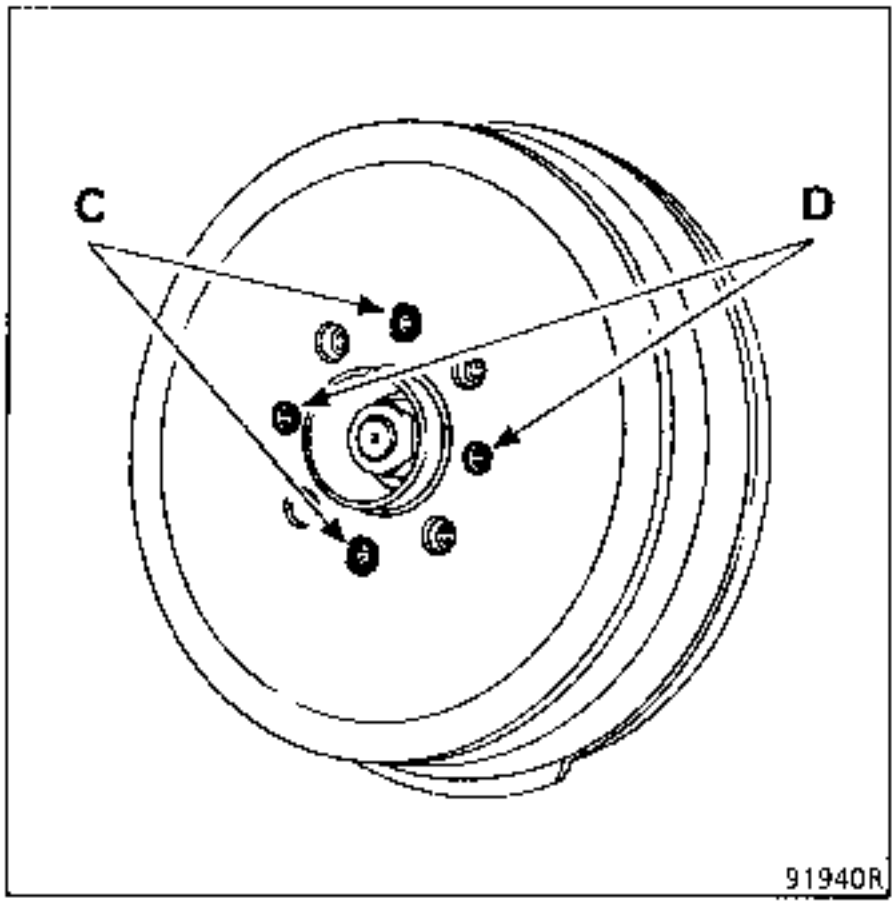
ESSENTIAL SPECIAL TOOLING		
Rou.	604-01	Hub locking tool
T.Av.	1050-02	Hub extractor
Fre.	573-01	Handbrake cable spring release pliers
Fre.	826	Tool for removing spring
M.S.	580	Impact tool

TIGHTENING TORQUES (in daN.m)	
Drive shaft nuts	21
Wheel bolts	9

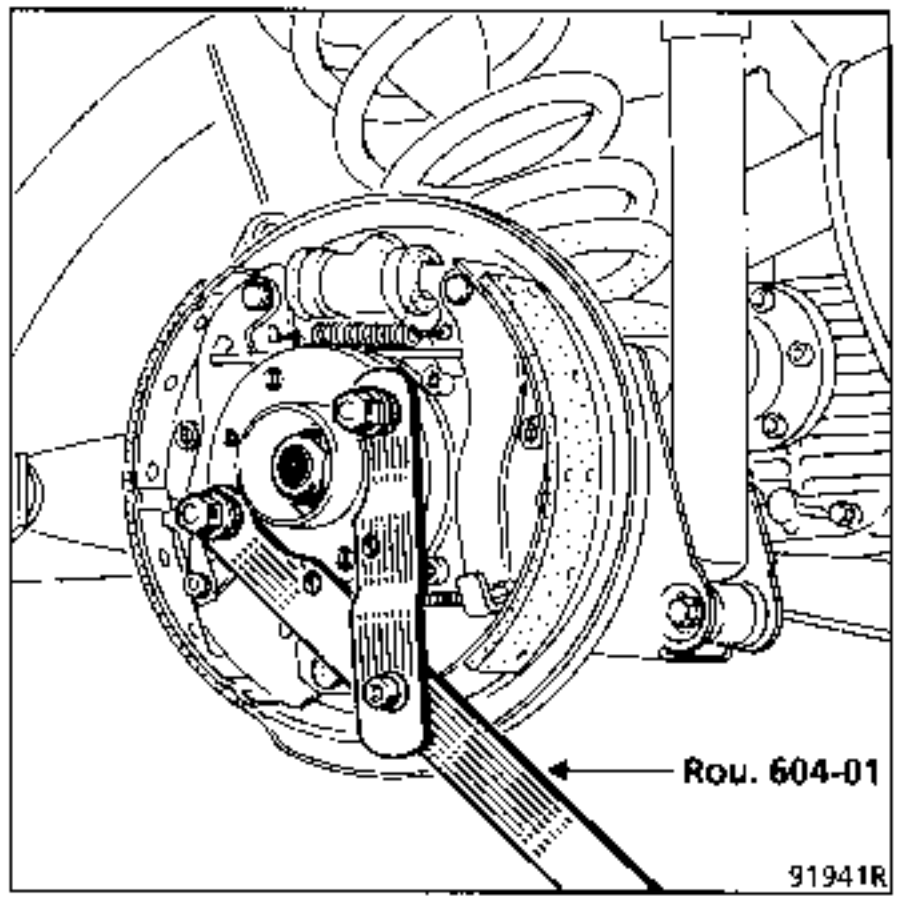
All the linings on any given axle must be replaced at the same time. Always fit linings of the same brand and quality.

REMOVING

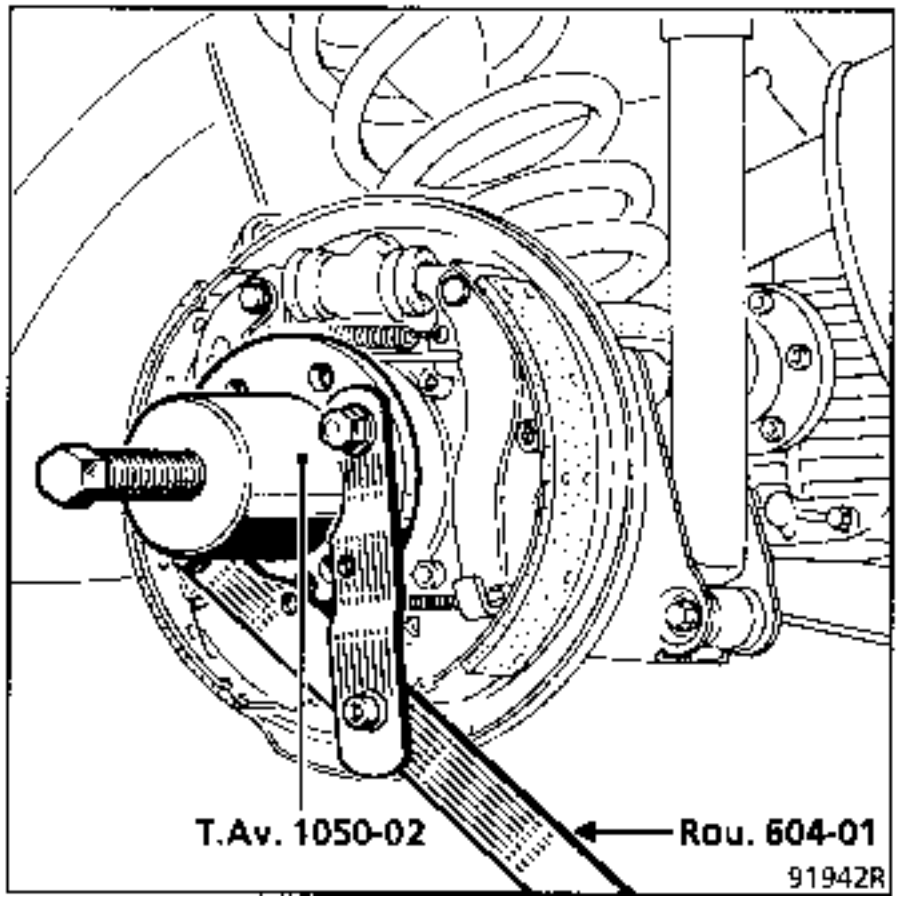
Remove :
- the brake drums, two bolts (C); if problems are encountered, extract them by inserting two bolts in holes (D),



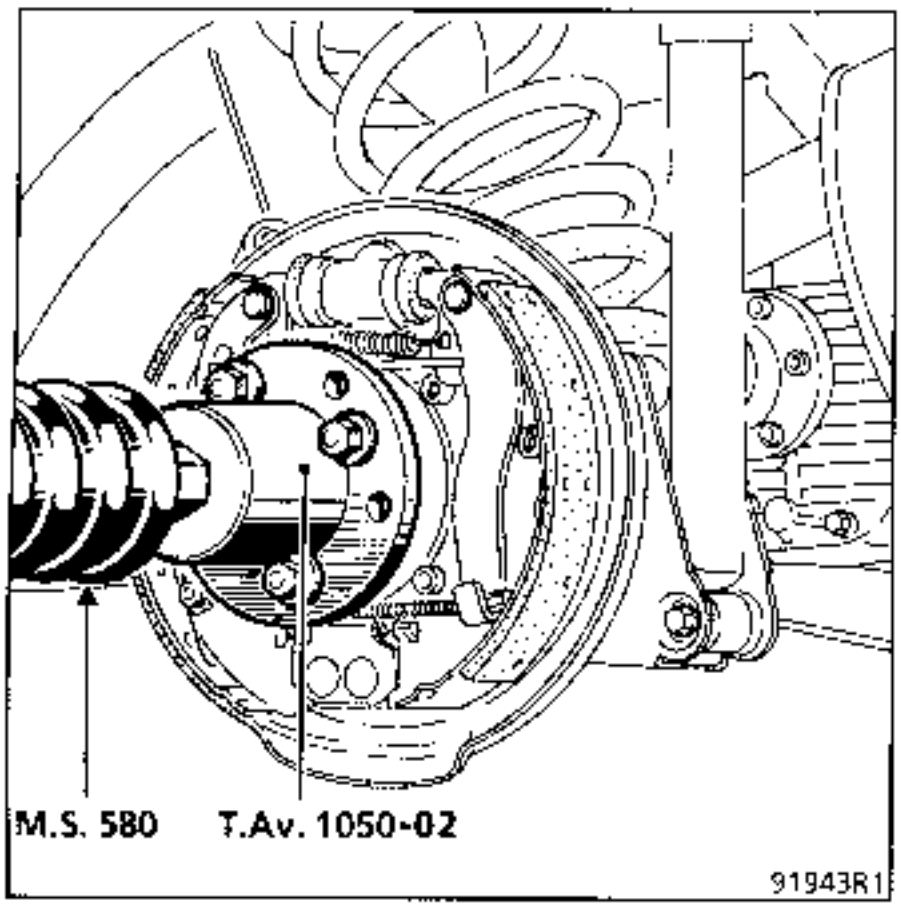
- the drive shaft nut, tool **Rou. 604-01**.



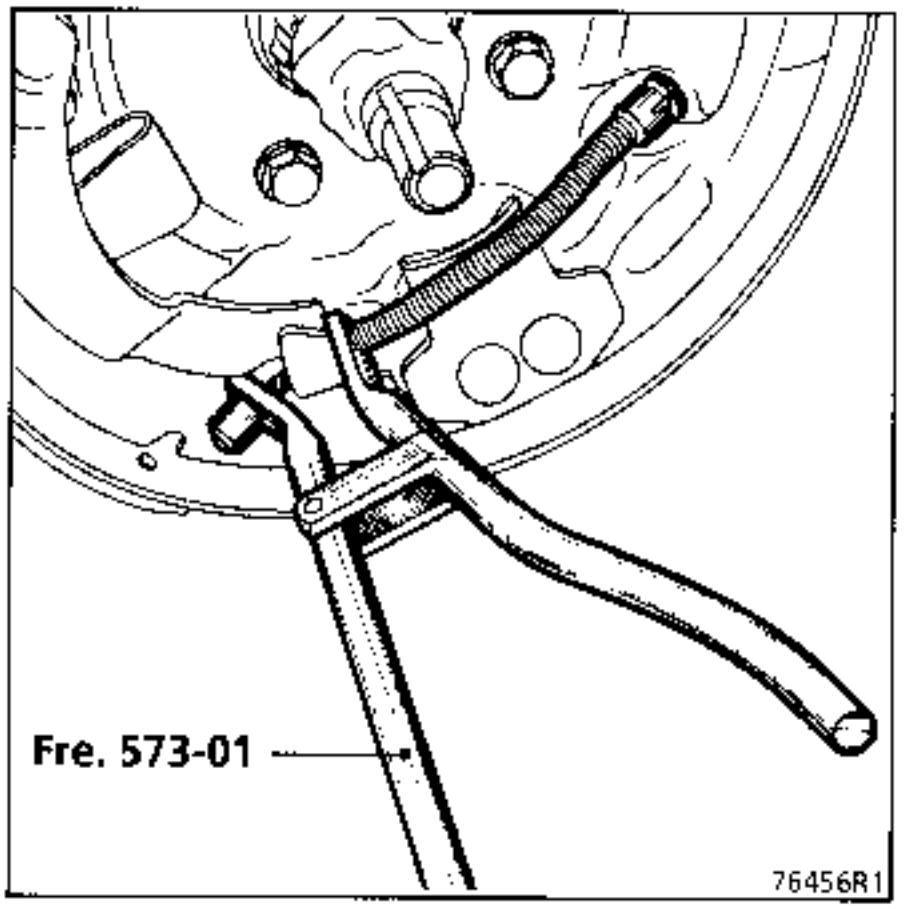
Push back the drive shaft to release tools **T.Av. 1050-02 + Rou. 604-01**.



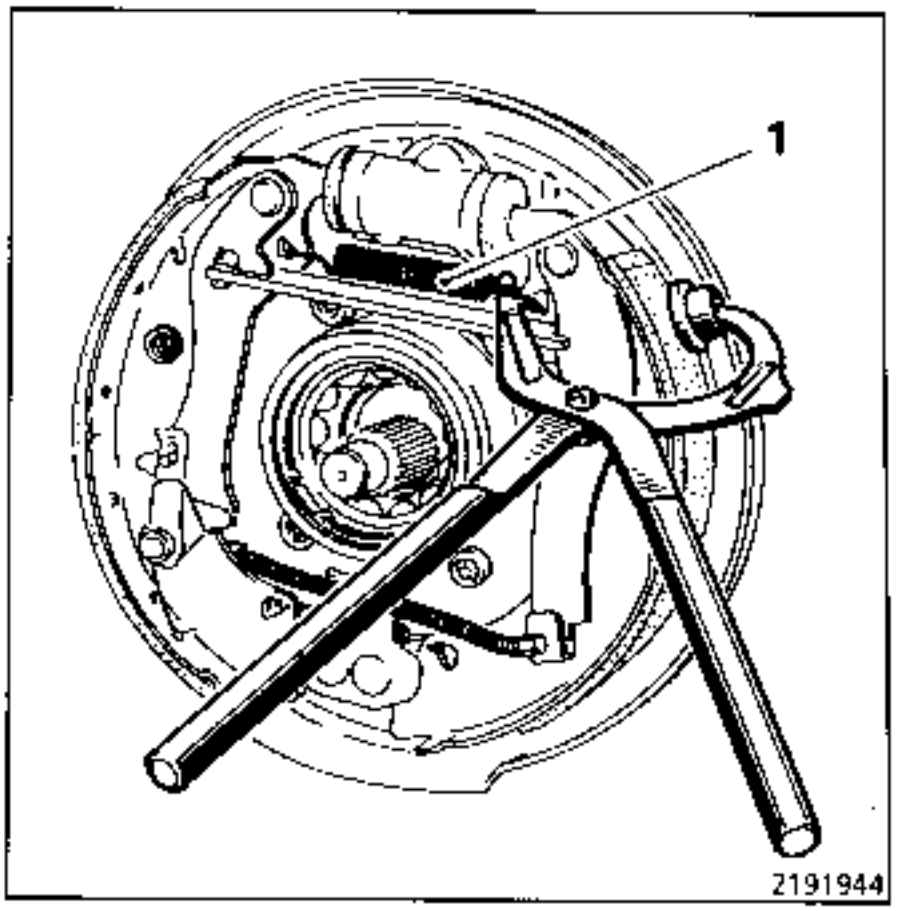
Extract hub, using tools **T.Av. 1050-02** + **M.S. 580**.



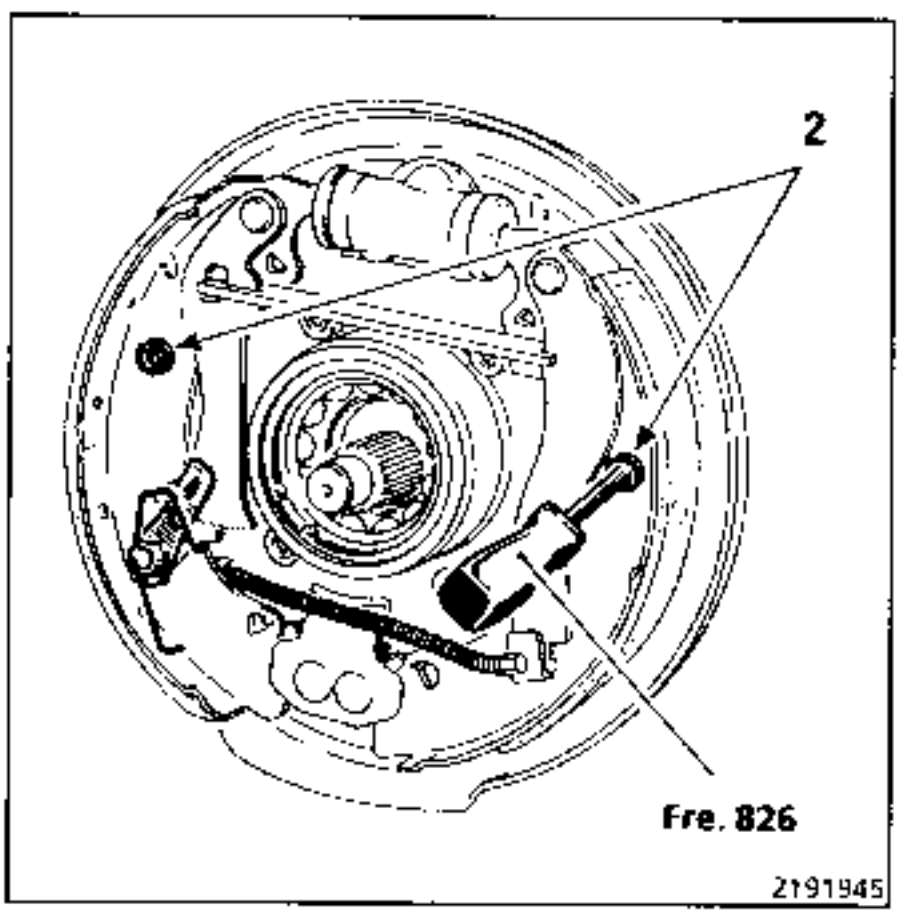
Remove:
- the handbrake cable, using tool Fre. **573-01**,



- the upper spring (1) using a brake shoe grip,

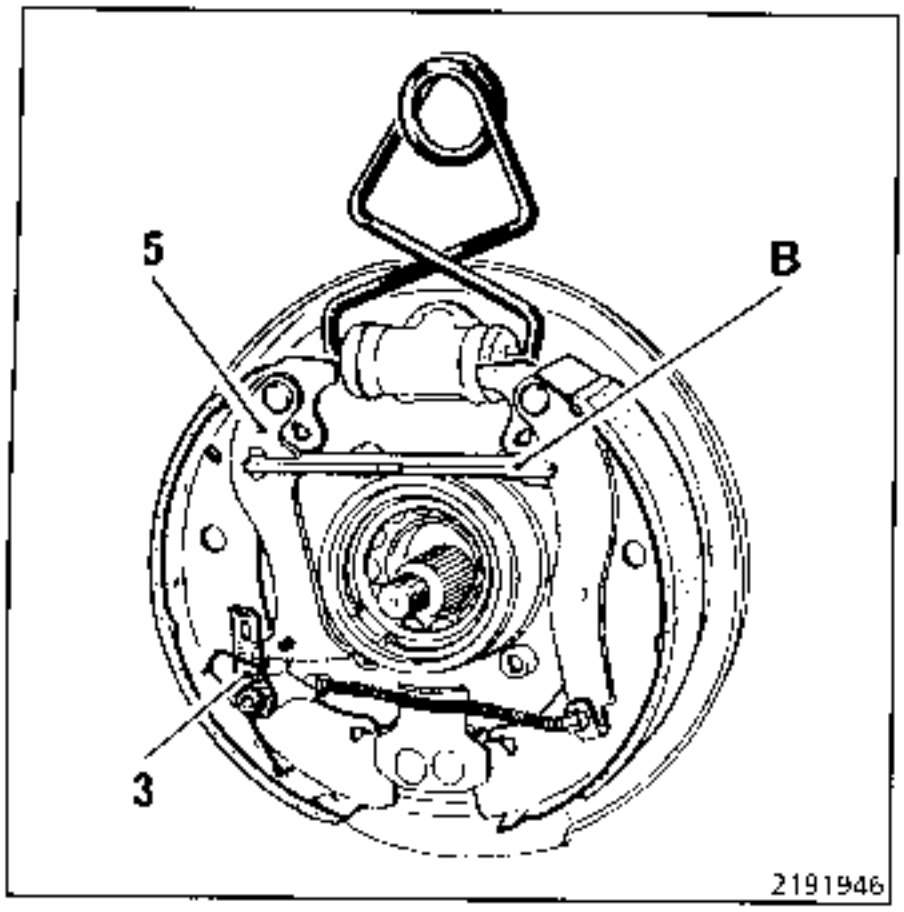


- the side retaining springs (2), using tool Fre. **826**.



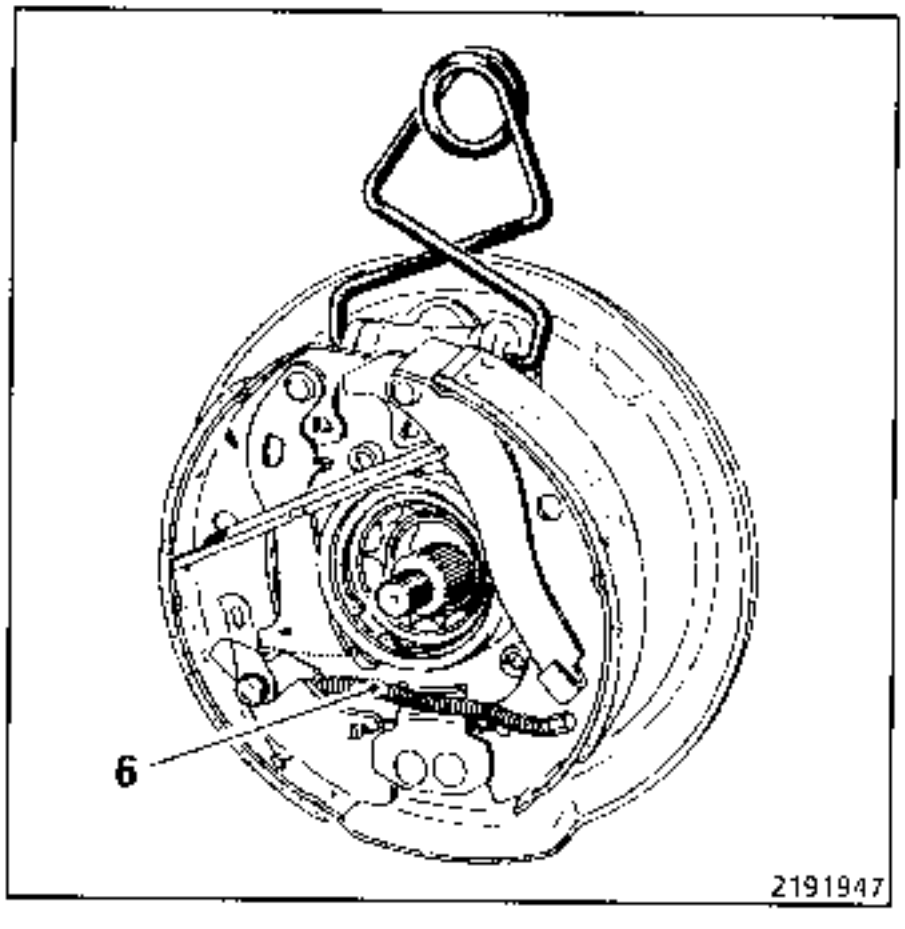
Fit a grip on the wheel cylinder pistons.

Release:
- the wear compensation system removing clip (3) from the pin and separating the shoes from the wheel cylinder,



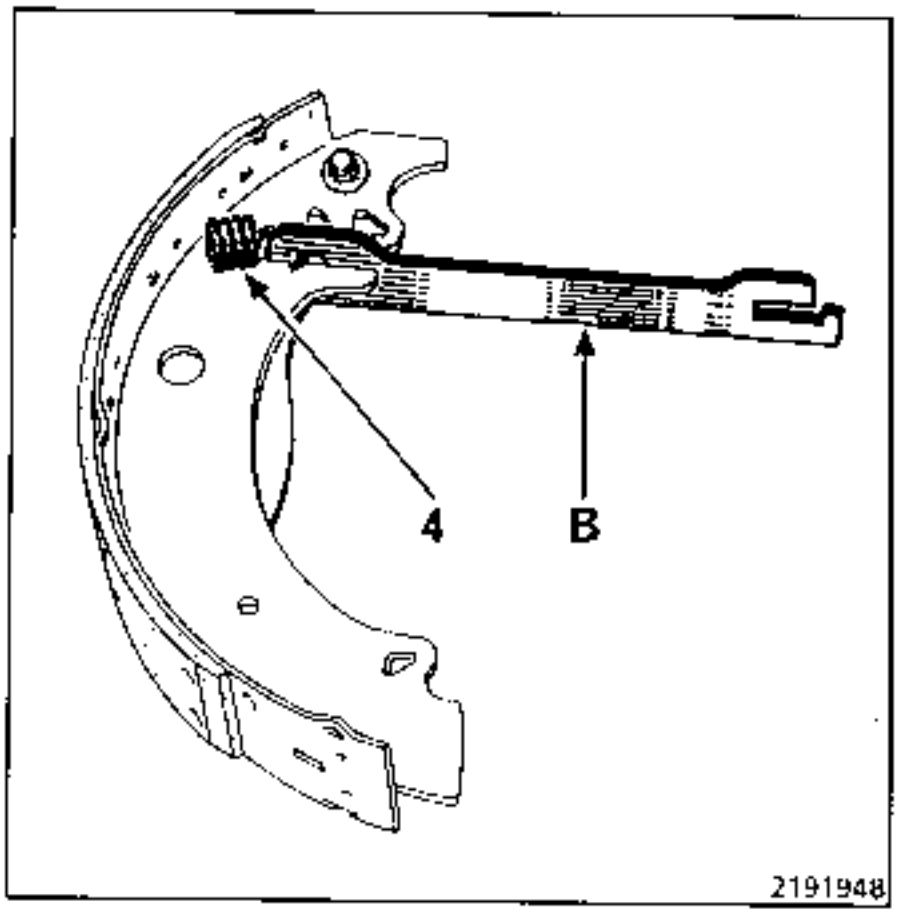
- the connecting bar (B) from the wear compensation lever (5).

Remove the two shoes including the lower spring (6).

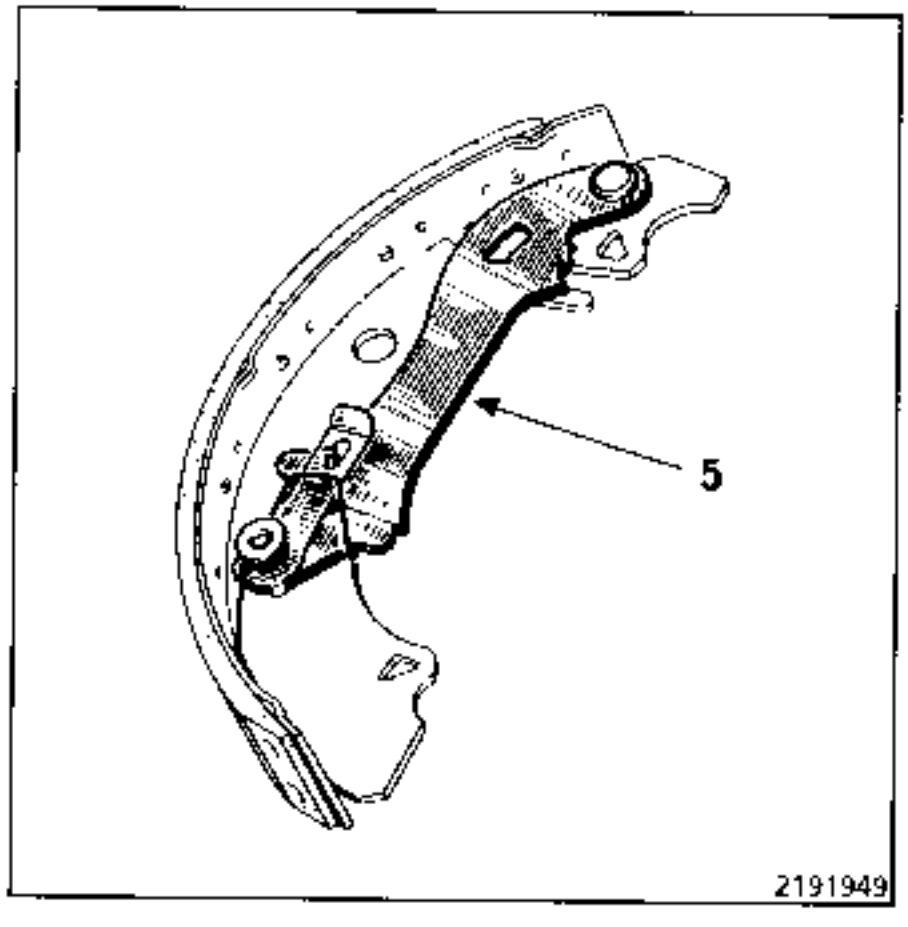


Remove:
- arm (B),
- spring (4).

from the trailing shoe.



Remove the wear compensation lever (5) from the leading shoe.



Clean the drum and flange, protecting the hub bearing.

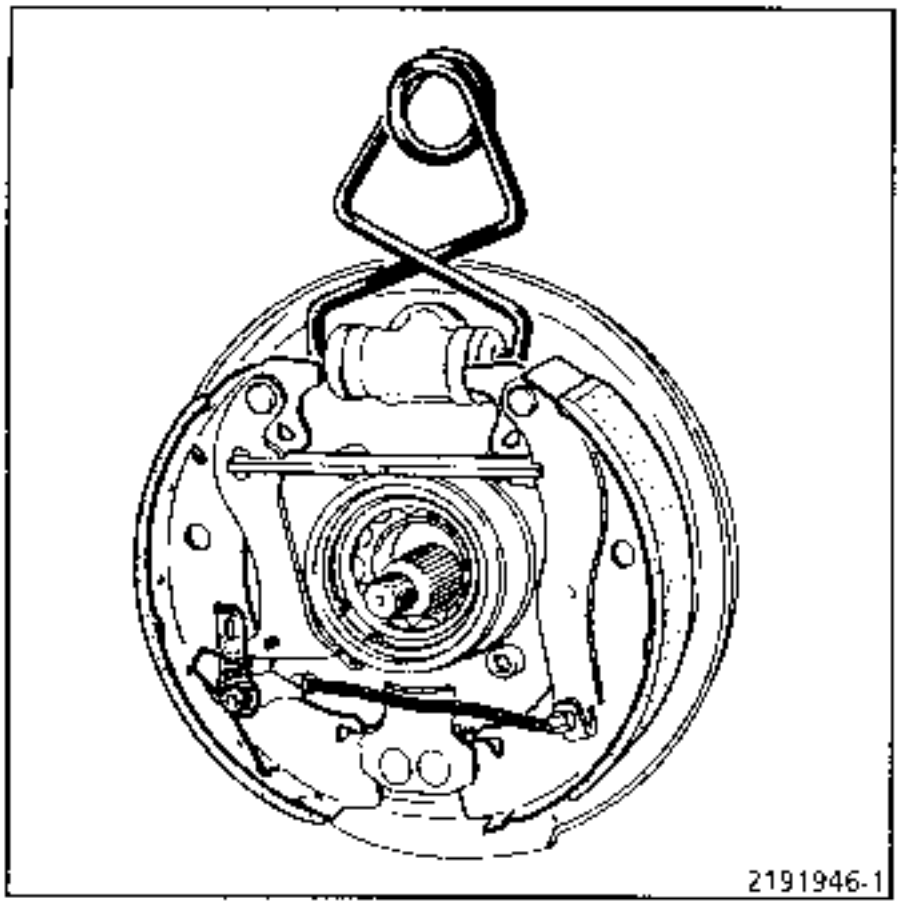
REFITTING

Install the arm (B) with the spring (4) fitted on the trailing shoe.

Reattach lever (5) to the leading shoe without engaging the toothed quadrant (C).

Connect the two shoes using the lower spring (6) and fit them on the back plate.

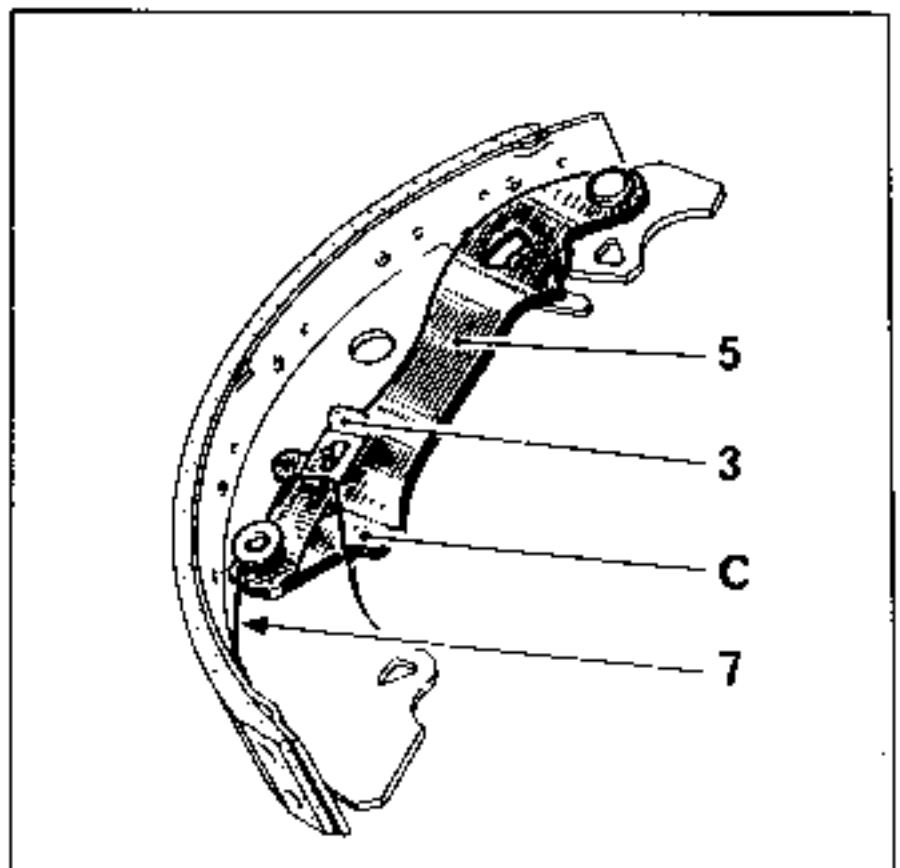
Engage the connecting bar (B) in the lever (5).



2191946-1

Remove the grips on the wheel cylinder pistons and then refit the side retaining springs (2) using tool Fre. 826.

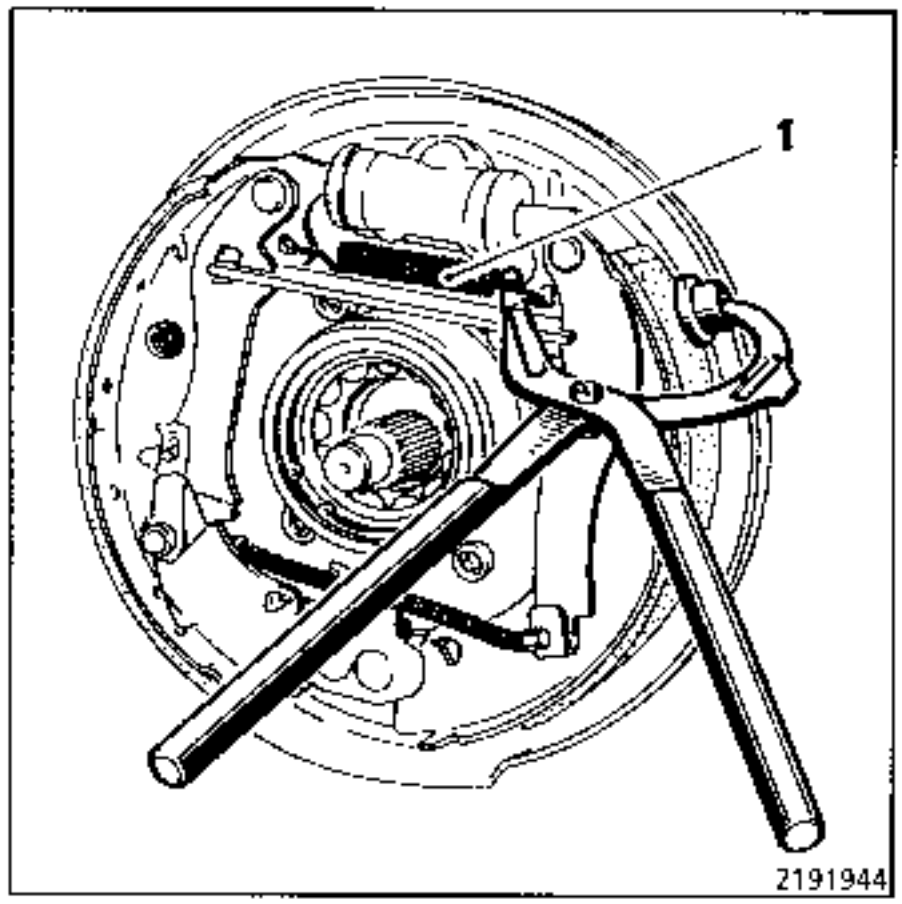
Refit toothed segment (C) in lever (5) and engage clip (3) around pin.



2191949-1

Check that the spring is correctly positioned (7).

Refit :
- the upper spring (1),

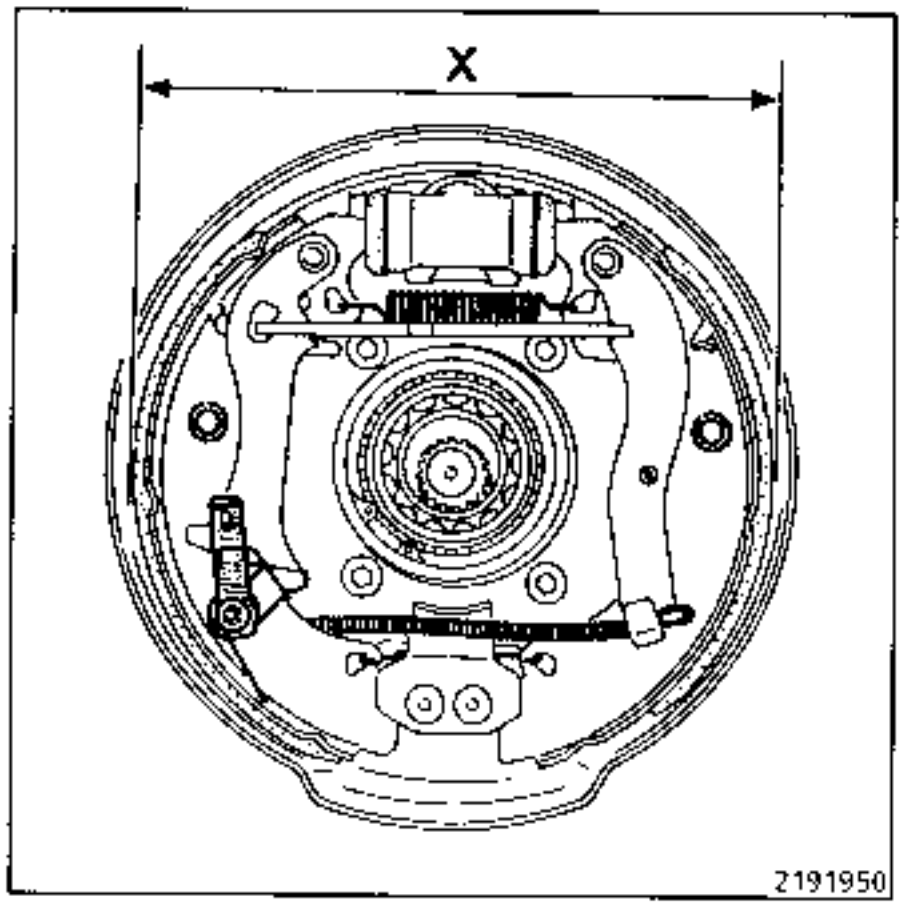


2191944

- the handbrake cable, using tool Fre. 573-01.

ADJUSTING

Using a screwdriver, adjust the diametral positions of the shoes via toothed quadrant (C) so that diameter (X) is between **254 mm** and **254.5 mm**.



Perform the same adjustment on the other anchor plate.

Brush the drive shaft splines and coat them with **LOCTITE SCELBLOC**.

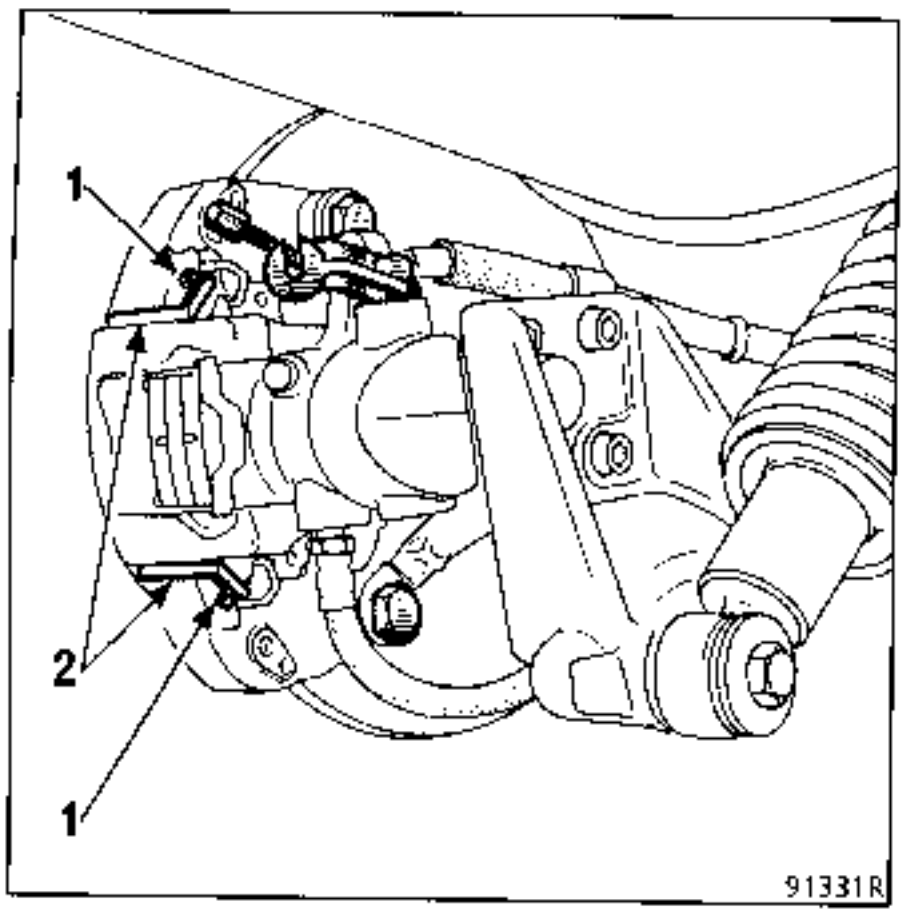
Refit:
- the hub and torque tighten using tool **Rou. 604-01**,
- the drum.

Adjust :
- **the linings by pressing down repeatedly on the brake pedal**,
- the handbrake (see relevant paragraph).

TIGHTENING TORQUES (in daN.m)	
Wheel bolts (4 bolts)	9
Wheel bolts (5 bolts)	10

REMOVAL

Disconnect the handbrake cable.



91331R

Remove:
- the two rollpins (1),
- the two keys (2) using a pin drift,
- the brake calliper,
- the pads.

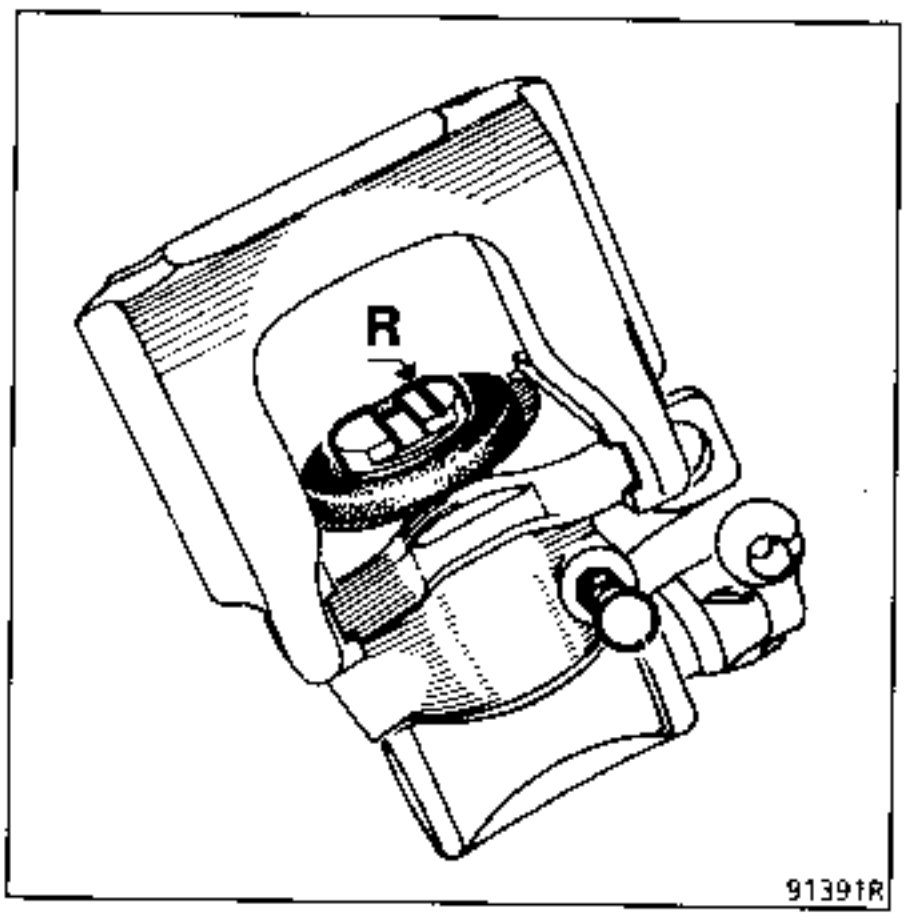
CHECKING

Check the condition of the piston dust cover and springs under the pads and that they are correctly mounted.

REFITTING

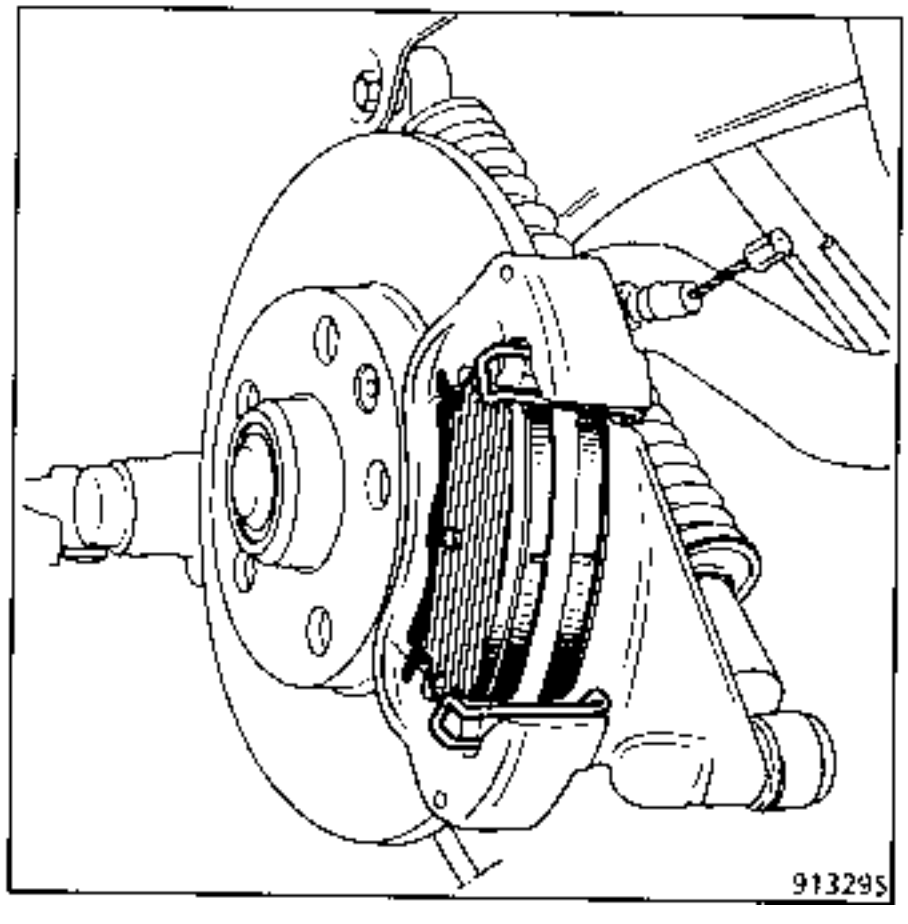
Push the piston back by screwing it up using a screwdriver with a square cross section until it will turn but does not go in any further.

Direct the piston so that line (R) on its bearing face is at the bleed screw end.



91391R

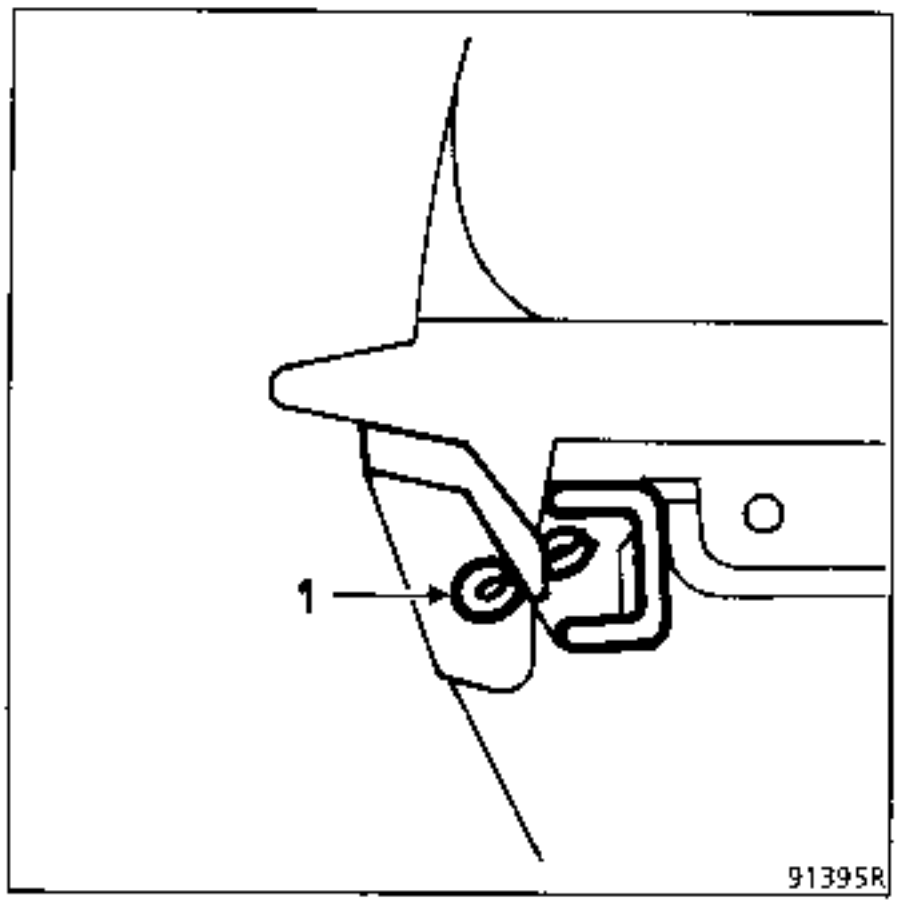
Fit in place :
- the new pads on their springs,


91329S

- the calliper between the pin spring and the bearing face of the key on the calliper bracket,

- the first key; insert a screwdriver in the location for the second key and insert this one by pressing on the screwdriver,

- the two rollpins (1) locking the keys.



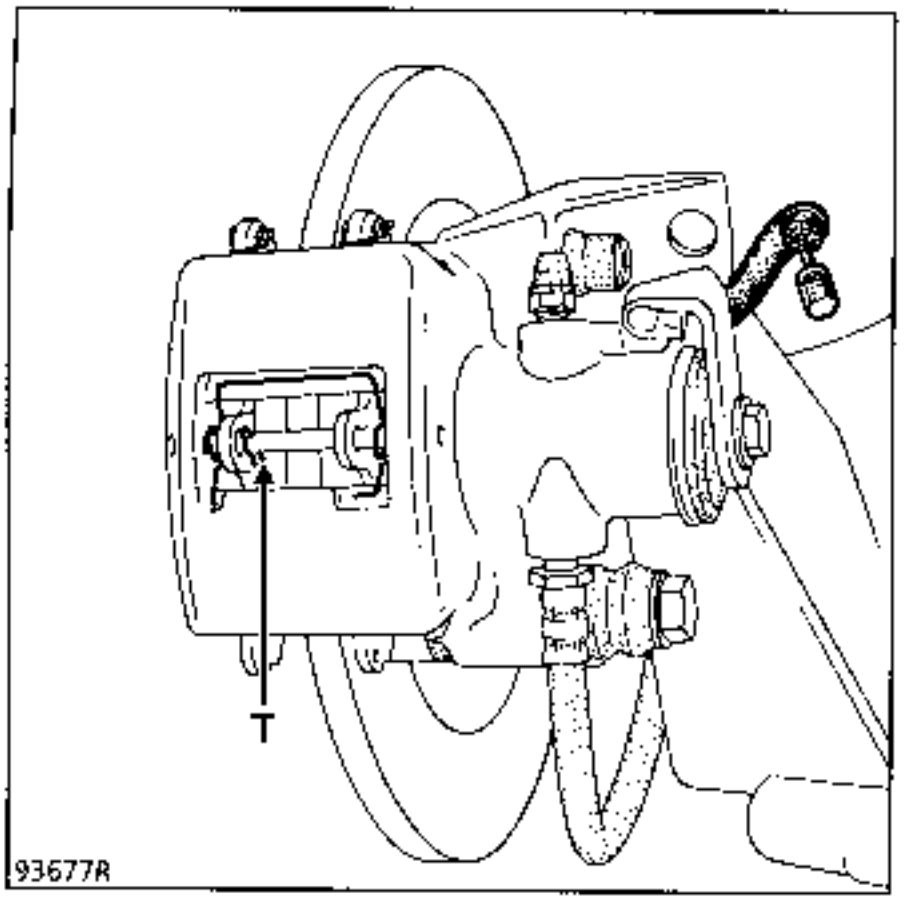
Reconnect the handbrake cables.

Press down several times on the brake pedal to bring the piston into contact with the pads.

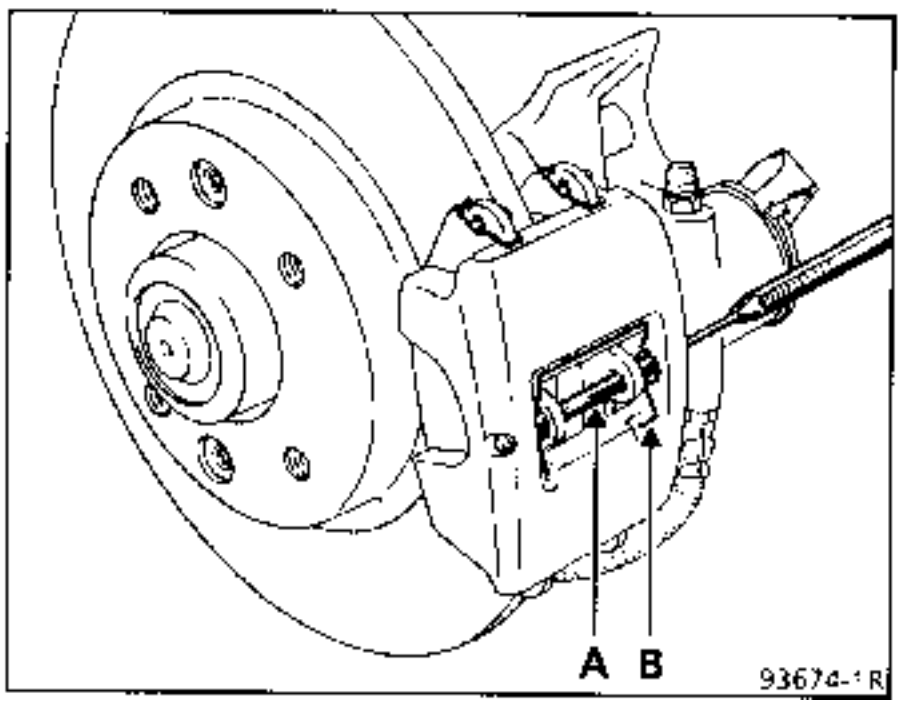
TIGHTENING TORQUES (in daN.m)	
Wheel bolts (4 bolts)	9
Wheel bolts (5 bolts)	10
Secondary carrier bolts	3,5
Main carrier bolts	7

REMOVAL

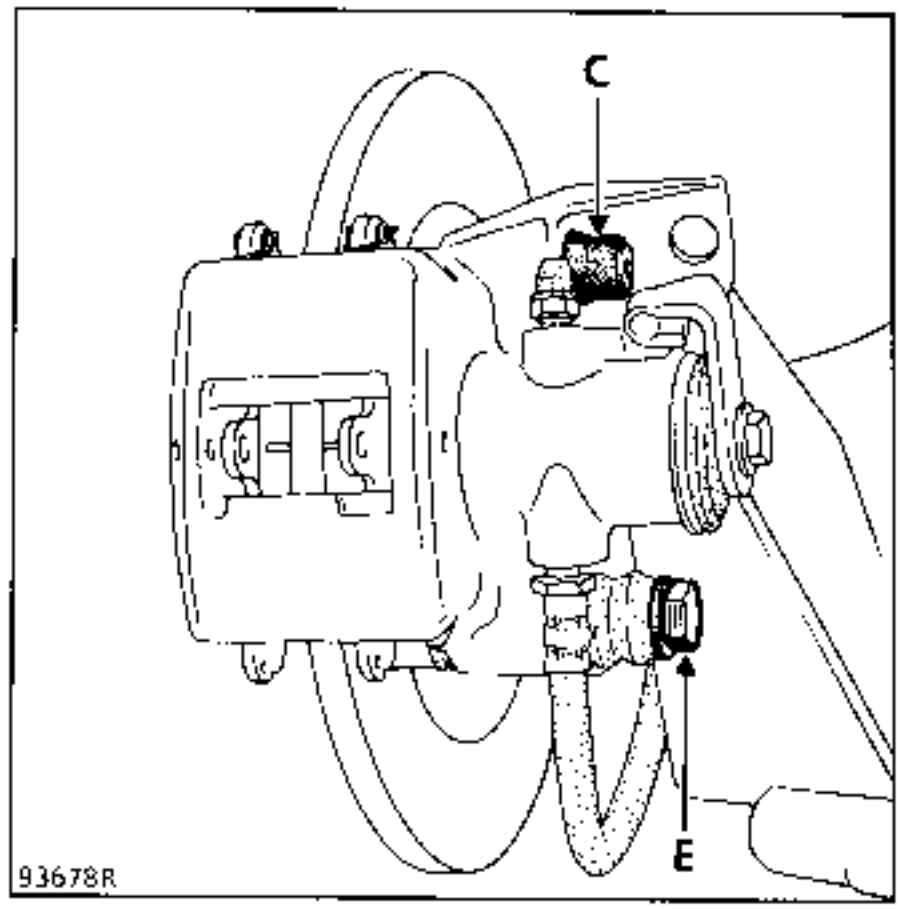
Disconnect the handbrake cable.



Remove:
- rollpin (T),
- pad-retaining pin (A) using a pin drift,

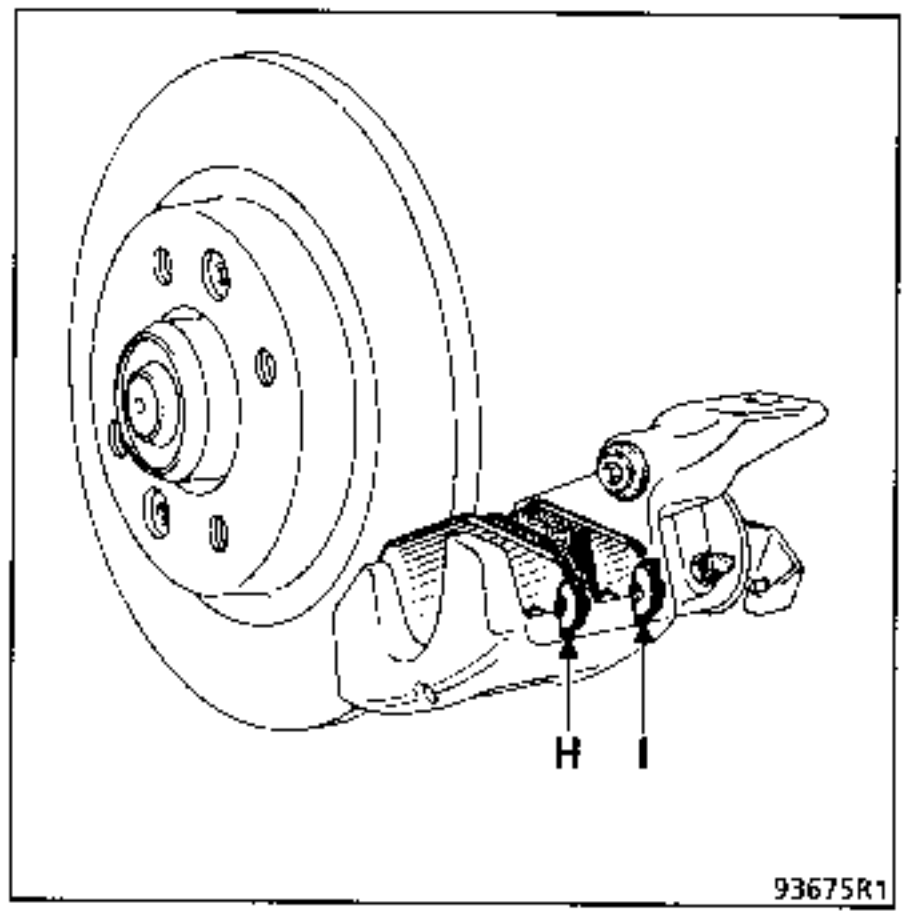


- spring (B),
- bolt (C) mounting the secondary carrier.



Then turn the calliper of main carrier (E).

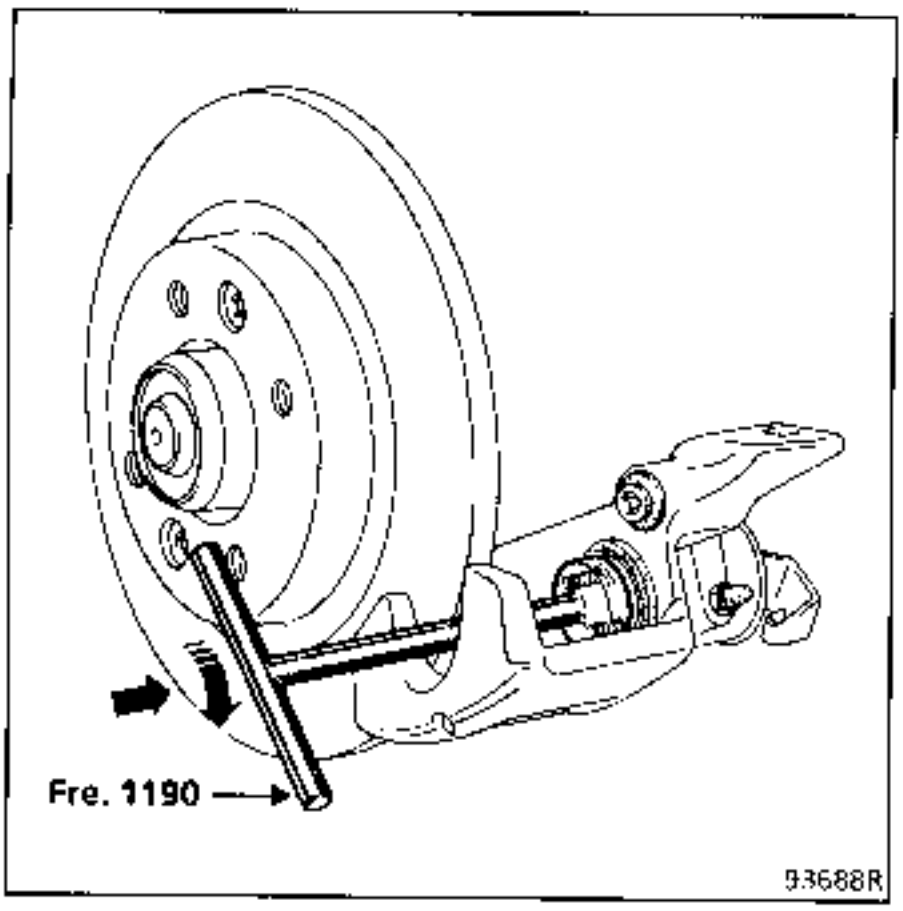
Remove outer pad (H) and inner pad (I).



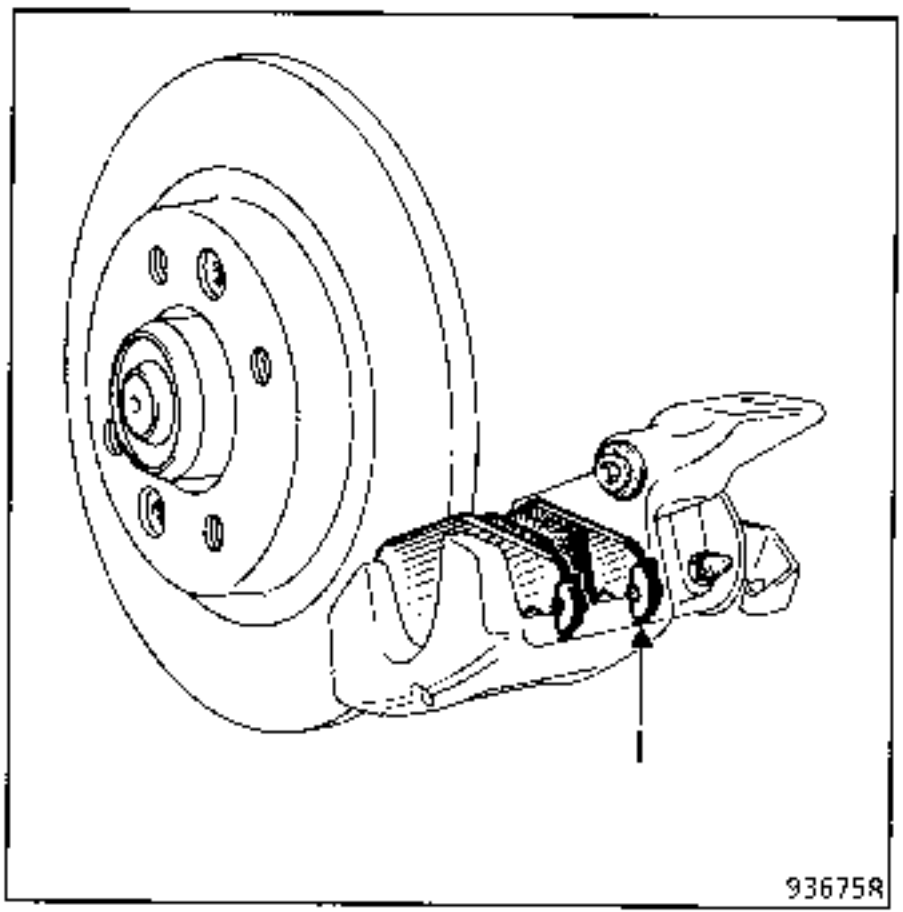
NOTE : On some vehicles the bolt mounting the main carrier (E) must be slackened in order to remove inner pad (I).

CHECKING
Check :
- the condition and mounting of the dust cover, piston and springs,
- that the calliper slides on its main carrier.

REFITTING
Push on the piston, screwing it up using tool Fre. 1190 until it is at the bottom of its bore.

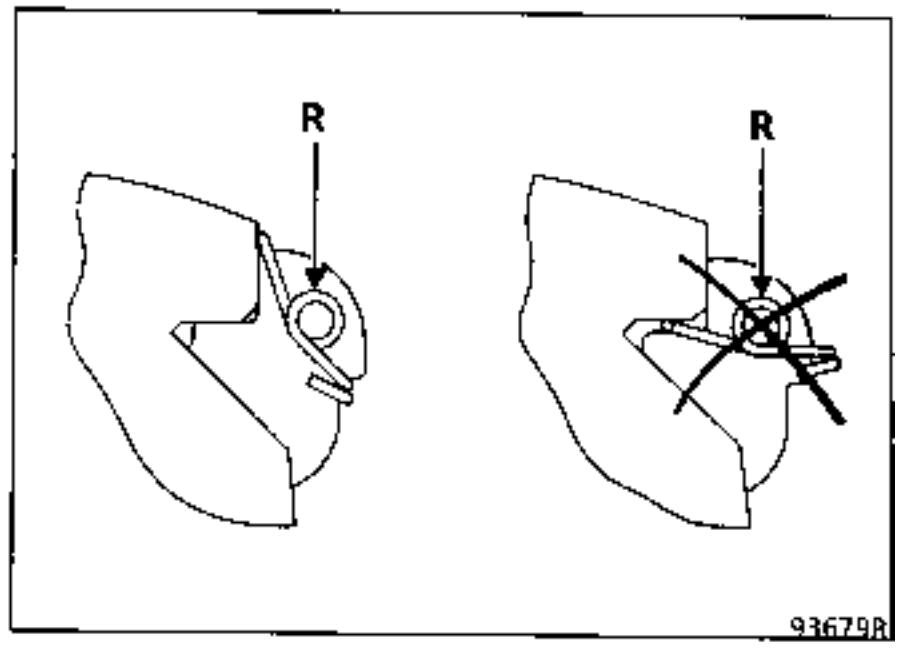


Fit in place the new pads fitting inner pad (I) first.



ATTENTION

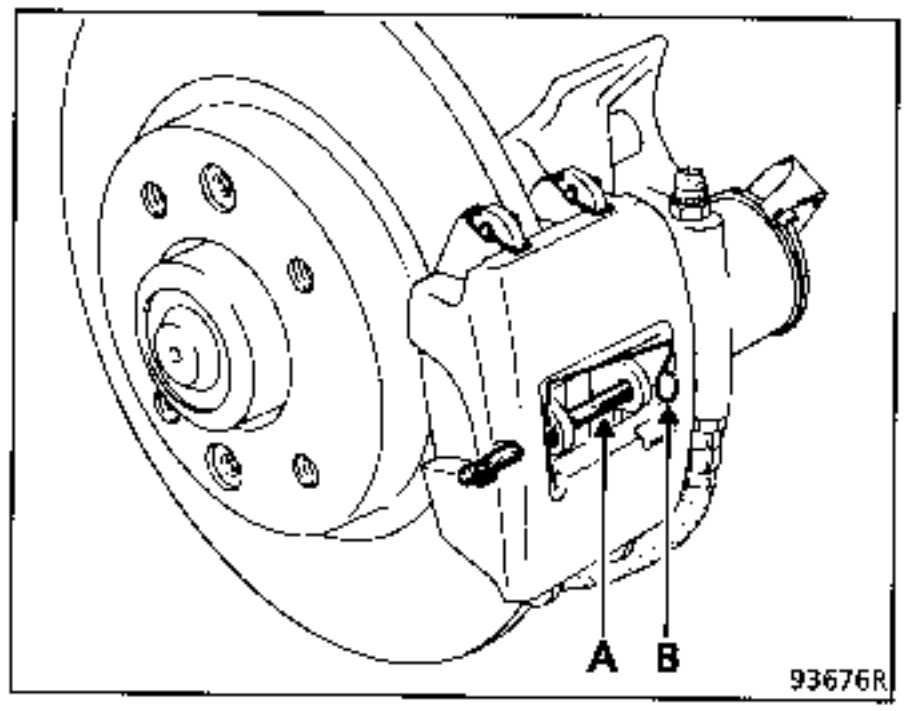
Side springs (R) must be fitted correctly.



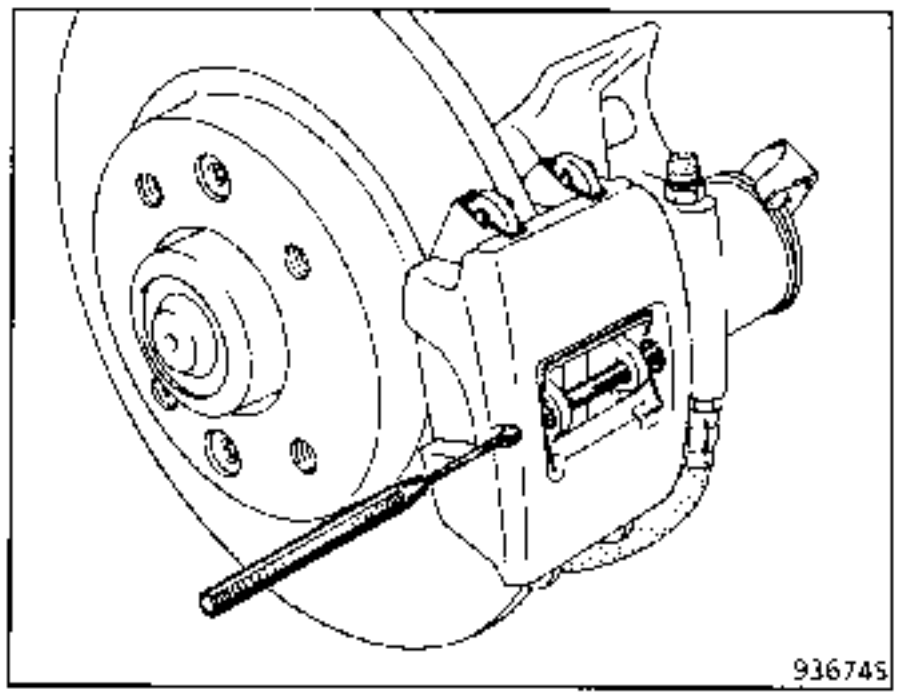
Return the calliper to its operating position and fit bolt (C) securing the secondary carrier coated with LOCTITE FRENBLOC then torque tighten it.

NOTE : If bolt (E) securing the main carrier has been dismantled, it must be refitted first, coated with LOCTITE FRENBLOC and torque tightened.

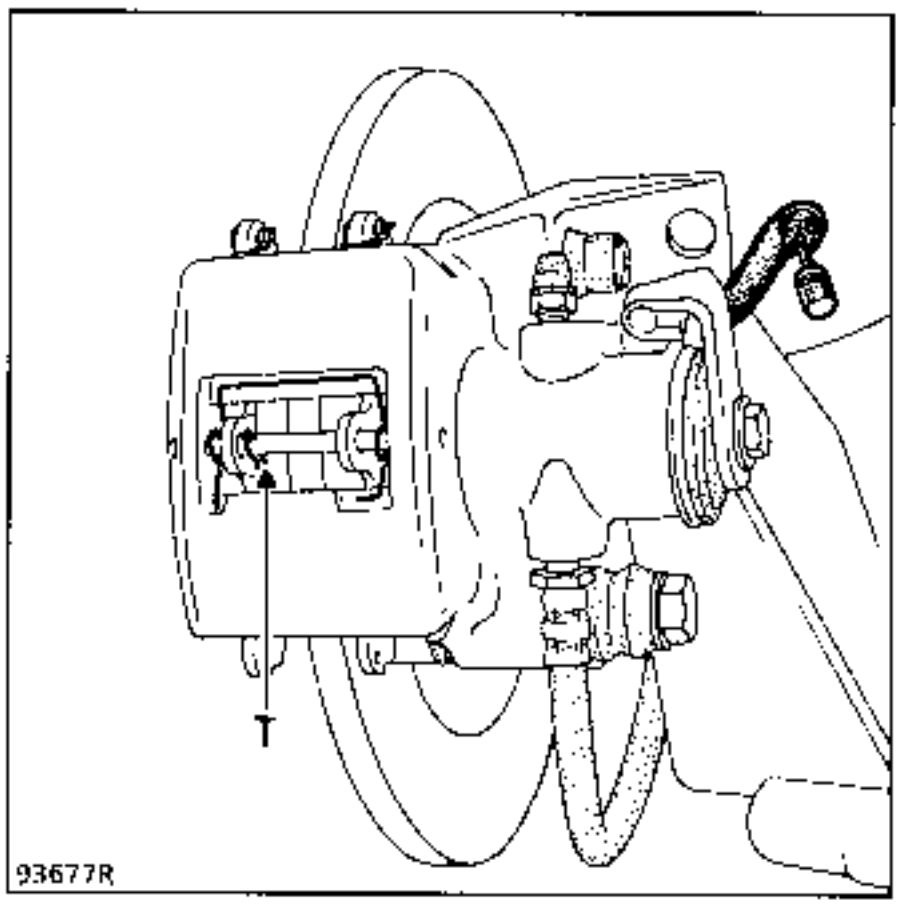
Position pad retaining pin (A) passing it through spring (B).



Then clip on the retaining pin using a pin drift.



Refit rollpin (T) and the handbrake cable.



Press down on the brake pedal several times in order to bring the piston into contact with the pads.

TIGHTENING TORQUES (in daN.m)	
Wheel bolts (4 bolts)	9
Wheel bolts (5 bolts)	10

REMOVING

Release the brake hose at the calliper end.

Remove the brake pads (see the relevant paragraph).

Unscrew the calliper on the hose (place a container underneath to catch the fluid).

Check the condition of the hose and replace it if necessary (see "replacing a hose").

REFITTING

Screw the new calliper onto the hose.

Unscrew the bleed screw on the calliper and wait for brake fluid to flow out. (Check that the level in the compensator reservoir is sufficient.).

Retighten the bleed screw.

Check the condition of the pads; if they are greasy replace them.

If the compensator reservoir has not been completely emptied during the operation, a partial bleeding of the system will be sufficient. If the reservoir has been emptied, carry out the full bleeding sequence:
- of the brake system,
- of the clutch system (depending on version).

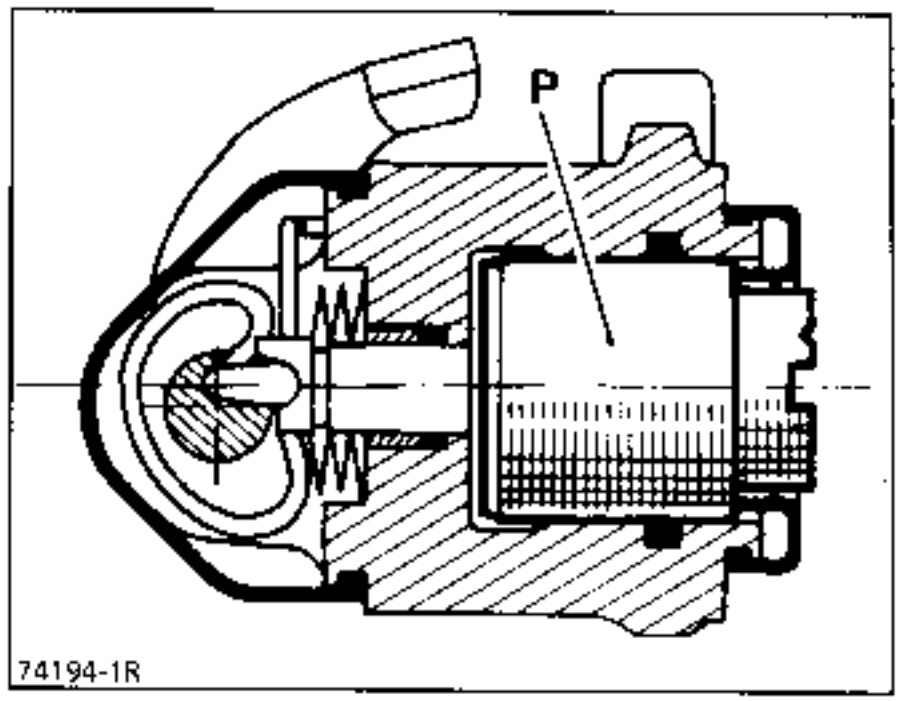
Press down on the brake pedal several times to bring the piston into contact with the pads.

OVERHAULING

The calliper assembly must be changed whenever any scratching or scoring is present in the piston bore.

Remove the brake calliper.

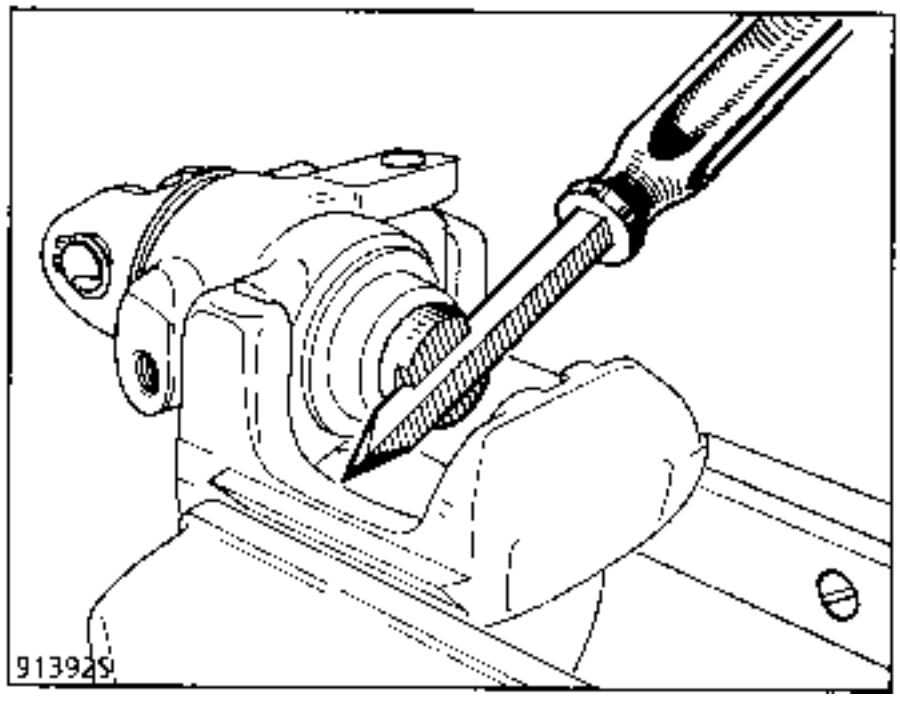
The interior of the piston (P) must not be dismantled.



Place the calliper in a vice fitted with soft jaws.

Remove the rubber dust cover.

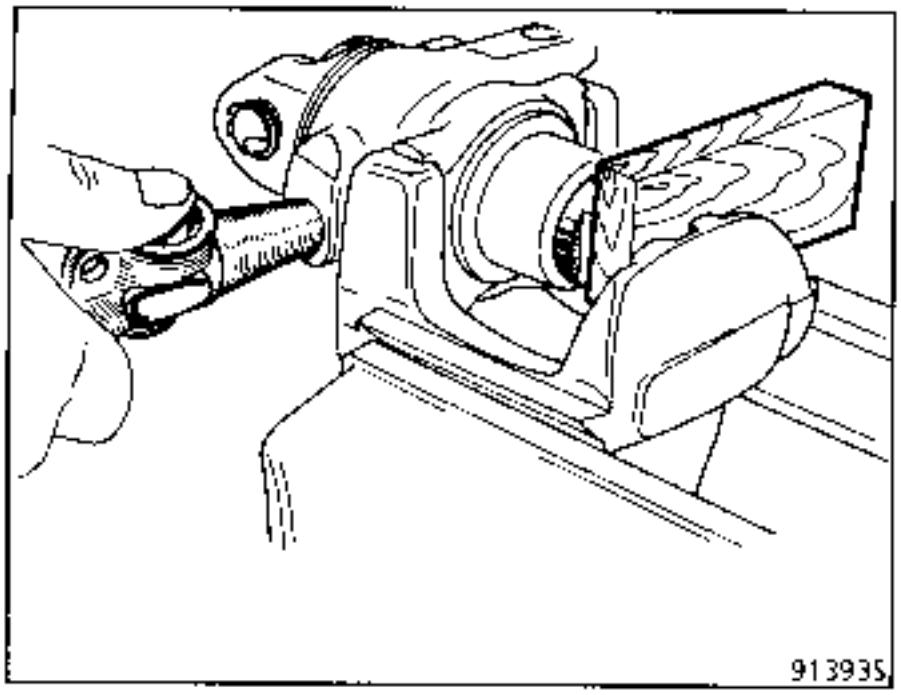
Remove the piston by unscrewing it with a screwdriver with a square cross section.



REPAIR

When the piston turns freely, gradually introduce compressed air into the cylinder, taking care not to eject the piston abruptly and placing a block of wood between the calliper and the piston in order to prevent damage to the piston.

If there are any marks from impacts or scoring on the piston, it cannot be reused.



Take the seal out of its groove using a steel blade with rounded edges.

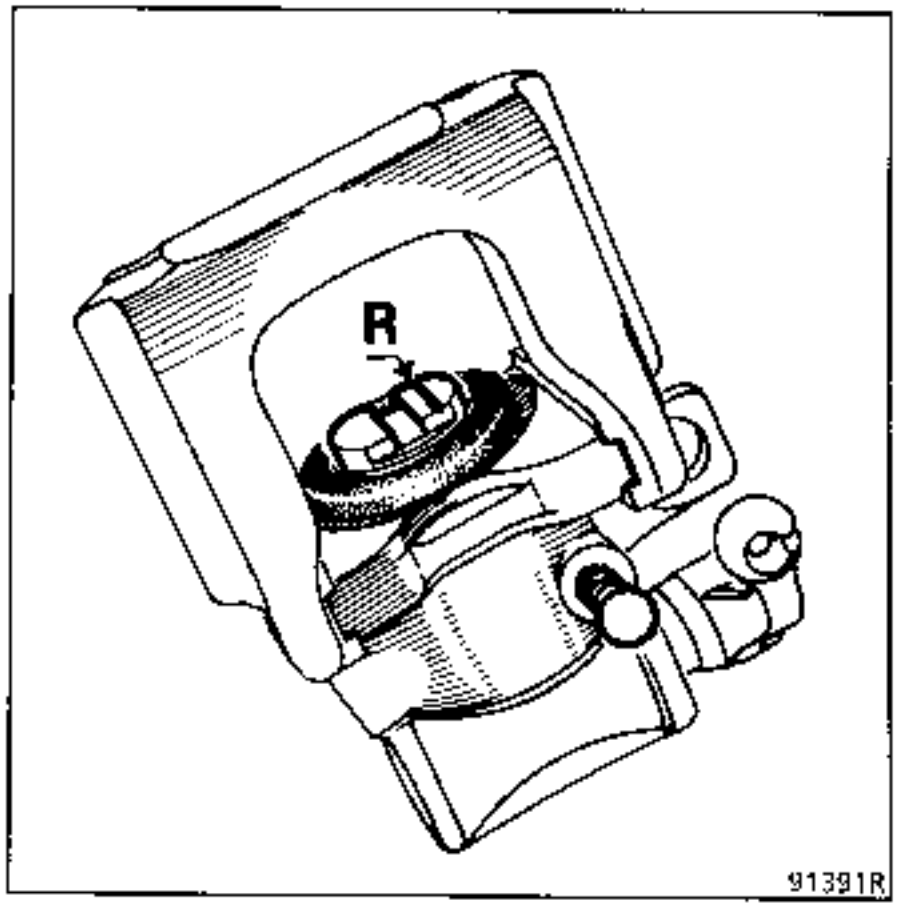
Clean the parts with methylated spirit and reassemble them.

Lubricate the seal and piston using brake fluid.

Gradually press in the piston by hand to prevent damage to the seal.

Finally press in the piston by screwing it up with a screwdriver until the piston turns but does not go in any further.

Direct the piston so that line (R) marked on the bearing face is at bleed screw (P) end, so as to enable the calliper to be bled properly and the pad to be fitted correctly in the central groove of the piston



Coat the periphery of the piston with **SPAGRAPH** grease.

Fit a new protective cap.

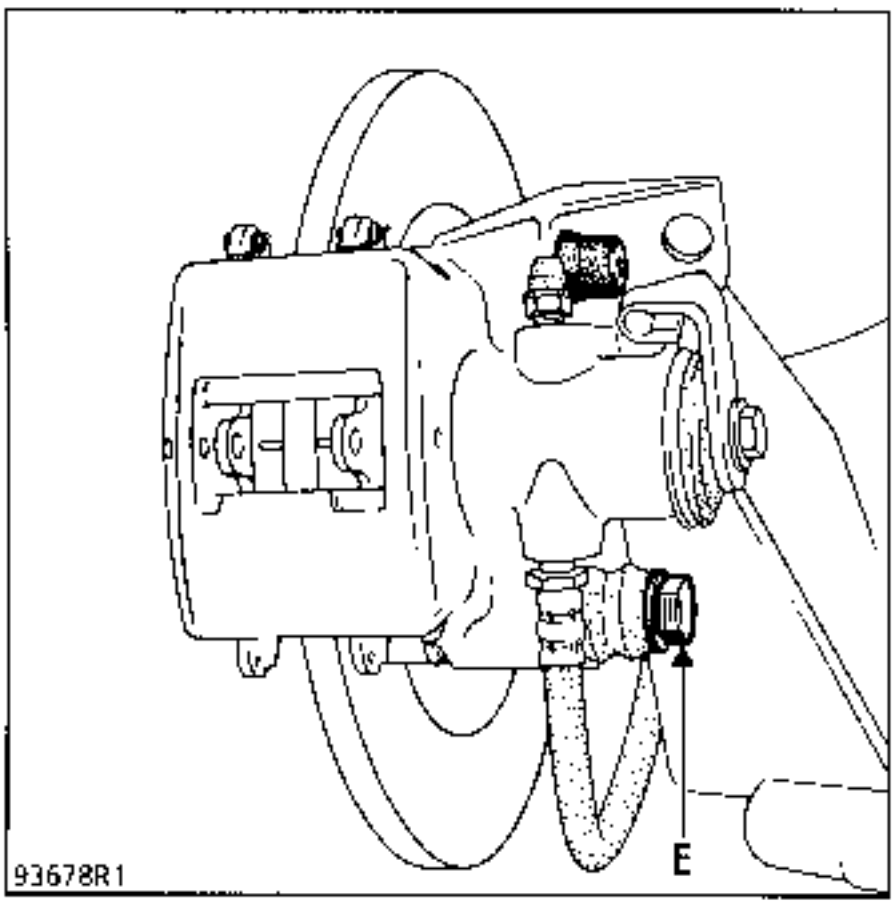
TIGHTENING TORQUES (in daN.m)	
Wheel bolts (4 bolts)	9
Wheel bolts (5 bolts)	10
Secondary carrier bolts	3.5
Main carrier bolts	7

REMOVING

Release the brake hose at the calliper end.

Remove the brake pads (see relevant section).

Remove main carrier (E).



Unscrew the calliper on the hose (place a container underneath to catch the fluid).

Check the condition of the hose and replace it if necessary.

REFITTING

Screw the new calliper on to the hose.

Unscrew the bleed screw on the calliper and wait for the brake fluid to flow out. (Check that the level in the compensator reservoir is sufficient.)

Retighten the bleed screws.

Check the condition of the pads; if they are greasy, replace them.

Refit bolt (E) securing the main carrier, coat it with LOCTITE FRENBLOC then torque tighten it.

Refit the pads (see relevant section).

If the compensator reservoir has not been completely emptied during the operation, a partial bleeding of the system will be sufficient. If the reservoir has been emptied, carry out the full bleeding sequence:
- of the braking system,
- of the clutch system (depending on version).

Press down the brake pedal several times to bring the piston into contact with the pads.

ESSENTIAL SPECIAL TOOLING		
Fre.	514	Handbrake control dismantling tool

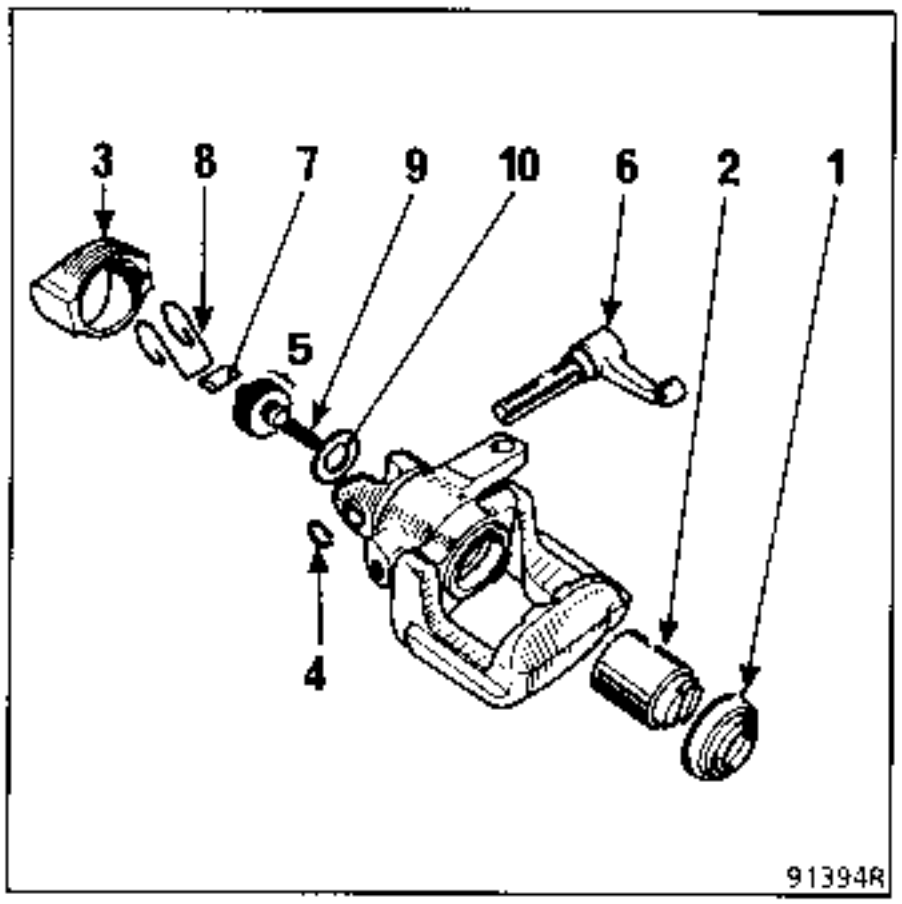
DISMANTLING

Place the calliper in a vice fitted with soft jaws without separating it from the support cylinder.

Remove:
- sealing cap (1),
- piston (2) by unscrewing it.

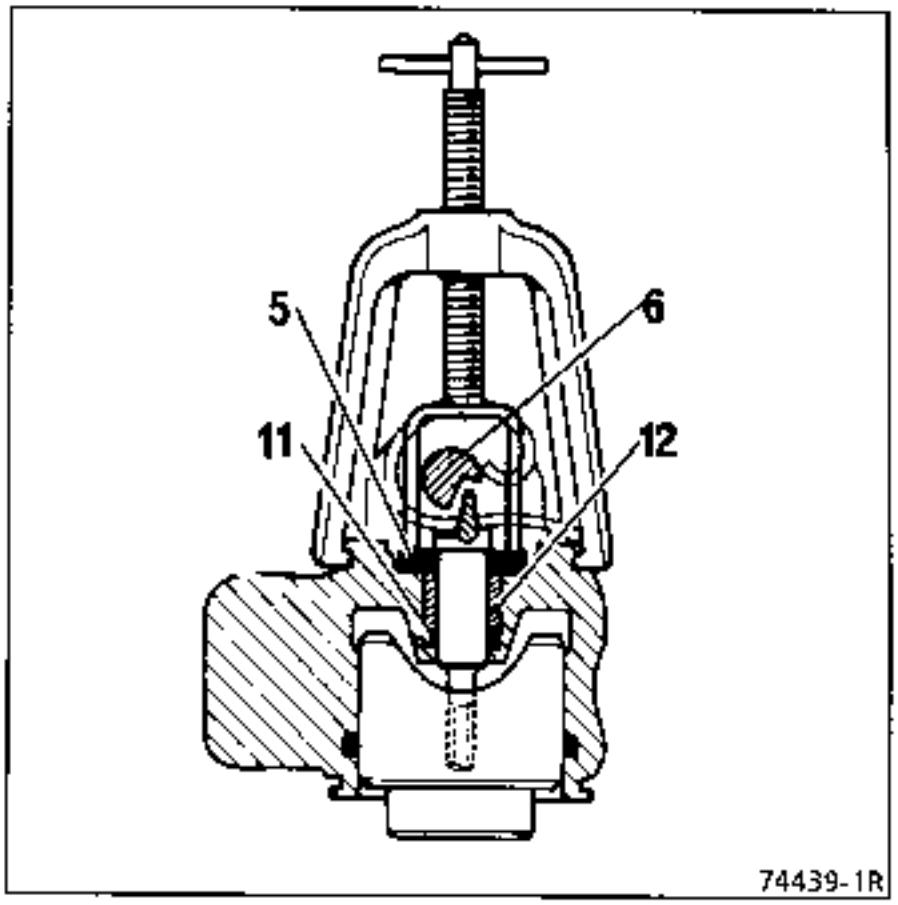
Turn dust cover (3) over (it is fitted on shaft (6)).

Remove circlips (4).



Compress flexible washers (5) using tool **Fre. 514**.

Remove:
- shaft (6) with dust cover (3) by pulling on the lever,
- pusher (7),
- spring (8),

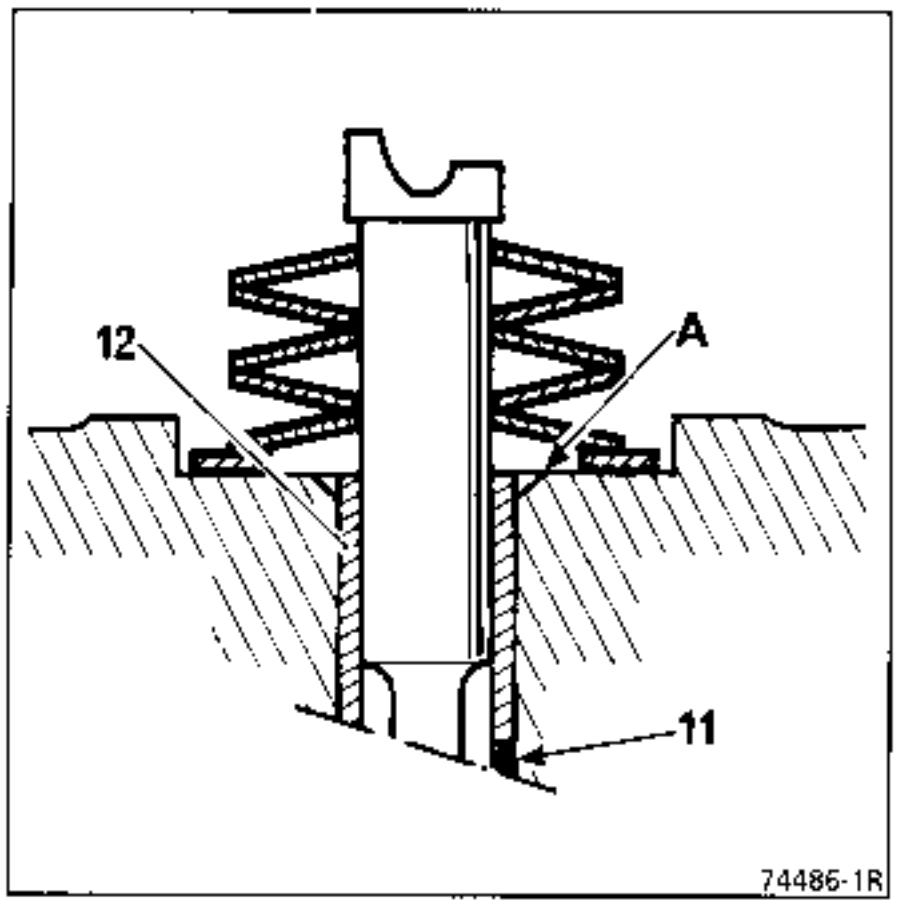


- adjusting screw (9),
- washer (10),
- flexible washers (5),
- bush (12) using a pin drift,
- O-ring (11).

Clean all the parts in methylated spirit.

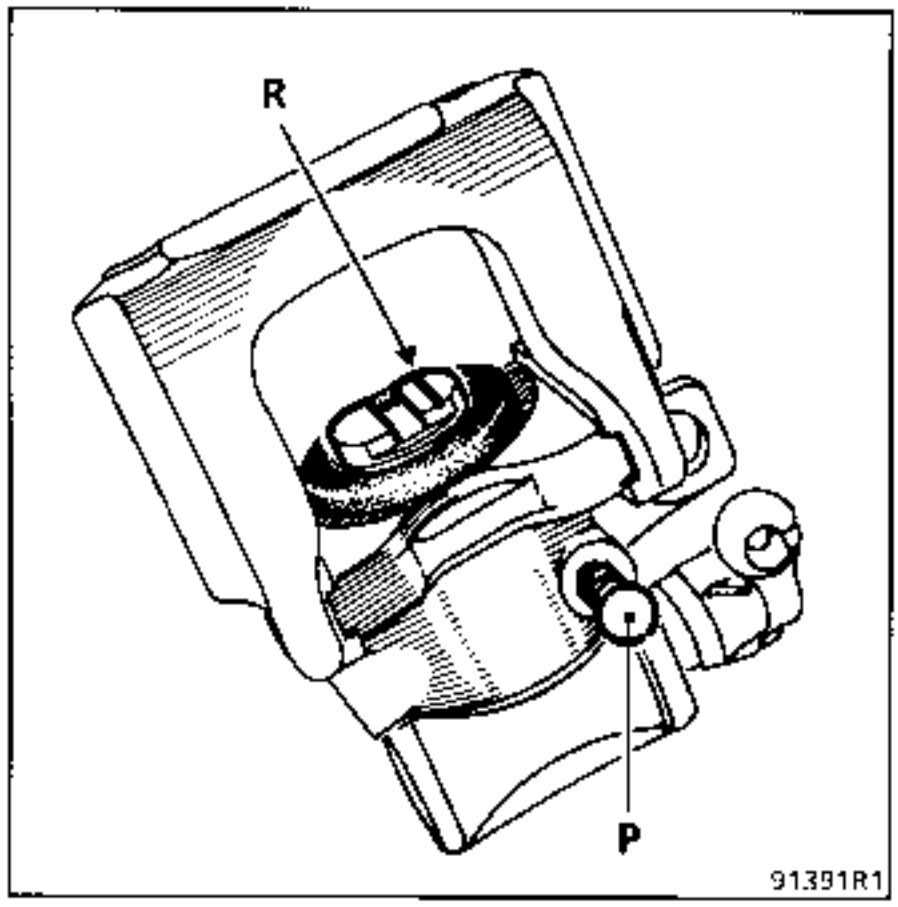
REASSEMBLY

Fit in place:
- O-ring (11),
- bush (12) until it is flush with face (A) using a piece of tubing of suitable diameter.



Check the position of the flexible washers: they must be fitted as shown in the diagram to allow the handbrake lever to be in the "rest" position.

Then proceed in the reverse order to dismantling.



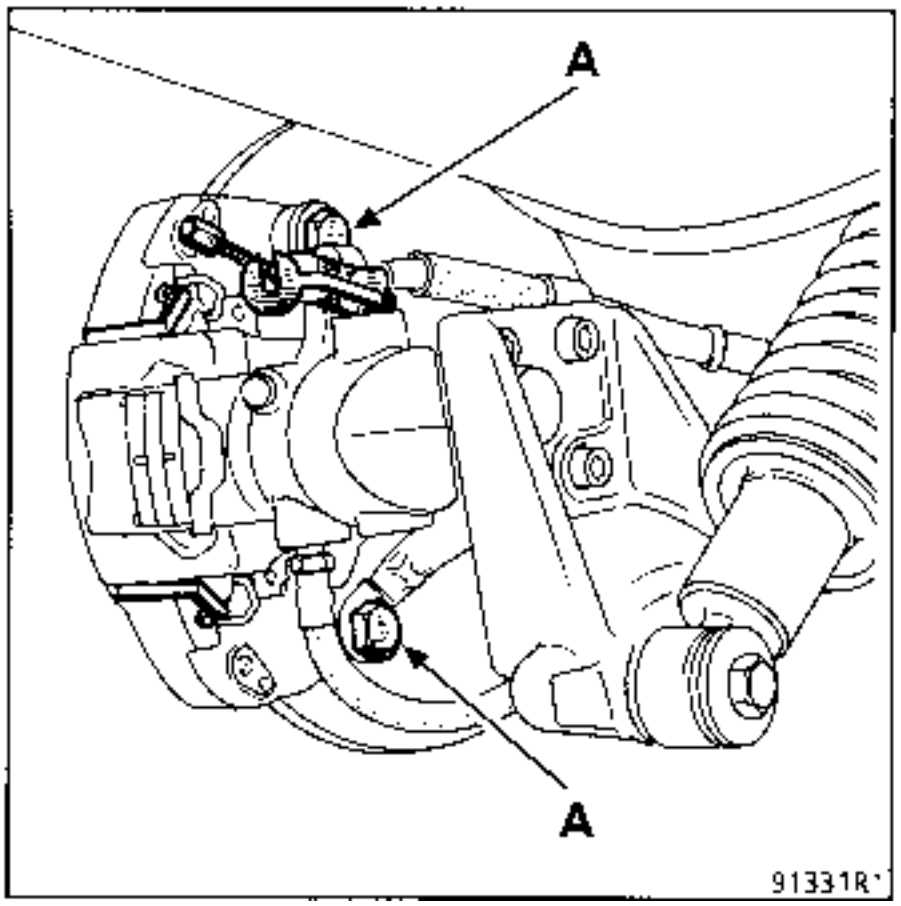
Direct the piston so that line (R) on its bearing face is at bleed screw (P) end.

The brake discs must not be refaced. The part must be changed if excessive wear or scoring is present.

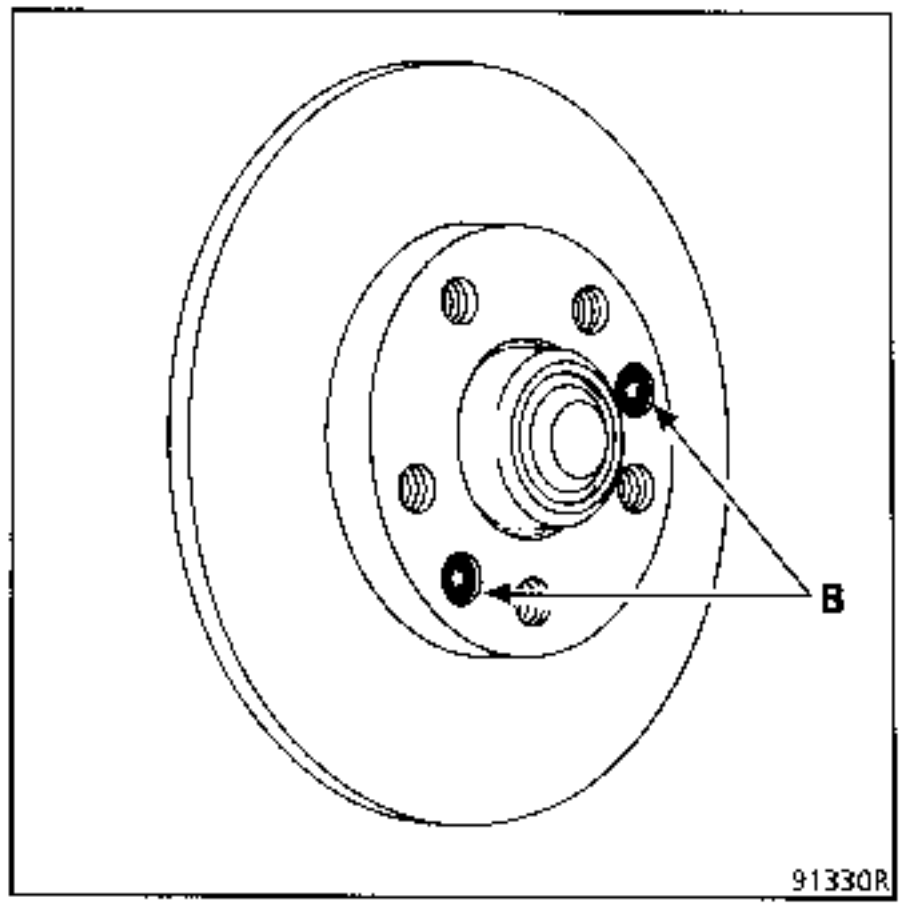
TIGHTENING TORQUES (in daN.m)	▽
Wheel bolts (4 bolts)	9
Wheel bolts (5 bolts)	10
Brake calliper mounting bolts	6.5

REMOVING

Remove:
- the brake pads (see the corresponding paragraph),
- the two bolts (A) securing the calliper bracket,



- the two bolts securing the disc (B),



- the disc.

REFITTING

Fit the disc in place on the hub and secure it using the two bolts (B).

Coat the calliper bracket bolts with **LOCTITE FRENBLOC** and torque tighten them.

Press down several times on the brake pedal to bring the piston into contact with the pads.

ESSENTIAL SPECIAL TOOLING		
Emb.	880	Impact tool
Rou.	943	Hub plug extractor
T.Av.	1050-02	Hub extractor

TIGHTENING TORQUES (in daN.m)		
Hub nut		16
Wheel bolts	4 bolts	9
	5 bolts	10

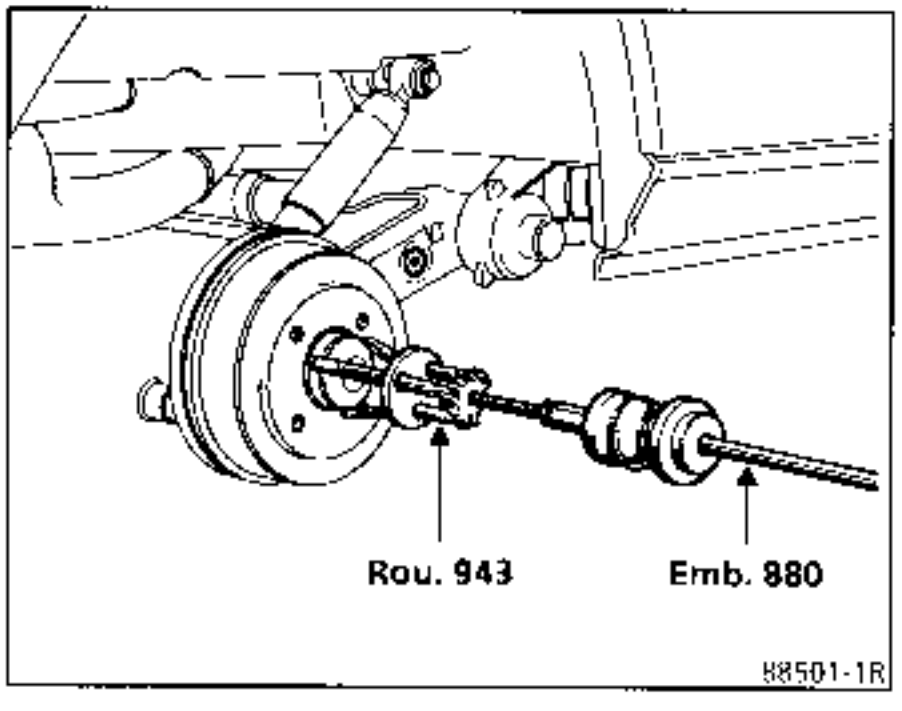
NOTE : L485 and L48L are fitted with hubs with integral bearings, thus the entire assembly has to be changed.

CHECKING

Using a clock gauge secured to the brake drum, check the axial clearance. It should be **0 to 0.03 mm max.**

REMOVING

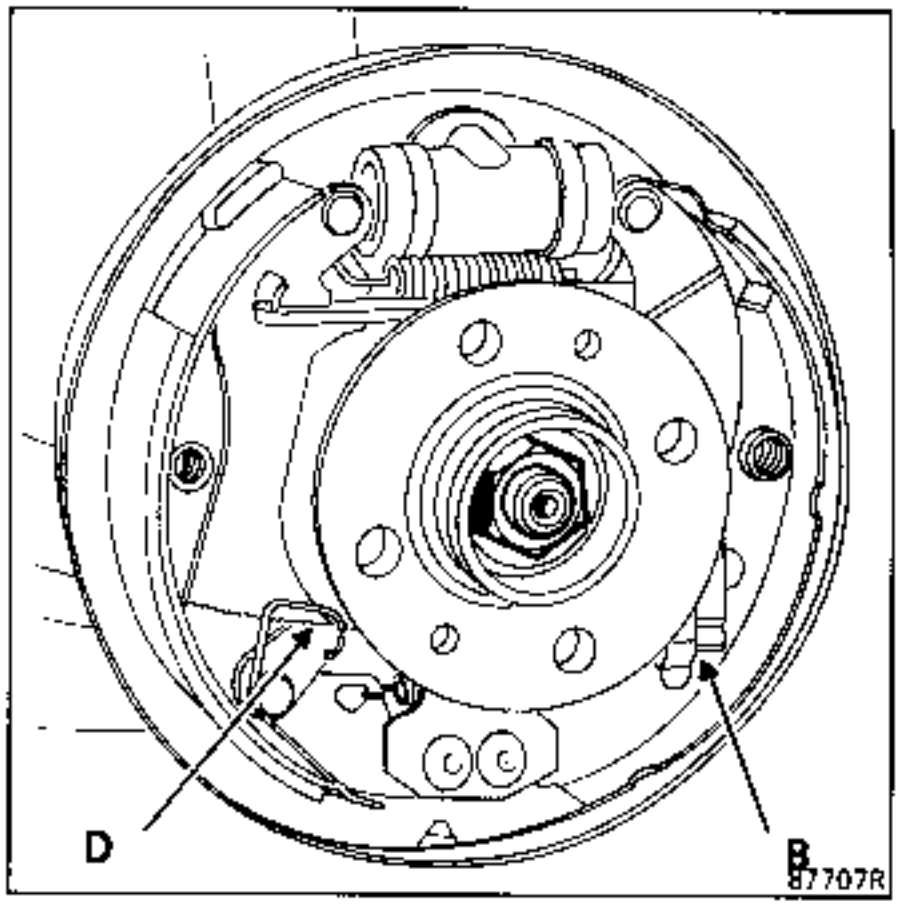
Remove :
- the hub plug using tools **Rou. 943 + Emb. 880,**



- the drum (see corresponding section).

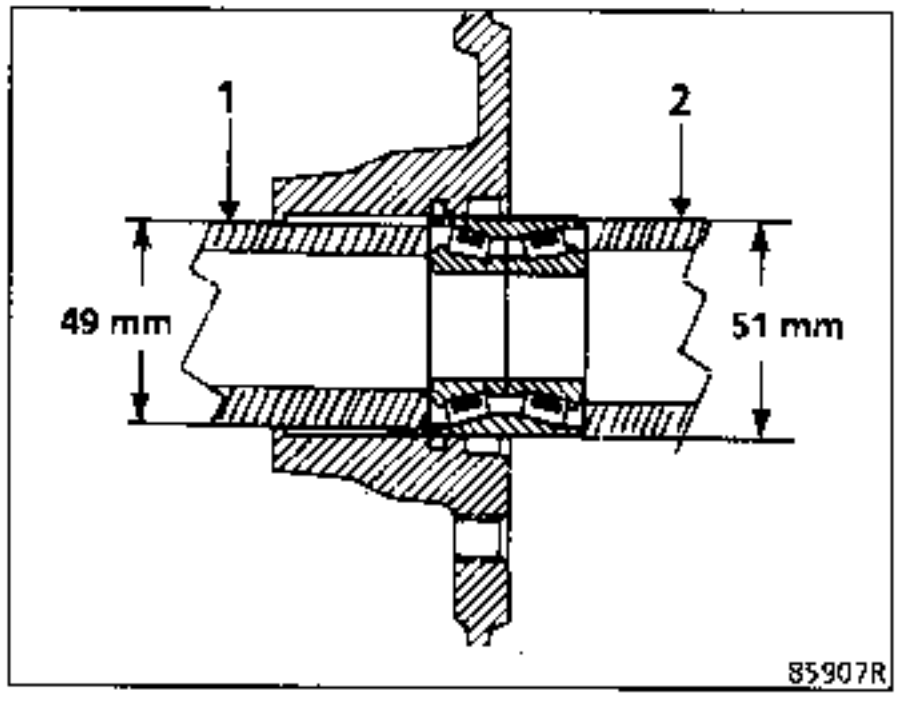
Assembly with metal-lined drum

Remove :
the hub (by releasing nut A).



All types

From the drum or hub remove:
- the bearing retaining clip,



- the bearing, using a piece of tubing (1).

REFITTING

Using a piece of tubing (2) and a press, push on the bearing until it is in contact with the shoulder.

Fit in place:
- a new clip,
- the drum or hub on the stub axle which has already been oiled with **SAE W 80**,
- a new lock nut and torque tighten it,
- the hub plug.

Assembly with metal-lined hub

Fit the drum in place on the hub.

All types

Adjust the brake pads by pressing down several times on the brake pad.

Adjust the handbrake (see corresponding section).

ESSENTIAL SPECIAL TOOLING		
M.S.	580	Impact tool
Rou.	15-01	Protective end cup
Rou.	604-01	Hub locking tool
T.Av.	1050-02	Hub extractor

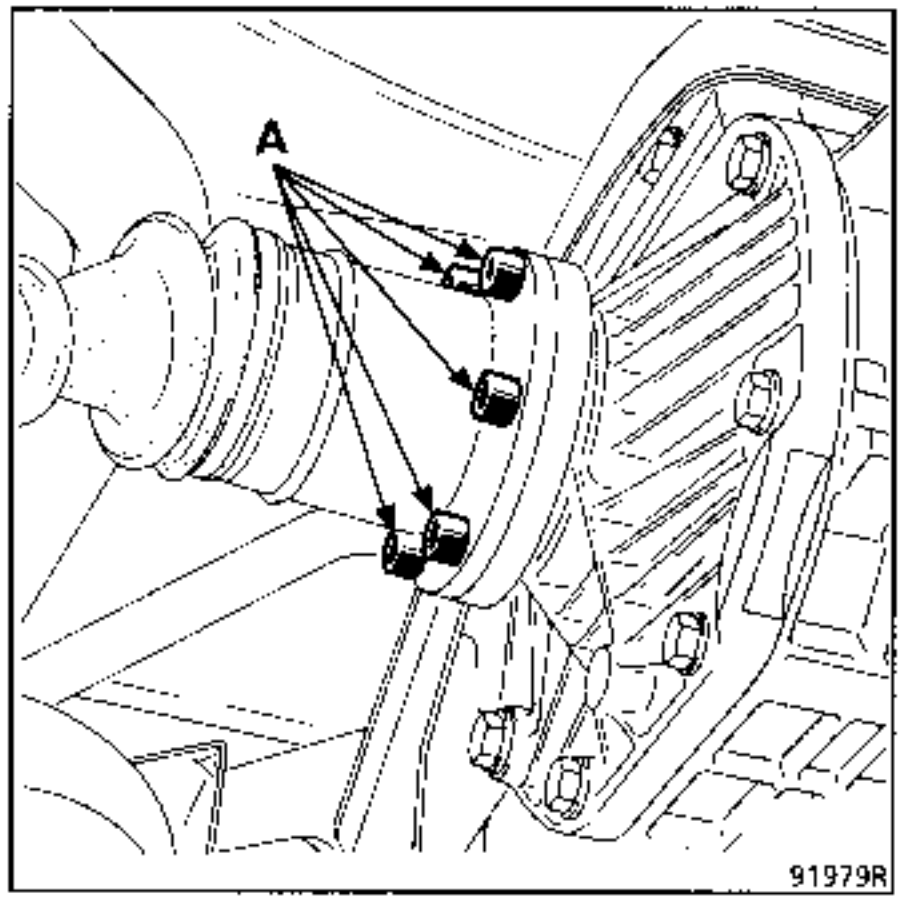
TIGHTENING TORQUES (in daN.m)		
Shock absorber bottom securing bolts		5.5
Anti-roll bar securing bolt		5.5
Bolts securing drive shaft to sun wheel		6
Drive shaft nut		21
Bolts securing arm		7
Brake back plate bolts		5.5
Calliper bracket bolts		6.5
Wheel bolts	4 bolts	9
	5 bolts	10

CHECKING

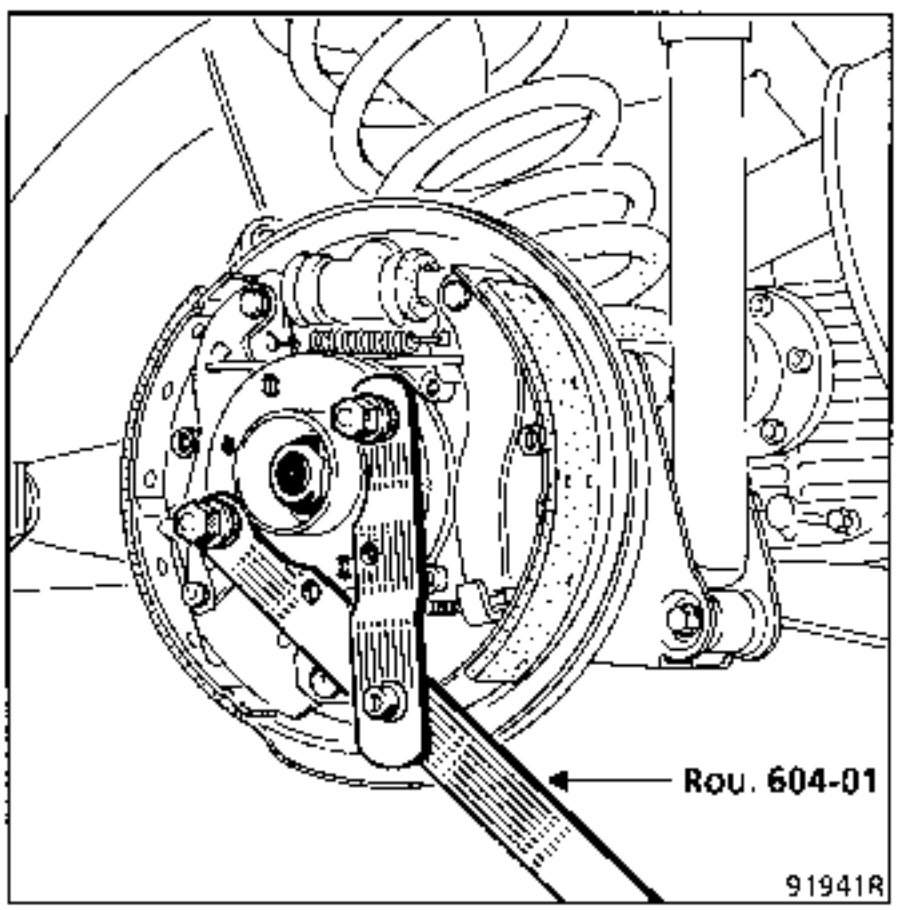
Using a clock gauge secured to the hub, check the axial clearance which should be between **0** and **0.05 mm**.

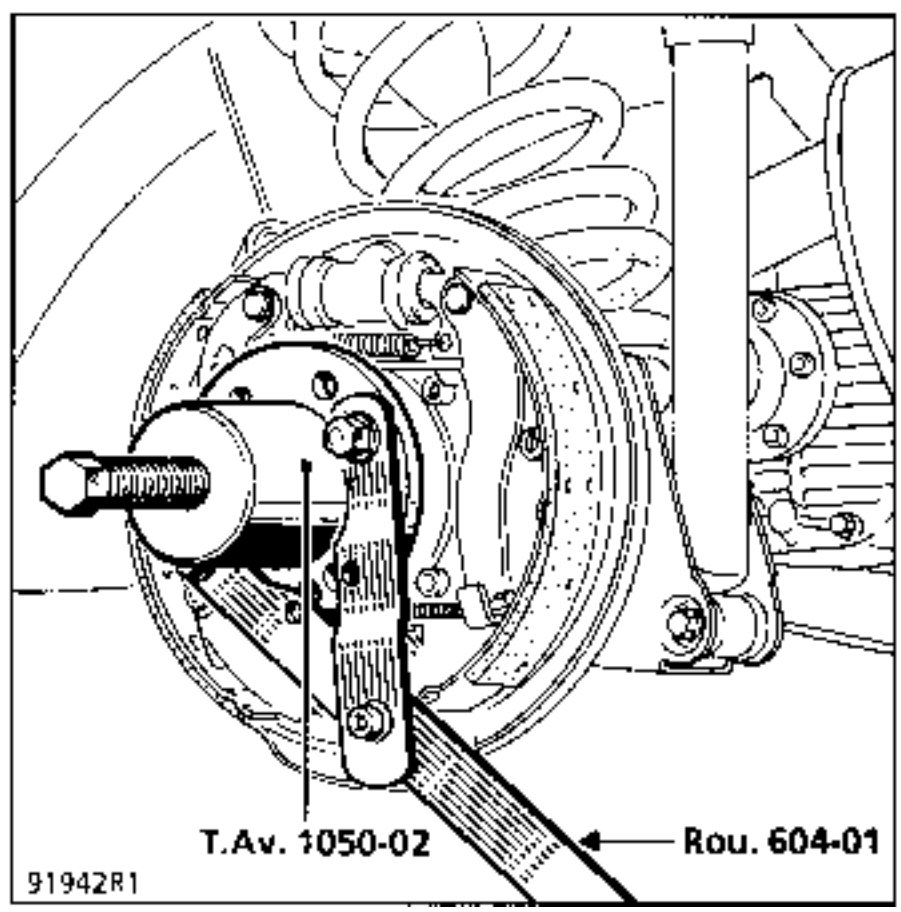
REMOVING

Remove:
- the brake drum or disc (depending on version),
- the drive shaft nut using tool **Rou. 604-01**,
- the six mounting bolts (**A**) on the sun wheel, with the hub locked in place, using tool **Rou. 604-01**.

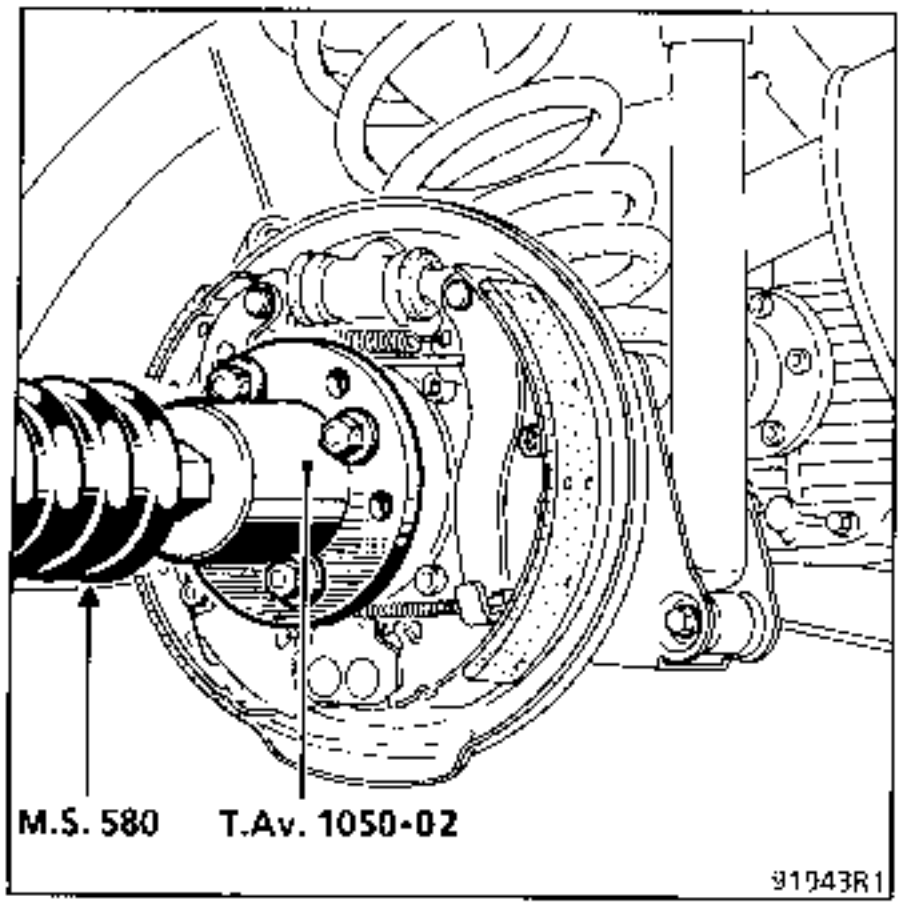


Push back the drive shaft and recover it using tools **T.Av. 1050-02** + **Rou. 604-01**.

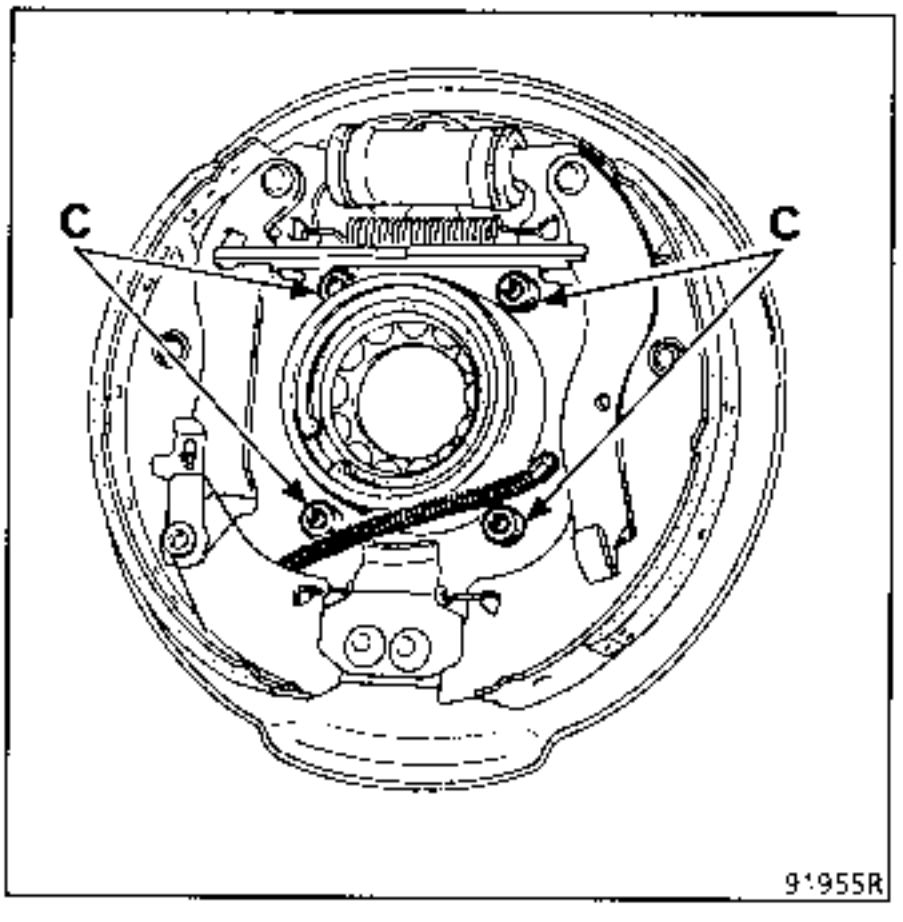




Using tools **T.Av. 1050-02 + M.S. 580** take out the hub and recover the bearing inner track ring.



Fit a pedal clamp and remove :
- the brake hose from the arm,
- the handbrake cable, and disengage it from these guides on the arm,
- the four bolts (C) from the brake anchor plate,

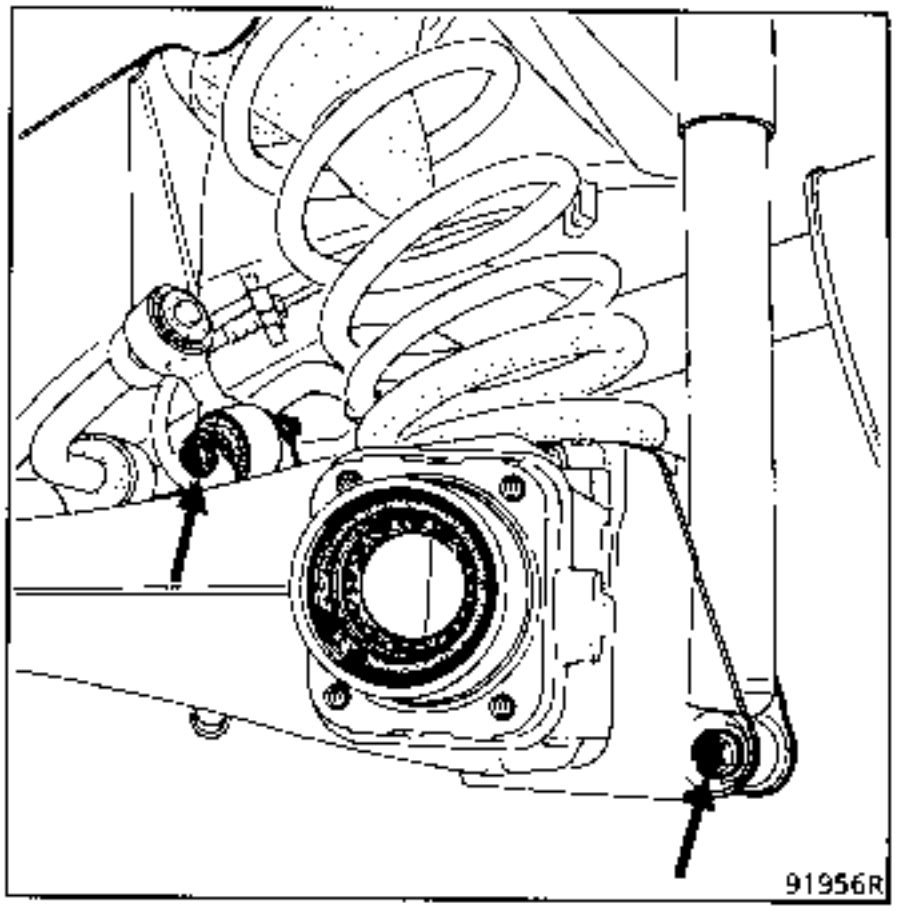


- the brake anchor plate.

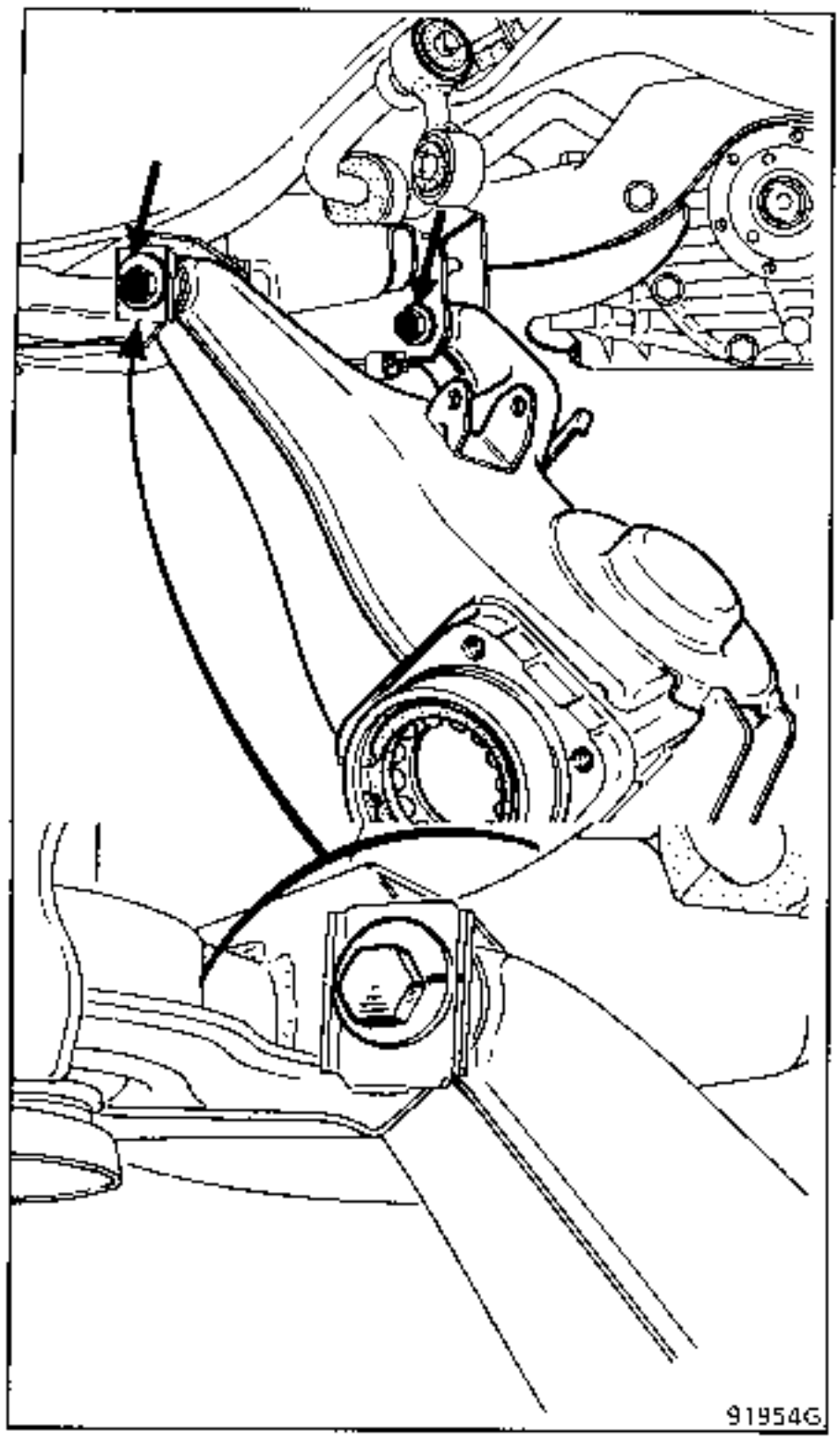
Right-hand side :

Remove the compensator control.

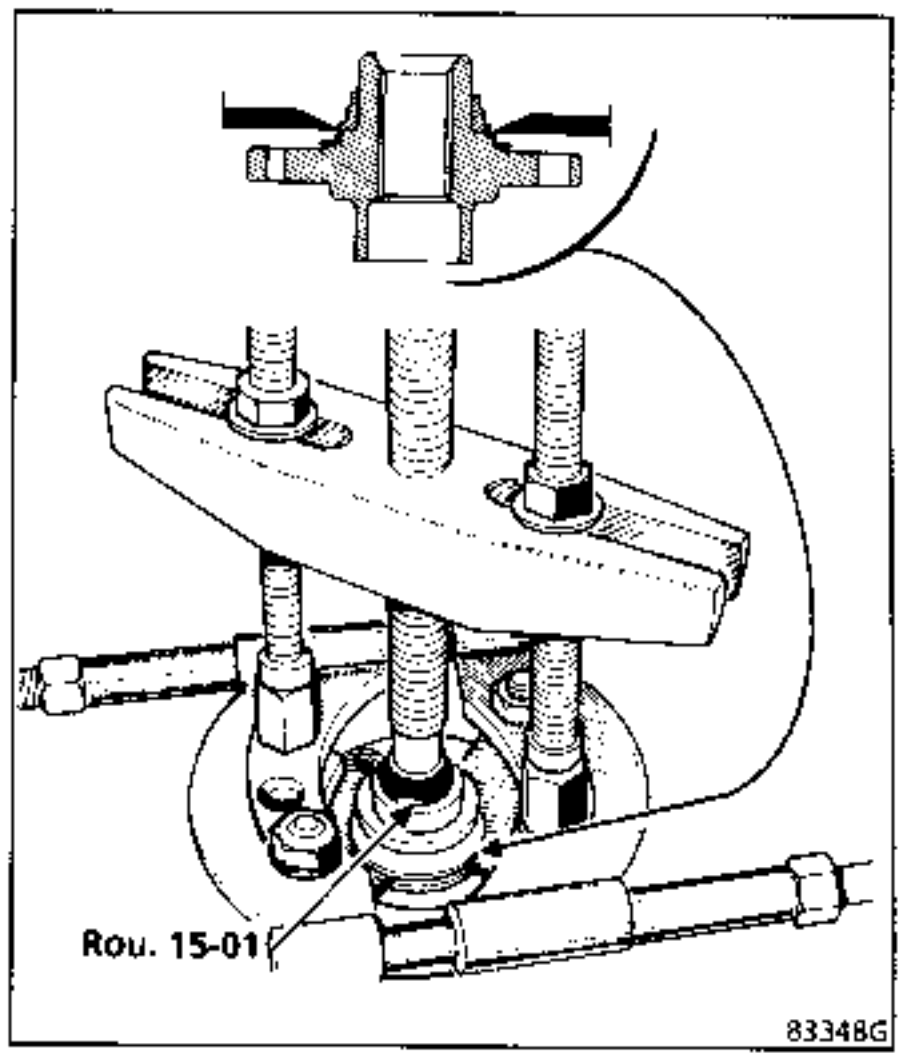
Use a jack to take the weight of the half-shaft assembly and remove :
- the shock absorber bottom mounting,
  the anti-roll bar link arm mounting.



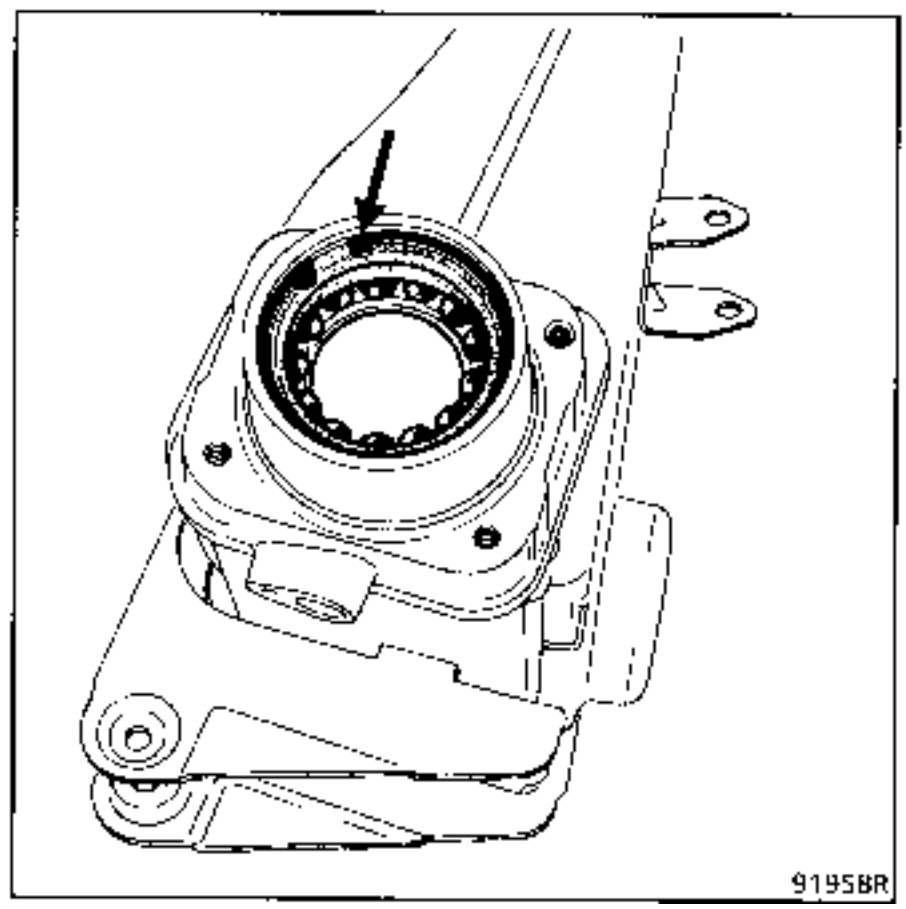
Lower the arm and remove
- the spring and its thrust block,
- the two bolts holding the arm, after first marking the position of the parallelism adjusting cam bolt,
- the rear swing arm.



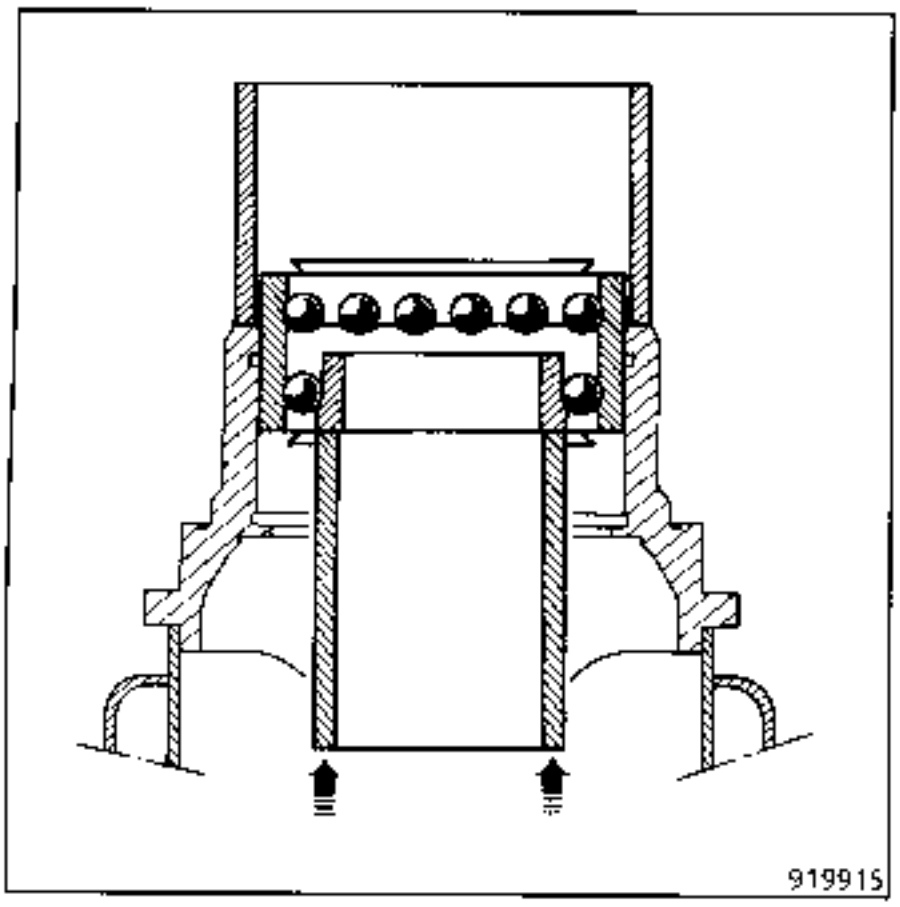
Remove the bearing inner track ring from the hub using an extractor with jaws of the **FACOM U53G + U53E** type and tool **Rou. 15-01.**



Remove the circlips holding the bearing on the arm.

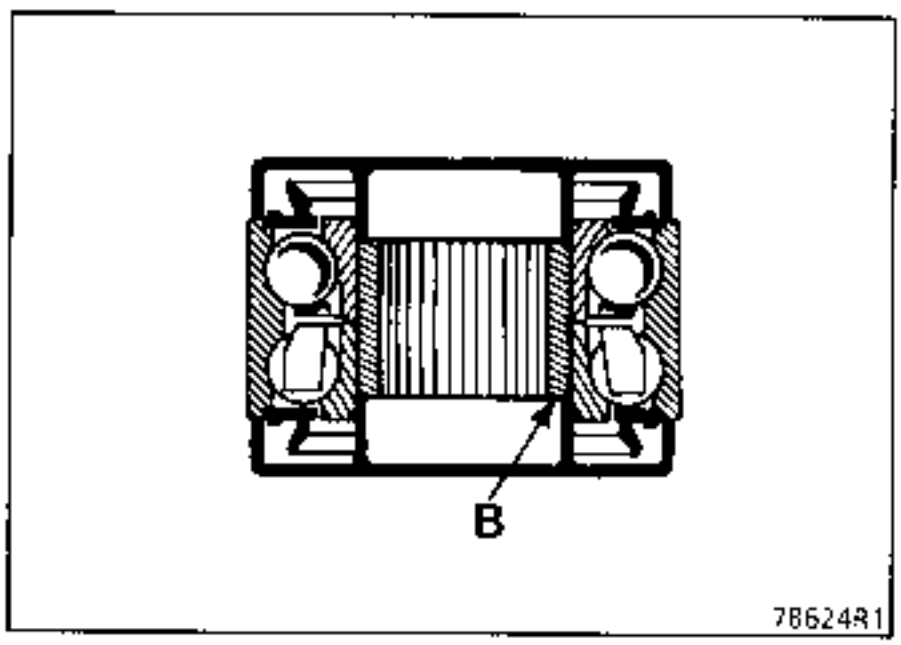


On the press, extract the outer track ring using one of the two inner track rings, leaving the ball races and seals in position.

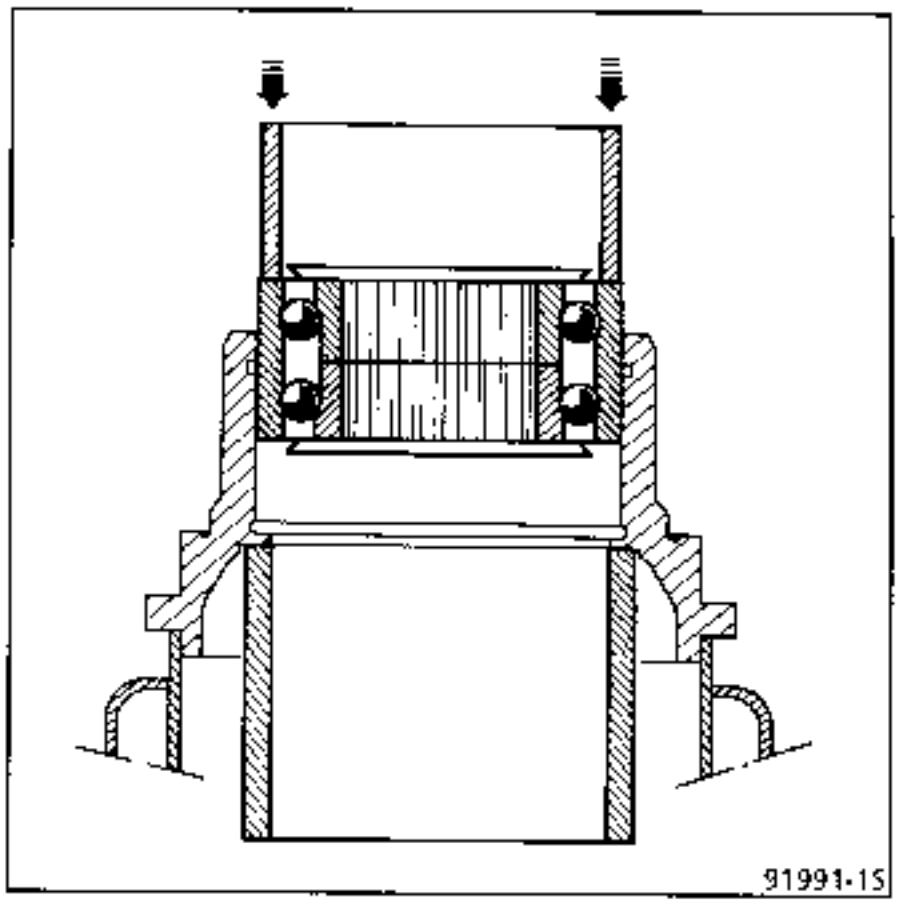


REFITTING

On the press, fit the bearing with its plastic ring (B) in the arm, using a piece of tubing with an outer diameter of **81 mm** and a bore of **75 mm**, taking the weight on the outer bush.



Do not rest on the inner track ring, otherwise the bearing might be damaged since great force is required to fit the bearing.

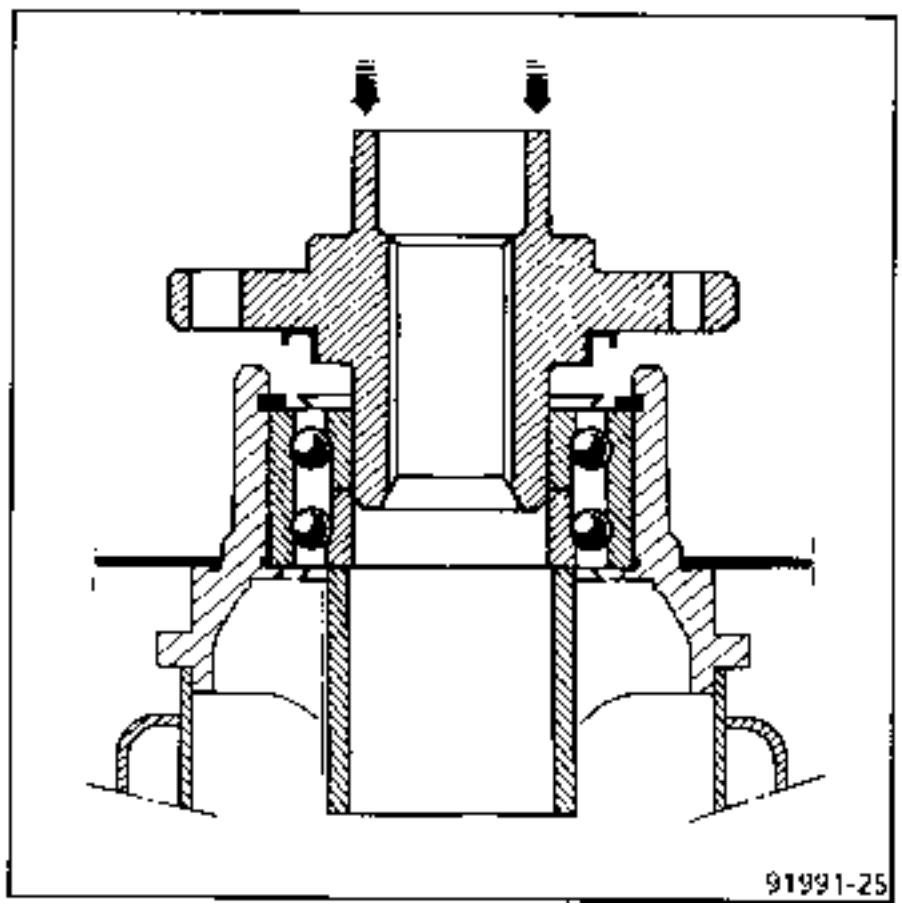


Fit the retaining circlips.

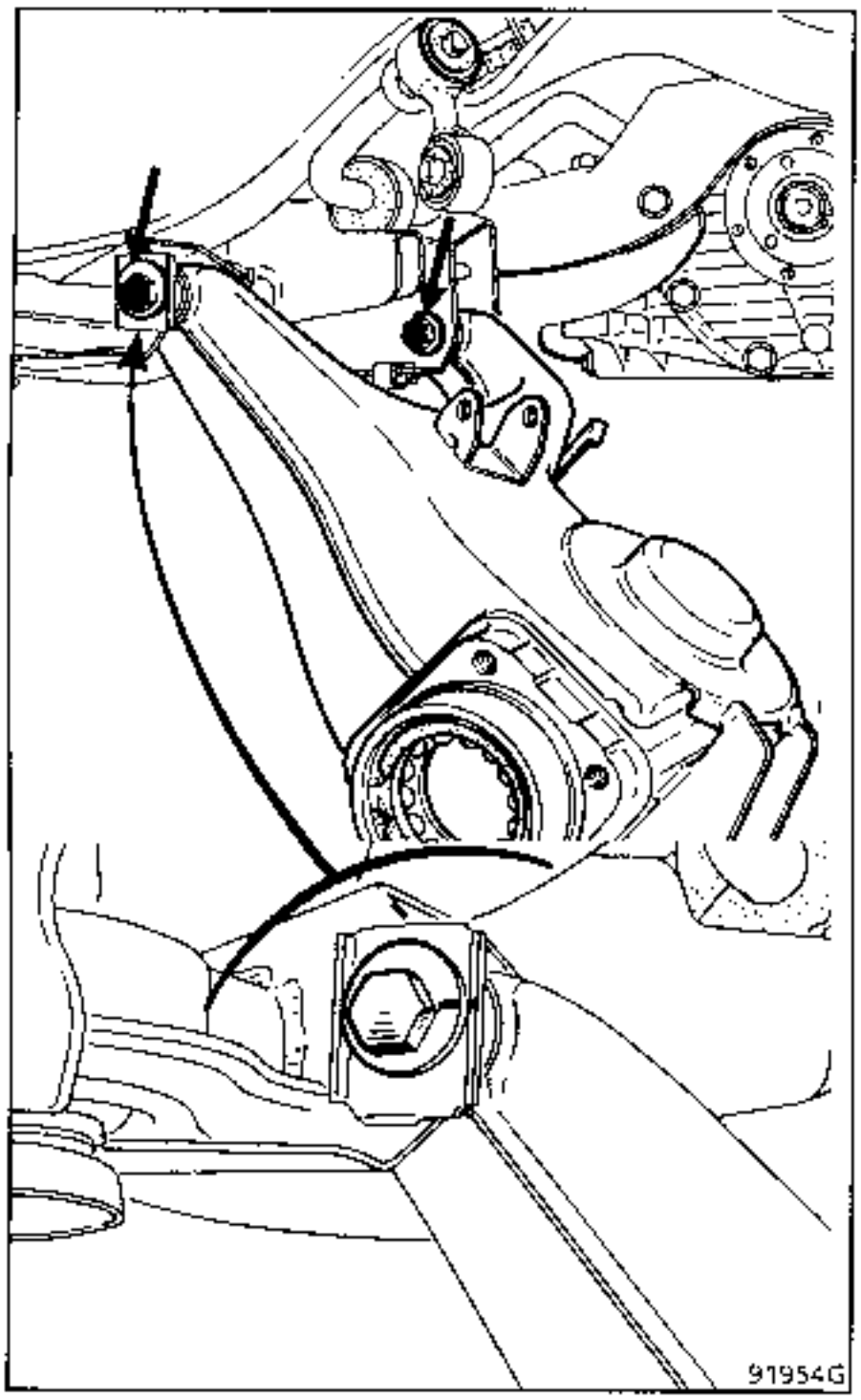
Coat each sealing lip.

Remove plastic ring (B).

Fit in place:
- the brake anchor plate, torque tightening its mountings which have previously been coated with **LOCTITE FRENBLOC**,
- the hub, on the press, using a piece of tubing with a bore of **43 mm** and outside diameter of **48 mm** taking the weight on the bearing inner track ring.



Refit the swing arm on the vehicle positioning the cam bolt according to the marks made on removal.

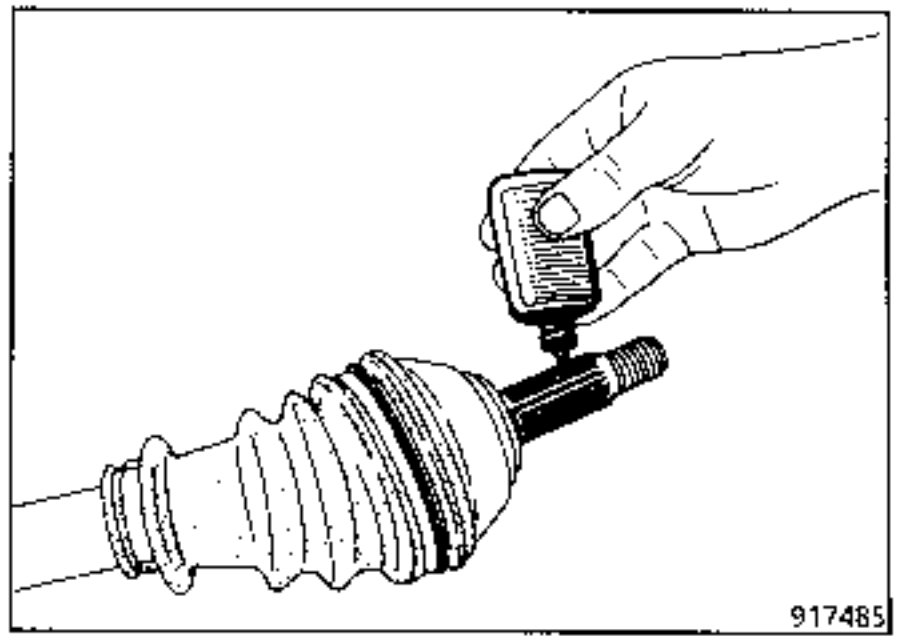


Fit a jack under the arm and fit the spring (see the instructions in the relevant paragraph).

Compress the half-shaft assembly engaging the bottom of the shock absorber and the anti-roll bar link arm in their locations.

Fit in place the bolts (previously coated with **MOLYKOTE BR2** grease) for the bottom of the shock absorber and the anti-roll bar link arm, but do not tighten them.

Coat the drive shaft stub axle with **LOCTITE SCELBLOC** and engage it in the arm.



Secure the drive shaft on the sun wheel (six bolts A) and torque tighten, using tool **Rou. 604-01**.

Fit in place:
- the handbrake cable,
- the brake hose.

On the right-hand side:
Fit the compensator control.

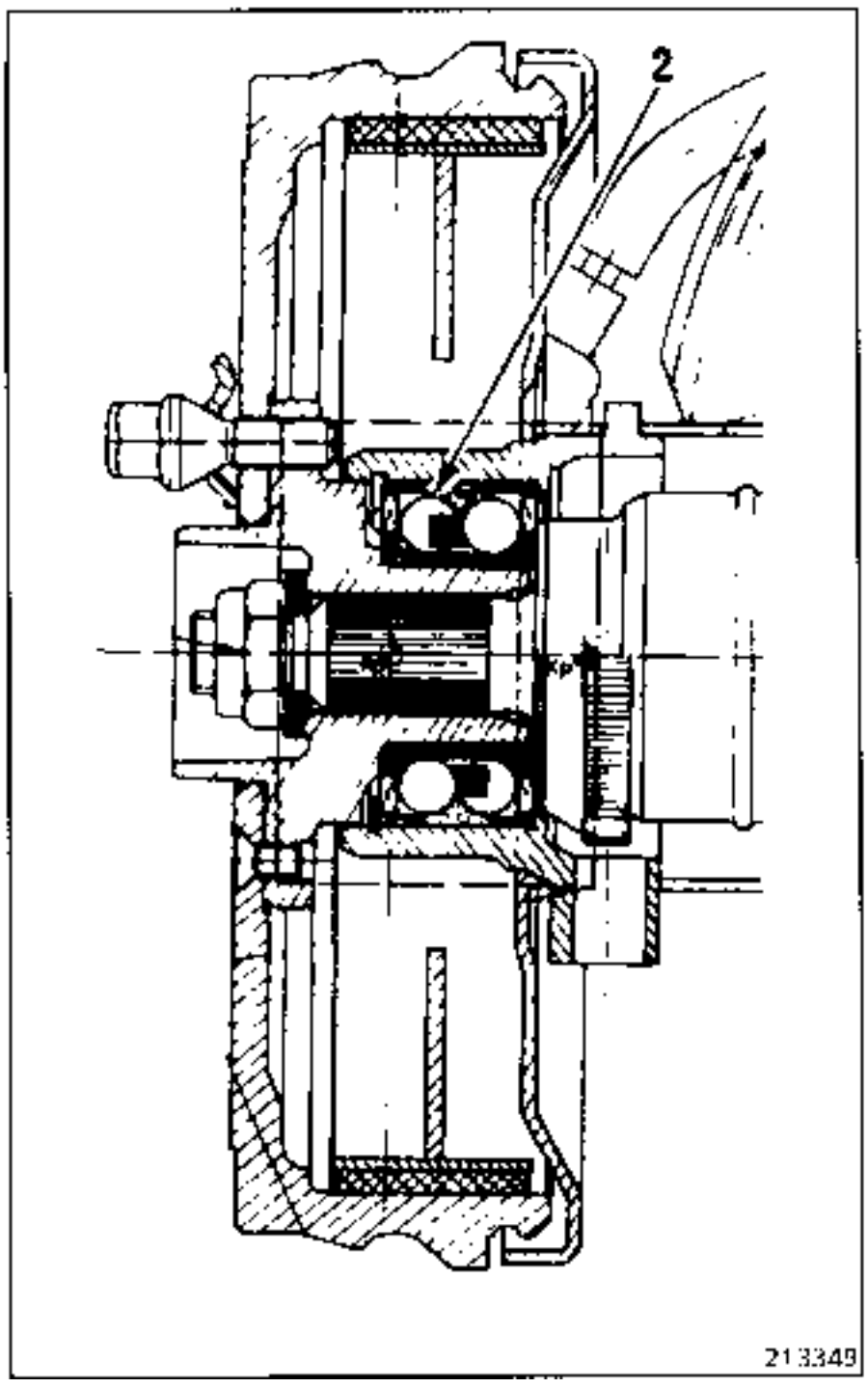
- Fit the brake drum or disc.

With the vehicle on its wheels, torque tighten the mountings for:
- the arm on the cross member,
- the anti-roll bar link arm,
- the bottom of the shock absorber.

Bleed the brake circuit.

The removing - refitting method is identical to the method for changing the bearing.

NOTE: As great force is needed to fit outer track ring (2) of the bearing in its bore, when this track is removed the complete bearing must be changed since the bearing will have marked a track in the bush.



TIGHTENING TORQUES (in daN.m)		
Upper securing bolt		8
Lower securing bolt		8.5
Wheel bolts	4 bolts	9
	5 bolts	10

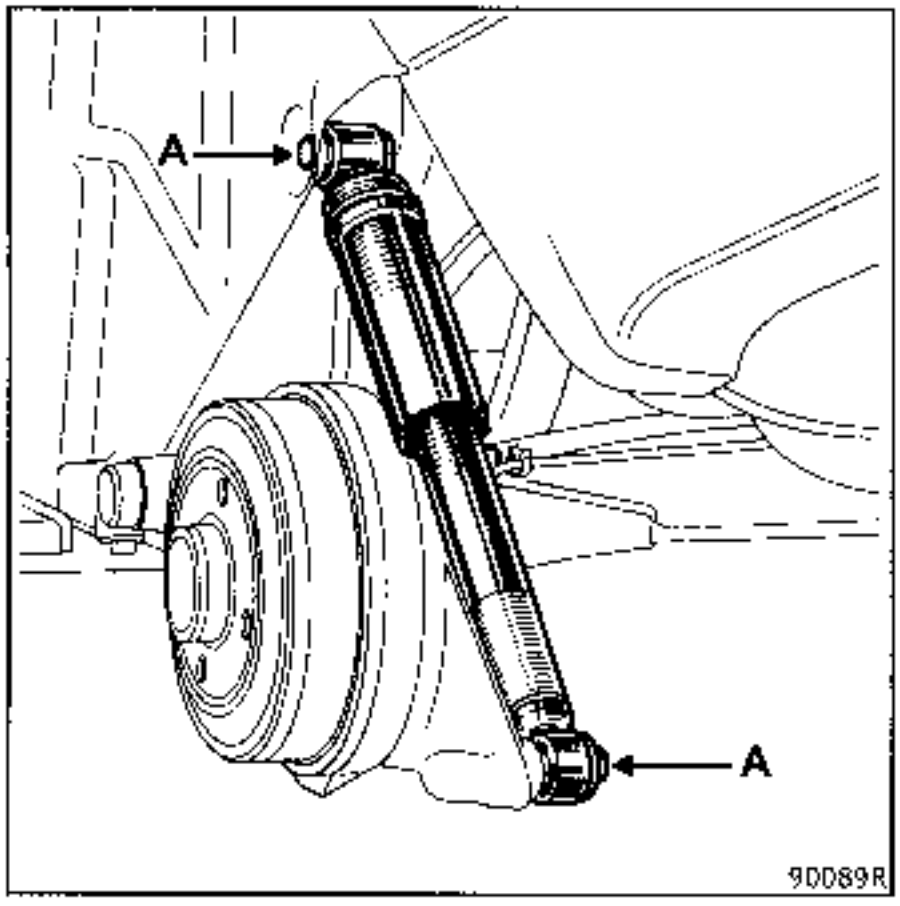
NOTE: Estate L485 and L48L vehicles have a spring - shock absorber assembly.

The spring cannot be dismantled - only the entire assembly can be changed.

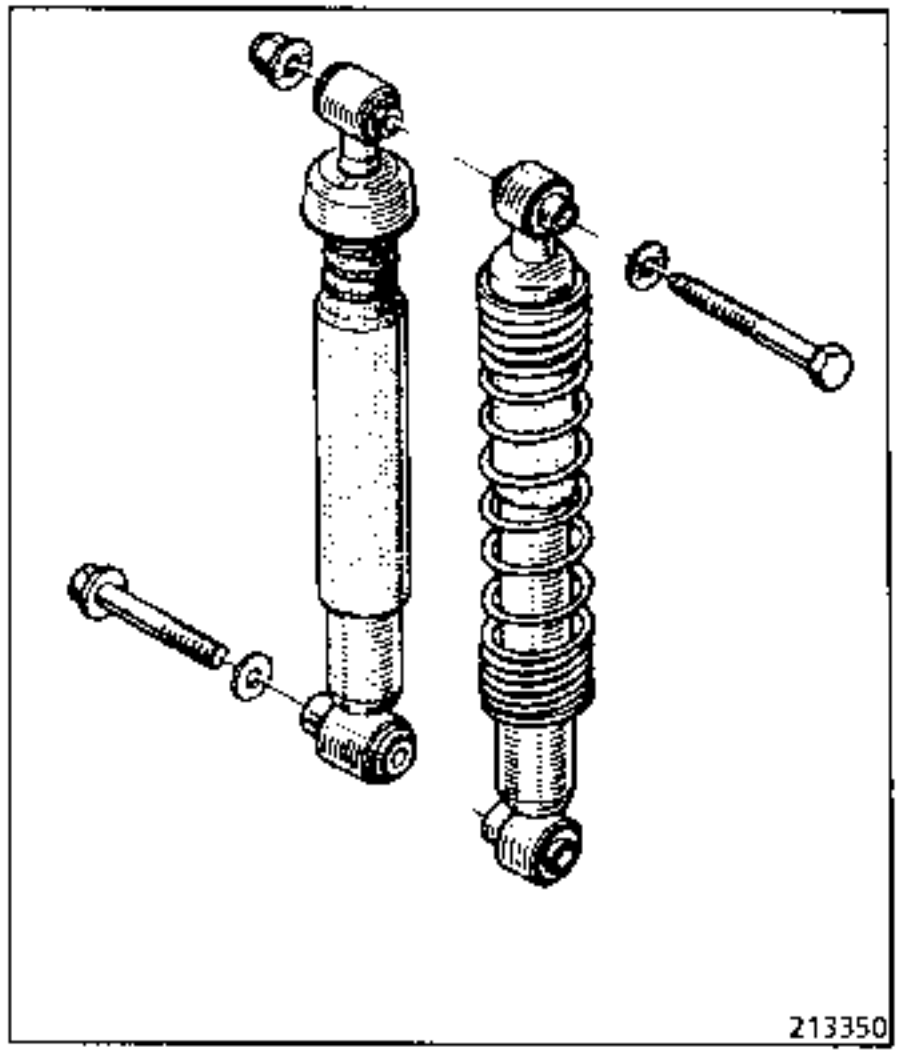
REMOVING

With the vehicle on axle stands and the wheels removed, support the rear arms with a jack.

Remove:
- bolts (A) for the upper and lower mountings;



- the shock absorber.



Precautions to be taken before assembly:

In the Parts Department these shock absorbers are stored horizontally.

Under these conditions, it is possible that shock absorbers intended to function vertically become unprimed.

Therefore, before fitting them to the vehicle, they must be pumped manually several times in the vertical position.

REFITTING

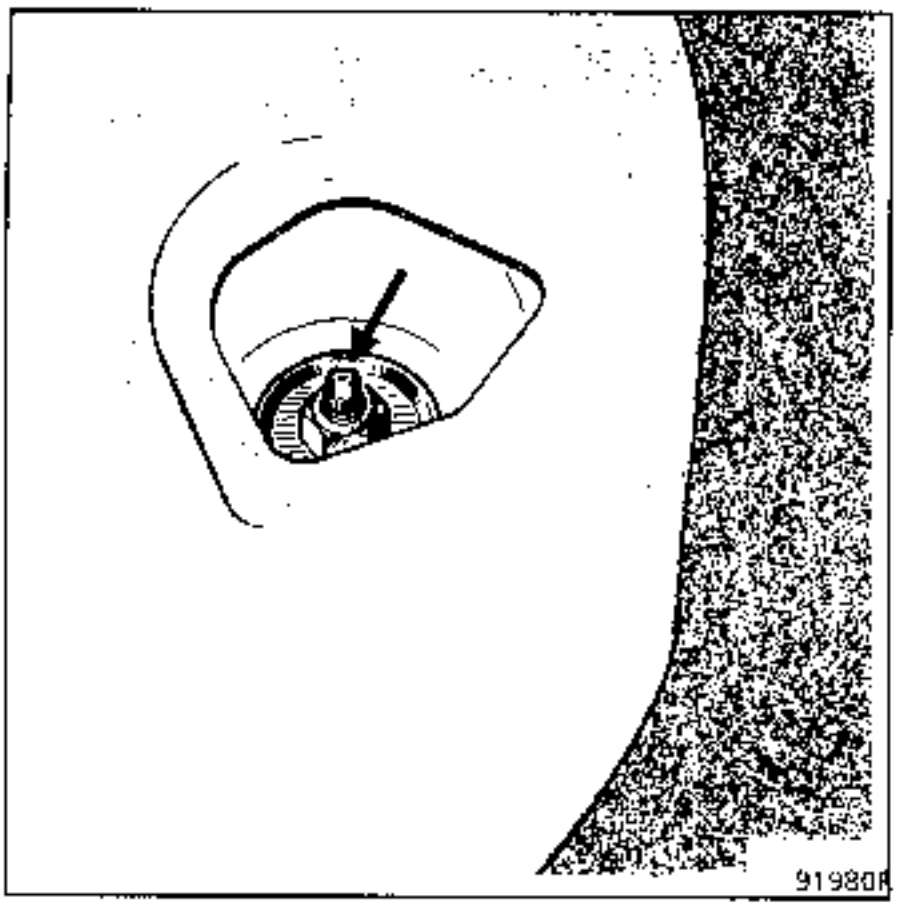
Fit in place:
- the shock absorber,
- the upper and lower mounting bolts, smeared with **MOLYKOTE BR2** grease without tightening them.

With the vehicle on its wheels, torque tighten the two bolts.

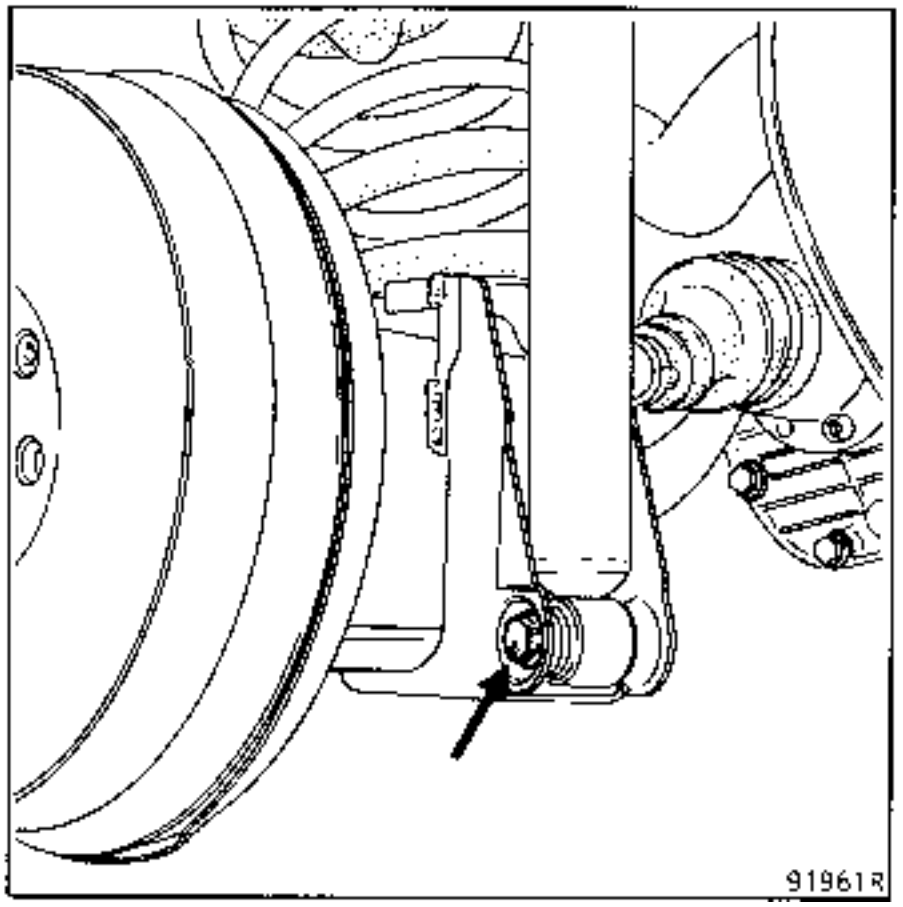
TIGHTENING TORQUES (in daN.m)		
Upper securing bolts		4.5
Lower securing bolt		5.5
Wheel bolts	4 bolts	9
	5 bolts	10

REMOVING

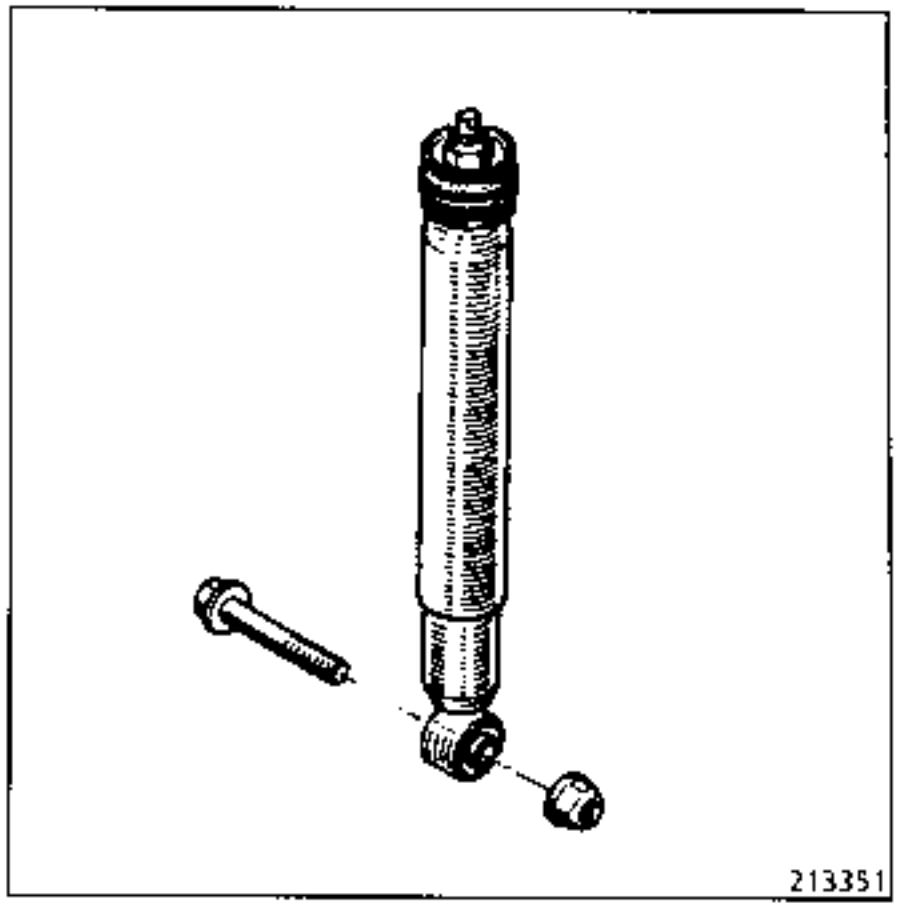
With the vehicle on its wheels remove :
- the upper mounting inside the vehicle,



- the lower mounting,



- the shock absorber.



Precautions to be taken before assembly:

In the Parts Department these shock absorbers are stored horizontally.

Under these conditions, it is possible that shock absorbers intended to function vertically become unprimed.

Therefore, before fitting them to the vehicle, they must be pumped manually several times in the vertical position.

REFITTING

Fit in place:
- the shock absorber,
- the upper and lower mounting nuts and bolts, smeared with **MOLYKOTE BR2** grease.

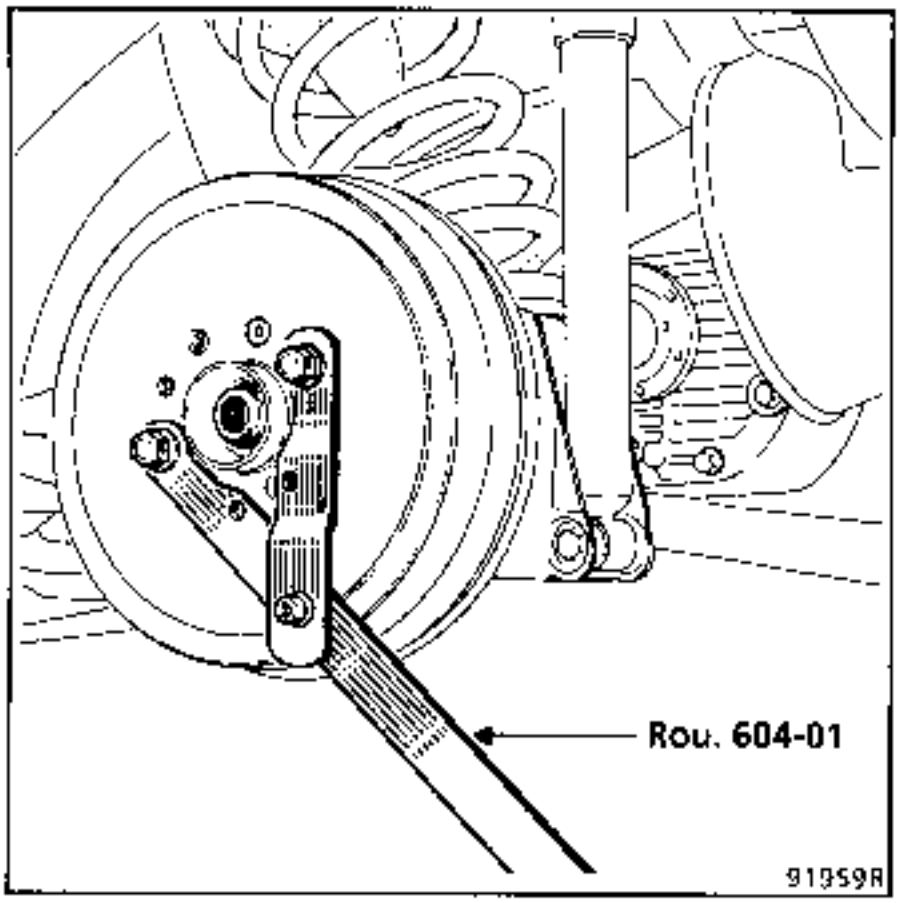
Torque tighten the mountings.

ESSENTIAL SPECIAL TOOLING		
Rou.	604-01	Hub locking tool

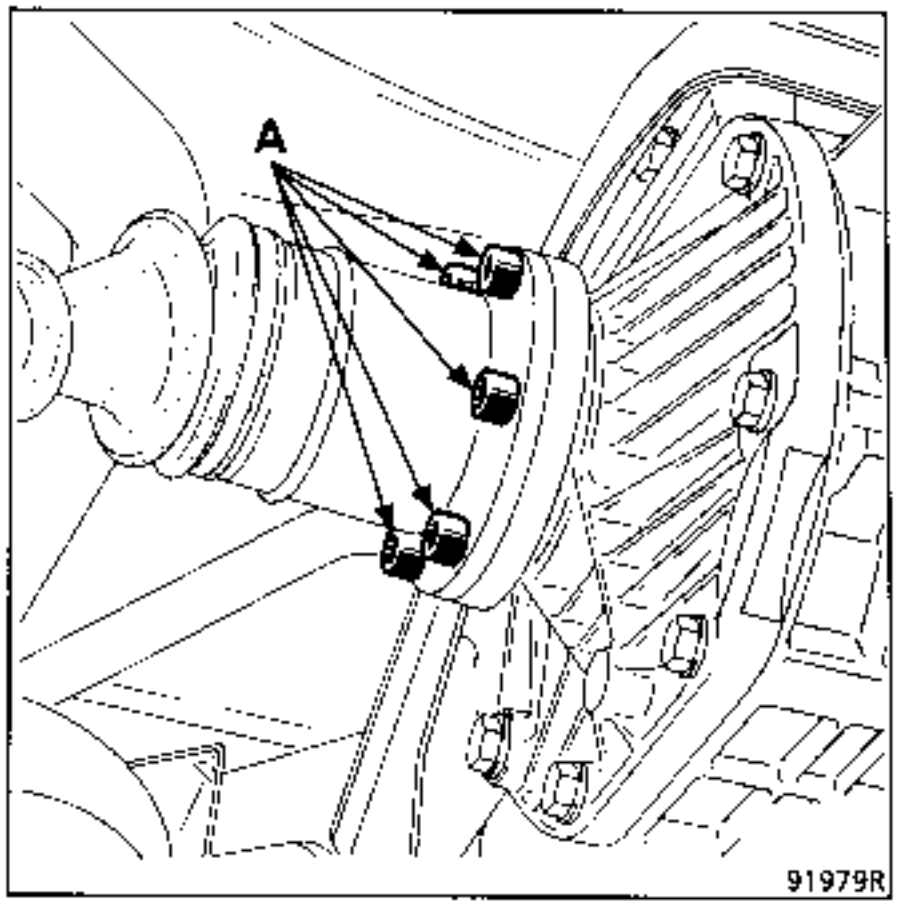
TIGHTENING TORQUE (in daN.m)		
Shock absorber bottom bolts		5.5
Anti-roll bar securing bolts		5.5
Bolts securing drive shaft to sun wheel		6
Wheel bolts	4 bolts	9
	5 bolts	10

REMOVING

Lock the hub using tool **Rou. 604-01**.

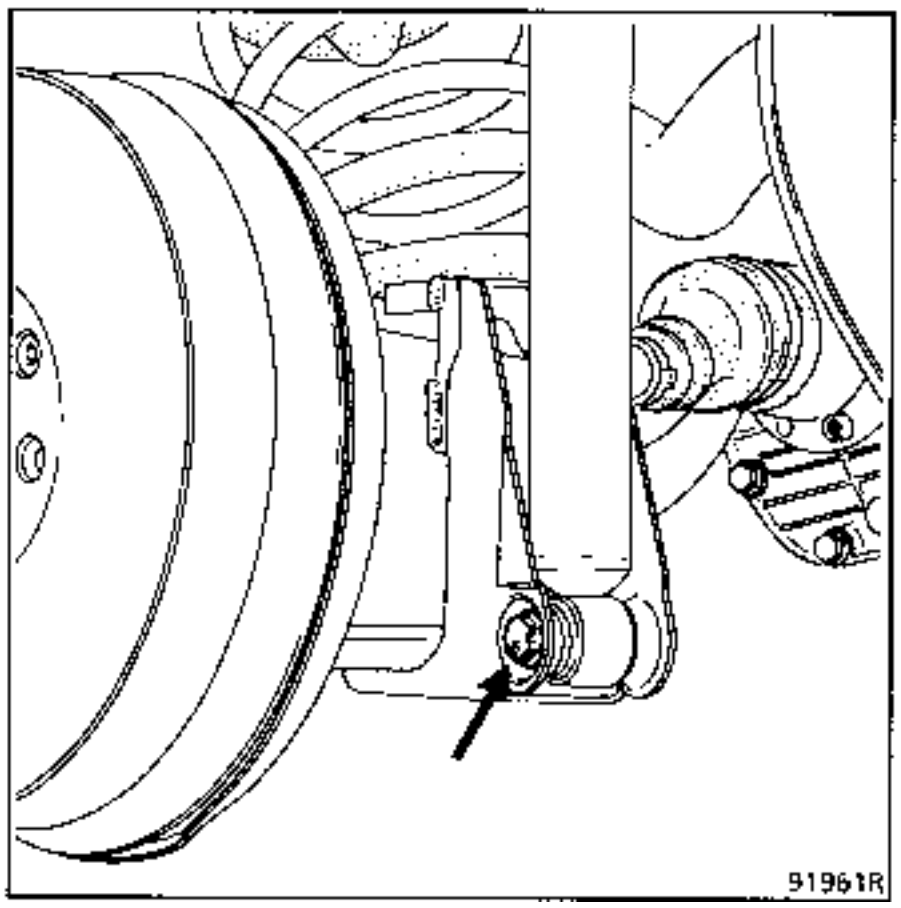


Remove the six bolts (A) securing the drive shaft on the sun wheel.

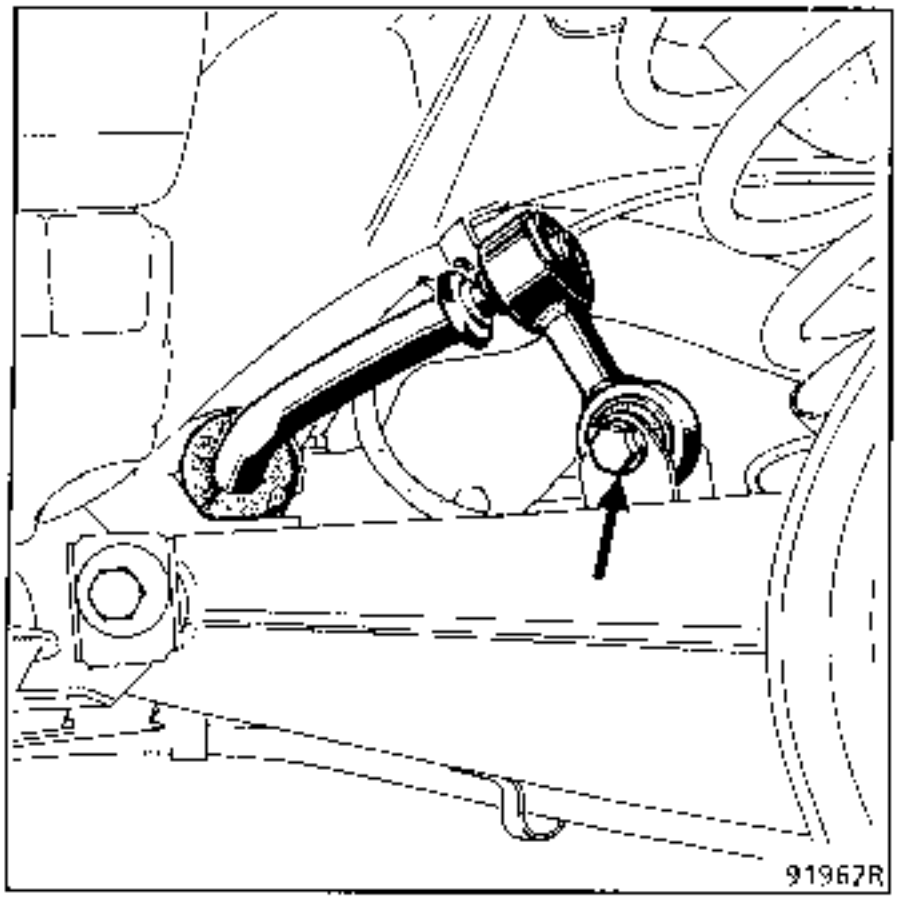


Disengage the drive shaft from the sun wheel and leave it suspended.
Support the half-shaft assembly with a jack and remove:

- the mounting from the bottom of the shock absorber,



- the mounting from the anti-roll bar link arm.

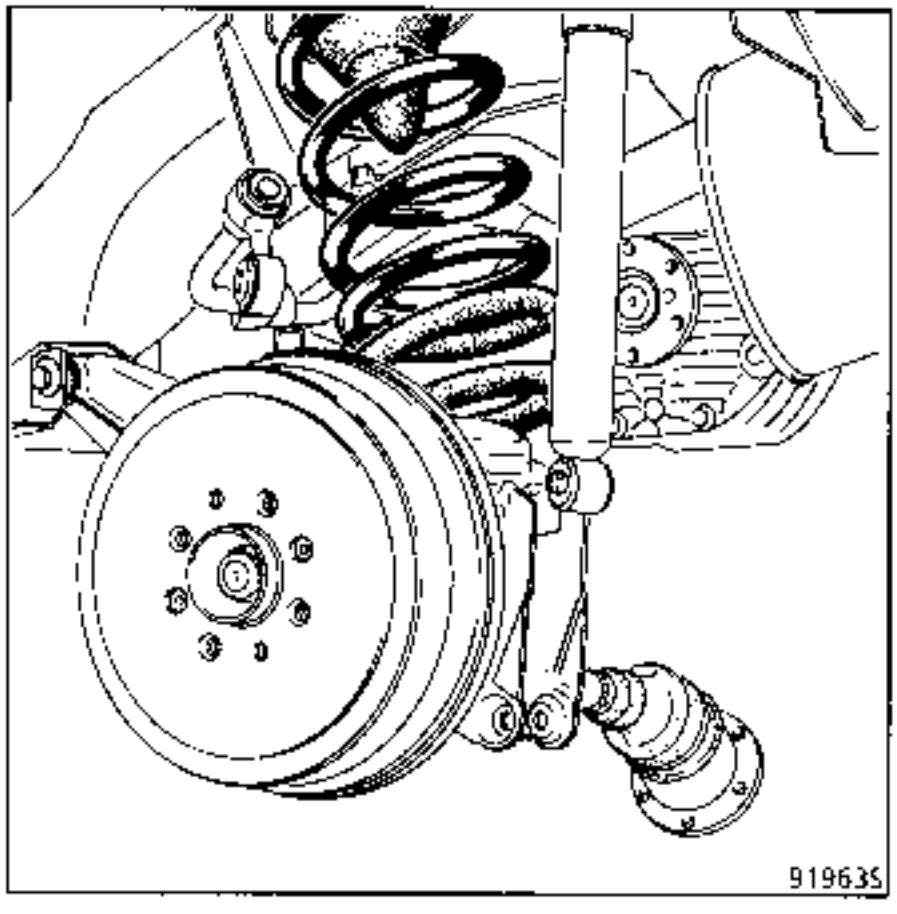


Fit a pedal clamp to the brake pedal and remove the brake hose from the arm.

Right-hand side :

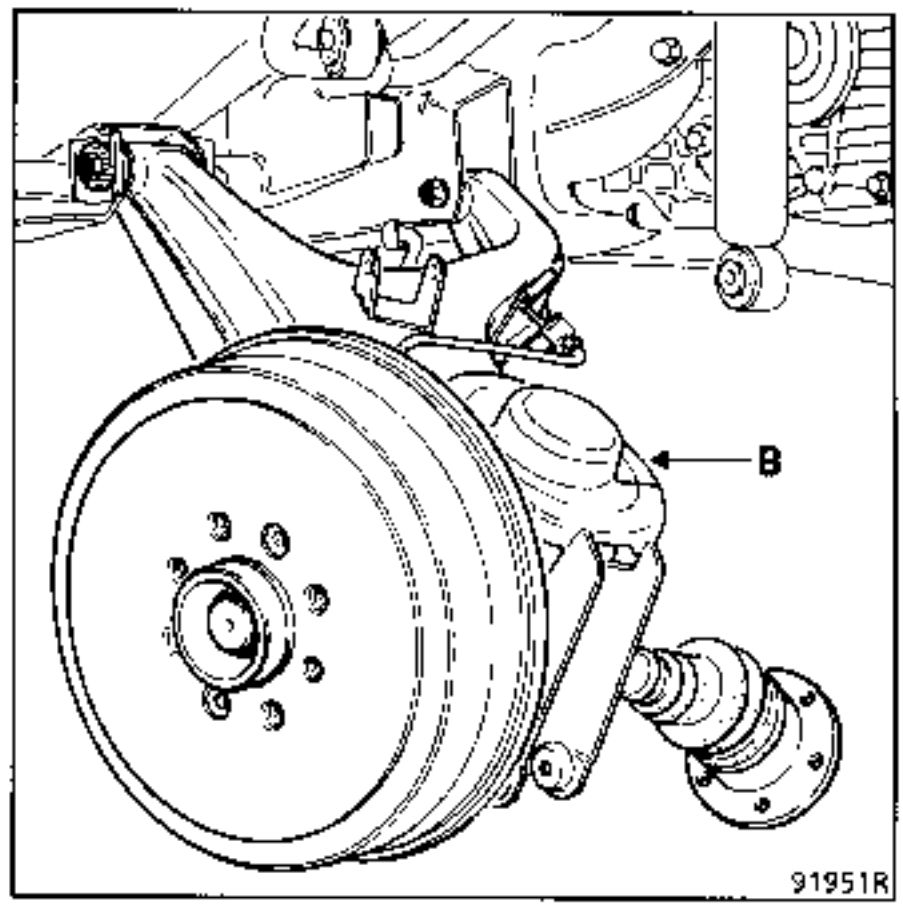
Remove the compensator control.

Lower the arm and remove the spring and impact damper.



REFITTING

Fit in place :
- the spring thrust block, directing the assembly so that the edge of the spring is opposite white mark (B) on the arm thrust cup;



- the block - spring assembly on the vehicle.

Compress the half-shaft assembly, engaging the bottom of the shock absorber and the anti-roll bar link arm in their locations.

Fit in place:
- the pins (previously smeared with **MOLYKOTE BR2** grease) for the bottom of the shock absorber and the anti-roll bar link arm, but do not tighten them,
- the brake hose.

On the right-hand side:

Refit the brake compensator control.

- the drive shaft on the sun wheel and torque tighten bolts (A) using tool **Rou. 604-01**.

With the vehicle on its wheels, torque tighten the pins on:
- the bottom of the shock absorber,
- the anti-roll bar link arm.

Bleed the brake circuit.

ESSENTIAL SPECIAL TOOLS		
Rou.	604-01	Hub locking tool

TIGHTENING TORQUES (in daN.m)		
Shock absorber bottom bolts		5.5
Anti-roll bar securing bolts		5.5
Anti-roll bar bearing bolts		3
Bolts securing drive shaft to sun wheel		6
Wheel bolts	4 bolts	9
	5 bolts	10

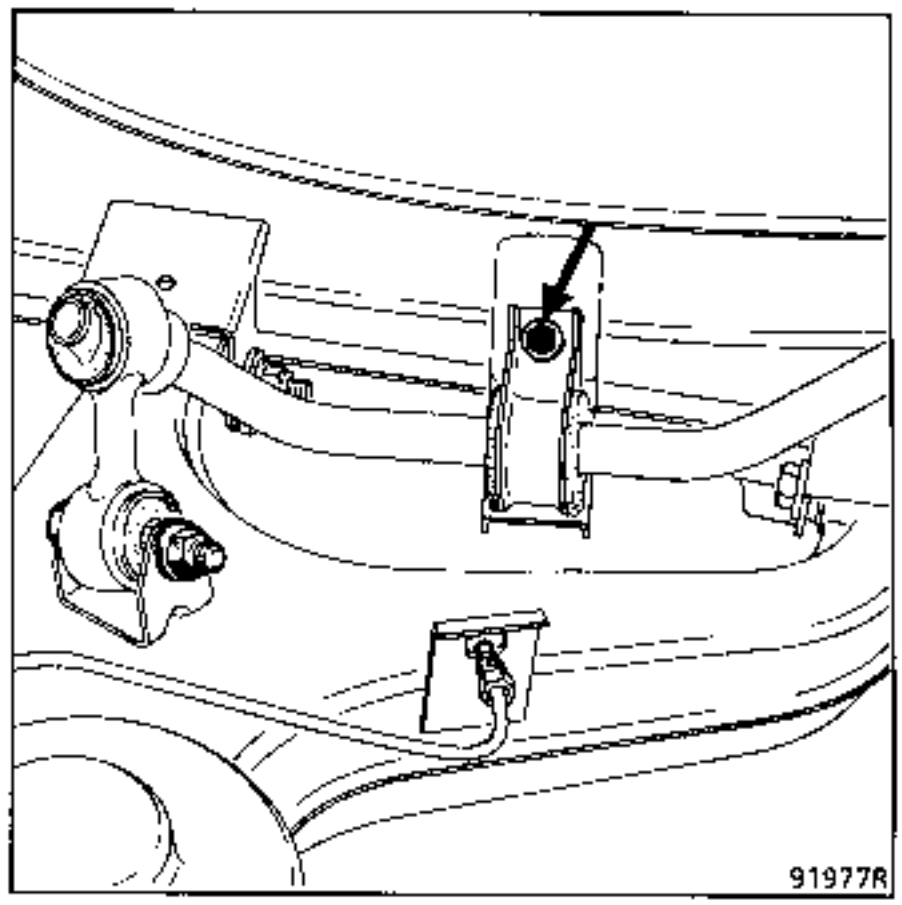
REMOVING

Right-hand side:

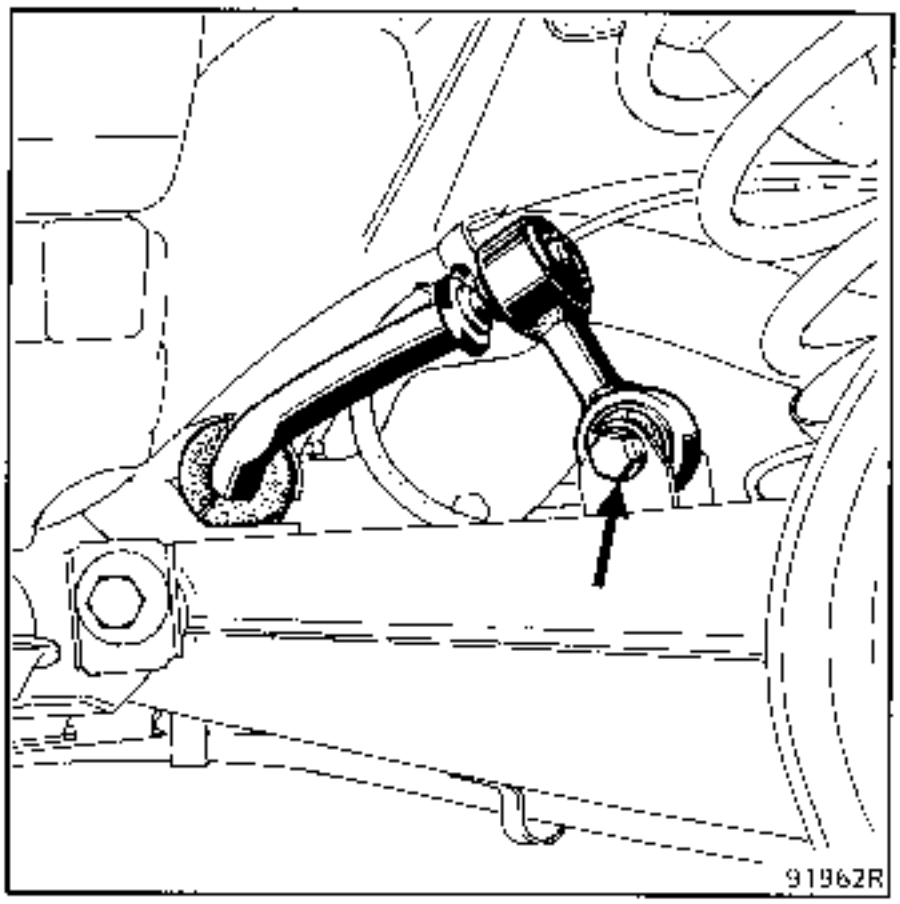
Remove the spring (see relevant section).

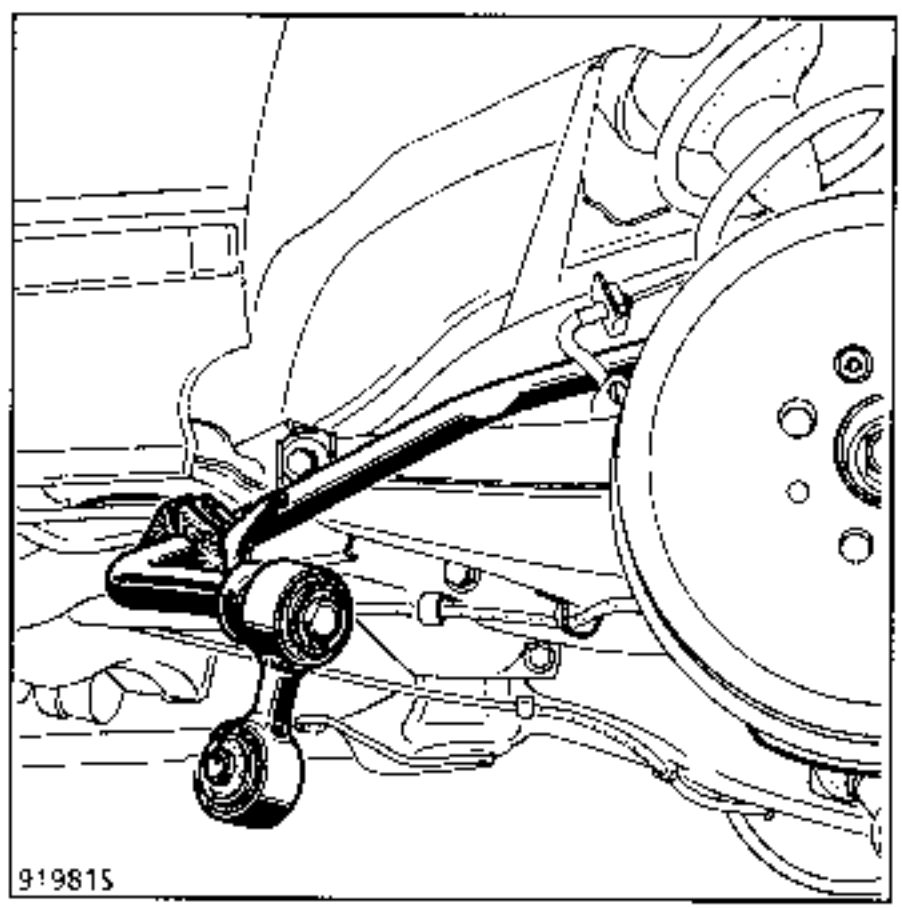
Left-hand side :

Place a jack under the half-shaft assembly and remove the anti-roll bar link arm mounting.



Take out the bar on the left-hand side, directing it as shown in the drawing.





On both sides :

Remove the anti-roll bar bearings.

REFITTING

Fit in place:

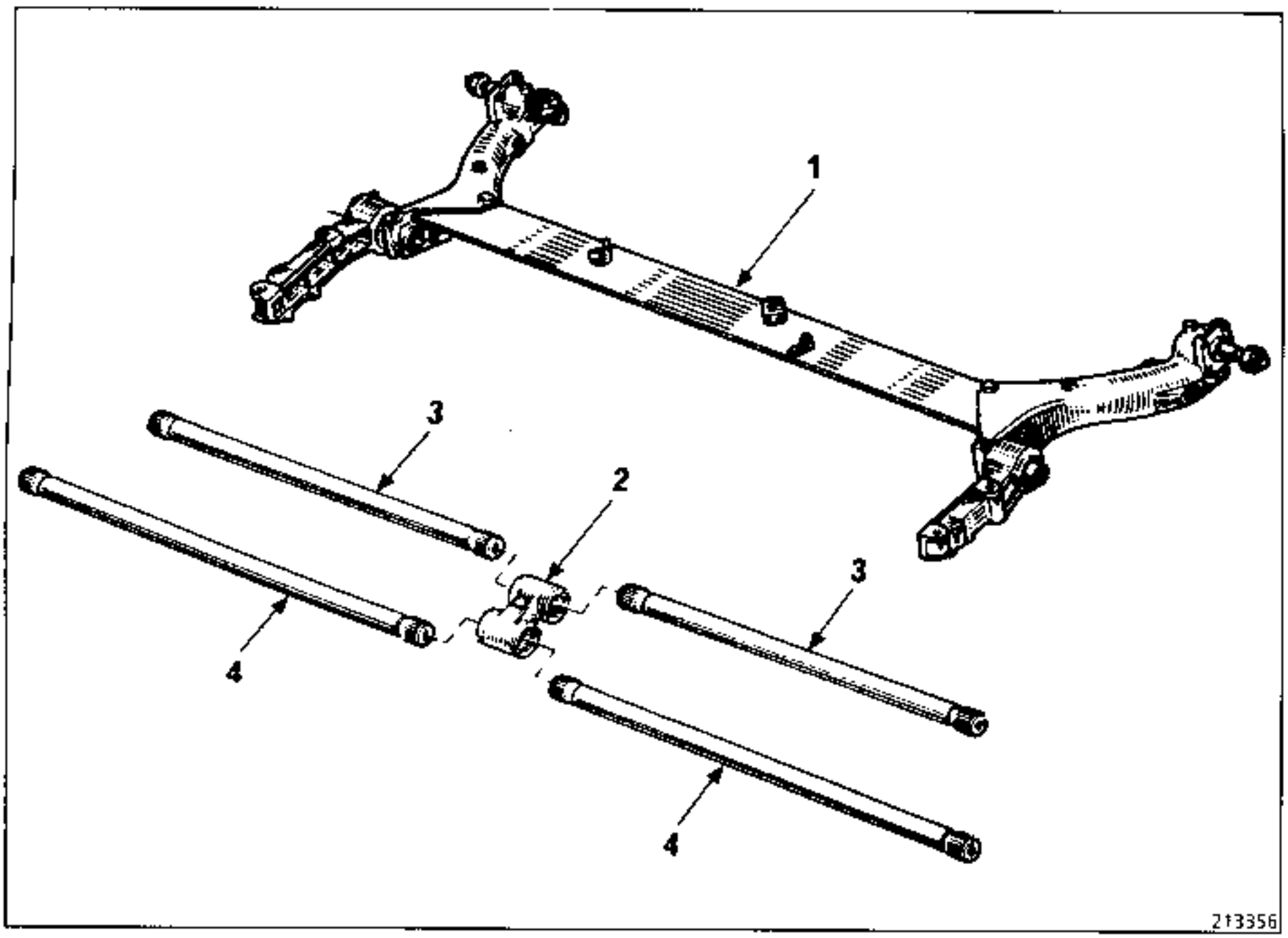
- the anti-roll bar from the left-hand side,
- the bearings on the cross member, but do not tighten them,
- the spring on the right-hand side (see corresponding section),
- the mountings holding the link arm on the arms, but do not tighten them.

With the vehicle on its wheels, torque tighten:

- the anti-roll bar bearings,
- the link arm mountings.

Bleed the brake circuit.

EXPLODED VIEW



The rear axle consists of:

- two arms connected by an L-shaped section This assembly (1) cannot be dismantled. If any components are deformed in any way, the entire assembly must be replaced,
- two anti-roll bars (3),
- two suspension bars (4),
- a link block (2) connecting the bars.

The assembly is connected to the body by means of two bearings fitted on silentblock bushes.

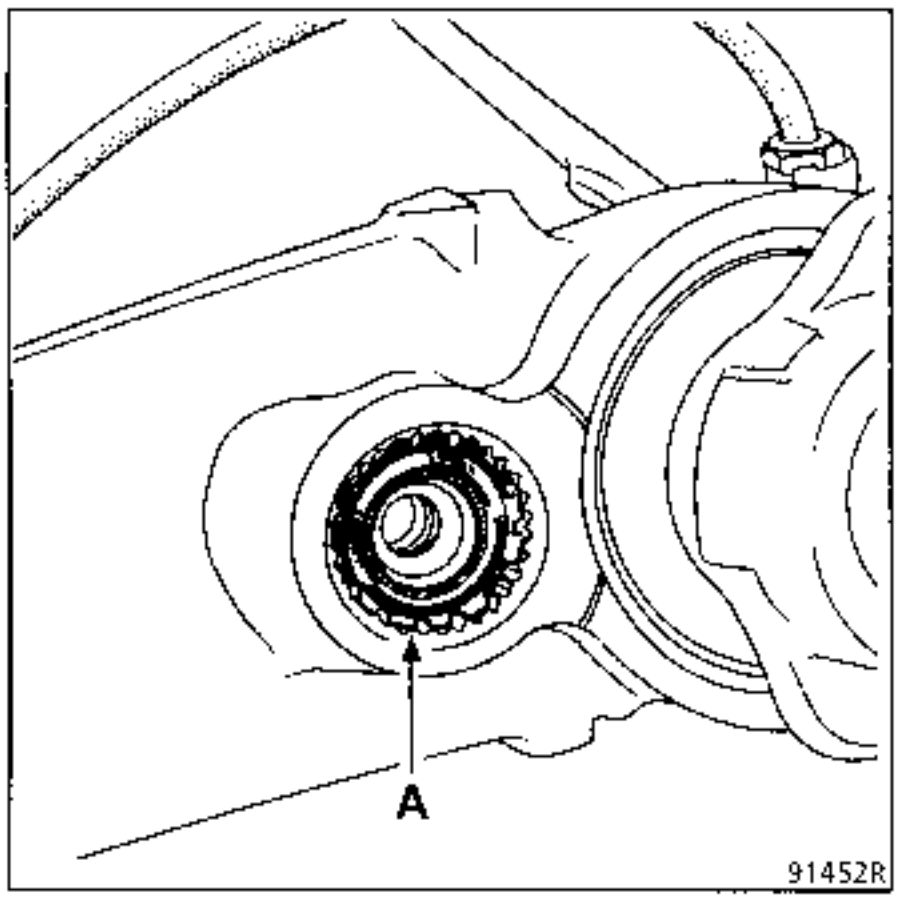
NOTE : It is prohibited to use a jack under the L-shaped section (1) to raise the vehicle.

REAR BEARING ELEMENTS		
Emb.	880	Impact tool

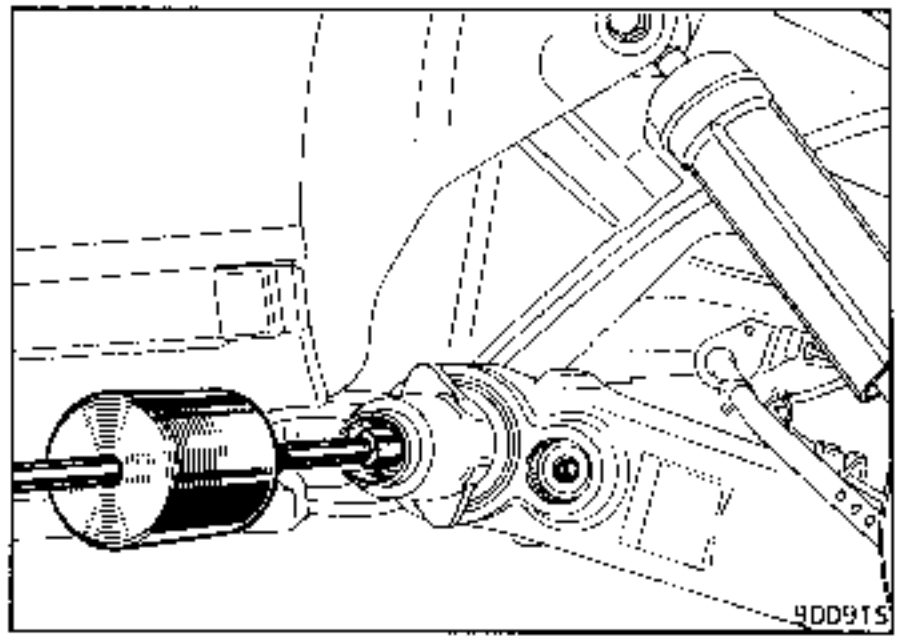
REMOVING

Place the vehicle on a 2-post lift (see recommendations in the "General" section).

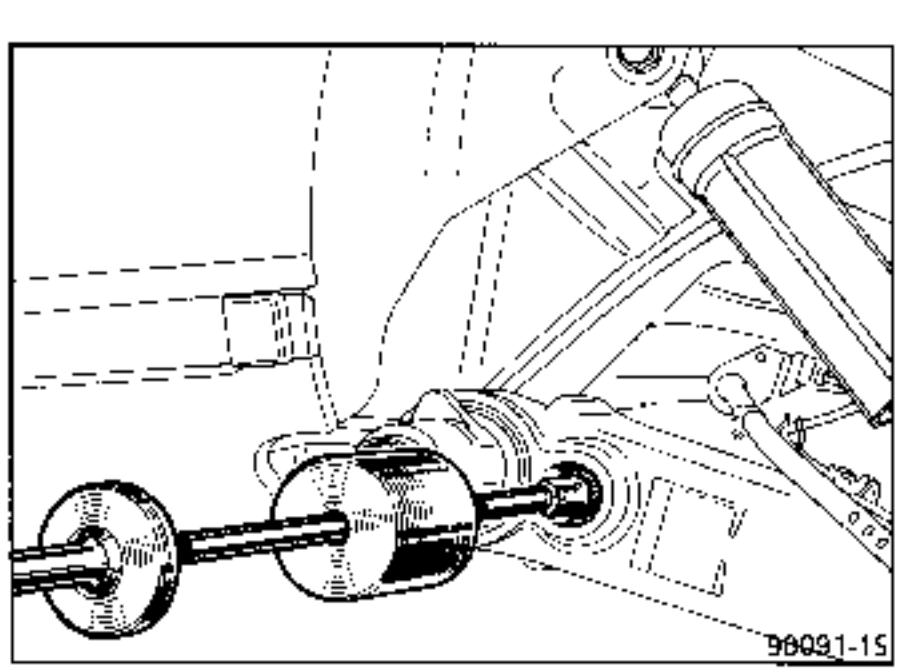
Special points
Depending on the version, the torsion bars are locked in their anchorages by means of clips (A) which have been destroyed in order to be removed.



Remove:
- the wheels,
- the shock absorbers,
- the two suspension arms using tool **Emb. 880**,



- one anti-roll bar using tool **Emb. 880,**
- the link block,
- the second anti-roll bar using tool **Emb. 880**.



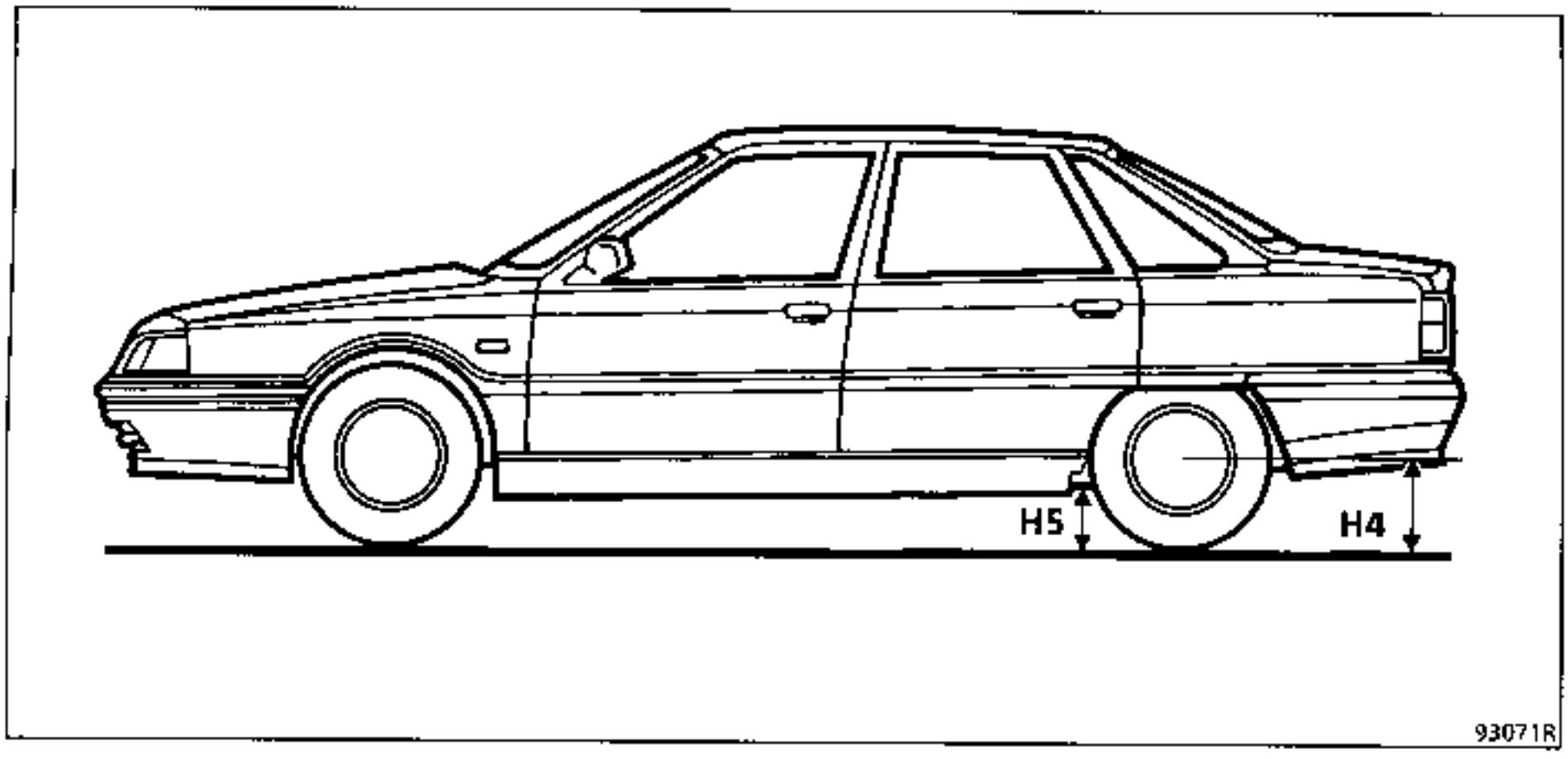
Then :

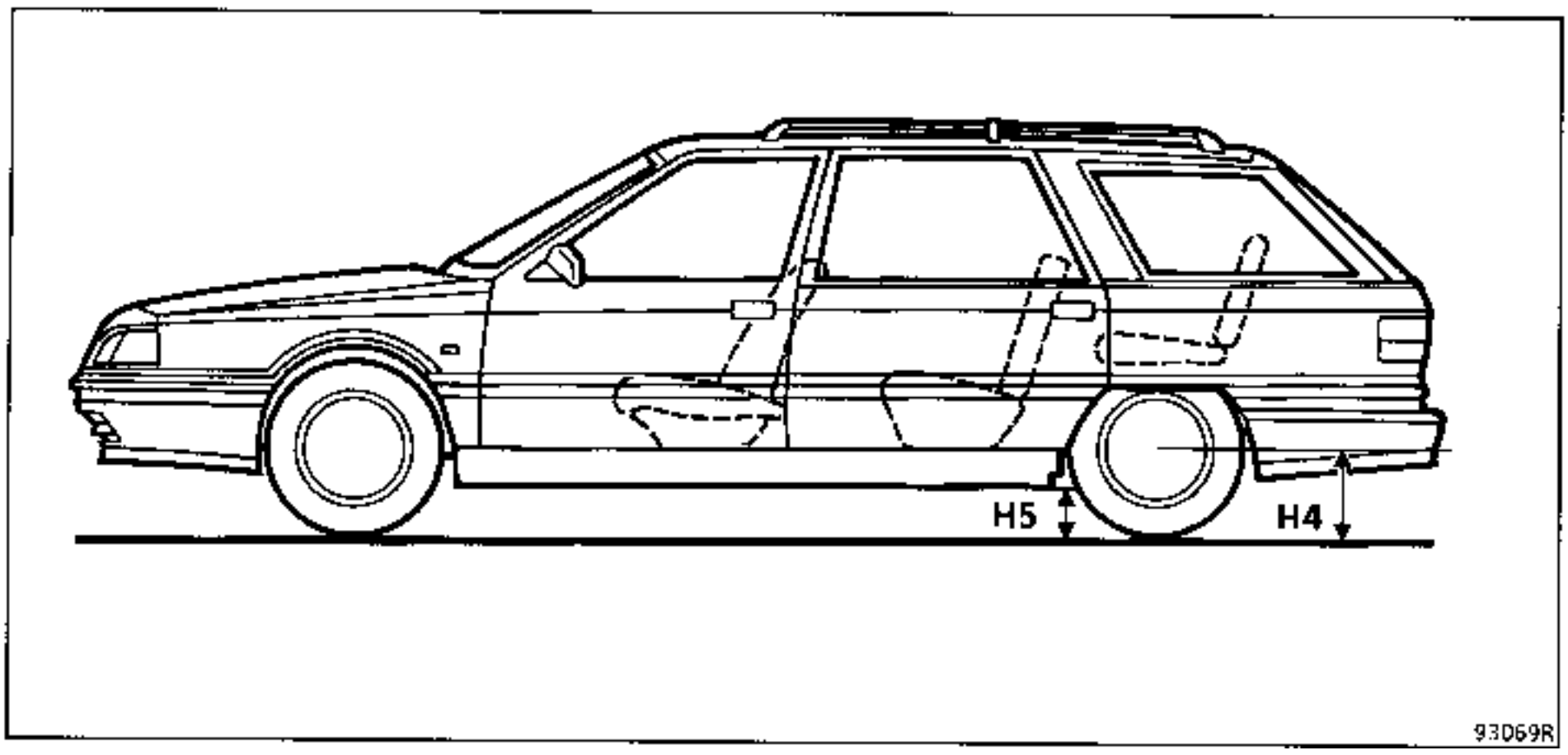
- either replace the rear axle (see section headed **"Rear axle - removing - refitting"** and the paragraph on **"Changing"**),

- or adjust the entire rear axle (see the section on **"Changing"**).

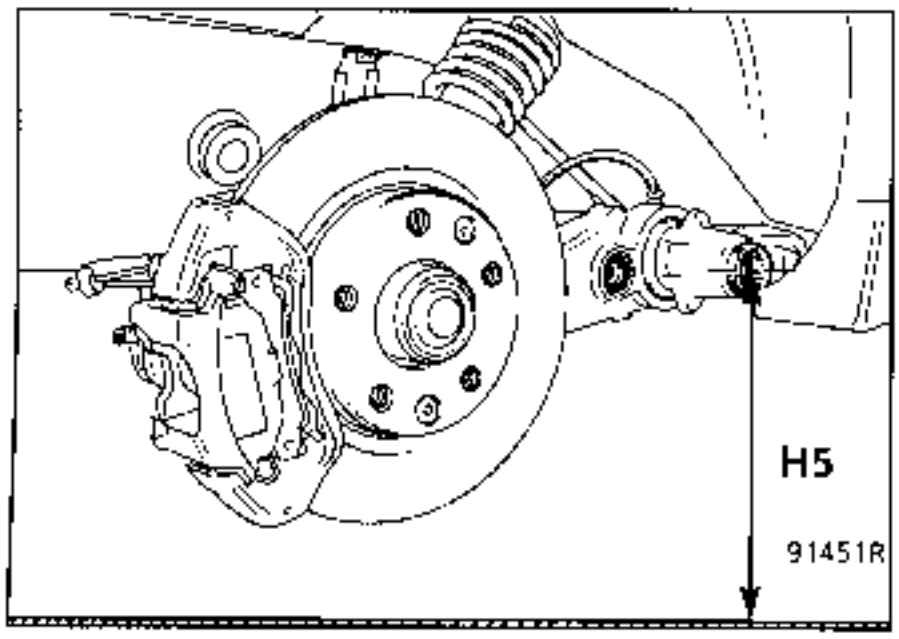
CHECKING

Place the vehicle, unladen, with a full fuel tank, on a flat surface.





Measure dimensions **H4** and **H5** and calculate the difference.



GOOD ROADS

TYPE			Dimension H4-H5	X
B481 L481 B482 L482 B48D L48D B48E L48E	B48F L48F B48H L48H B48J L48J L48M L48N	B484 L484 B48I L48I	28	496
B483 L483 B488 L488 L489	B48K L48K L48W B48W B48P	B487 L487 B48C L48C L48P	30	485
B480 L486 B48O L48O	L480 B48V B48A	B486 L48V L48A	23	485
L485	L48L		52	445
B48Y L48R	L48Y B48Q	B48R L48Q	38	480
K481 S482 K48E S48H K488 K48K K480 K48O K48R	S481 K486 K48F K48J K48V K48M K48A K487	K482 S486 K48H K483 S48V K48N K481 K489	10	475

Tolerances : ± 7.5 mm

UNMADE ROADS

TYPE	Dimension H4-H5	X
L481 L48J	0 − 7.5 mm	508
K48J	10 ± 7.5 mm	475

There are three possible cases where adjustment is required:

1. Heights correct on one side but difference between RH/LH too great.

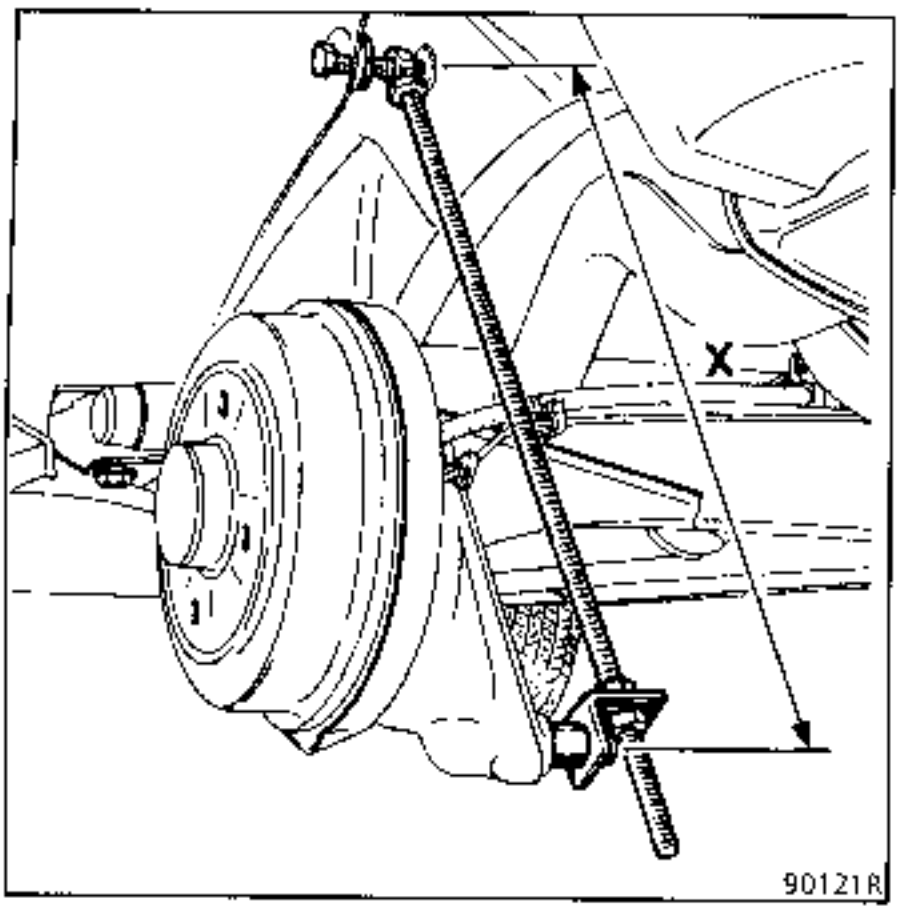
2. Heights incorrect and difference between RH and LH too great.

3. Heights incorrect but difference between RH and LH correct.

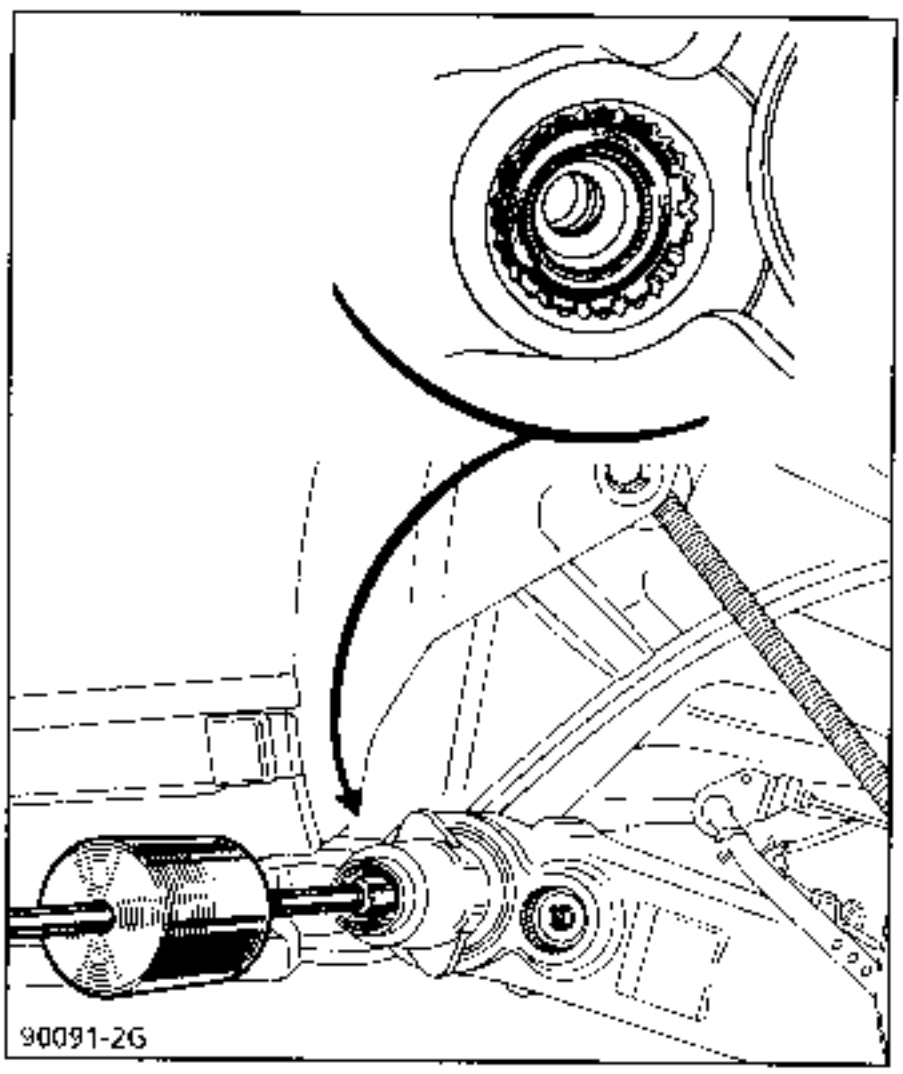
ADJUSTMENT

The underbody height is adjusted by acting SOLELY on the rotation of the suspension bars.

Remove the wheels and shock absorbers, position the tools in place of the shock absorbers with dimension X at value previously set.

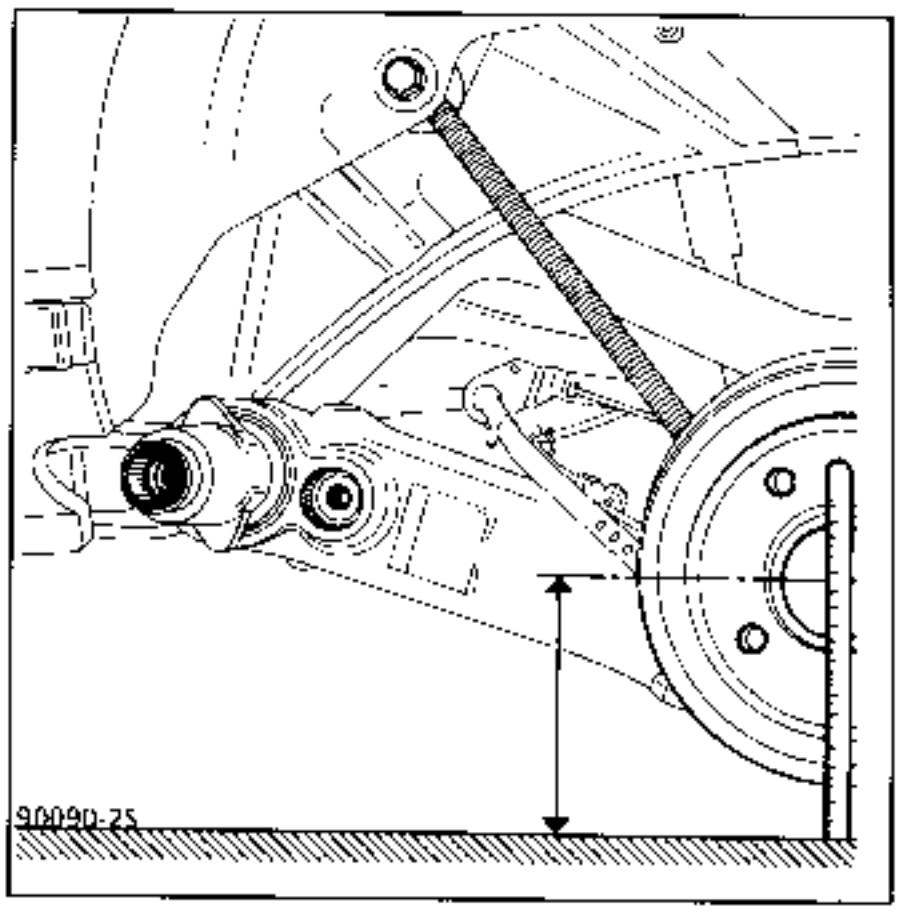


Remove:
- the two clips from the suspension bar anchorages,



- the two suspension bars using tool Emb. **880**.

Measure the distance between the wheel centre line and the ground (on both sides).



Then, by moving both tools, decrease or increase the distance between the centre line and the ground **at the same time on both sides** by the difference in height measured when the vehicle was checked.

Fit in place:
- the suspension bars in their new position bearing in mind that: **1 notch = 3 mm variation in underbody height,**
- the shock absorbers,
- the wheels.

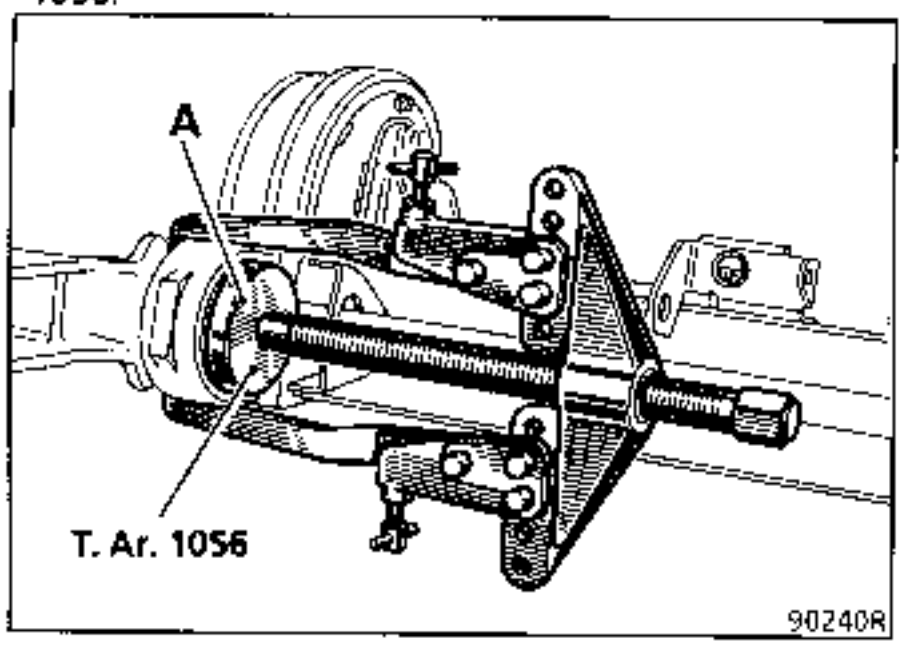
With the vehicle on its wheels, check and if necessary adjust:
- the brake compensator (depending on version),
- the headlight beam settings.

This operation is performed with the rear axle and suspension bars removed.

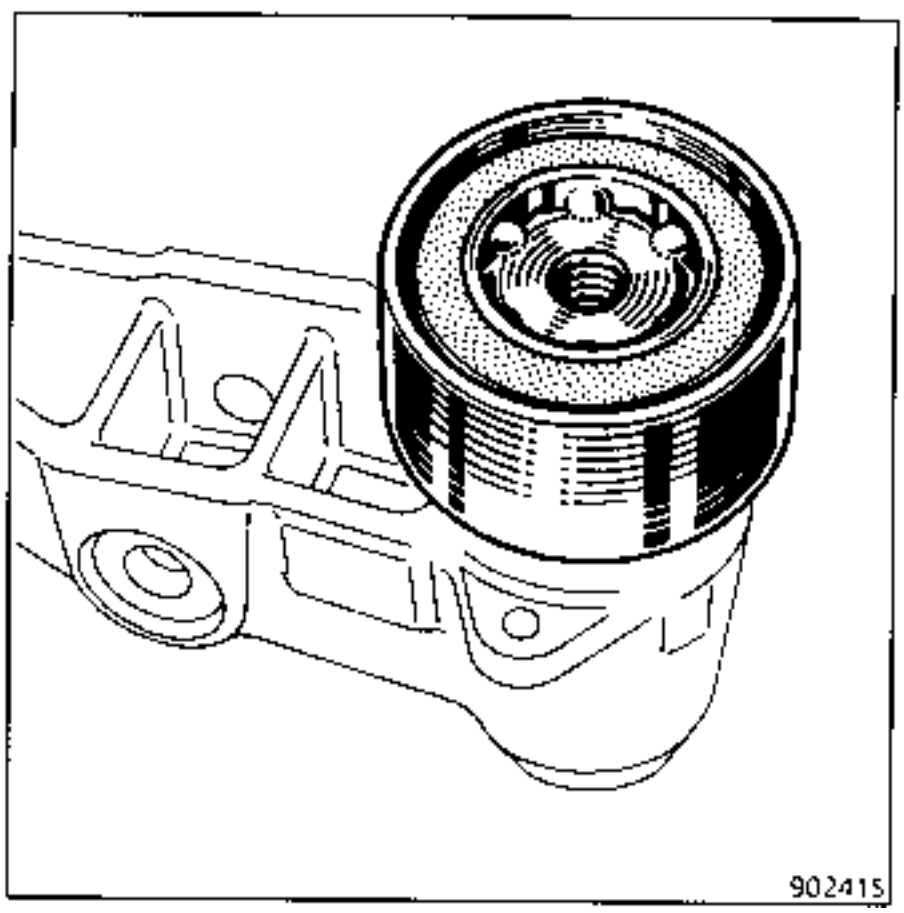
ESSENTIAL SPECIAL TOOLING	
T.Ar. 1056	Tooling for replacing rear axle rubber bush

DISMANTLING

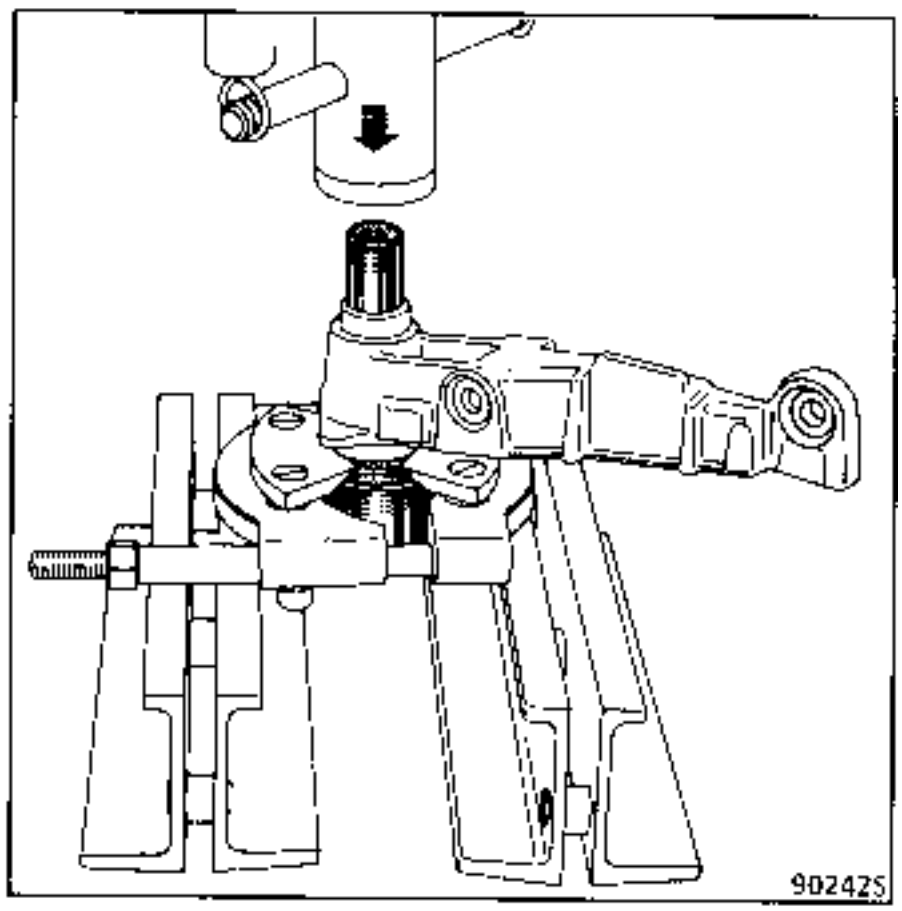
Take out the bearing - bush assembly from the rear arm using component (A) from tool T.Ar. 1056.



Weld on a spacer (e.g. a nut 26 mm across flats) in the bush central tube.

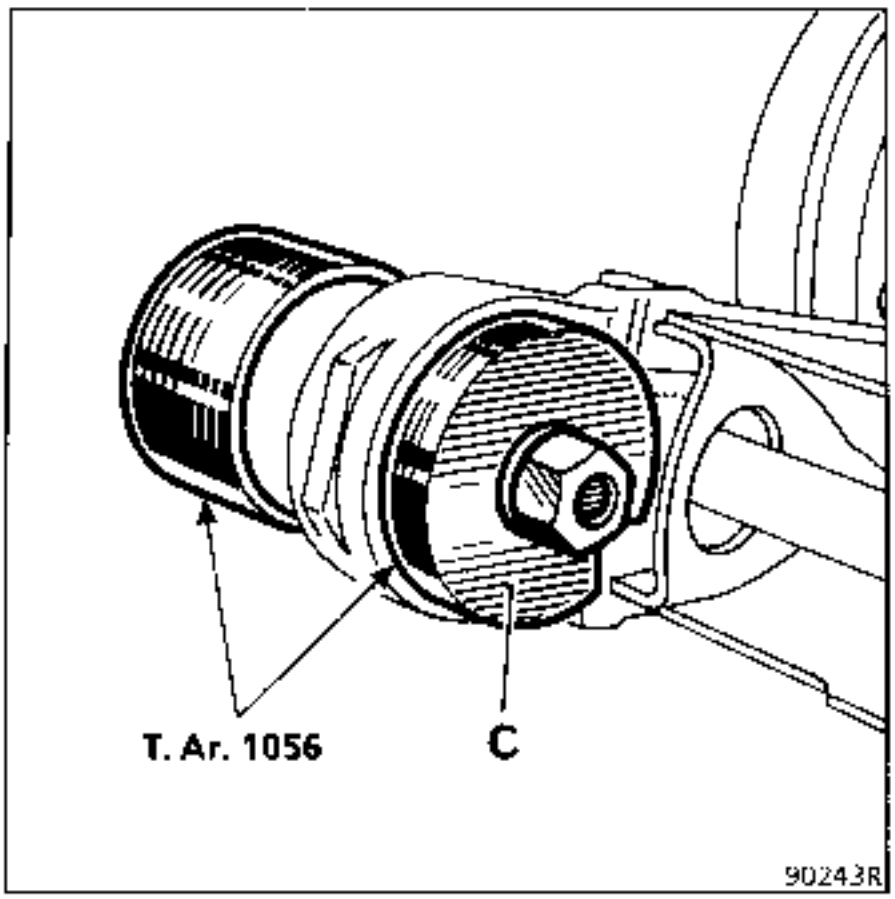


Take out the bush on the press, taking the weight on a FACOM U53G extractor.

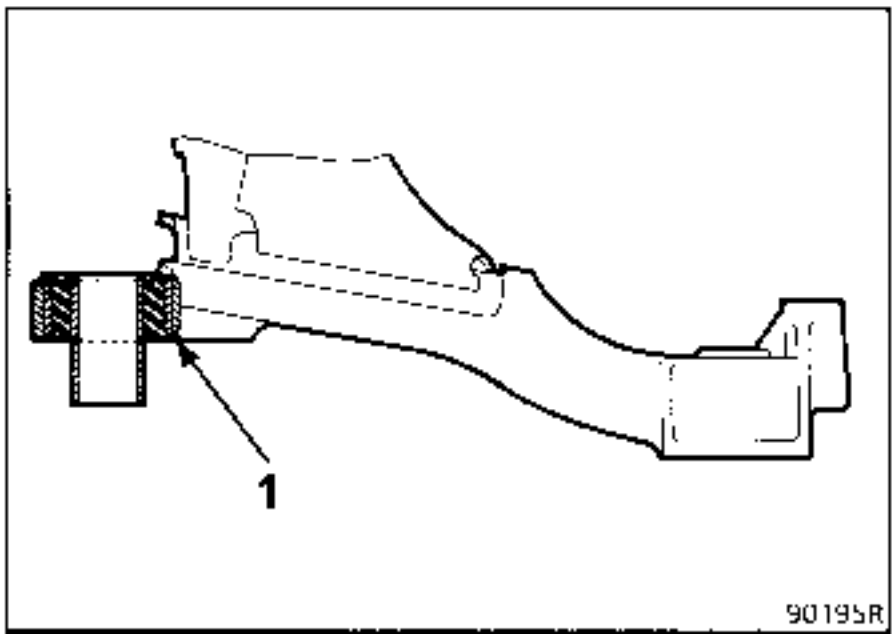


REASSEMBLY

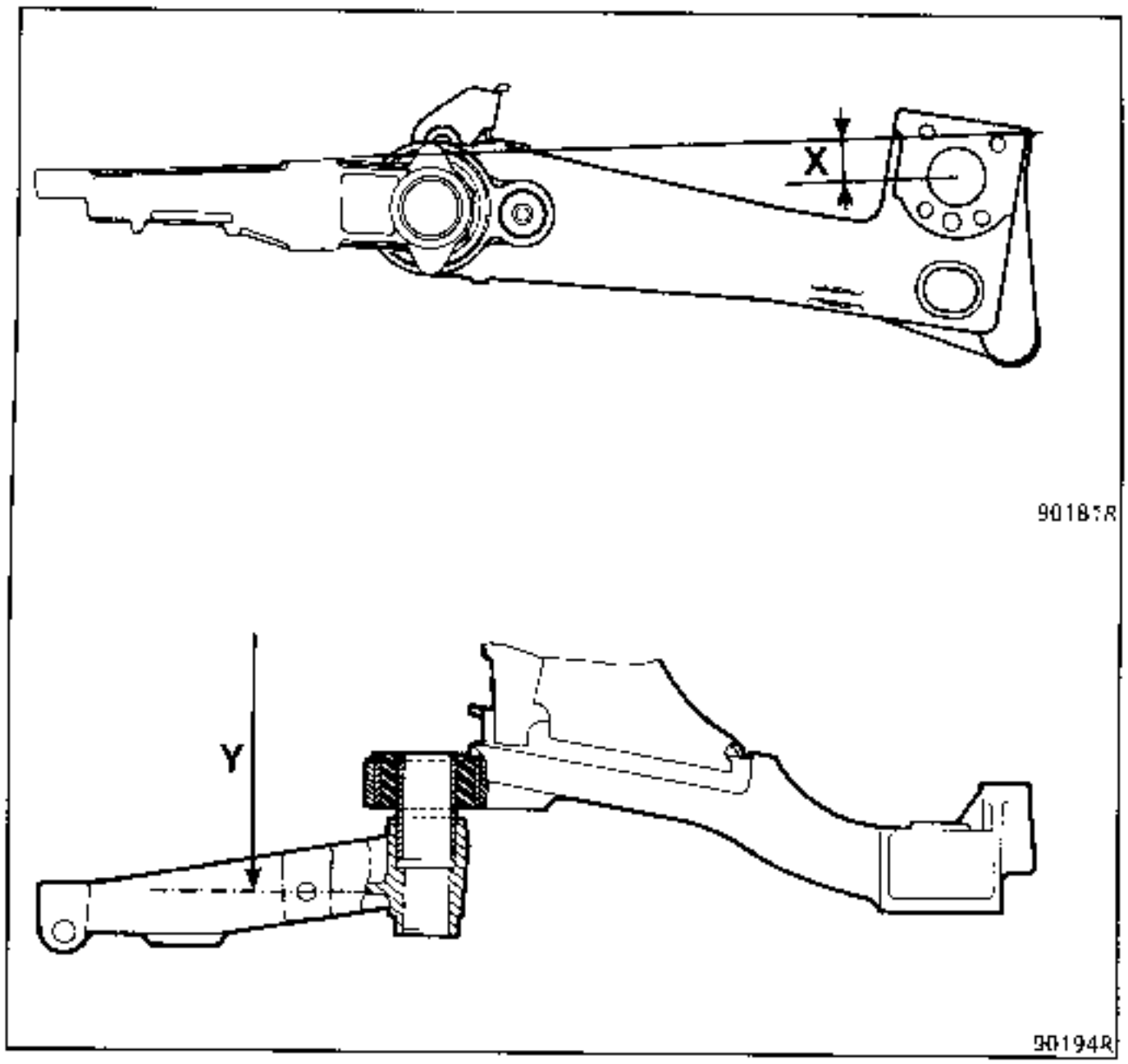
Fit the bush in place in the rear arm using components (B), (C) and the threaded rod from tool T.Ar. 1056, positioning component (C) as shown in the drawing.



NOTE : Fit on the bush until edge (1) is flush with the arm.

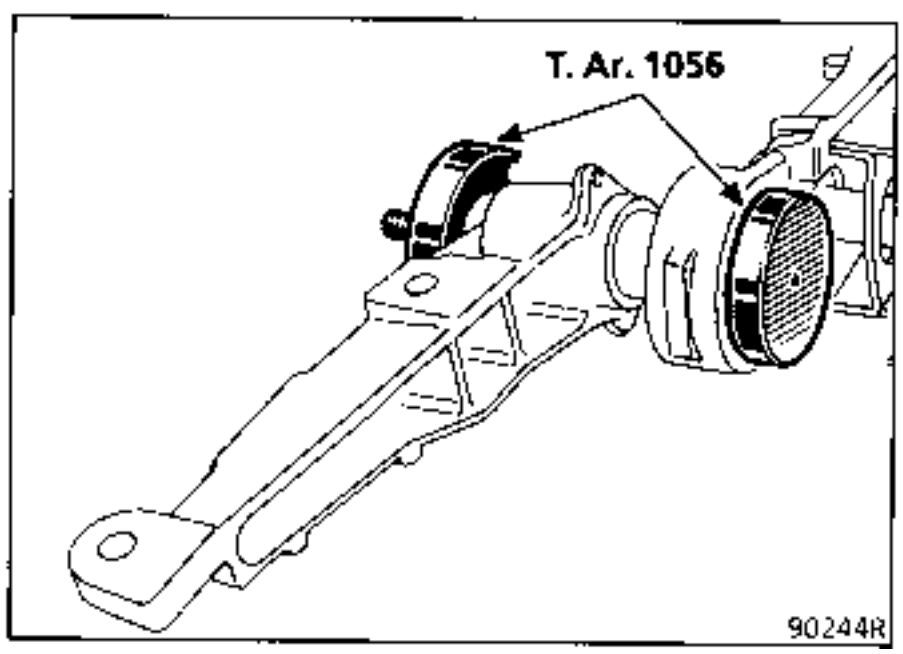


Fit in place the bearing on the bush ensuring dimension X = 24 ± 1 mm between the bearing face and stub axle shaft.



In this position, fit the bearing using components (A) and (C) from tool T.Ar. 1056 until dimension Y = 1285 ± 1 mm is obtained between the bearing centre lines

Fit the rear axle in place on the vehicle and refit the suspension bars (see relevant section).



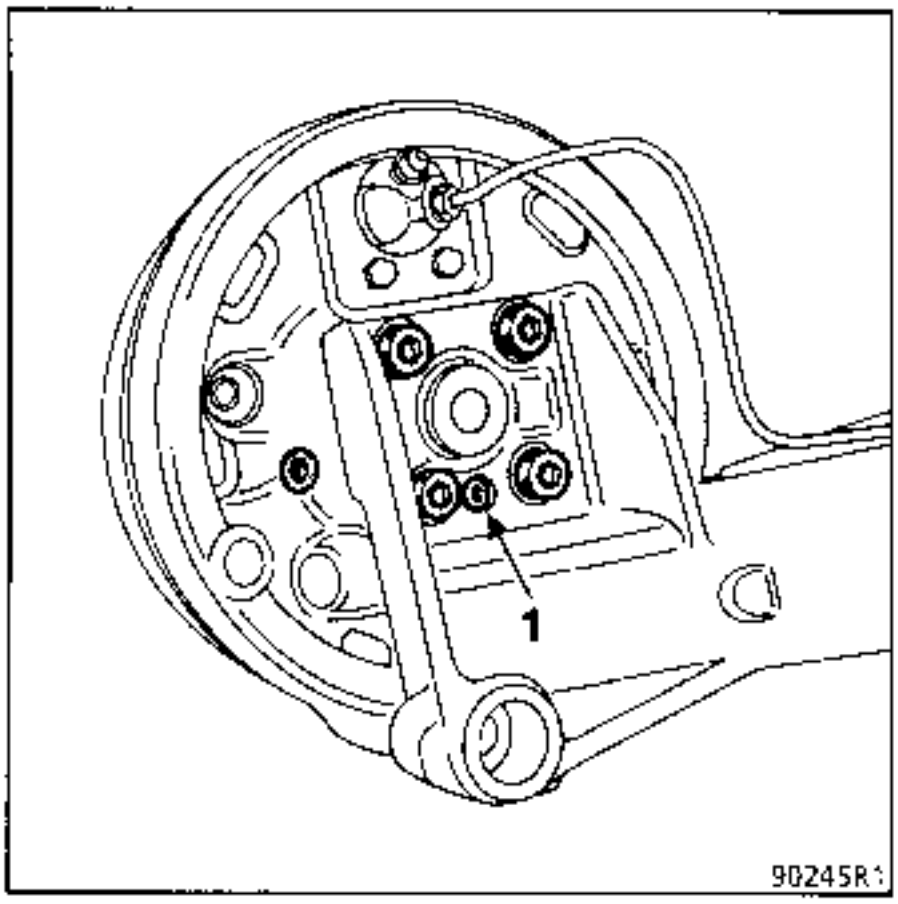
This operation is performed in situ.

TIGHTENING TORQUES (in daN.m)		
Bearing securing nut		8.5
Hub nut		16
Stub axle securing bolts		7.5
Wheel bolts	4 bolts	9
	5 bolts	10

REMOVING

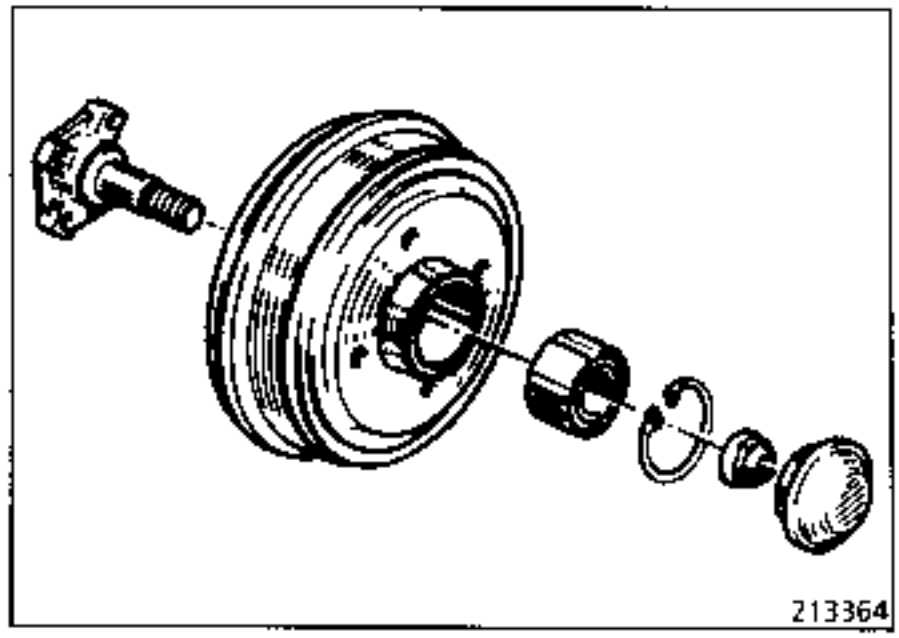
Place the rear of the vehicle on axle stands.

Remove:
- the drum (see the corresponding section),
- the four bolts holding the stub axle on the arm,
- the bolt (1) holding the brake back plate on the stub axle,

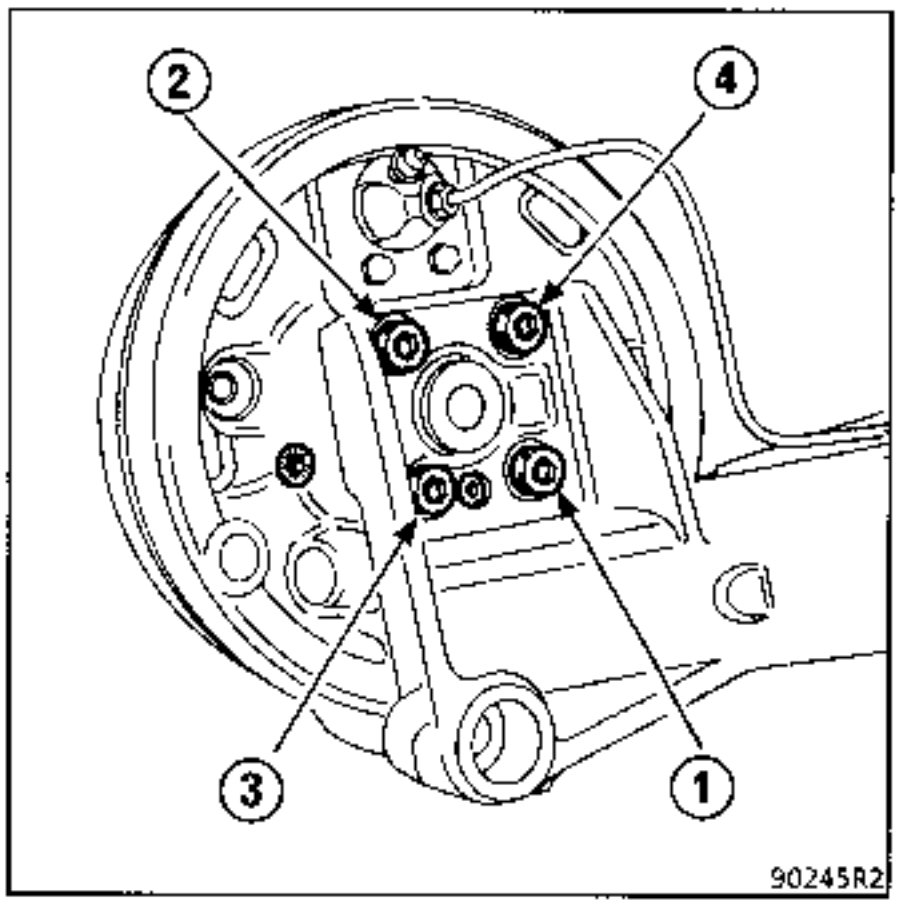


- the stub axle.

REFITTING



Fit in place:
- the stub axle and tighten bolt (1),
- four new arm mounting bolts and torque tighten them in the order (1), (2), (3) and (4) according to the diagram.



NOTE: If the stub axle mounting bolts are re-used, they must be smeared first with **LOCTITE FRENBLOC** or a new spring lock (grower) washer must be fitted.

Refit the drum (see the relevant section).

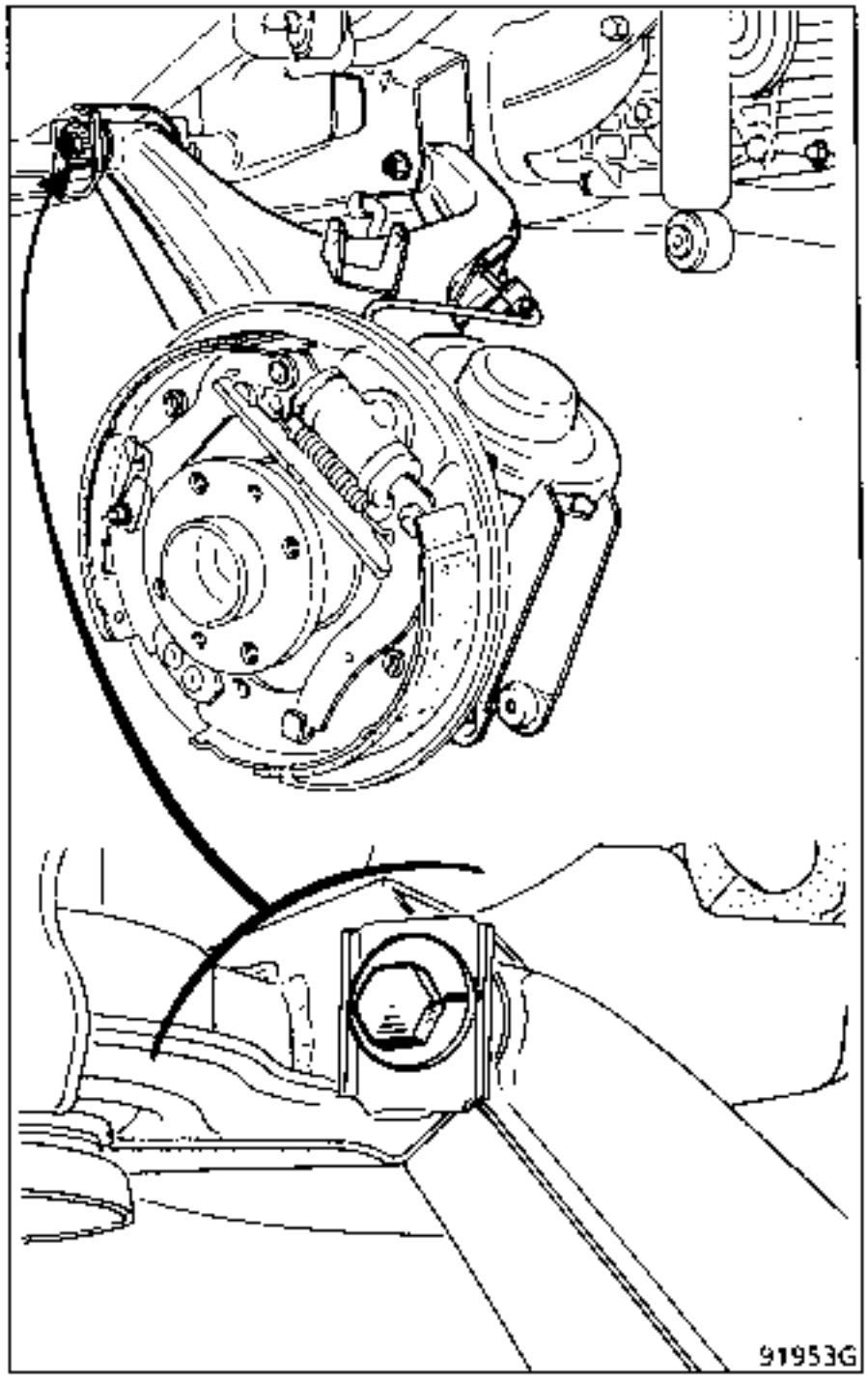
ESSENTIAL SPECIAL TOOLING		
Rou.	604-01	Hub locking tool
T.Av.	1050-02	Hub extractor

TIGHTENING TORQUE (in daN.m)		
Shock absorber bottom mounting bolt		5.5
Anti-roll bar mounting bolt		5.5
Bolts securing drive shaft to sun wheel		5
Drive shaft nut		21
Swing arm mounting bolt		7
Wheel bolts	4 bolts	9
	5 bolts	10

REMOVING

Remove:

- the brake drum (see relevant section);
- the handbrake cable and free it from its guides on the arm;
- the drive shaft (see relevant section);
- the spring (see relevant section);
- the two mounting bolts from the arm after marking the position of the parallelism adjusting cam bolt;
- the swing arm.



Replacing the bushes

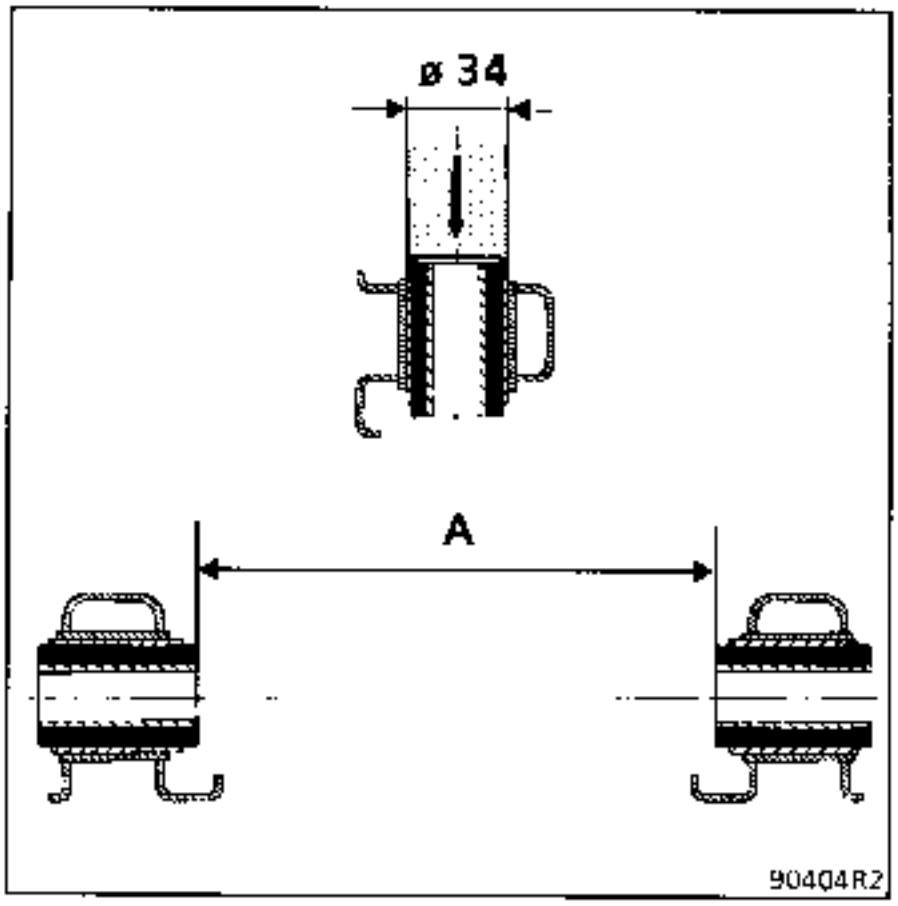
In order to keep the bushes centred in relation to the swing arm centre line, they must be replaced one after the other.

On the press knock out one of the worn bushes using a piece of tubing with an outer diameter of **34 mm**.

Refit a new bush until dimension A = **262 ± 0.5 mm**.

On the press, knock out the second bush and proceed in the manner as above in order to retain dimension A = 262 ± 0.5 mm.

NOTE : The inner and outer bushes of the swing arms are not identical (please see the PR for the vehicle in question).



REFITTING

Refit the swing arm to the vehicle, positioning the cam bolt so that it is aligned with the markings made on removal.

Place a jack under the arm and fit in place:
- the spring (see relevant section),
- the drive shaft (see relevant section),
- the handbrake cable,
- the brake drum.

With the vehicle on its wheels, torque tighten the following:
- the mounting securing the arm to the cross member,
- the anti-roll bar link arm mounting,
- the shock absorber base.

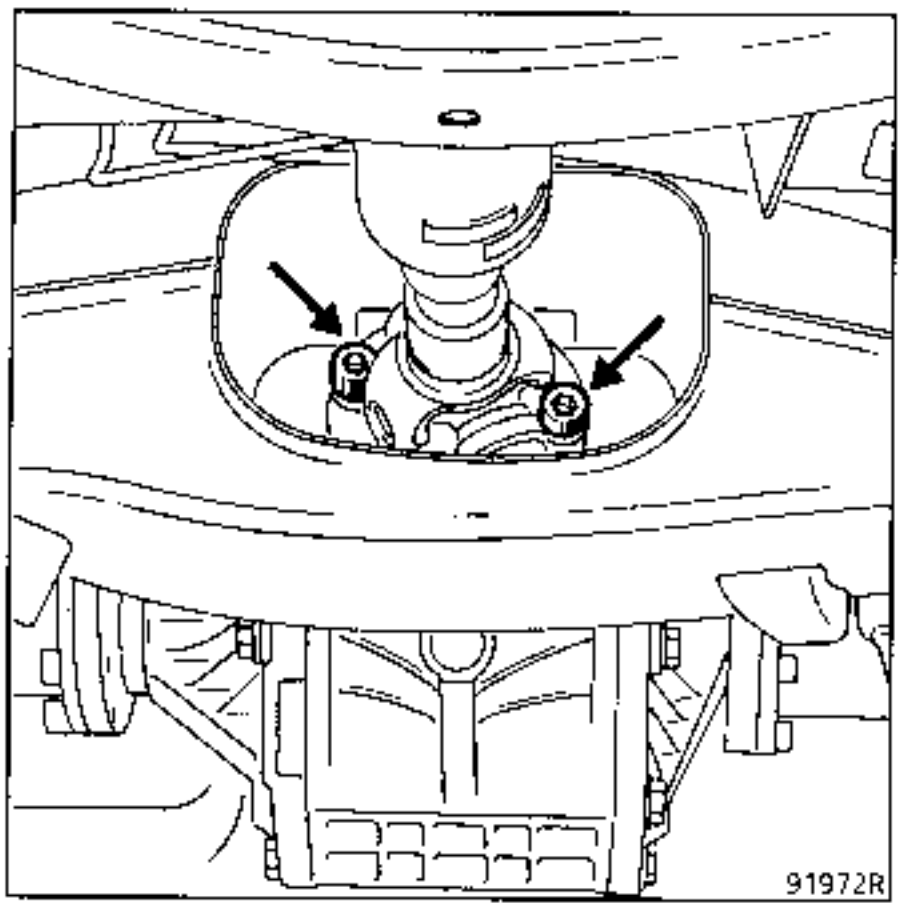
Bleed the brake system; check and if necessary adjust the parallelism.

ESSENTIAL SPECIAL TOOLING		
Rou.	604-01	Hub locking tool

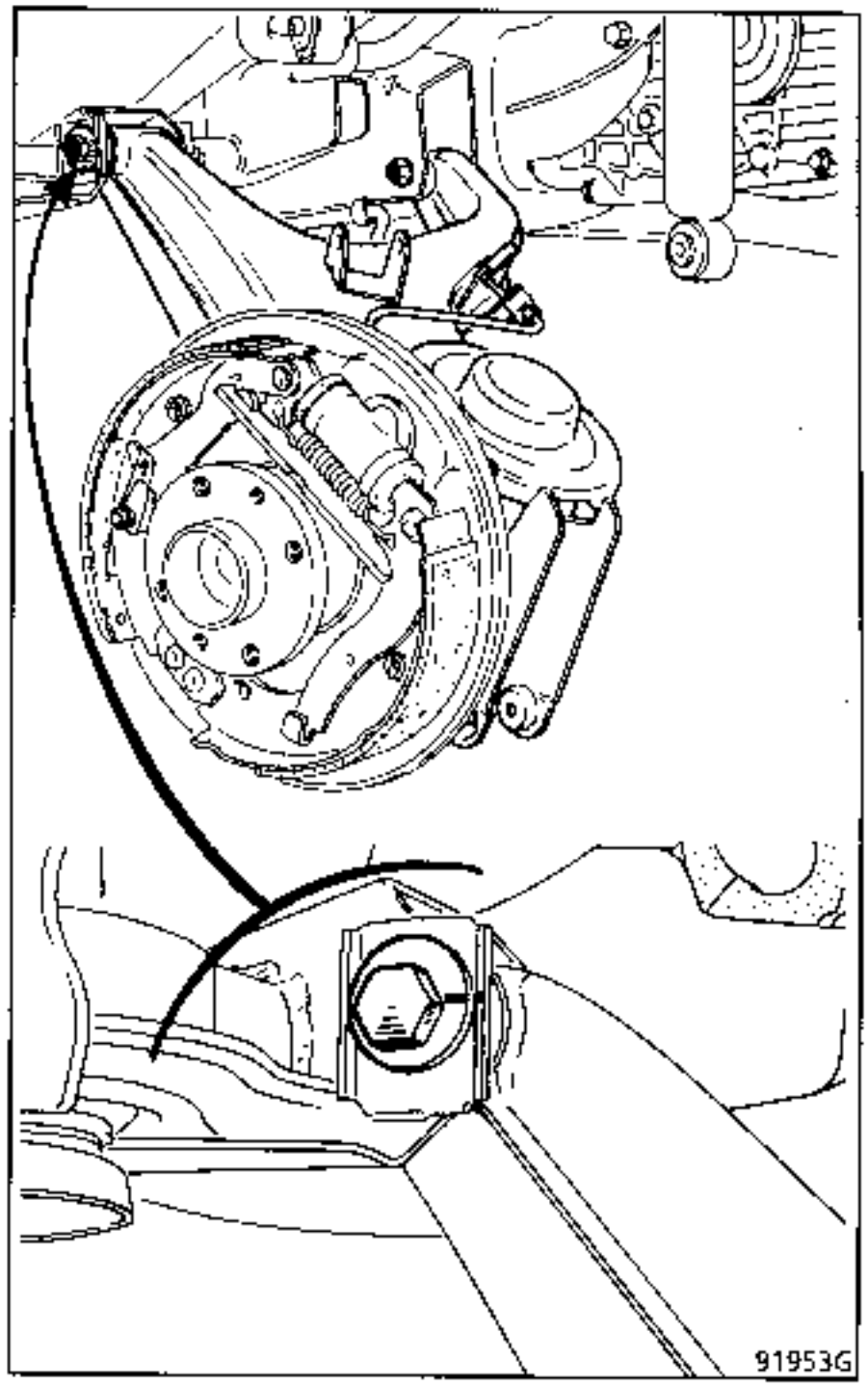
TIGHTENING TORQUES (in daN.m)	
Shock absorber bottom bolts	5.5
Anti-roll bar securing bolts	5.5
Bolts securing drive shaft to sun wheel	6
Bolts securing arm	7
Anti-roll bar bearing bolt	3
Final drive flange bolt	5
Final drive securing bolt on cross member	8
Final drive rear mounting	8
Cross member mounting on bush	12
Cross member mounting on support panel	8
Wheel bolts 4 bolts	9
5 bolts	10

REMOVING

With the vehicle on its wheels remove :
- the mounting bolts from the final drive flange,

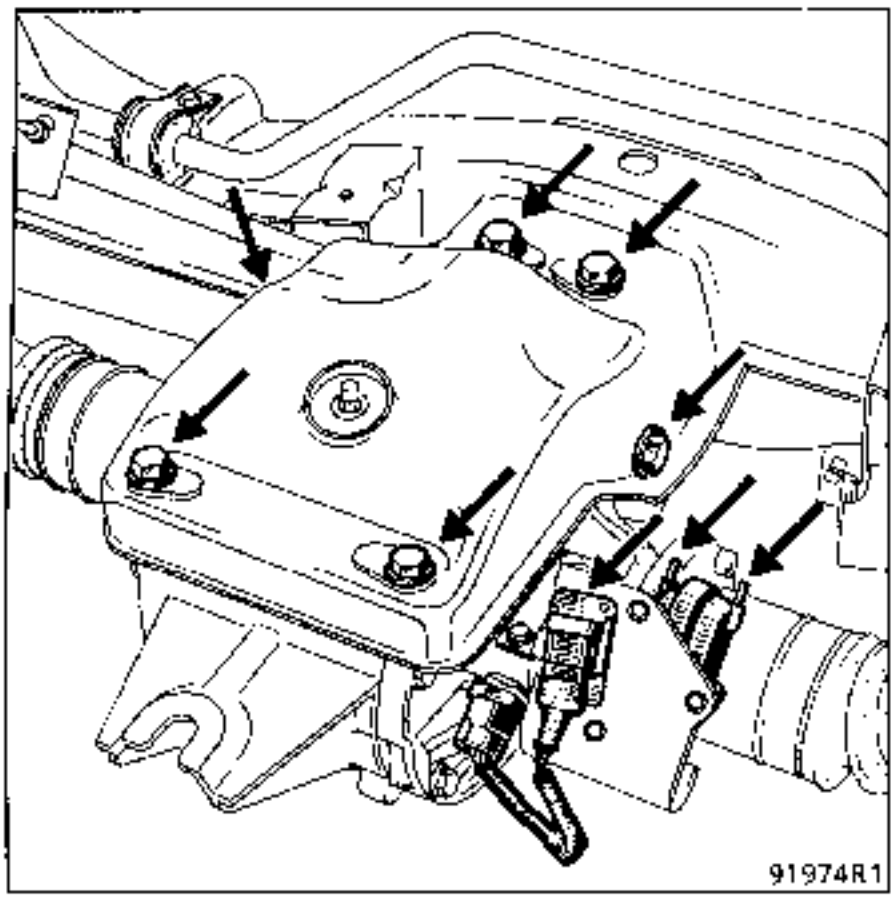


- the brake drums (see relevant section),
- the handbrake cables, disengaging them from the guides on the arms,
- the springs (see relevant section),

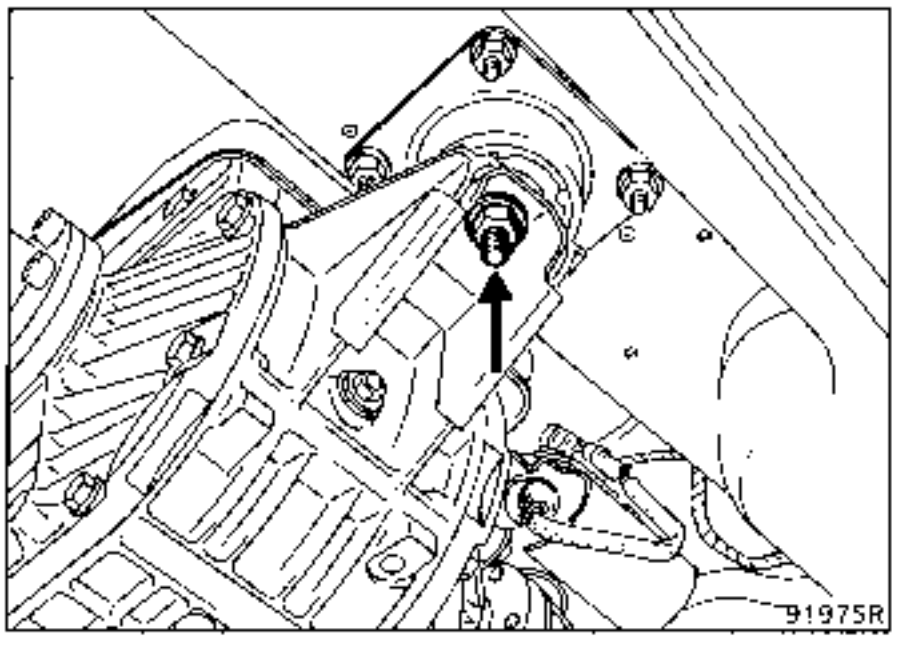


- the two arm mounting bolts, after first marking the position of the cam bolt for adjusting the parallelism,
- the rear swing arms.

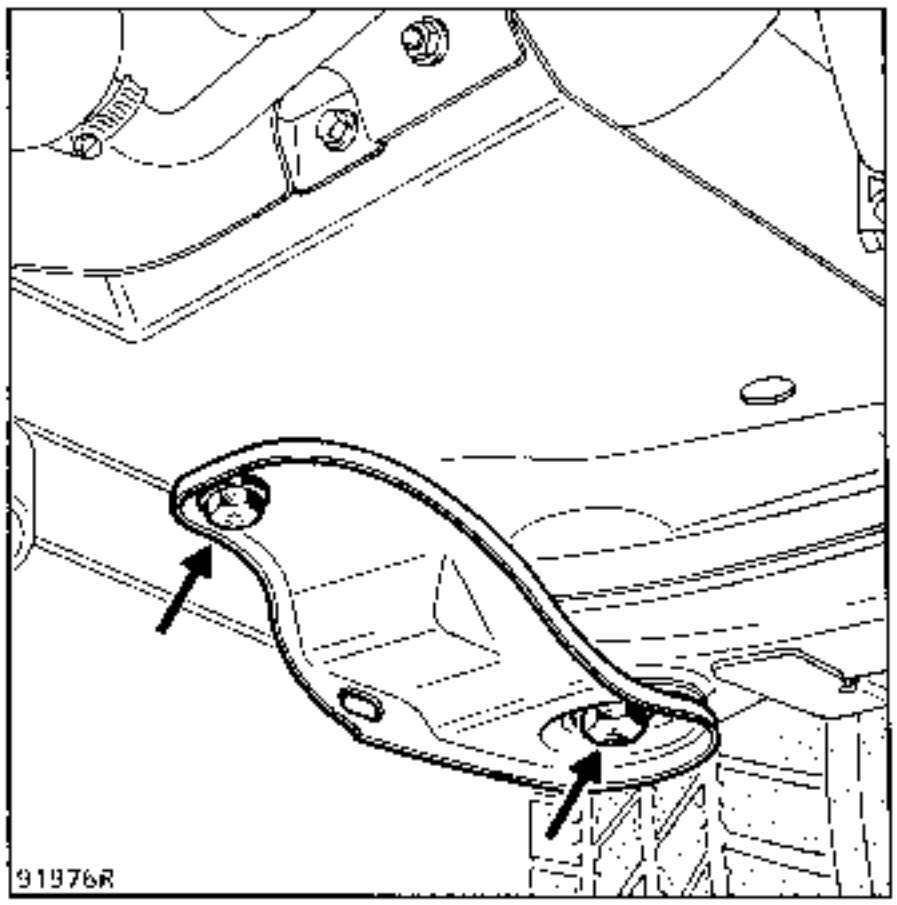
Place a jack under the final drive and remove:
- the pneumatic controls for the dog clutch and the switch connector,



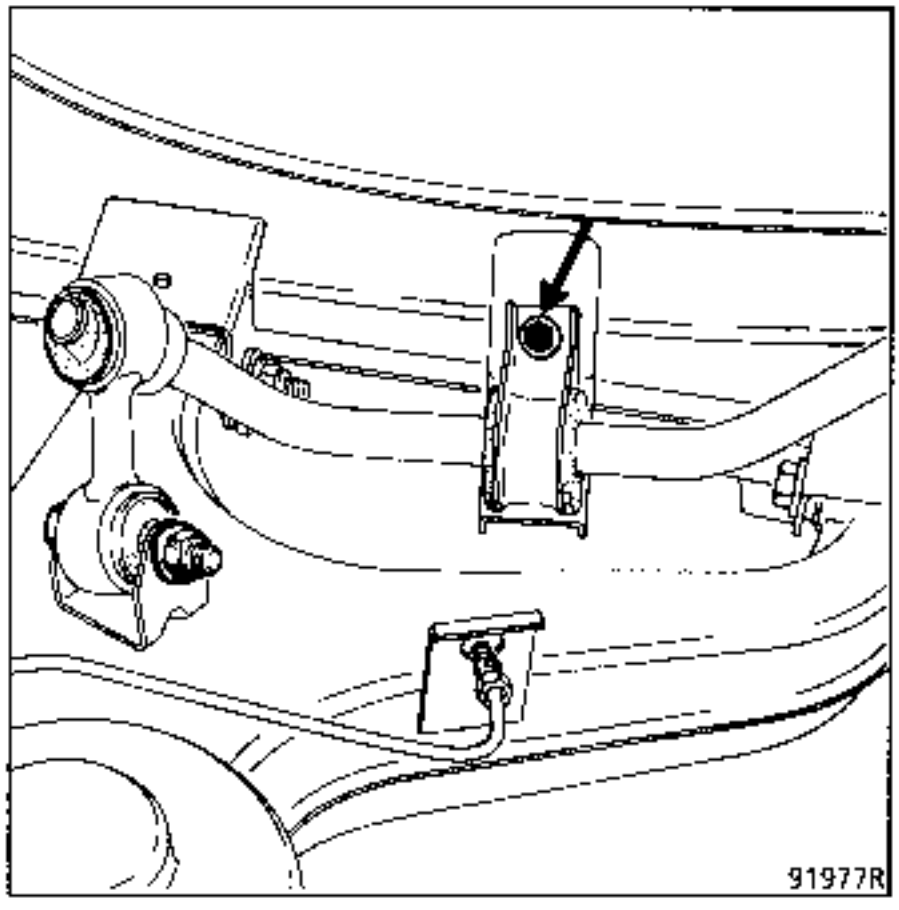
- the final drive rear mounting from the body,



- the six bolts holding the final drive on the cross member,
- the final drive,
- the front mountings for the final drive cross member,
- the cross member.



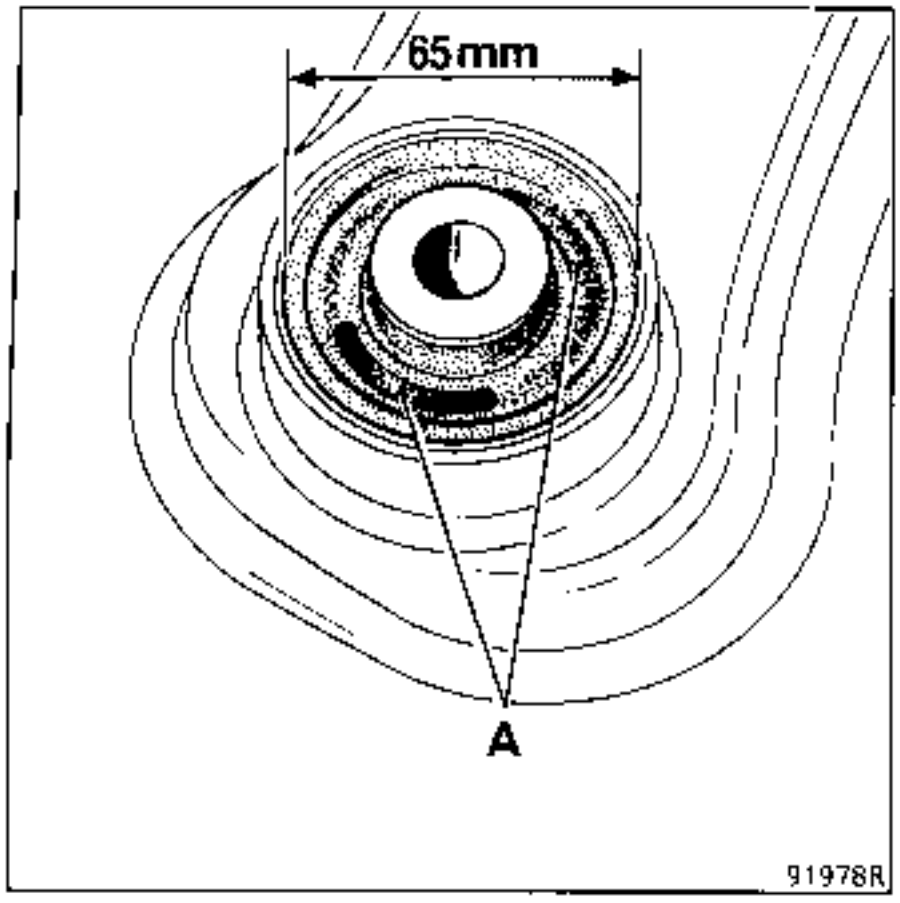
NOTE: If the final drive mounting cross member is being replaced, remove the anti-roll bearings.



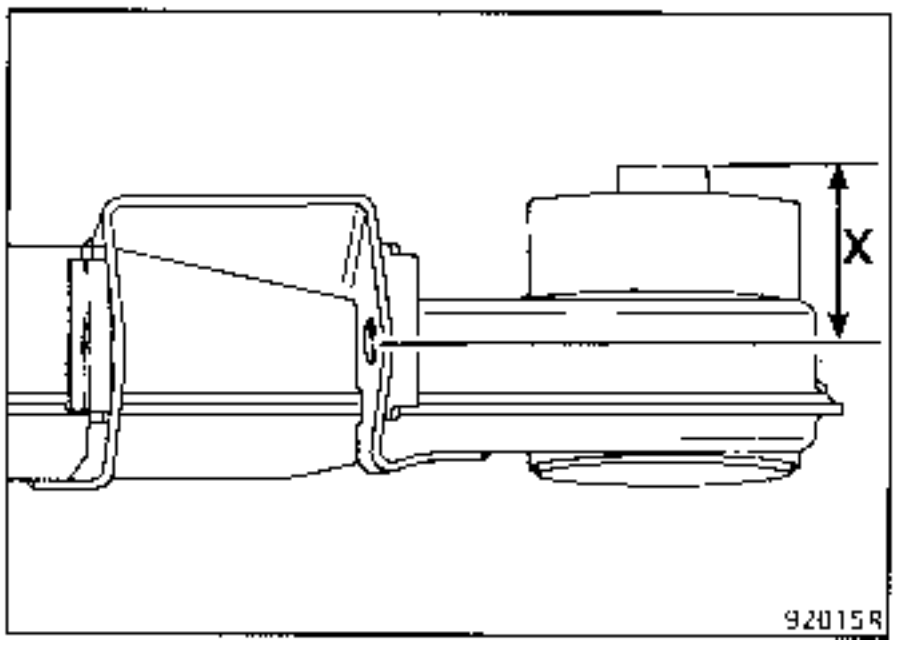
CHANGING THE RUBBER BUSHES

On the press:

- extract the worn bush using a piece of tubing with an outside diameter of **65 mm**,



- using the same piece of tubing, fit the new bush, directing gaps **A** as shown in the drawing above, until dimension **X = 43.5 ± 0.5 mm** is obtained.



REFITTING

If the bushes are being replaced, fit:

- the anti-roll bar on the cross member without tightening its bearings.

Fit in place and torque tighten:

- the cross member on the vehicle,
- the final drive and its mounting on the body-work.

Reconnect:

- the dog clutch control and the connector.

Fit in place :

- the rear swing arms on the vehicle, positioning the cam bolt according to the marks made on removal.

Place a jack under the half shafts and refit:

- the springs (see the relevant section),
- the final drive flange,
- the handbrake cables,
- the drums.

With the vehicle on its wheels, torque tighten:

- the anti-roll bar bearings,
- the final drive flange,
- the rear swing arm mounting bolts.

Bleed the brake circuit. Check and if necessary adjust the braking compensator.

WHEELS

There are two types of identity marks for the road wheels :
- Stamped mark for steel wheels,
- Casting mark for light alloy wheels.

The marks enable the main dimensions to be recognised and may be of the complete type :

Example : **5 1/2 J14.4CH.36**

or of the simplified type :

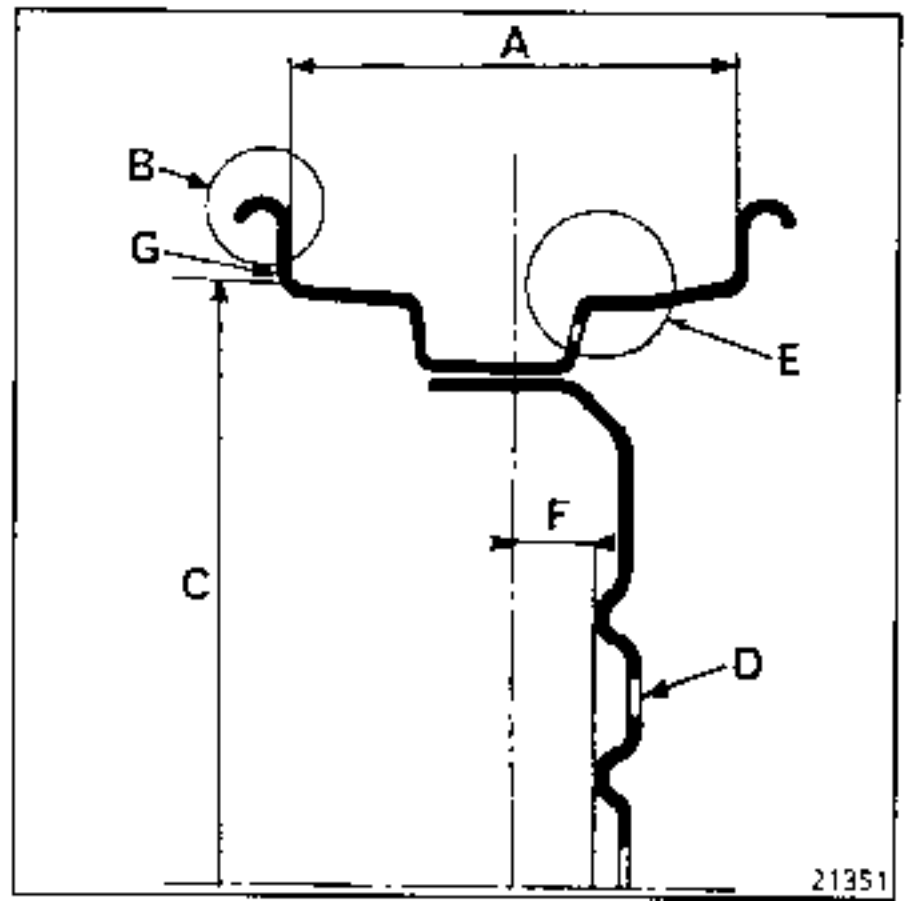
Example : **5 1/2 J14**

	A	B	C	D	E	F
ROAD WHEEL PATTERN	WIDTH (in inches)	RIM PROFILE	NOMINAL DIA. (in inches)	Number of holes	Bead locating flange	Off-set in mm
5 1/2 J14 4 CH.36	5 1/2	J	14	4	CH	36

The wheel bolts are on a p.c.d. of :
- 4 wheel bolts : **100 mm**
- 5 wheel bolts: **108 mm**

Maximum run-out : 1.2 mm measured on rim profile (at G).

Maximum out-of-round : 0.8 mm measured on bead locating flange.



The tyres are of the **Tubeless** type.

Tyre inflation pressures must be checked when cold. During normal running, pressures may increase by **0.2** to **0.3 bars**.

If a check has to be made when the tyres are hot, take into account this increase in pressure and **NEVER** deflate the tyre.

For **4 x 4** vehicles, it is essential that the tyres are identical (circumference the same length).

Type	Rim	Rim run-out (mm)	Wheel bolts tightening torque in (daN.m)	Tyres	Inflation pressure (bars)	
					FRONT	REAR
B481 B48D L481 L48D	5 x 13 5 1/2 x 13	1,2	9	155R13T 175/70R13T	2.0	2.2
L481 D.A.I.	5 x 13			165/80R13T		
B482 B484 L482 L484	5 1/2 x 13 5 1/2 x 14			175/70R13H 175/70R13T 175/65R14H 175/65R14T		
B483 B48C L489 L483 L48C	5 1/2 x 14			185/65R14H	2.3	2.3
B48K L48K						
L485 L48L	6 1/2 x 15		10	195/55R15V 195/55R15Z	2.5	2.3
B486 B48V L486 L48V	5 1/2 x 13 5 1/2 x 14		9	175/70R13T 175/65R14T	2.3	2.3
L48A B48O B488 B48A L48O L488 B48I B48P B487 L48I L48P L487 B48W L48W	5 1/2 x 13 5 1/2 x 14			185/70R13T 185/65R14T		
B48E L48N L48E	5 1/2 x 13 5 1/2 x 14			175/70R13H 175/65R14H	2.0	2.2
B48F L48F	5 1/2 x 13 5 1/2 x 14			155R13T 175/70R13T 175/65R14T		
B48J L48J	5 x 13 5 1/2 x 13 5 1/2 x 14			165/80R13T 175/70R13T 175/65R14T		
L48M	5 x 13 5 1/2 x 13 5 1/2 x 14			155R13T 175/70R13T 175/65R14T		
B48H B480 L48H L480					2.3	2.3
B48R 4 x 4 L48R 4 x 4 B48 Y 4 x 4 L48Y 4 x 4	6 1/2 x 15			175/70R13T	2.0	2.6

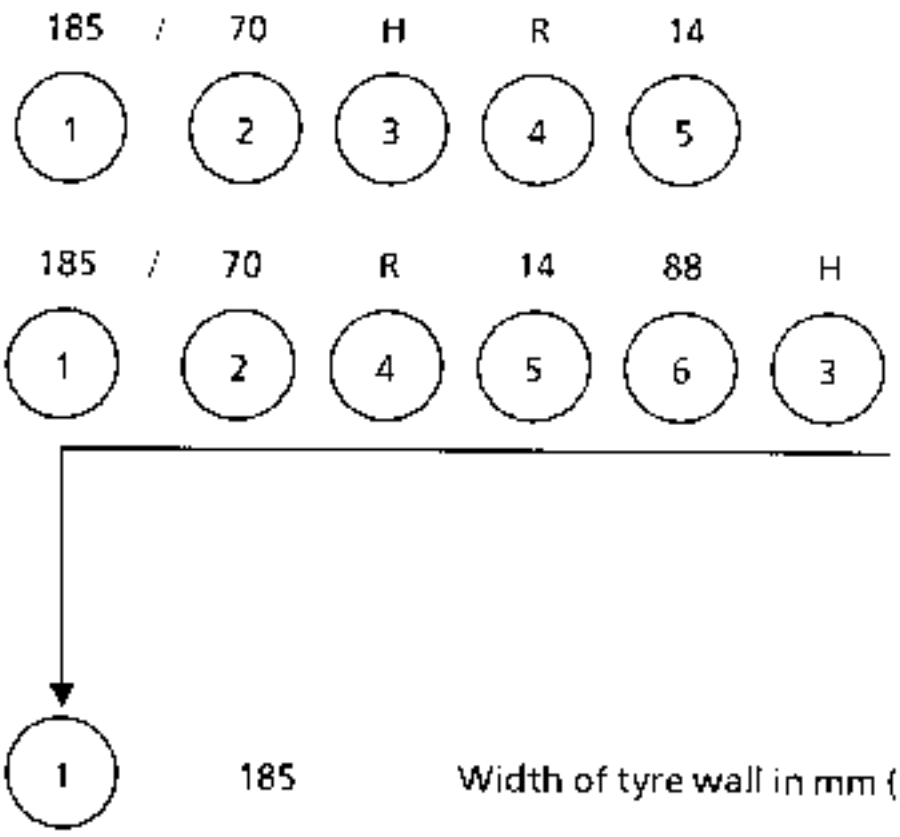
Type	Rim	Rim run-out (mm)	Wheel bolts tightening torque in (daN.m)	Tyres	Inflation pressure (bars)	
					FRONT	REAR
K481	5 1/2 x 13	1.2	9	175/70R14T	2.0	2.6
K482 K484	5 1/2 x 13 5 1/2 x 14			175/70R13T 175/65R14T 175/65R14H		
K483 K489 K48K K48B K48C	5 1/2 x 14			185/65R14H	2.3	2.6
K486 K48V	5 1/2 x 13 5 1/2 x 14			175/70R13T 175/65R14T		
K487 K488 K48W K48A K48I K48O K48P	5 12 x 14			185/65R14T		
K483 4 x 4 K486 4 x 4 K48K 4 x 4 K48V 4 x 4	5 1/2 x 14			185/65R14H		
K48E K48F	5 1/2 x 14			175/65R14T	2.0	2.6
K48J	5 x 13 5 1/2 x 14			165/80R13T 175/65R14T		
K48M	5 1/2 x 13			175/70R13H		
K48N K48H	5 1/2 x 13 5 1/2 x 14			175/70R13T 175/65R14H 175/65R14T	2.3	2.6
S481 S482	5 1/2 x 13 5 1/2 x 14			175/70R13T 175/65R14T	2.0	2.6
S486 S48H S48V	5 1/2 x 13 5 1/2 x 14			175/70R13T 175/65R14T	2.3	2.6
B48Q L48Q B48Y L48Y B48R L48R	6 1/2 x 15		10	185/55R15V	2.3	2.3
K48R	6 1/2 x 15	1.2	10	185/55R15V	2.5	2.5

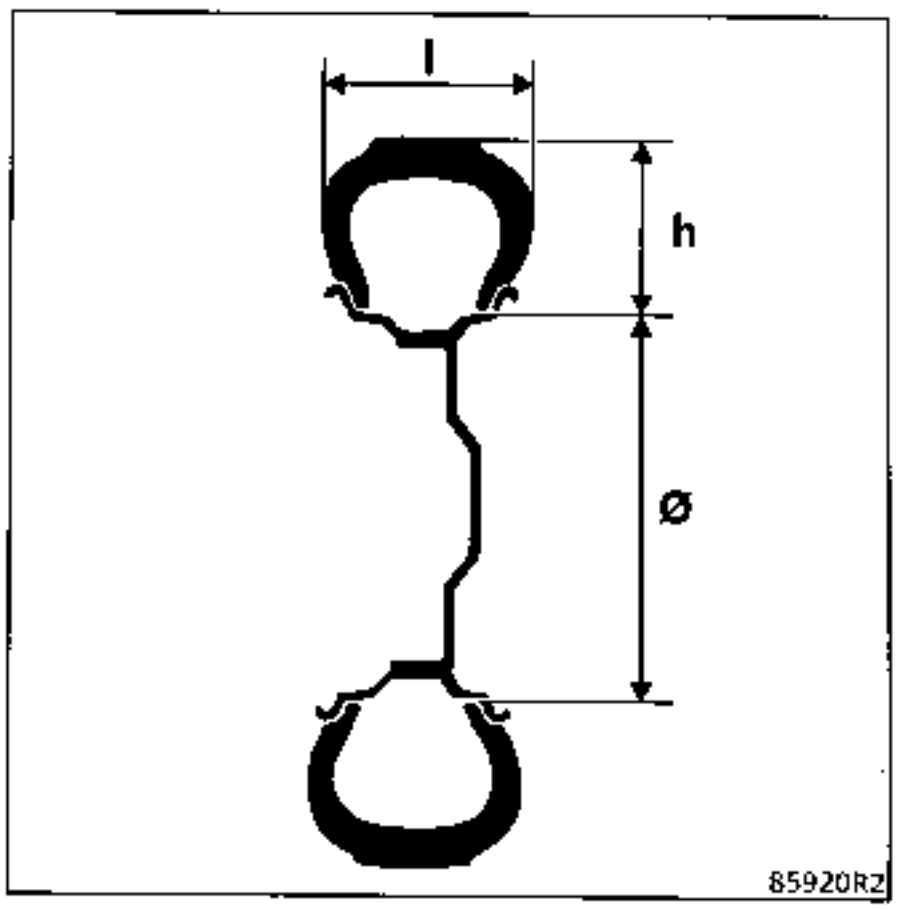
Add 0.1 bar for vehicles with automatic transmission.

TYRES

The same type of tyre may have two different identification marks.

Example : 185/70 H R 14
or 185/70 R 14 88 H





1	185	Width of tyre wall in mm (S) section
2	70	h/w ratio $\frac{\text{height}}{\text{width}}$
4	R	Radial structure
5	14	Inside diameter expressed in inches.
6	88	Suffix giving maximum load per tyre **88 (560 kg)**
3	H	Maximum speed suffix **210 km/h** max.

Some speed symbols :

Max. Speed	km/h
R	170
S	180
T	190
U	200
H	210
V	240
ZR	+ 240

Types of structure :

Cross-ply	No marking
Radial	R
Bias belted	B (Bias belted)

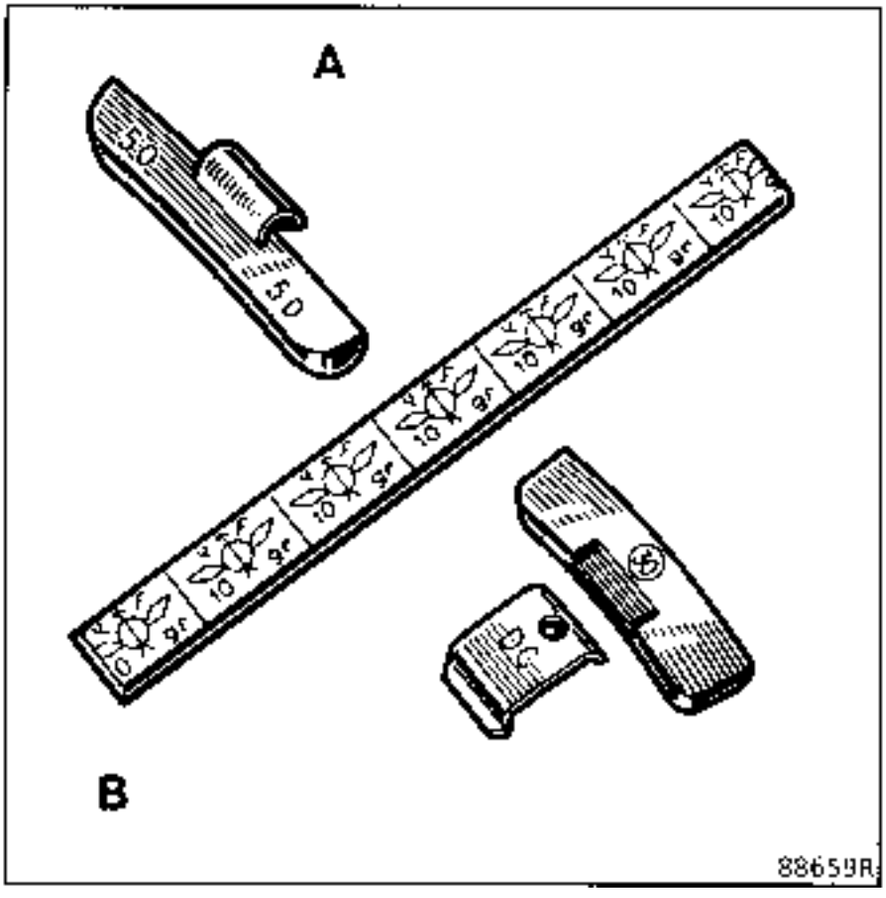
BALANCE WEIGHTS

Use only those weights supplied as RENAULT replacement parts :

- They are fastened to the rims with clips on steel wheels (clips integral with weights),

- They are fastened with flat clips of self-adhesive on light alloy wheels.

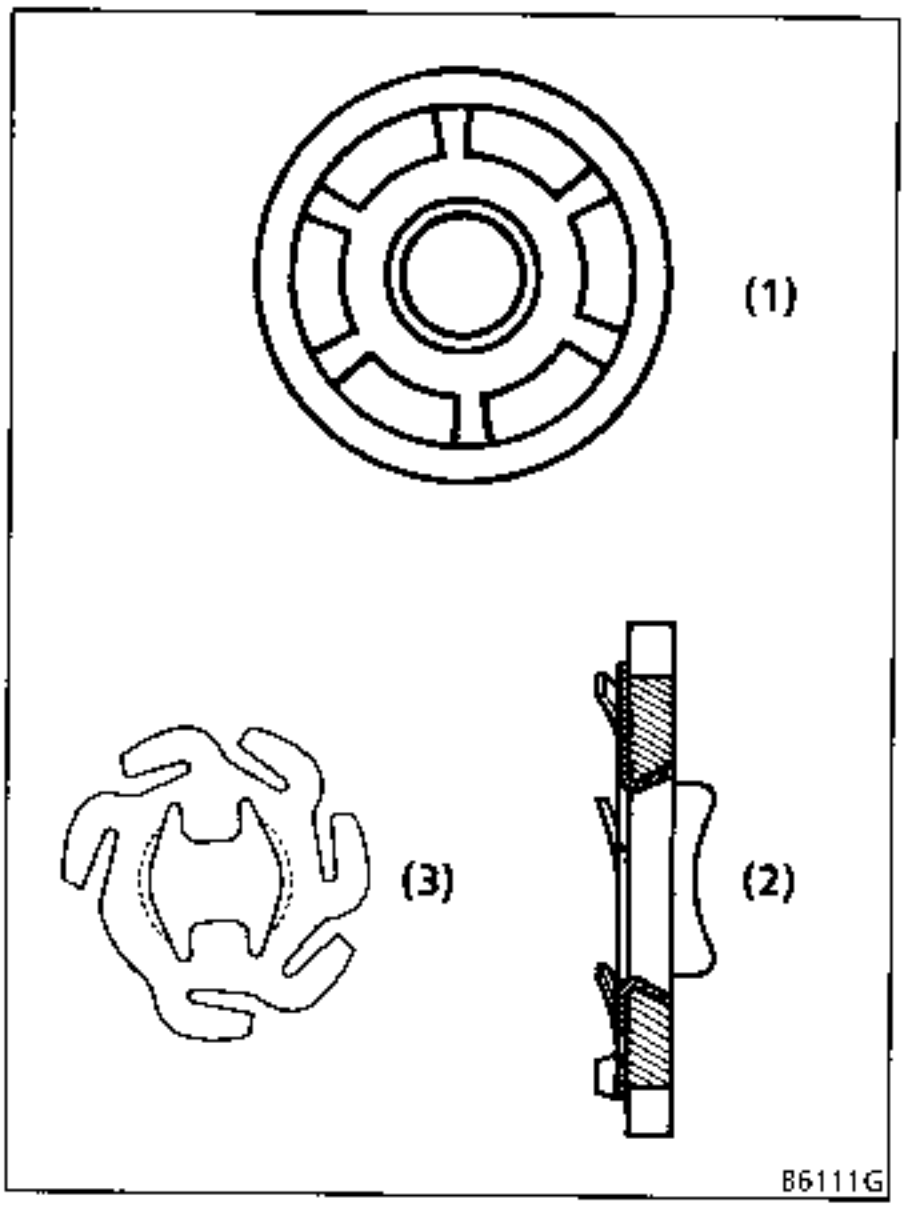
A Steel wheel
B Aluminium wheel



ESSENTIAL SPECIAL TOOLING		
Dir.	812-01	Axial ball joint wrenches
	or	
Dir.	832-01	
T.Av.	476	Ball joint extractor

TIGHTENING TORQUES (in daN.m)	
Ball joint nuts	3.5
Axial ball joint	5
Wheel bolt	9
Link arm sleeve lock nut	3.5

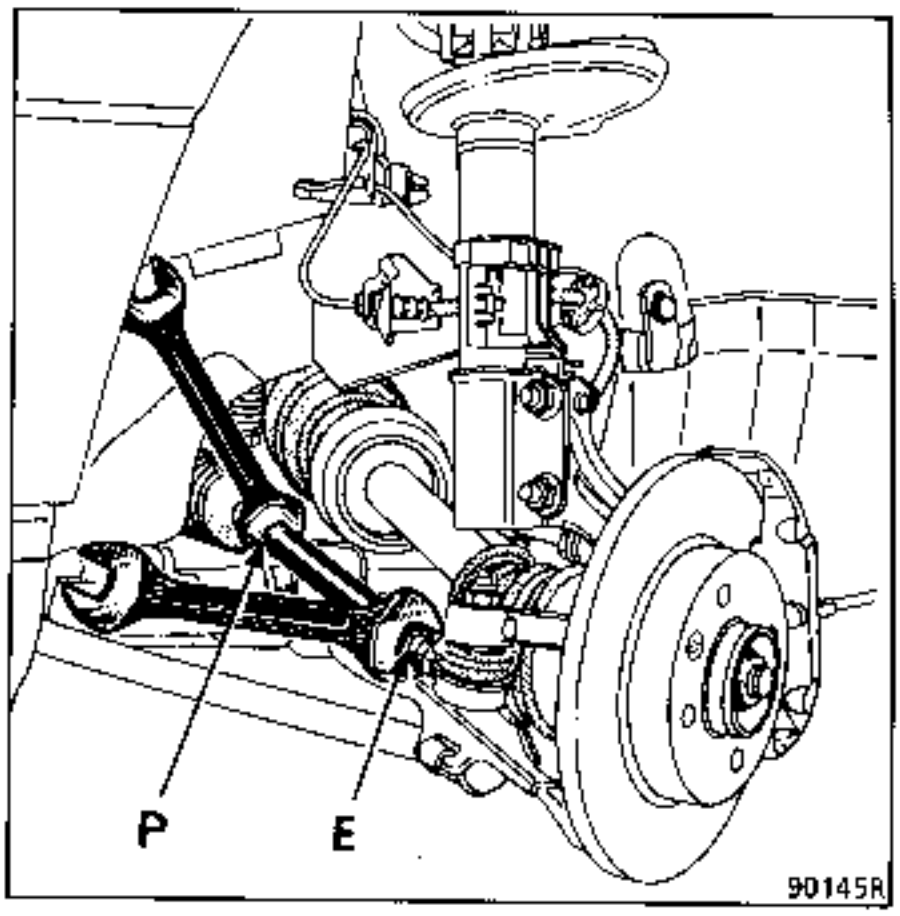
Axial ball joint with flat lock washer.



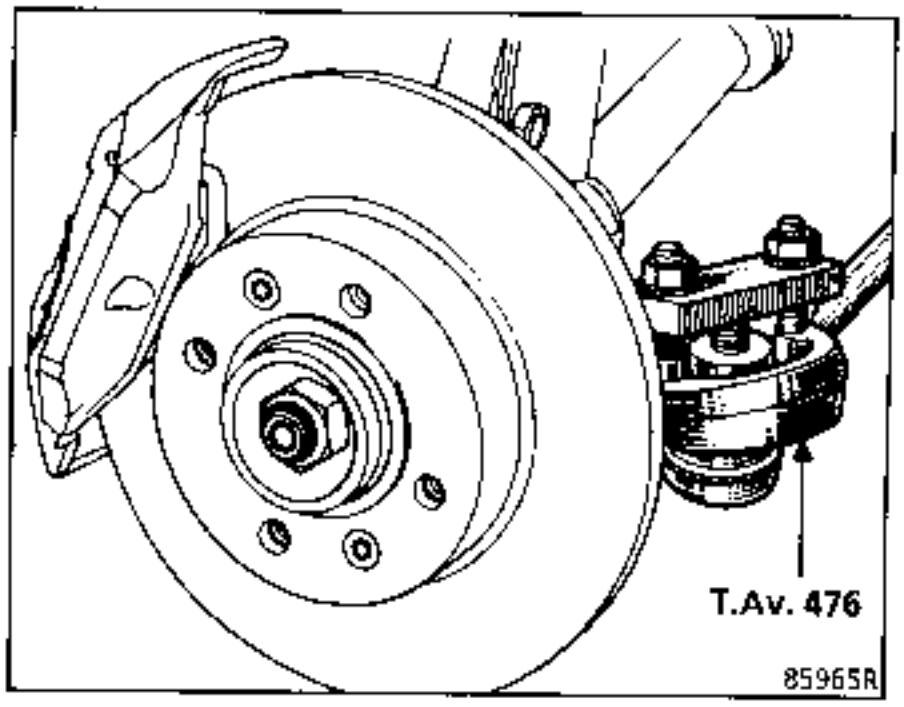
REMOVING THE BALL JOINT : Assembly (2) must be changed systematically at each dismantling. The ball joint itself may be used again if the notches are undamaged.

REMOVAL

Loosen lock nut (E) holding the axial ball joint at (P) with an flat wrench.



Disconnect the steering arm ball joint using tool **T.Av. 476**.

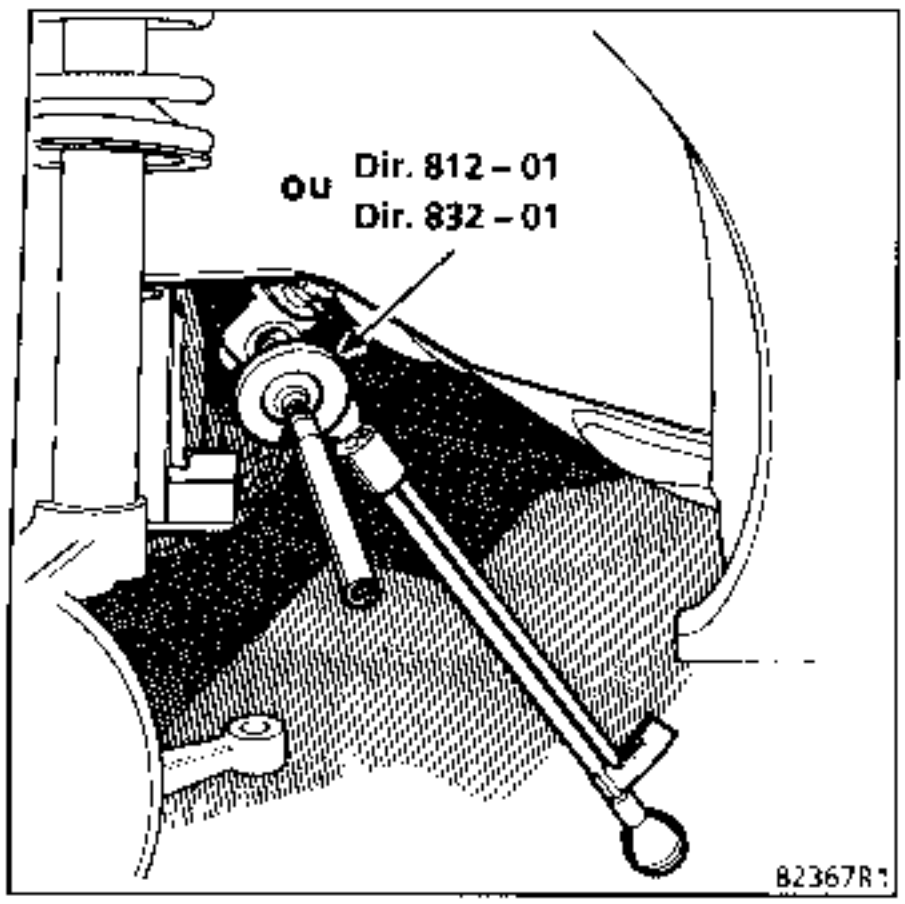


Remove:

- the axial ball joint, counting the number of turns needed to clear the threads. Make a note of the number for refitting as it will assist pre-adjustment of the parallelism,

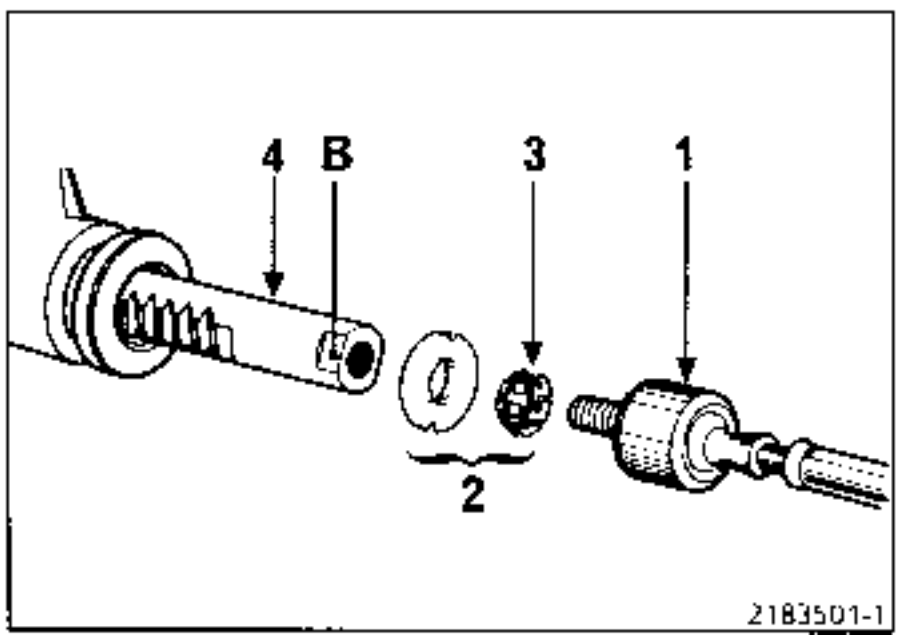
- the steering rack gaiter.

Loosen the axial ball joint using tool Dir. **812-01** or **Dir. 832-01 and hold stop washer (2) with a pair of vice grips to prevent the rack from turning.**



REFITTING

Refit the following to the rack (4) :
- the stop washer-lock washer assembly (2),
- the new axial ball joint (1) having previously smeared the threads with **LOCTITE FRENBLOC**.



NOTE : Make sure that the two tabs on lock washer (2) are in line with flats (B) on the rack before tightening with wrench tool Dir. **812-01** or **Dir. 832-01**

Refit the gaiter and its clip.

Screw the axial ball joint onto the rack end, turning it by the number of turns made on dismantling.

Reconnect the steering arm to the stub axle carrier.

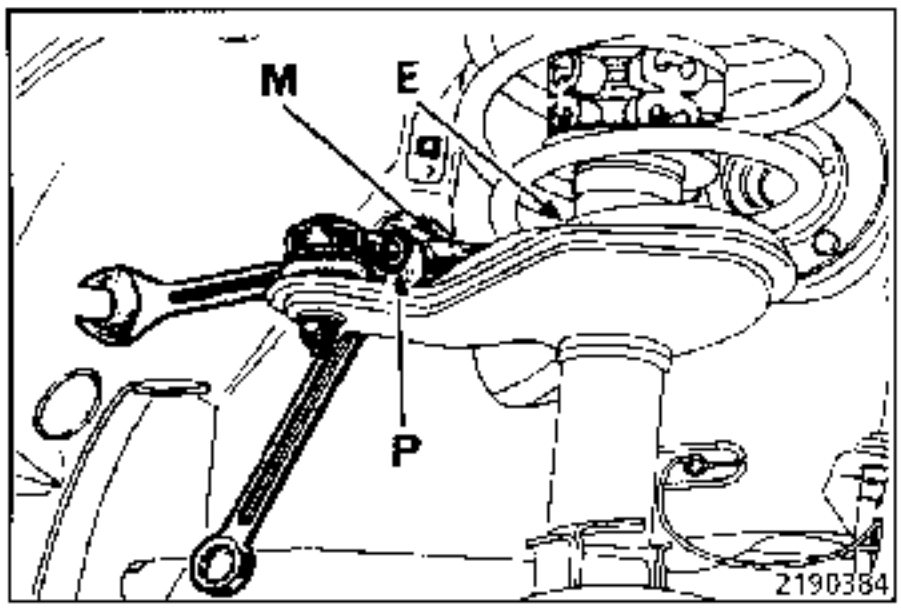
Check the parallelism and adjust if necessary. Then tighten the rack lock nut.

ESSENTIAL SPECIAL TOOLING	
T.Av. 476	Ball joint extractor

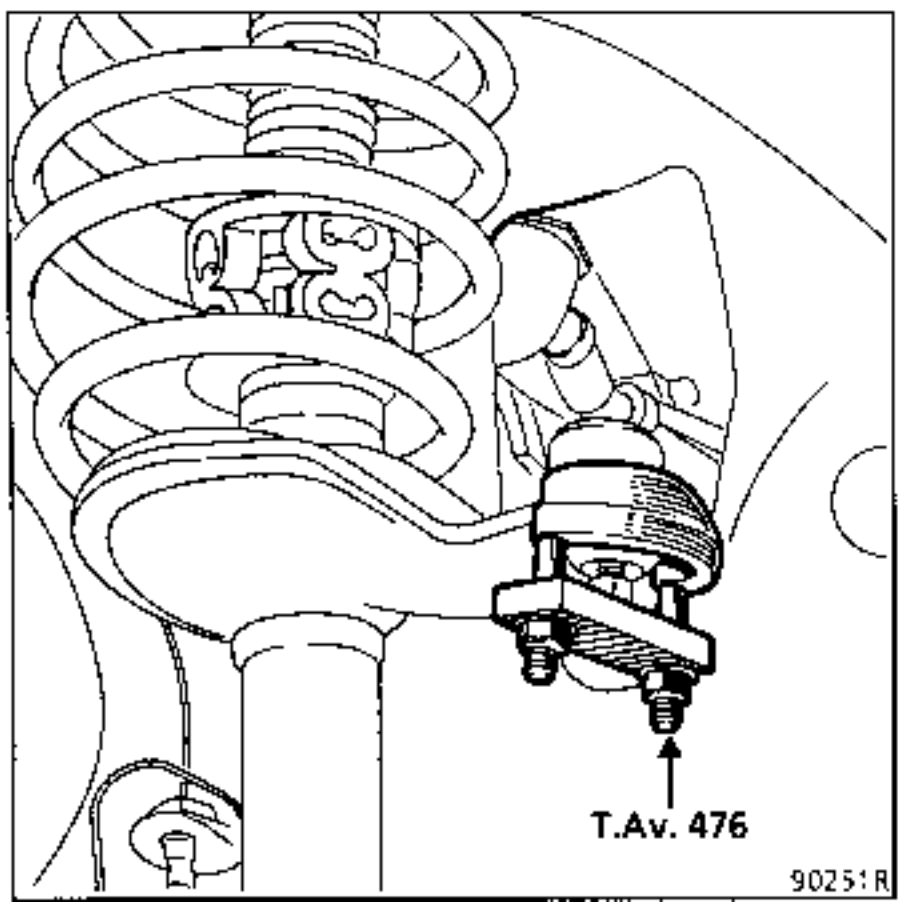
TIGHTENING TORQUES (in daN.m)	
Bolts securing link to the rack	4
Link bolt lock nut	3.5
Arm securing nut	3.5
Steering ball joint nut	4
Steering arm sleeve lock nut	3.5
Wheel bolts 4 bolts	9
5 bolts	10

REMOVAL

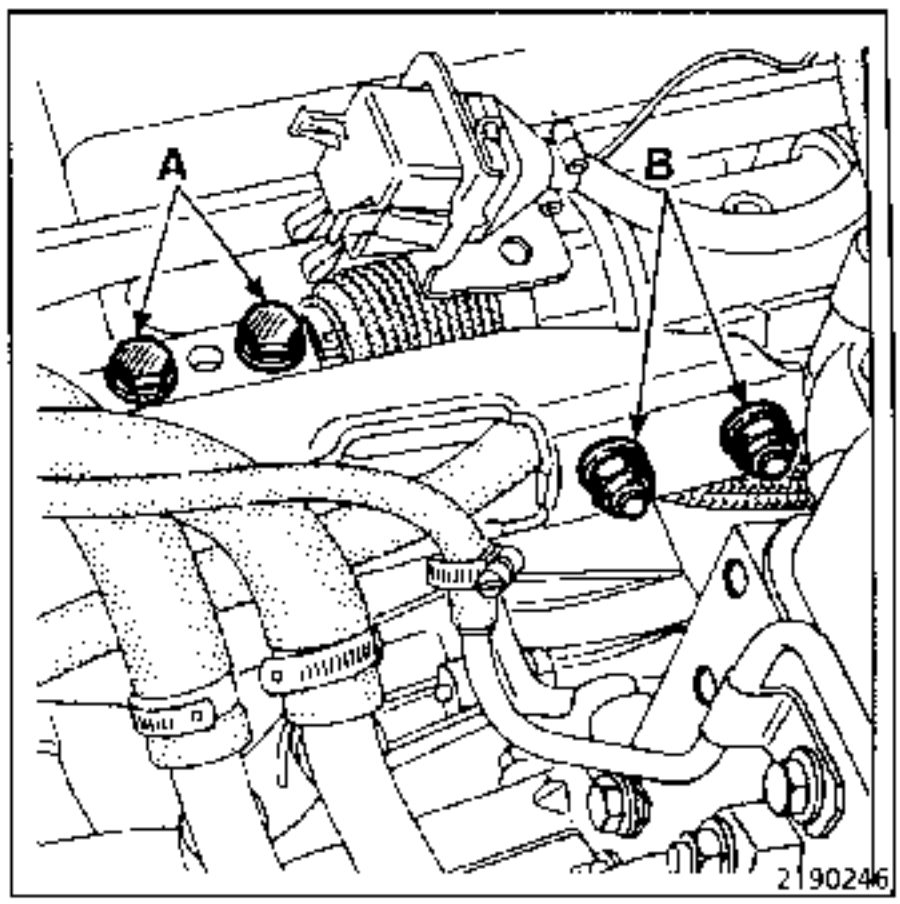
Loosen lock nuts (P) and (E), holding sleeve (M) with a flat wrench.



Disconnect the steering ball joint using tool **T.Av. 476**.



Remove:
- the ball joint housing by unscrewing sleeve (M) and counting the number of turns needed to clear the threads, so that the parallelism can be preset on refitting,
- nuts (B) securing the arms to the link,



- bolts (A) securing the steering arm link.

NOTE : As the steering rack end has threaded bolt holes, it is essential first of all to remove the lock nuts from bolts A.

Take apart the link/steering arm assembly and remove the steering arm on the side in question.

REFITTING

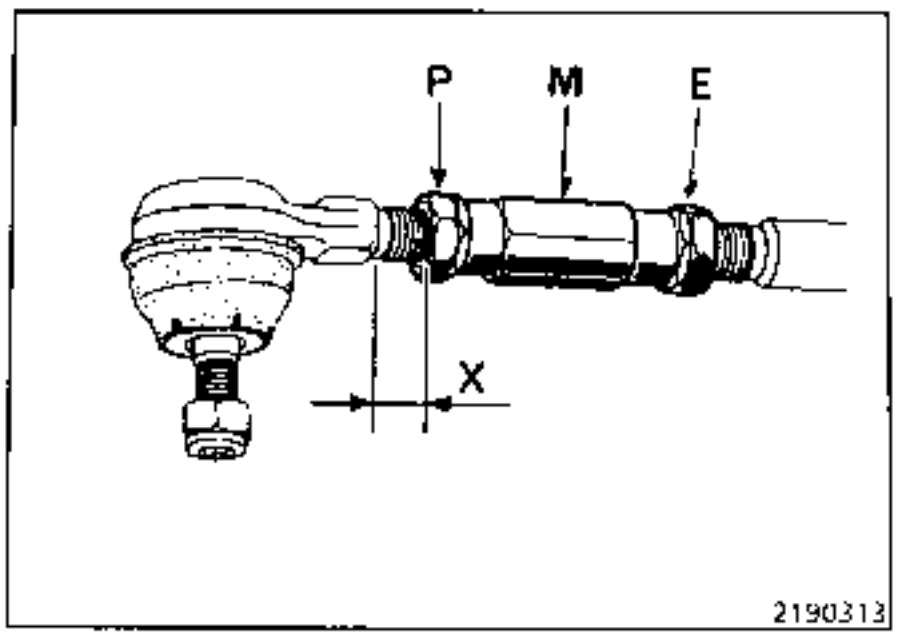
Fit the steering arm in place in the link and secure the assembly on the end of the rack without tightening it.

Screw up sleeve (M) by two turns on the arm, engage the ball joint then screw up sleeve (M) by the number of turns counted on dismantling.

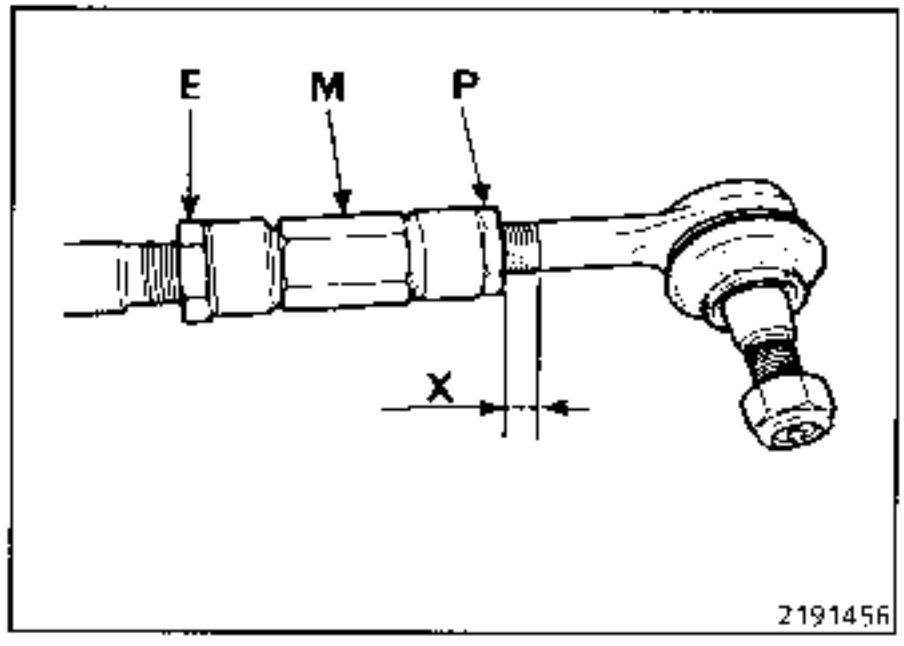
NOTE : **Sleeve (M) has a lefthand and a righthand thread.**

Measure length X between the edge of the thread and lock nut (P). Make sure it is symmetrical on both sides, otherwise correct it when adjusting the parallelism.

1st TYPE



2nd TYPE



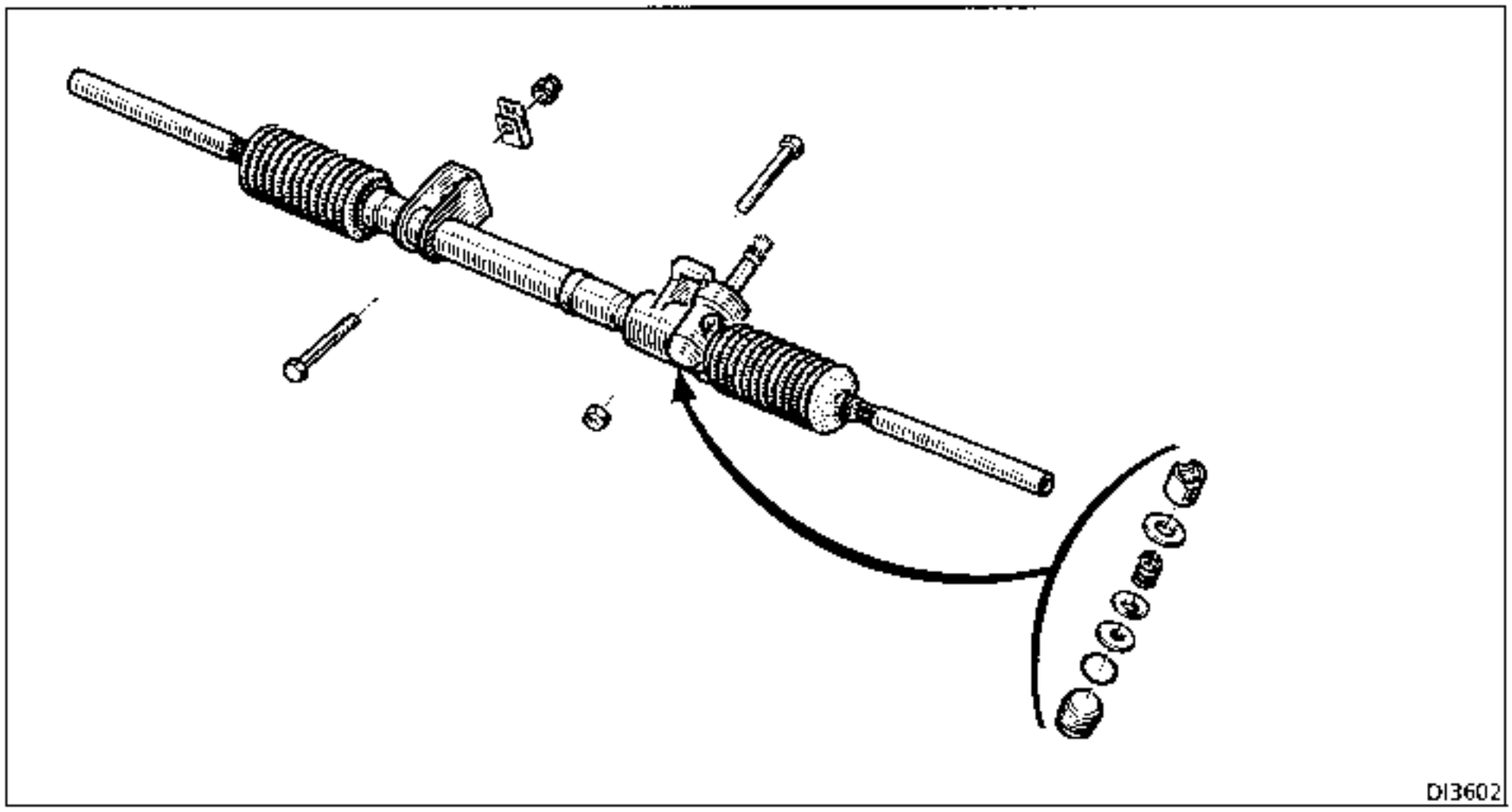
Reconnect the ball joint in the stem of the shock absorber.

Vehicle unladen

Torque tighten :
- the link and steering arm bolts and nuts,
- the ball joint nut in the shock absorber stem.

Check the parallelism and adjust if necessary.

Torque tighten lock nut (E) and lock nut (P) in order and whilst holding sleeve (M) :

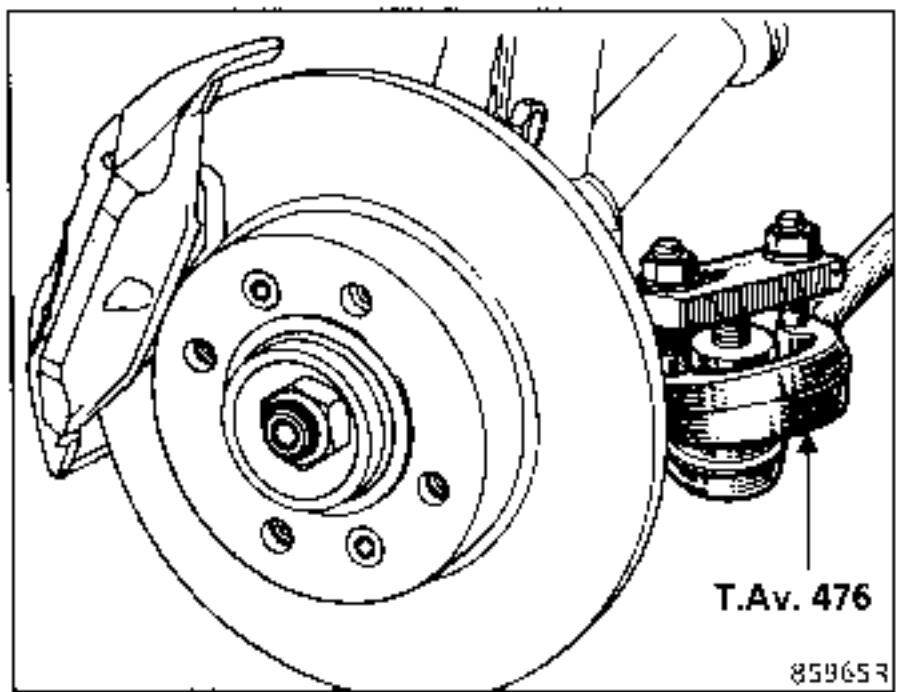


ESSENTIAL SPECIAL TOOLING	
T.Av. 476	Ball joint extractor

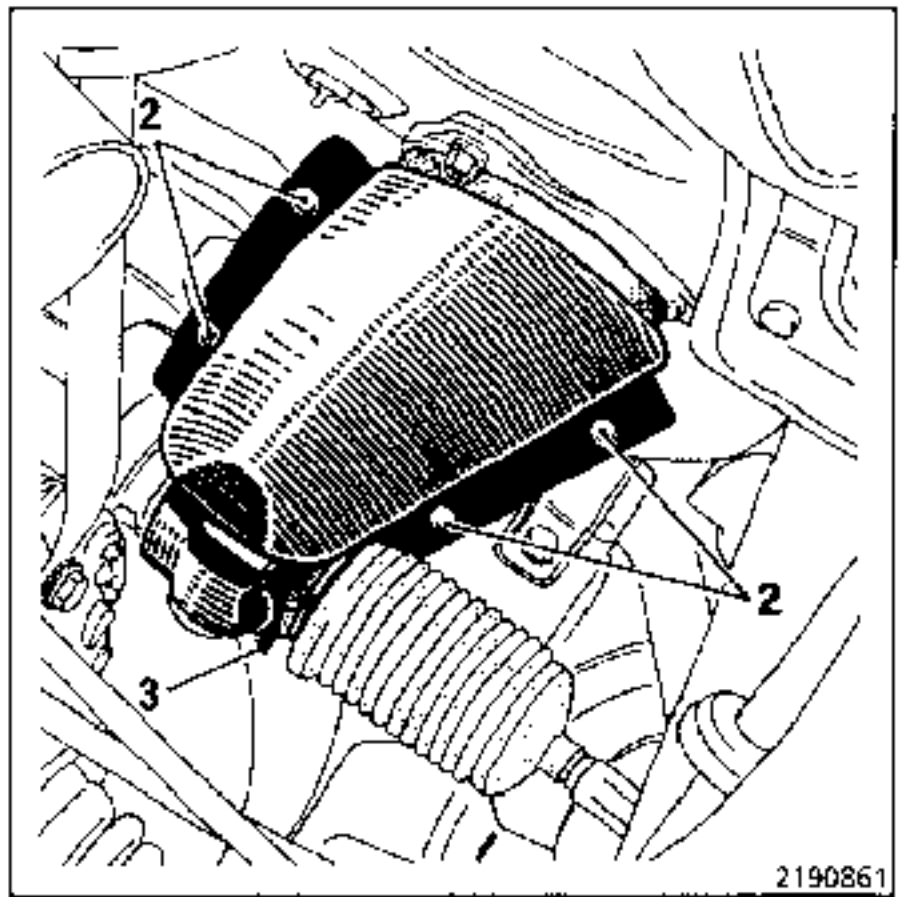
TIGHTENING TORQUES (in daN.m)	
Steering ball joint nuts	4
Axial ball joint	5
Steering box securing bolts	5
Wheel bolts	9

REMOVAL

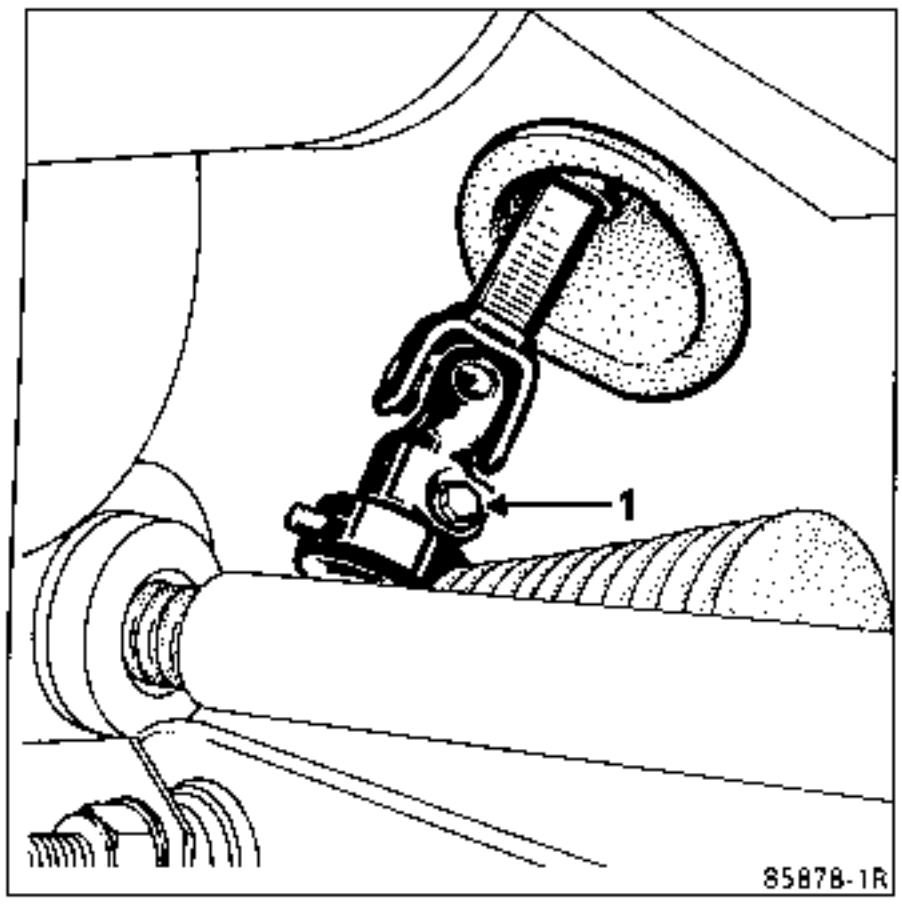
Disconnect the ball joints using tool **T.Av. 476**.



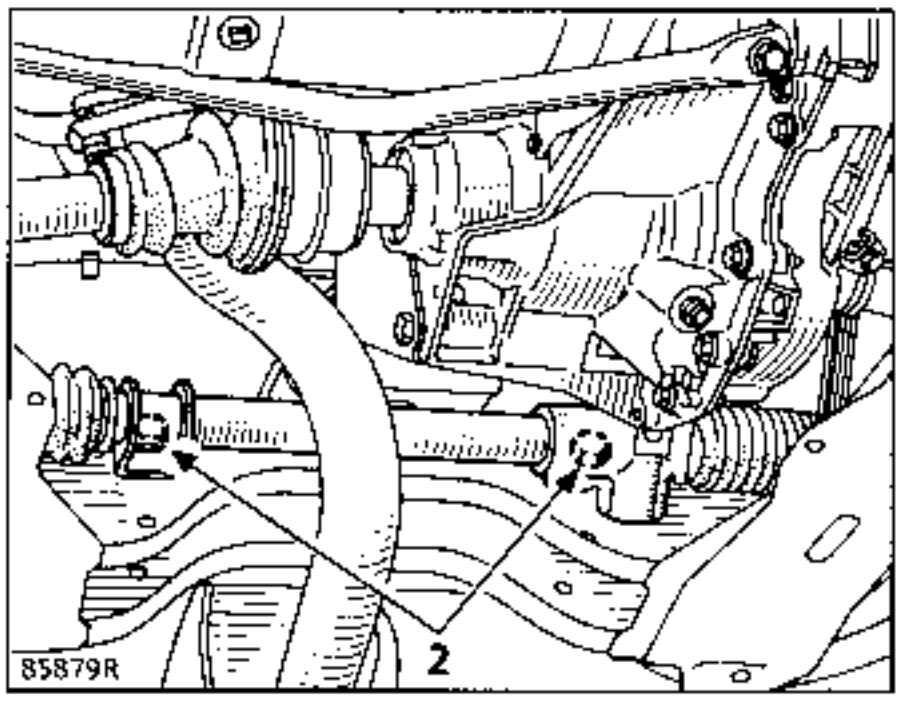
Remove:
- the plastic protector, unclipping the four rivets (2) and by cutting retaining collar (3),



- the universal joint securing bolt (1), marking its position on the steering box,



- the two bolts (2),

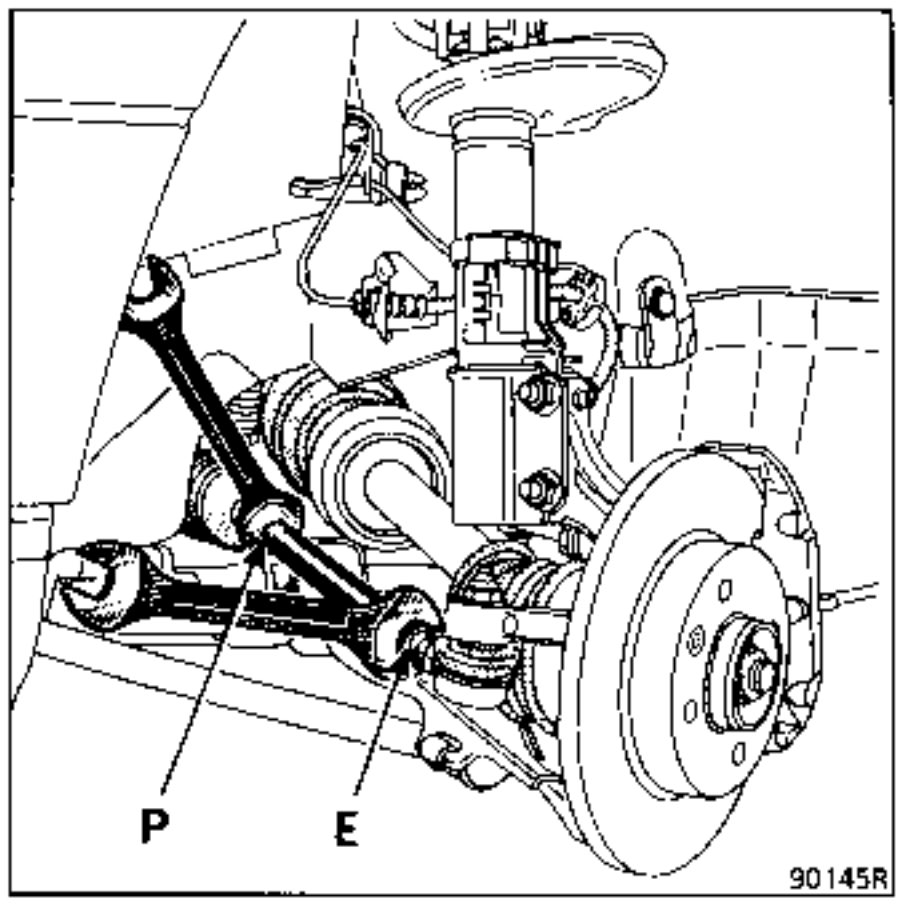


- the steering box.

The axial ball joints must only be unscrewed from the rack if they are going to be changed.

If the steering box is being changed, the ball joint housings at the stub axle carrier end must be recovered.

To do this :
- loosen lock nut (E), holding the axial ball joint with a flat wrench at (P),
- unscrew the ball joint housings, noting the number of turns needed to clear the threads.



REFITTING

Proceed in reverse order to removal.

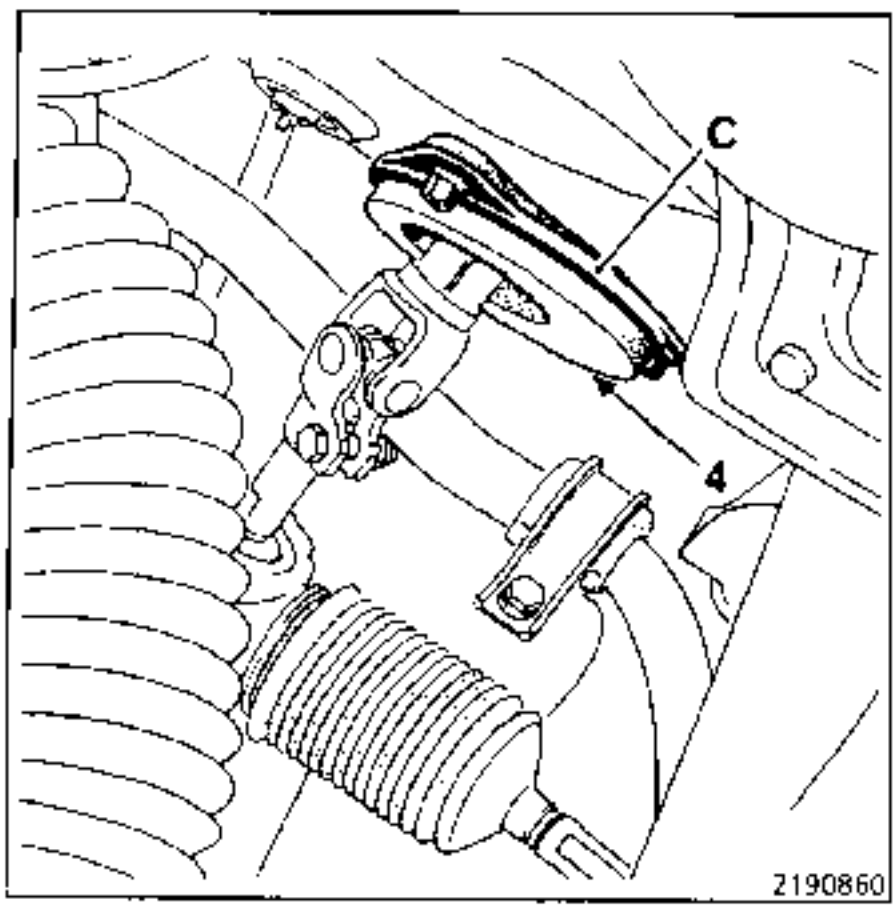
If a new steering system is being fitted, fit the ball joint housings in the position marked on dismantling.

Refit the housing-arm assembly to the vehicle, making sure that the universal joint is in the position marked on dismantling. If it is not, realign the steering wheel.

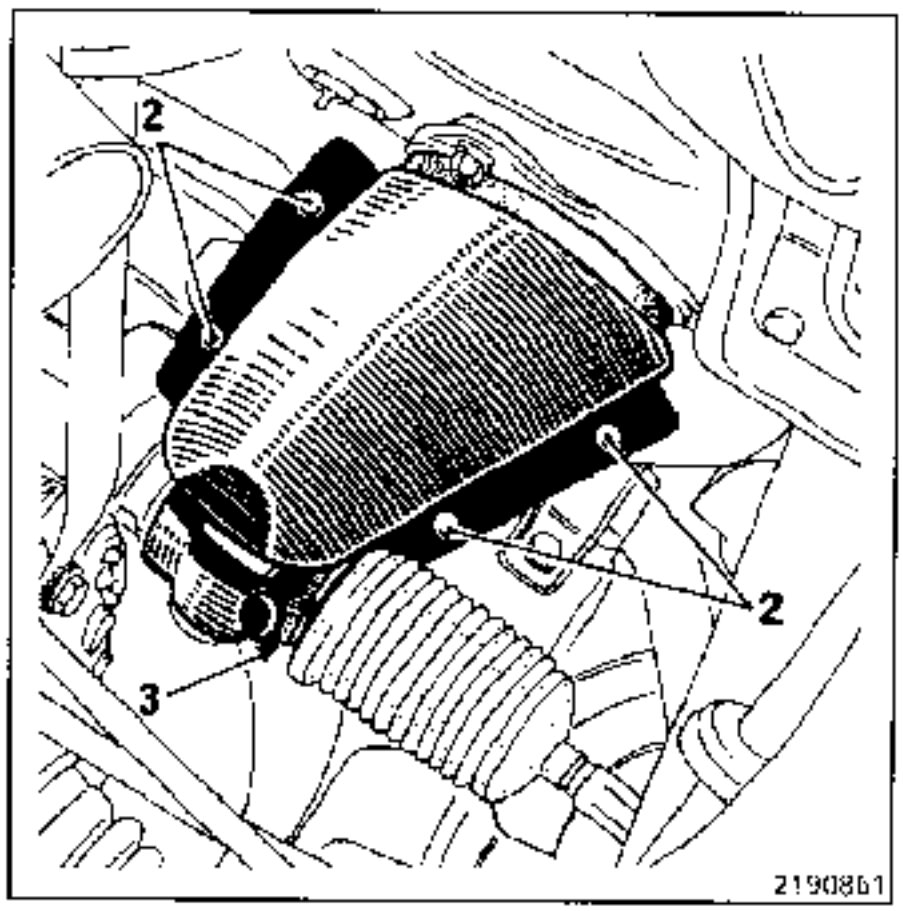
NOTE : If the steering universal joint is impossible to fit, disconnect the collapsible steering wheel shaft.

Fit the plastic protector.

To do this :
- ensure that sealing foam (4) is stuck to the backing (C),



- assemble the two half shells by clipping rivets (2) in place,
- fit a new retaining collar (3) in its groove and tighten it.



Check the parallelism.

ESSENTIAL SPECIAL TOOLING		
Dir.	812-01	Axial ball joint wrenches
	or	
Dir.	832-01	
T.Av.	476	Ball joint extractor

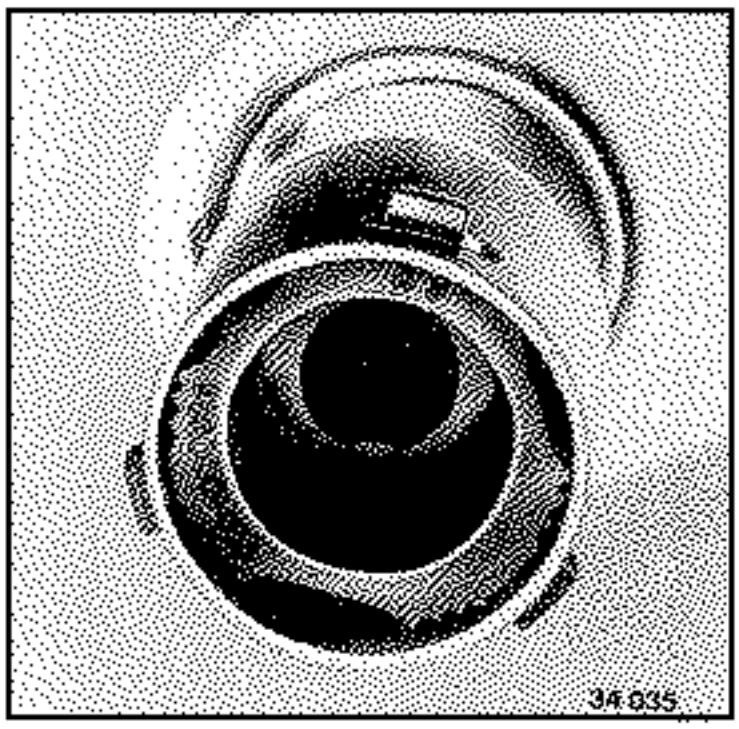
TIGHTENING TORQUES (in daN.m)	▽
Wheel bolts	9
Steering ball joint nuts	4
Axial ball joint	5

REMOVAL

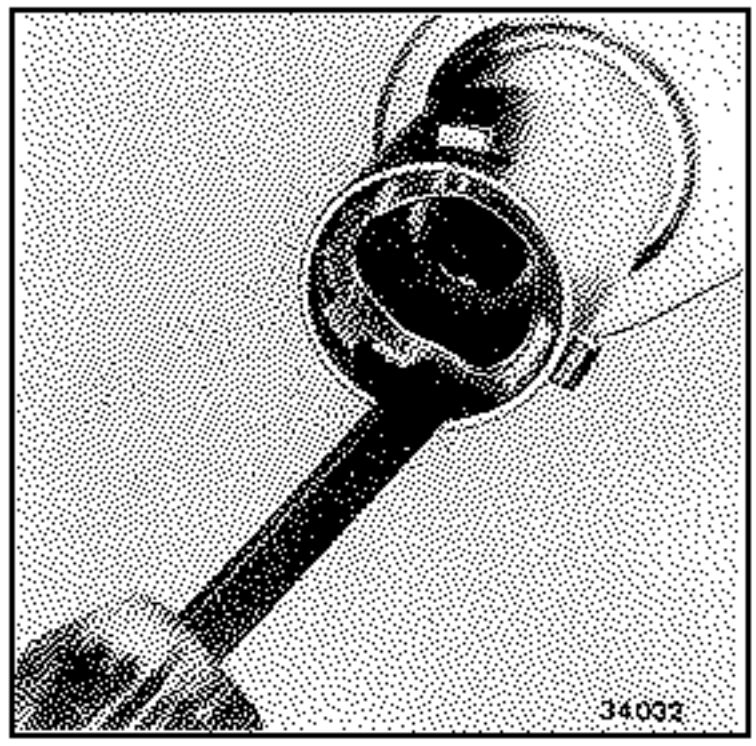
Place the front of the vehicle on axle stands and remove the wheel on the side opposite the steering column.

Remove:
- the steering rack gaiter,
- the axial ball joint (see relevant section).

Turn the steering wheel completely so that the rack no longer extends beyond the box and free the anti-noise bearing.



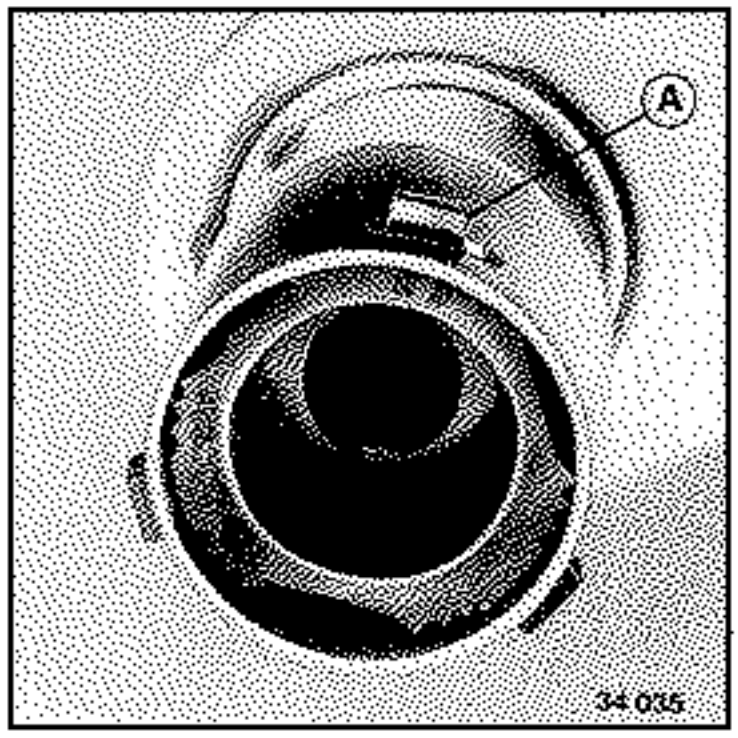
Using a flat-ended screwdriver, the cutting end of which has been removed, extract the anti-noise bearing.



REFITTING

Carefully clean the rack and anti-noise bearing location. Coat them with MOLYKOTE BR2 grease.

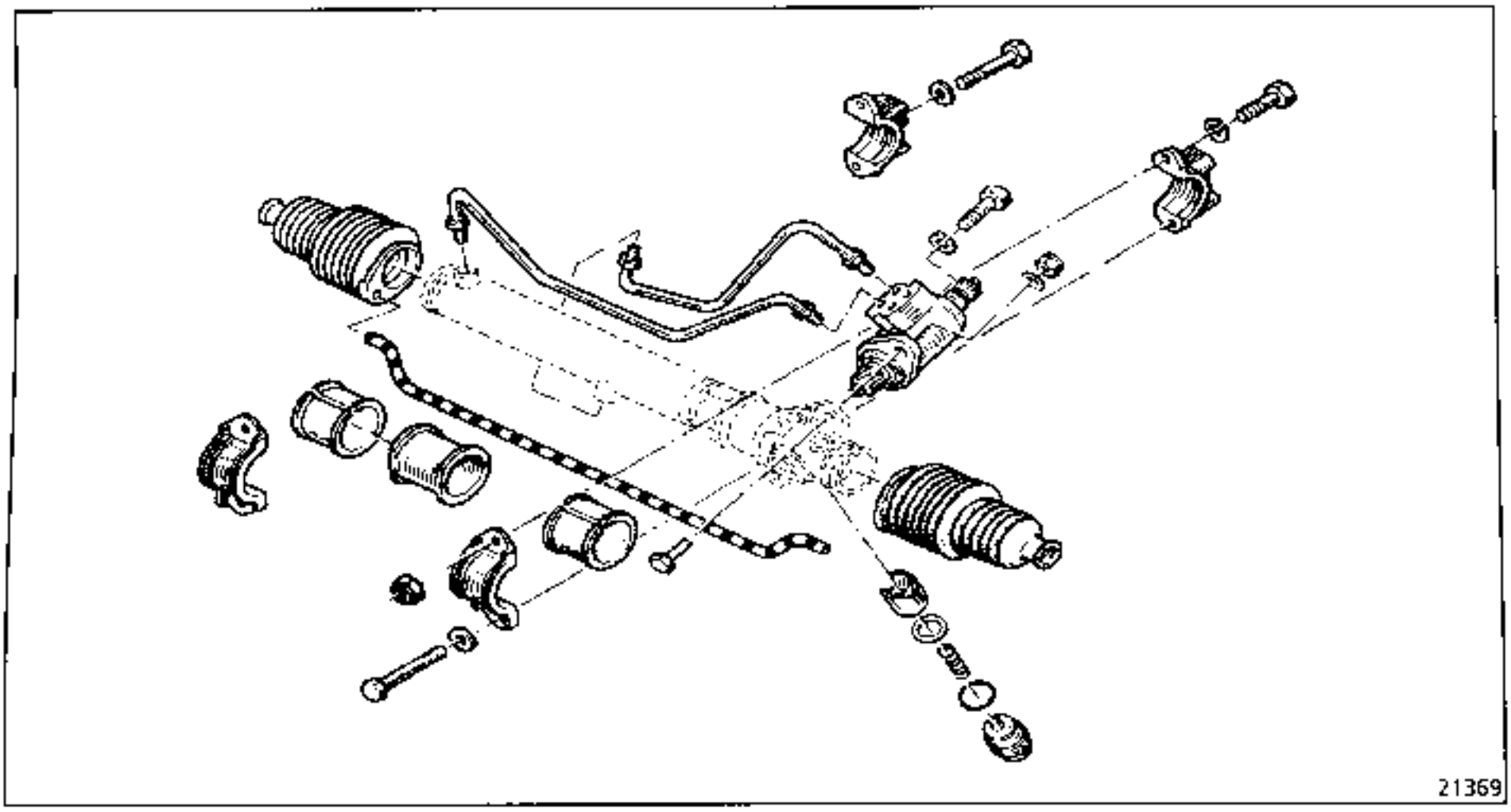
In the same ways as on removal, refit the anti-noise bearing in place, taking care to fit the three lugs in notches (A).



Engage the rack in the bearing.

On the rack, refit :
- the thrust washer together with a new lock plate,
- the axial ball joint,
- the steering ball joint housing at the stub axle carrier end.

Check and if necessary, adjust the parallelism.

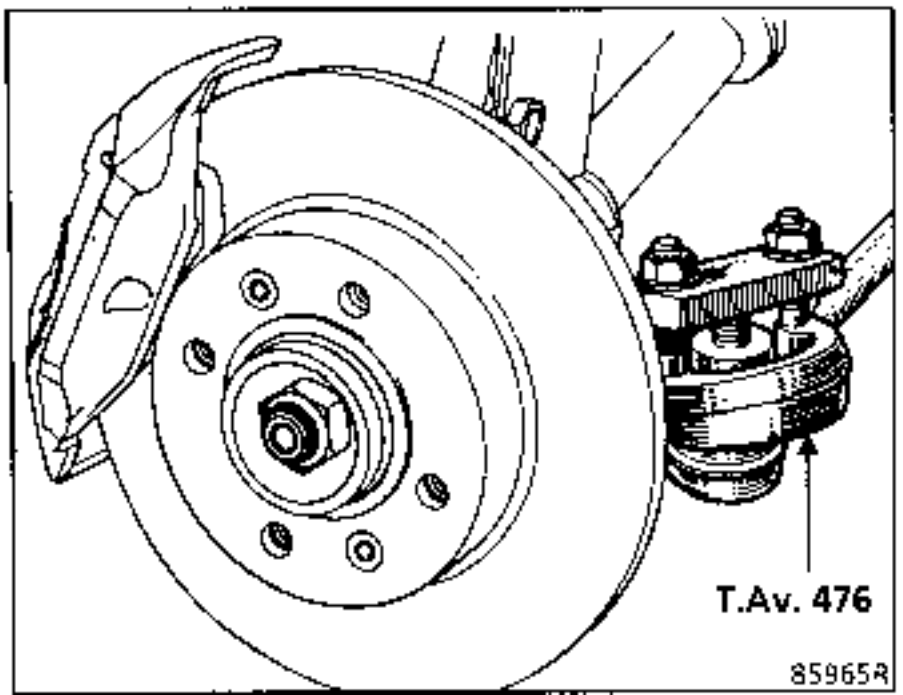


ESSENTIAL SPECIAL TOOLING		
Mot.	453-01	Hose clamps
T.Av.	476	Ball joint extractor

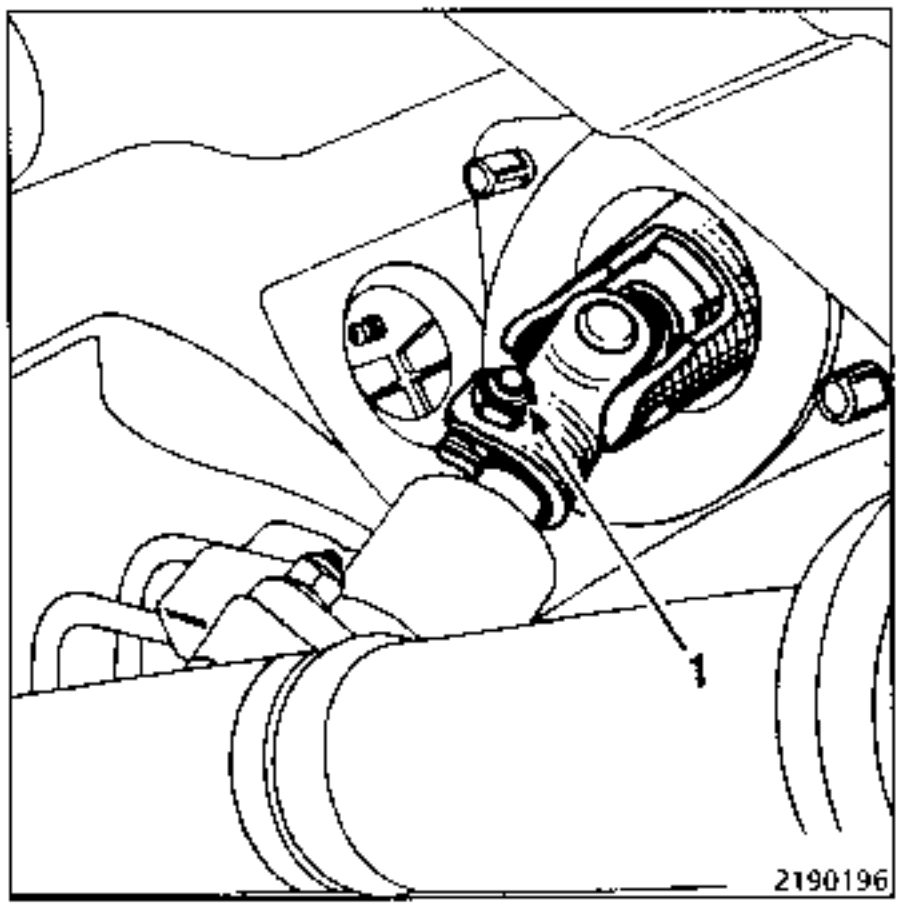
TIGHTENING TORQUES (in daN.m)	
Steering ball joint nuts	4
Axial ball joint	5
Steering box securing bolts	5
Wheel bolts	9

REMOVAL

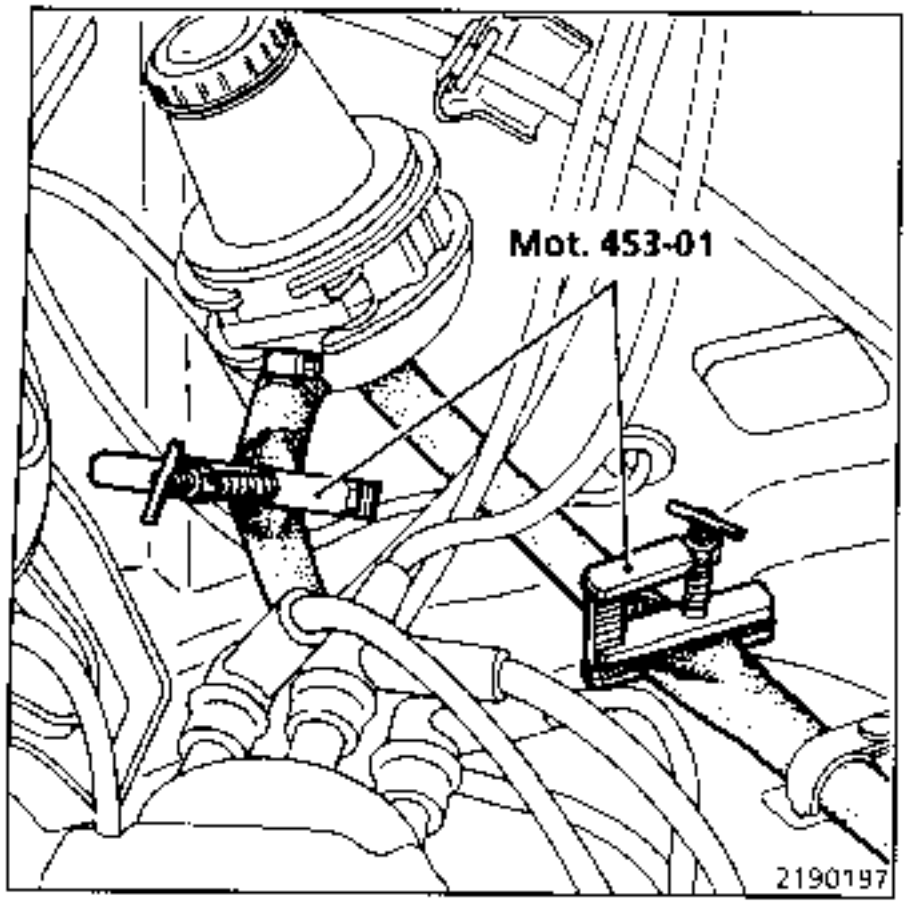
Disconnect the ball joints using tool T.Av. 476.



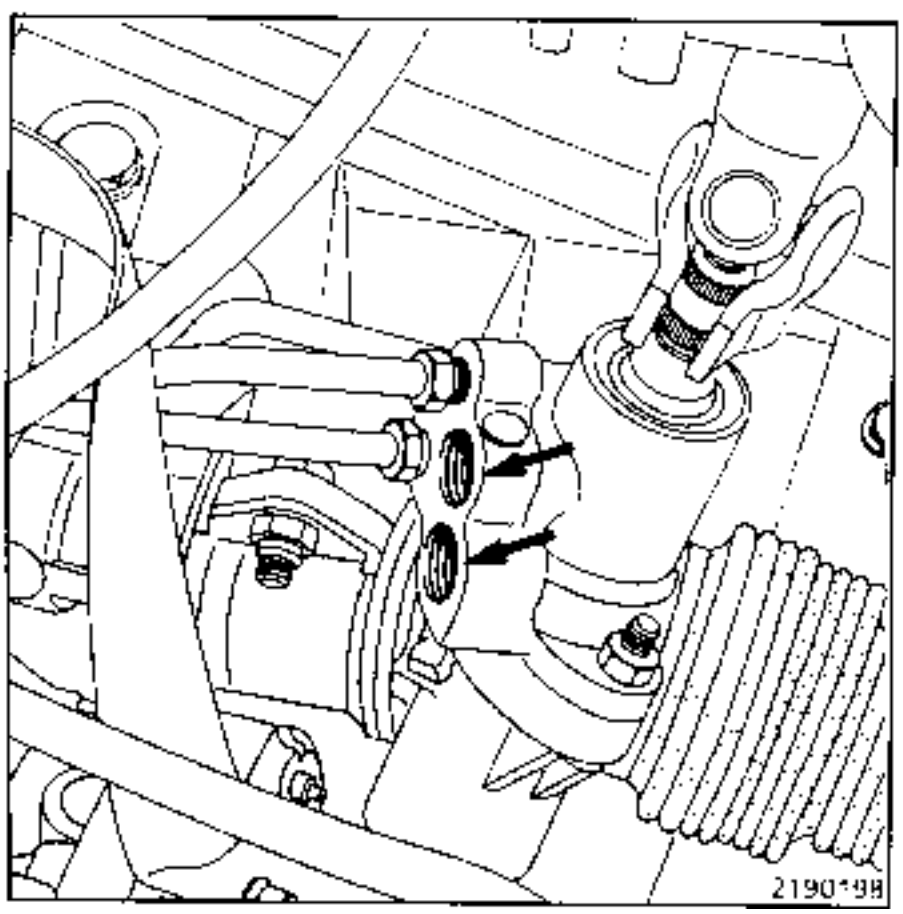
Remove:
- bolt (1) securing the universal joint, marking its position on the box.



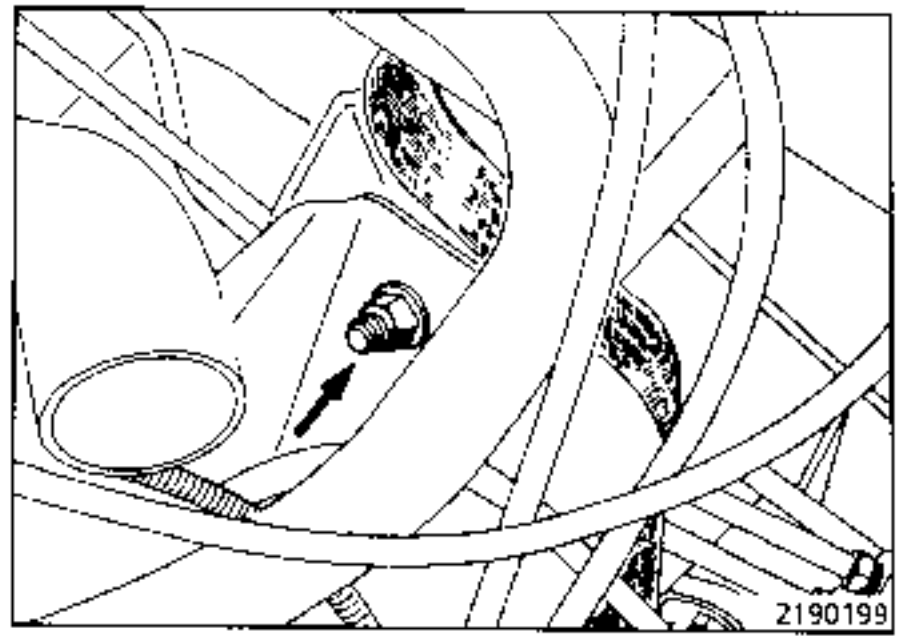
Place a clamp **Mot. 453-01** on each of the hoses coming from the oil reservoir.



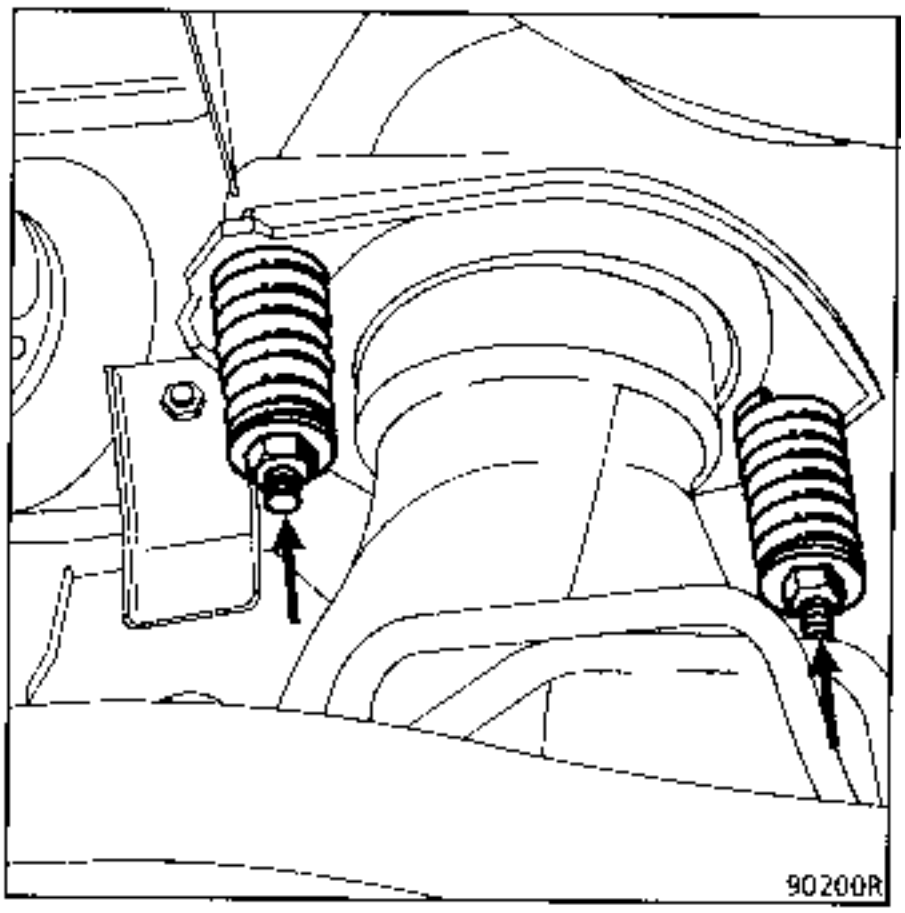
Remove:
- the hose support bracket,
- the pipes coming from the oil reservoir and the high pressure pump on the rotary valve,

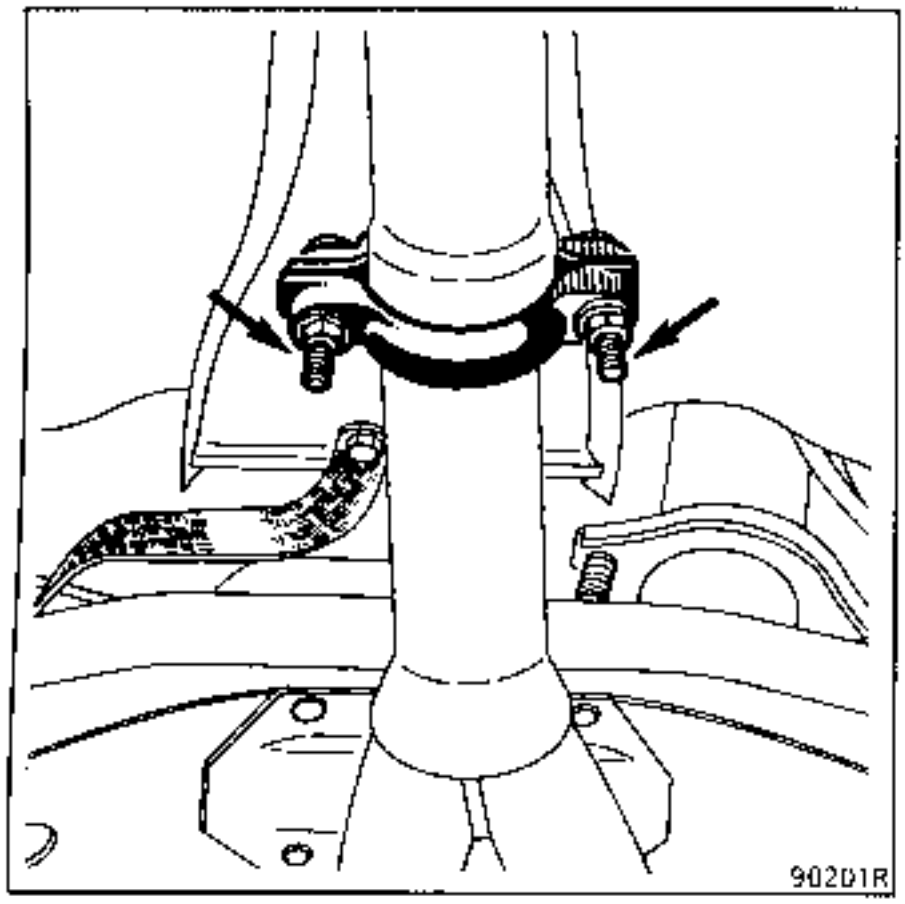


- the nut securing the engine rear mountings.

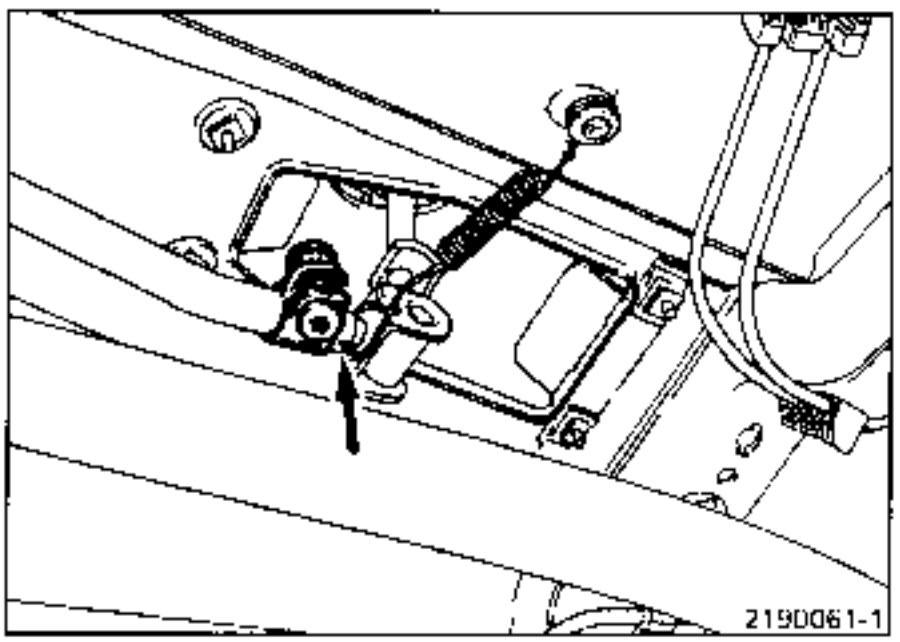


Underneath the vehicle remove :
- the exhaust downpipe from the manifold and the central connection under the vehicle,



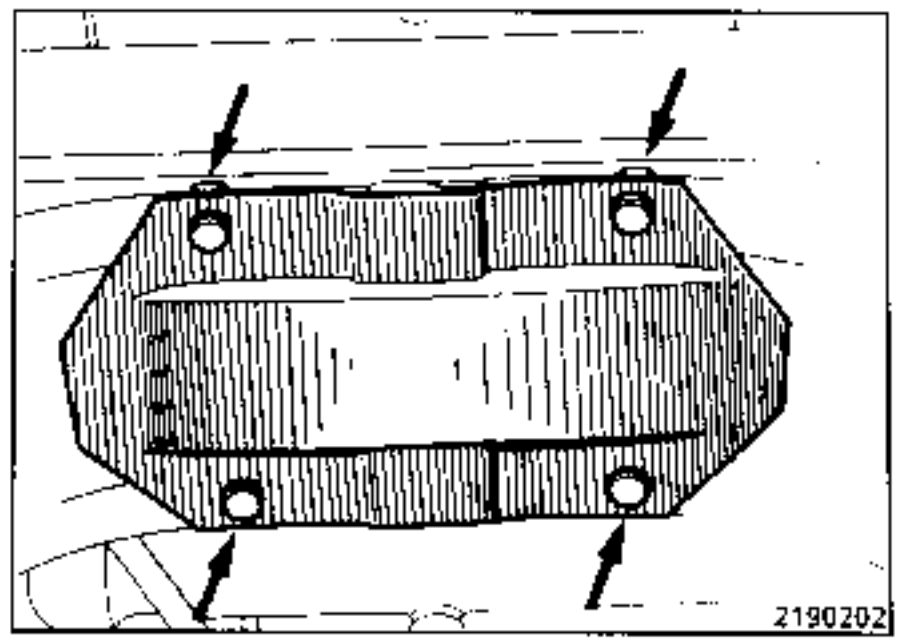


- the gear selector control from under the lever, marking its position.

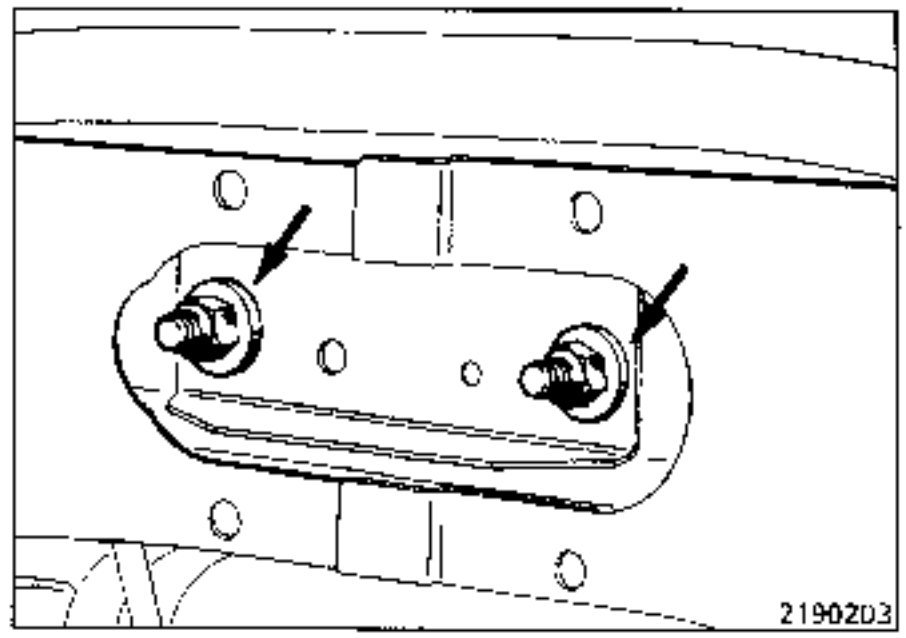


Raise the engine-gearbox assembly as high as possible and remove :

- the plate giving access to the bolts securing the engine mounting to the cradle,

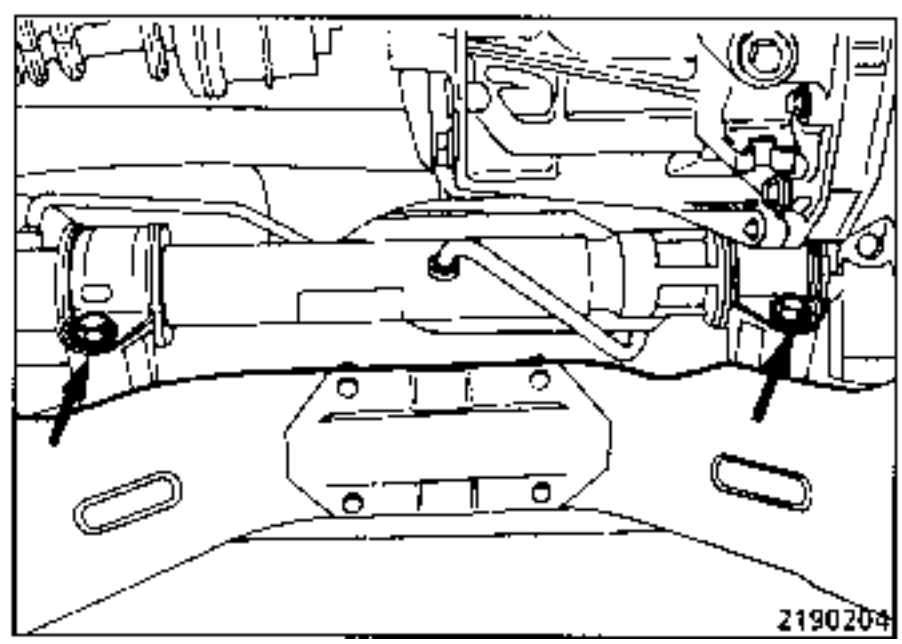


- the two bolts securing the engine mounting.

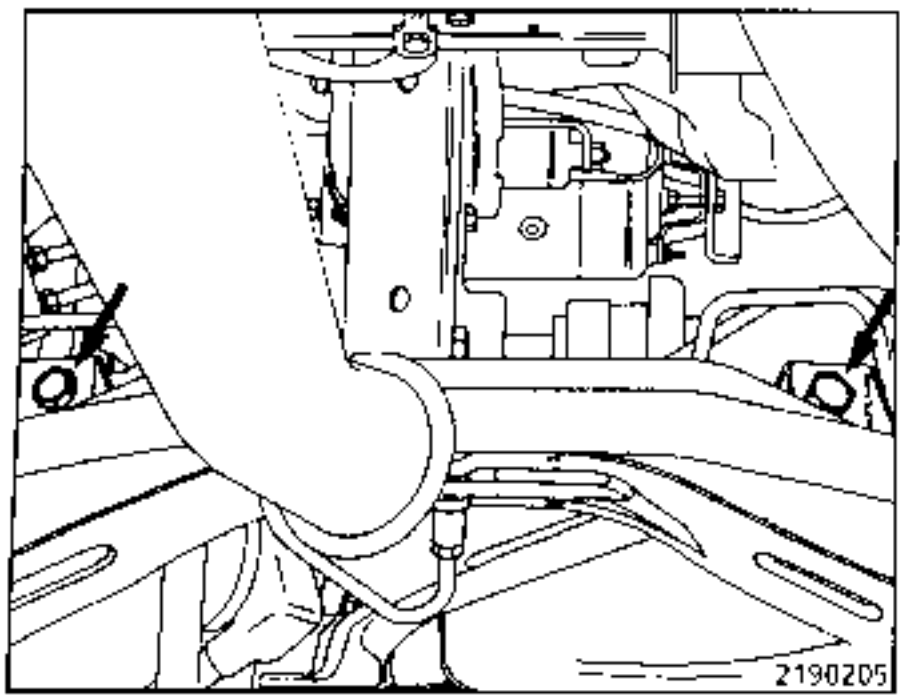


Move the steering rack towards the lefthand side and remove :

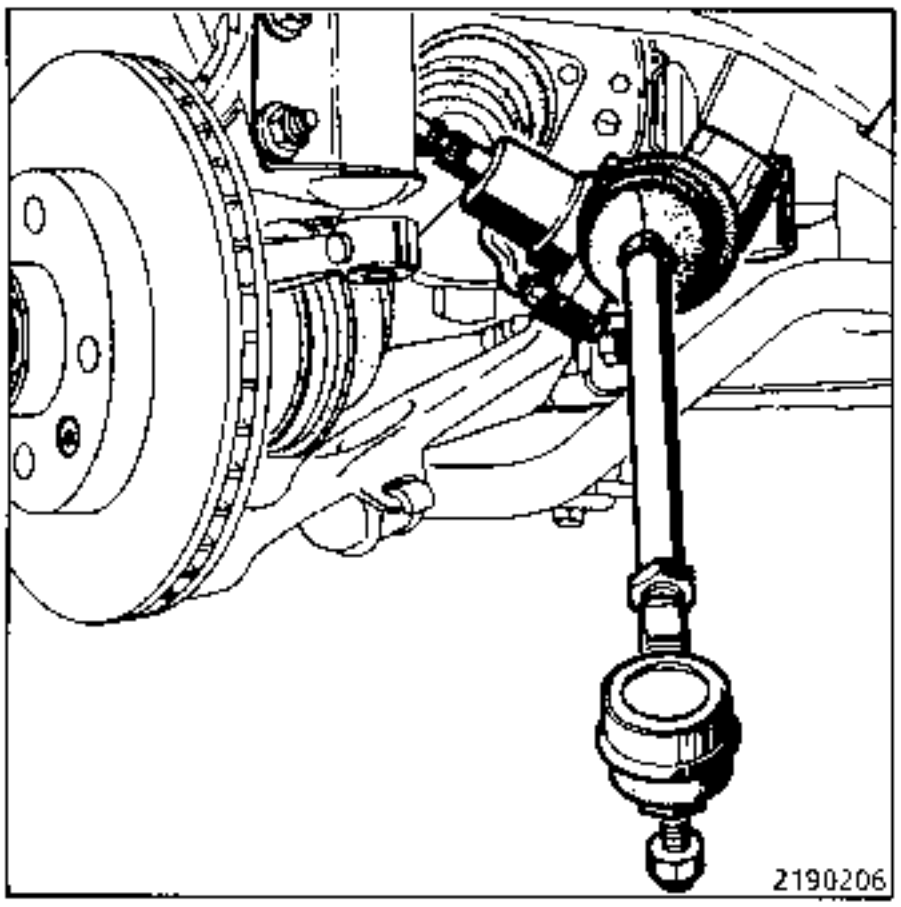
- the two steering box lower securing bolts,



- the two steering box upper securing bolts.



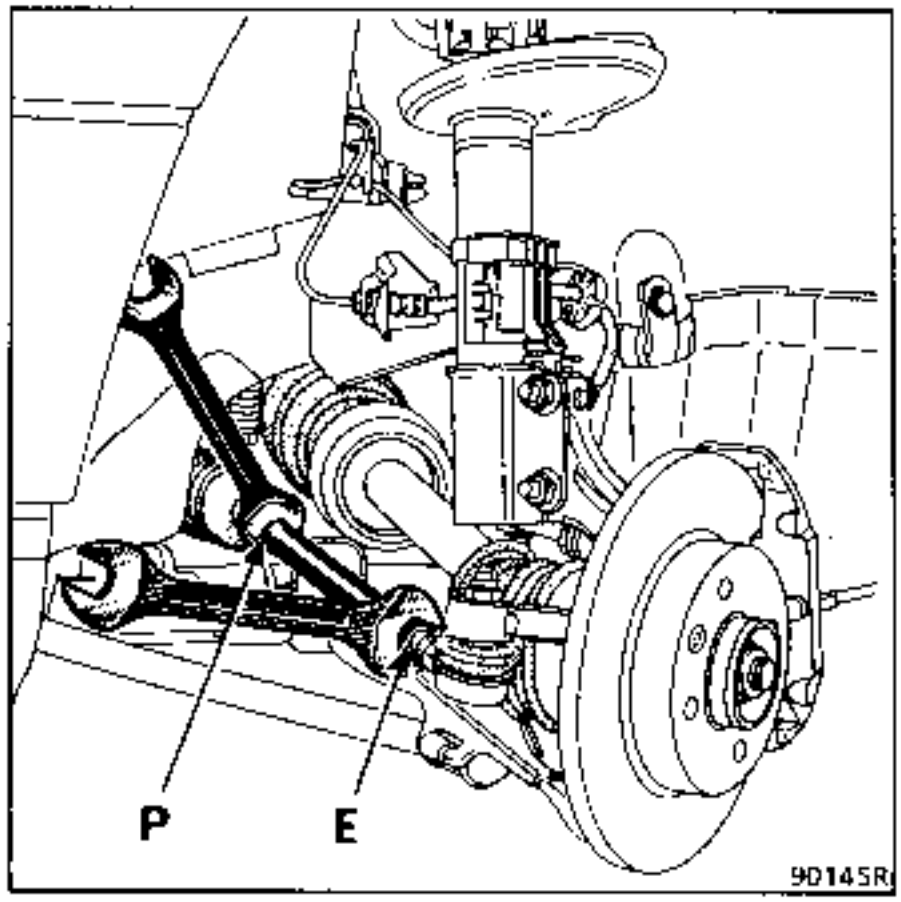
Remove the steering box from the lefthand side inner wing panel side.



The axial ball joints must only be unscrewed from the rack if they are going to be changed.

If the steering box is being changed, the ball joint housings at the stub axle carrier end must be recovered.

To do this :
- loosen lock nut (E), holding the axial ball joint with a flat wrench at (P),
- unscrew the ball joint housings, noting the number of turns needed to clear the threads.



REFITTING

If a new steering system is being fitted, fit the ball joint housings in the position marked on dismantling.

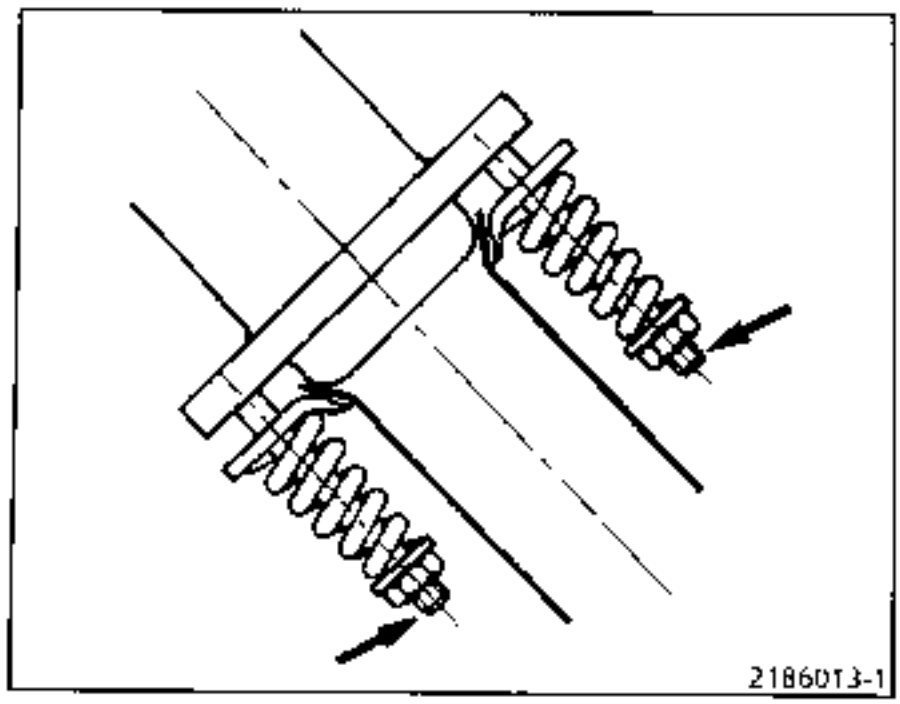
The engine-gearbox assembly must be raised as high as possible.

Fit in place the steering box and secure it.

Refit:
- the engine rear mounting to the cradle,
- the closure plate.

Lower the engine-gearbox assembly and fit it in place.

Refit :
- the exhaust downpipe.



Reconnect :
- the selector control, aligning it with the marks made on removal,
- the ball joints to the stub axle carrier.

Position the steering universal joint according to the marks made on removal and tighten it.

Fit in place and tighten the nut securing the engine rear mounting.

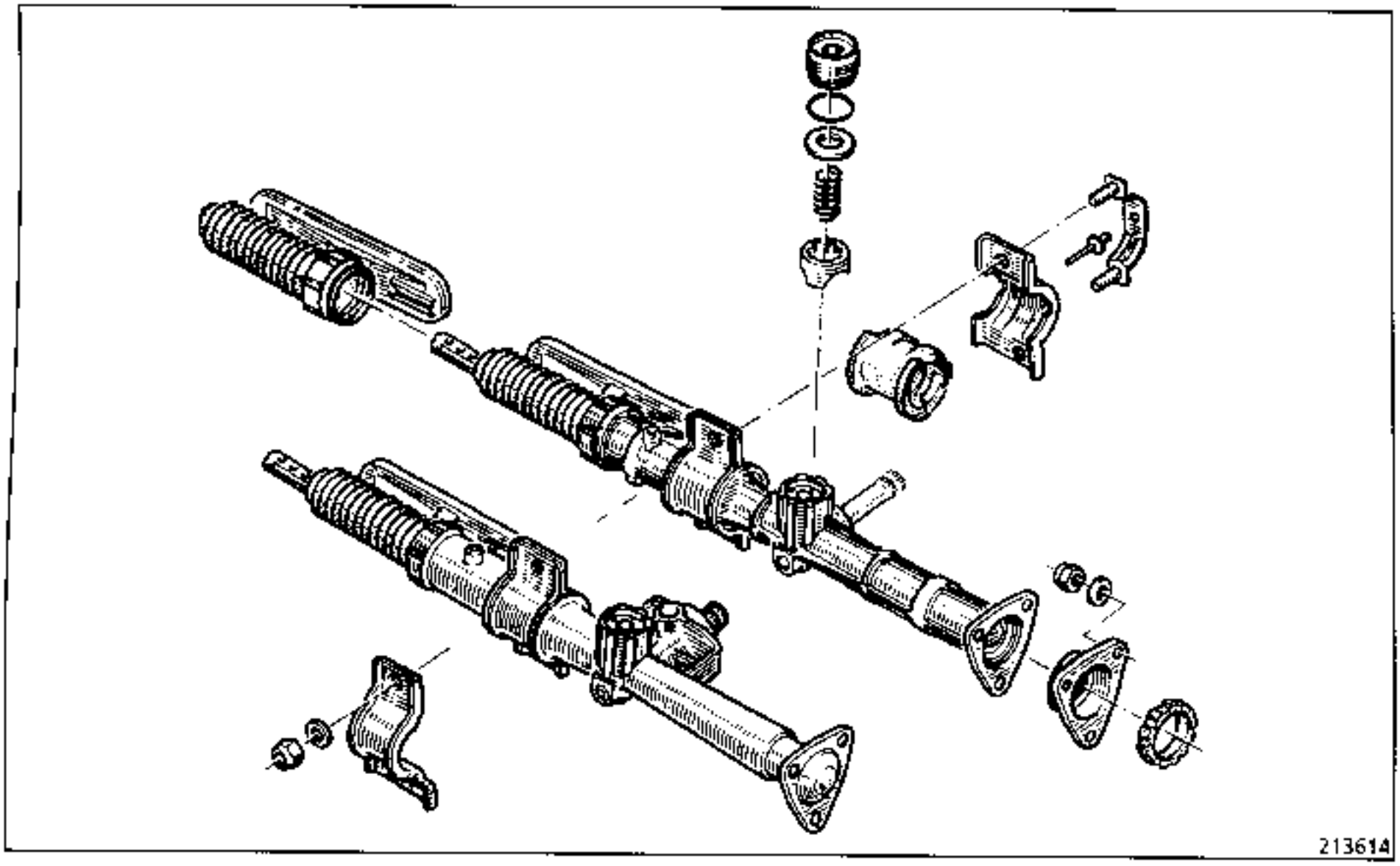
Reconnect the rotary valve feed pipes and remove clamps **Mot. 453-01**.

Fill the circuit with oil, up to the level of the grille in the chamber.

Turn the wheels from left to right (engine not running) so as to distribute the oil in the system.

Repeat this operation with the engine running and then top up the level (see section on **"Refilling the system"**).

Check and, if necessary, adjust the parallelism.



ESSENTIAL SPECIAL TOOLING		
Mot.	453-01	Hose clamps
T.Av.	476	Ball joint extractor
Dir.	1067	Parallelism adjusting tool

TIGHTENING TORQUES (in daN.m)		▽
Centre bearing securing nut		5
Securing nuts on shock absorber turret		3
Bolts securing link to rack		4
Steering arm securing nuts		3.5
Link bolt lock nut		3.5
Ball joint nuts		4
Wheel bolts	4 bolts	9
	5 bolts	10

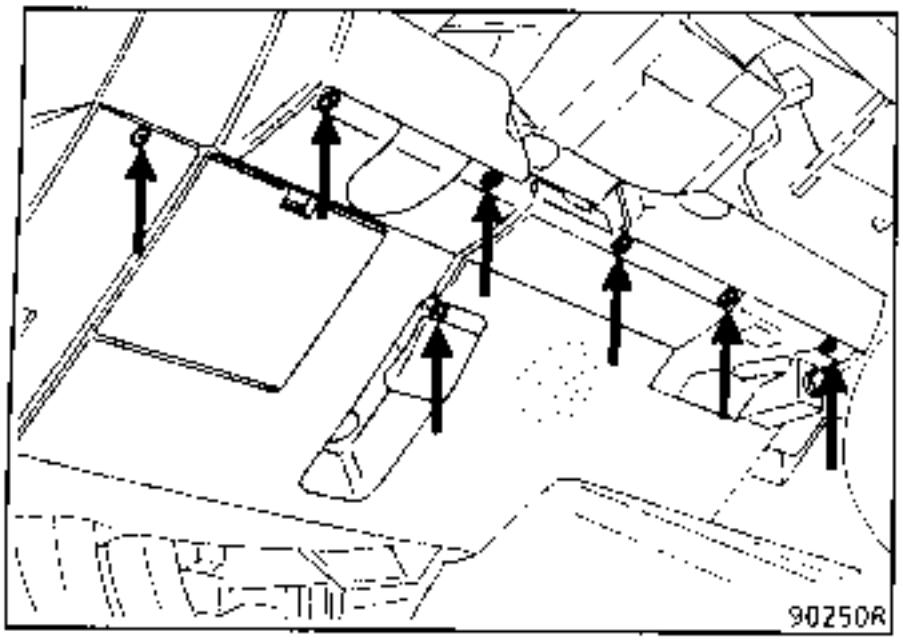
Special features of vehicles with ABS option.

NOTE : The steering box is removed after the removal of the ABS hydraulic assembly. The method is then identical to X48 vehicles with in-line engines.

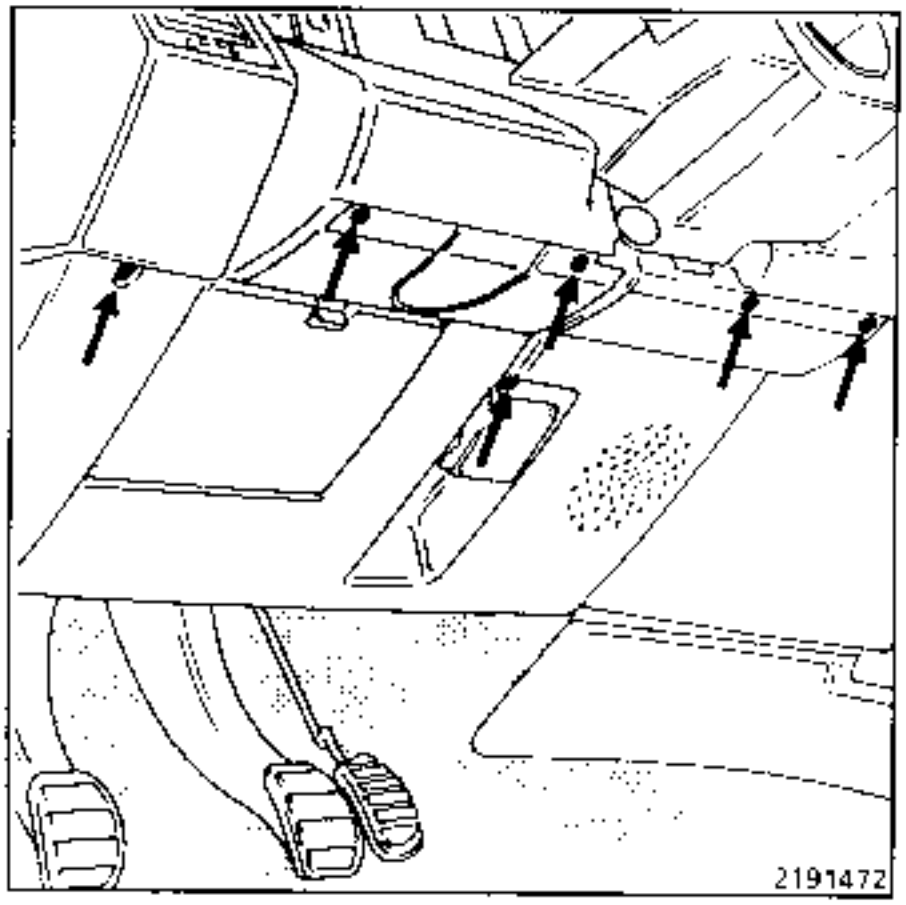
REMOVAL

Remove the cover under the steering wheel and the sound-deadening cover.

1st TYPE



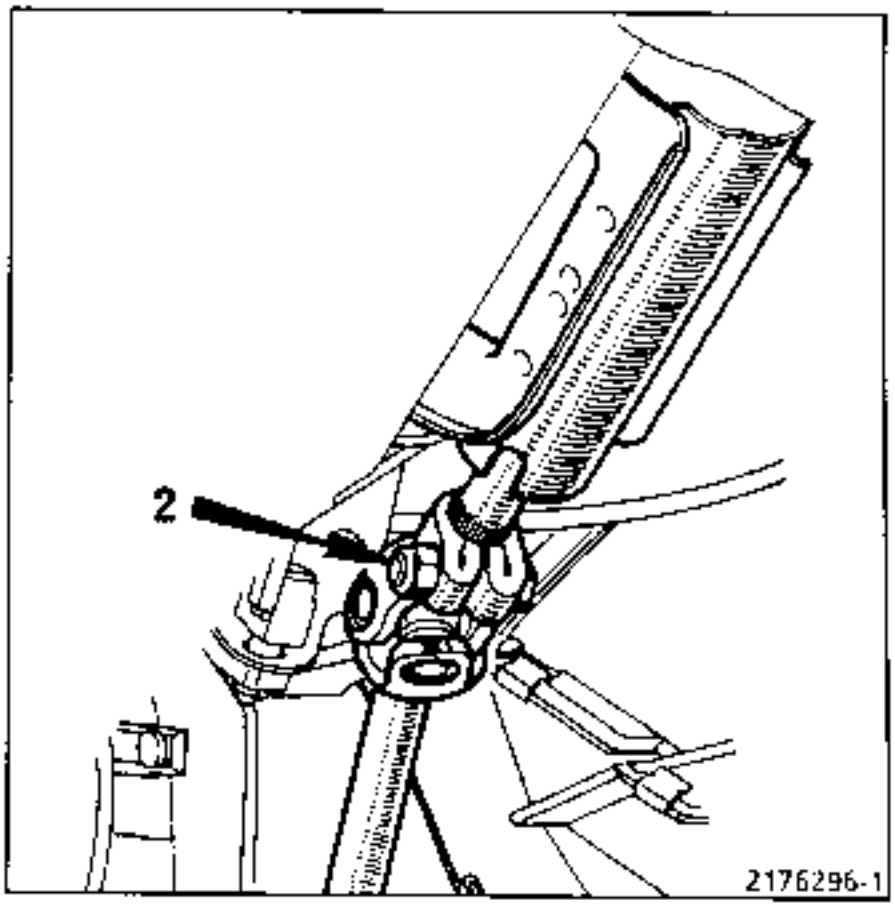
2nd TYPE



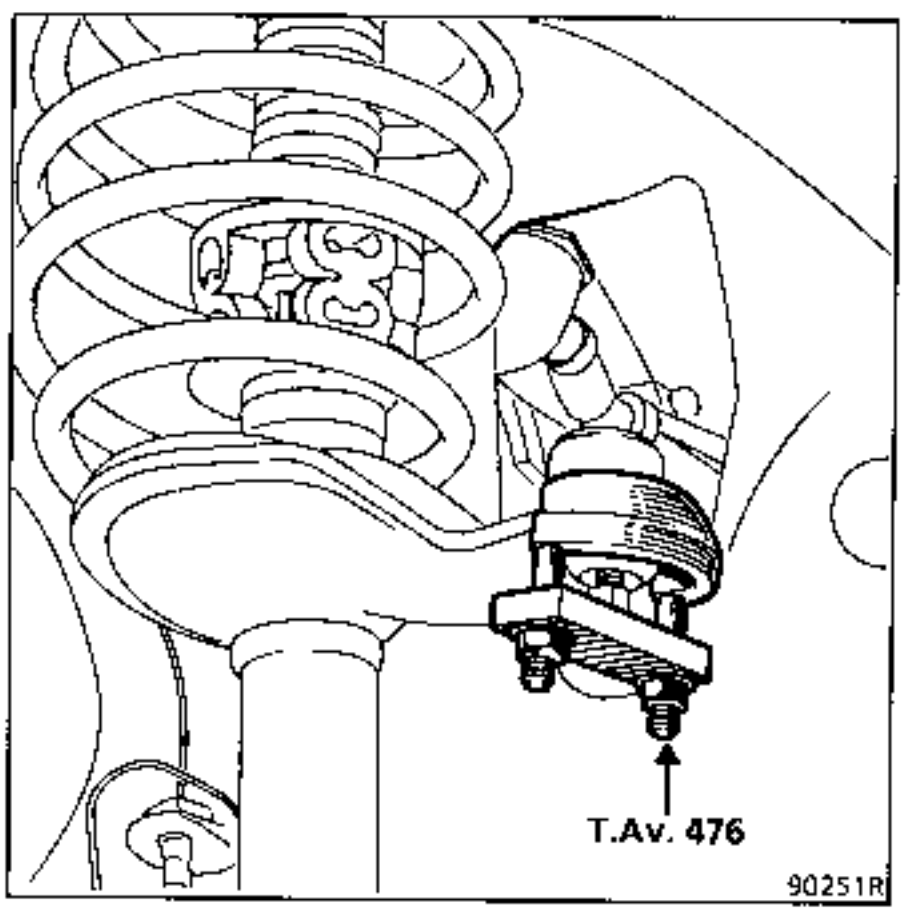
NOTE : On the 1st type, the glove compartment must be opened to remove the cover under the steering wheel.

In all cases, remember to remove the bolt located under the steering column adjusting lever.

Move the steering rack to the righthand side and remove bolt (2) securing the intermediate shaft to the steering wheel shaft.

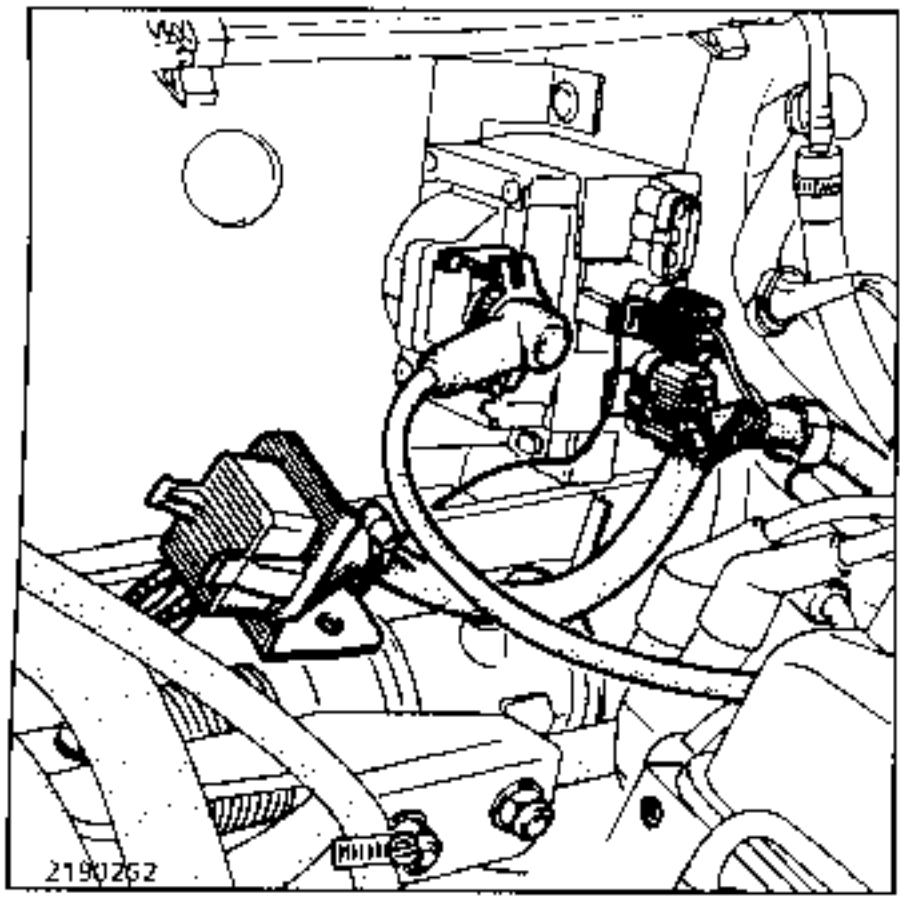


Disconnect :
- the ball joints using tool **T.Av. 476.**



Depending on engine type

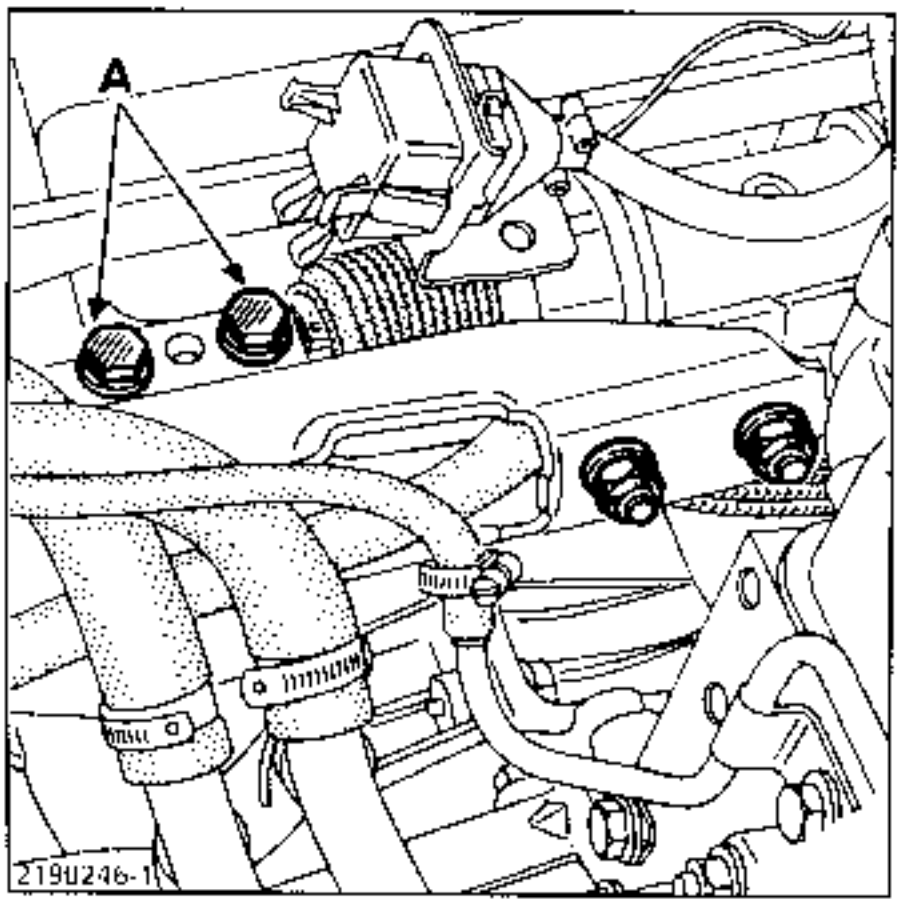
- disconnect the power module leads,



- the diagnostic plug and its mounting.

All types

- bolts (A) securing the steering arm link.



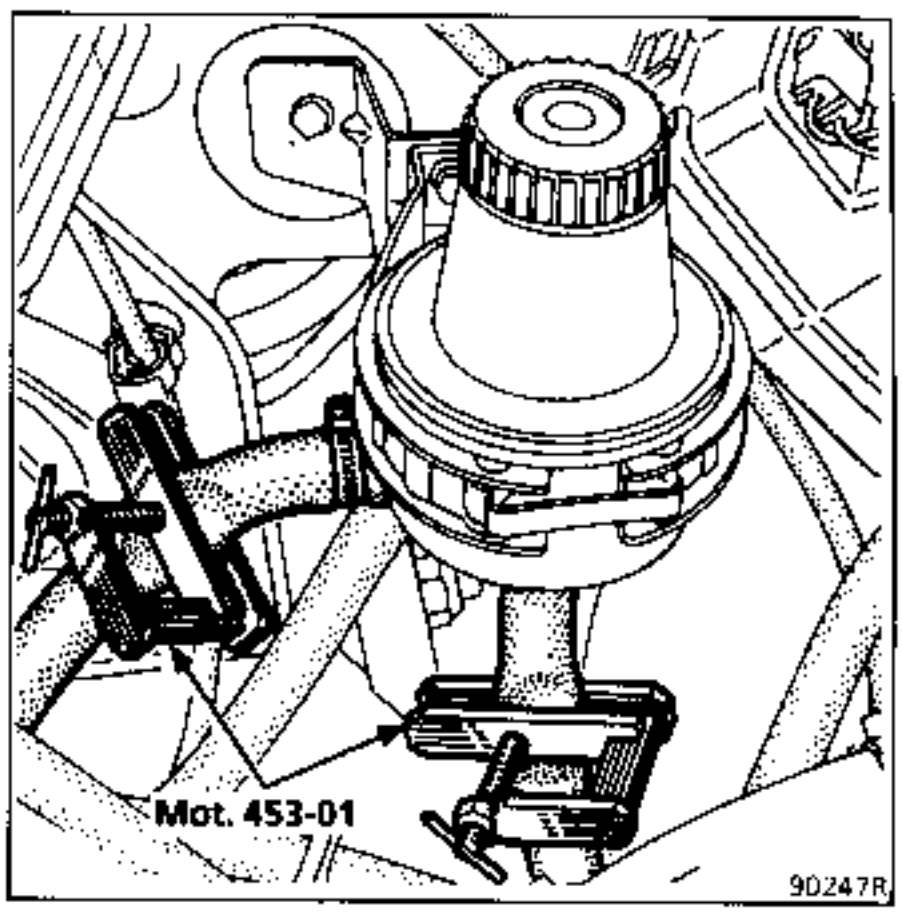
NOTE : As the steering rack nose has threaded bolt holes, the lock nuts must first be removed from bolts (A).

- free the link/arm assembly from the righthand side.

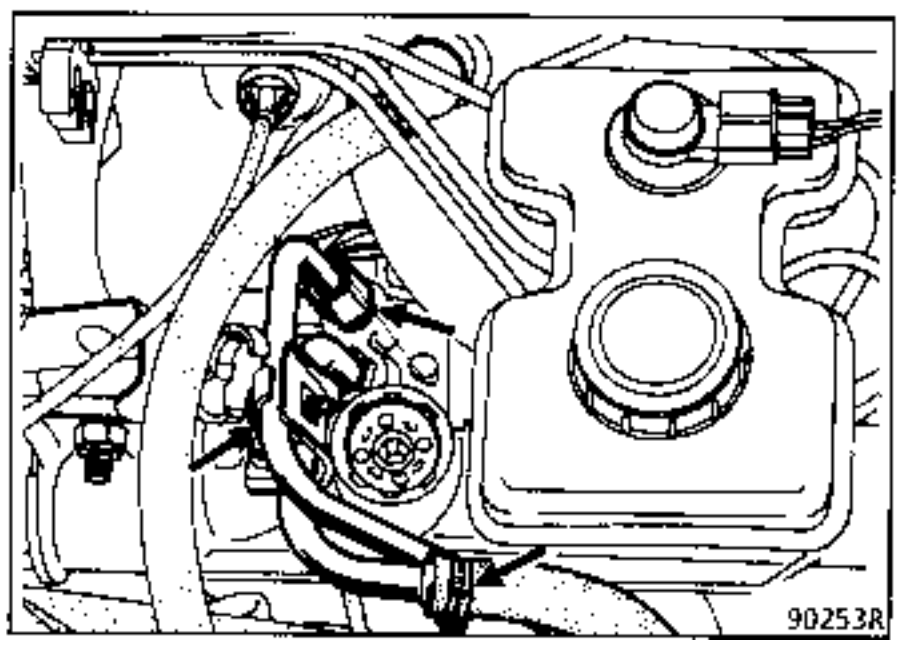
Move the steering rack to the lefthand side.

Power-assisted steering

Fit a clamp ***Mot. 453-01*** *to each of the hoses coming from the oil reservoir.*



Remove:
- *the hose mounting bracket,*
- *the* ***high pressure*** *lines from the valve union,*
- *the* ***low pressure*** *lines from the hose union.*

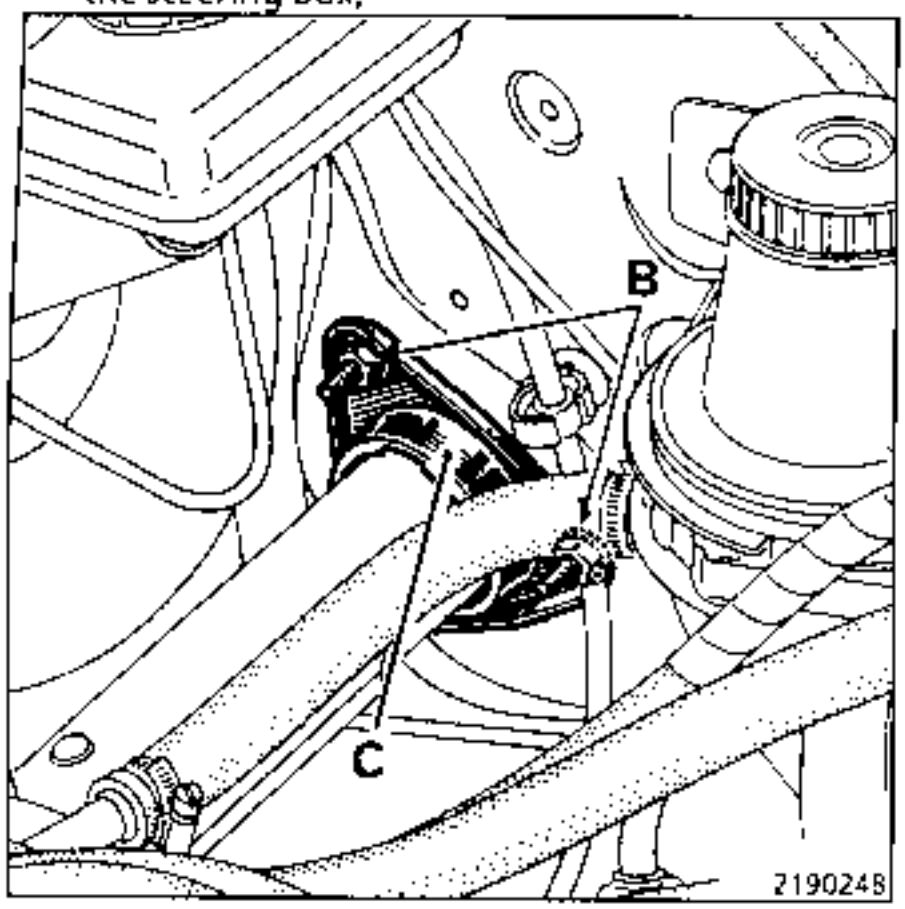


All types

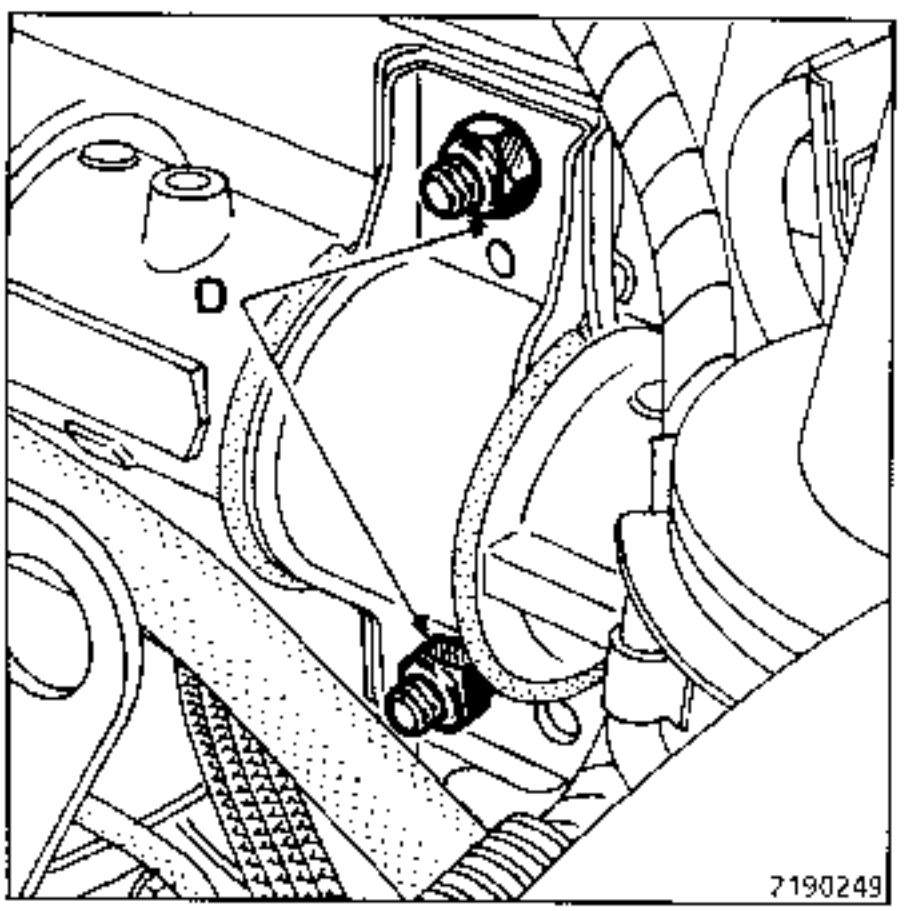
Remove:

- the three nuts (B) securing the steering body to the shock absorber turret and free securing flange (C) from the studs on the body shell,

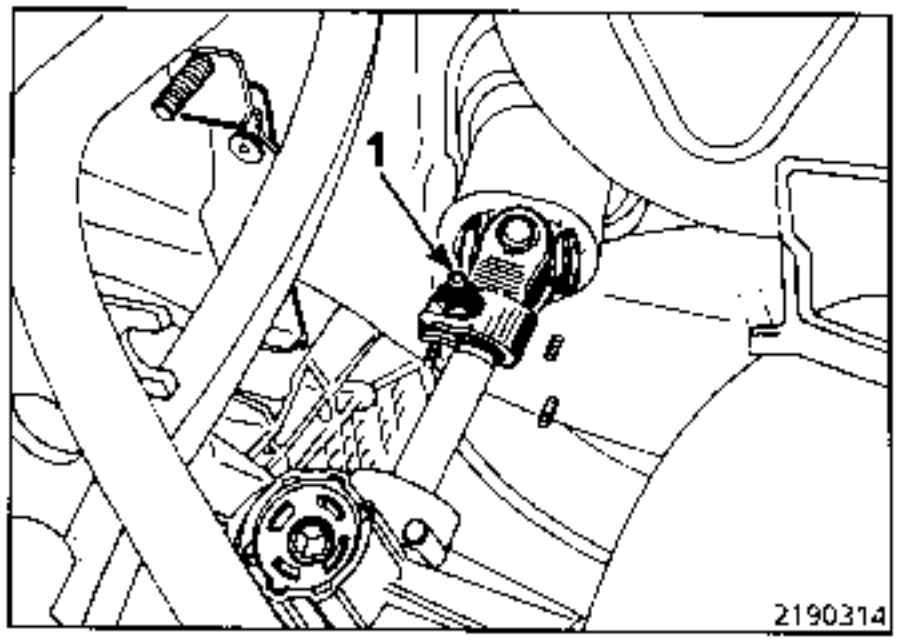
- the PVC collar holding the bulkhead gaiter on the steering box,



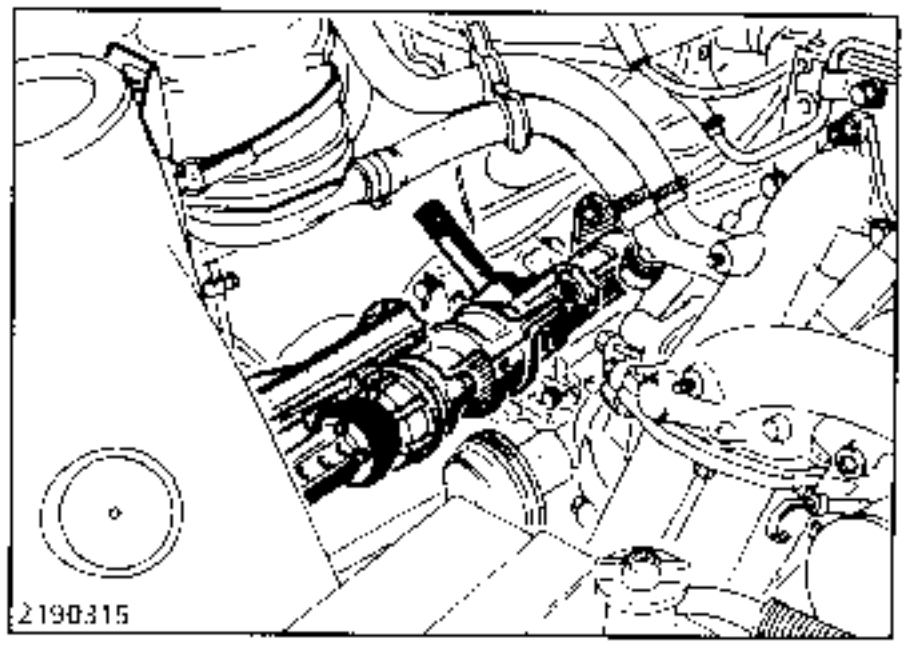
- the two centre bearing nuts (D).



Free the steering box, moving it forward and remove bolt (1) securing the universal joint.



Tilt the steering box downwards and remove it from the righthand side.



Depending on engine type

NOTE : Take care not to damage the TDC sensor.

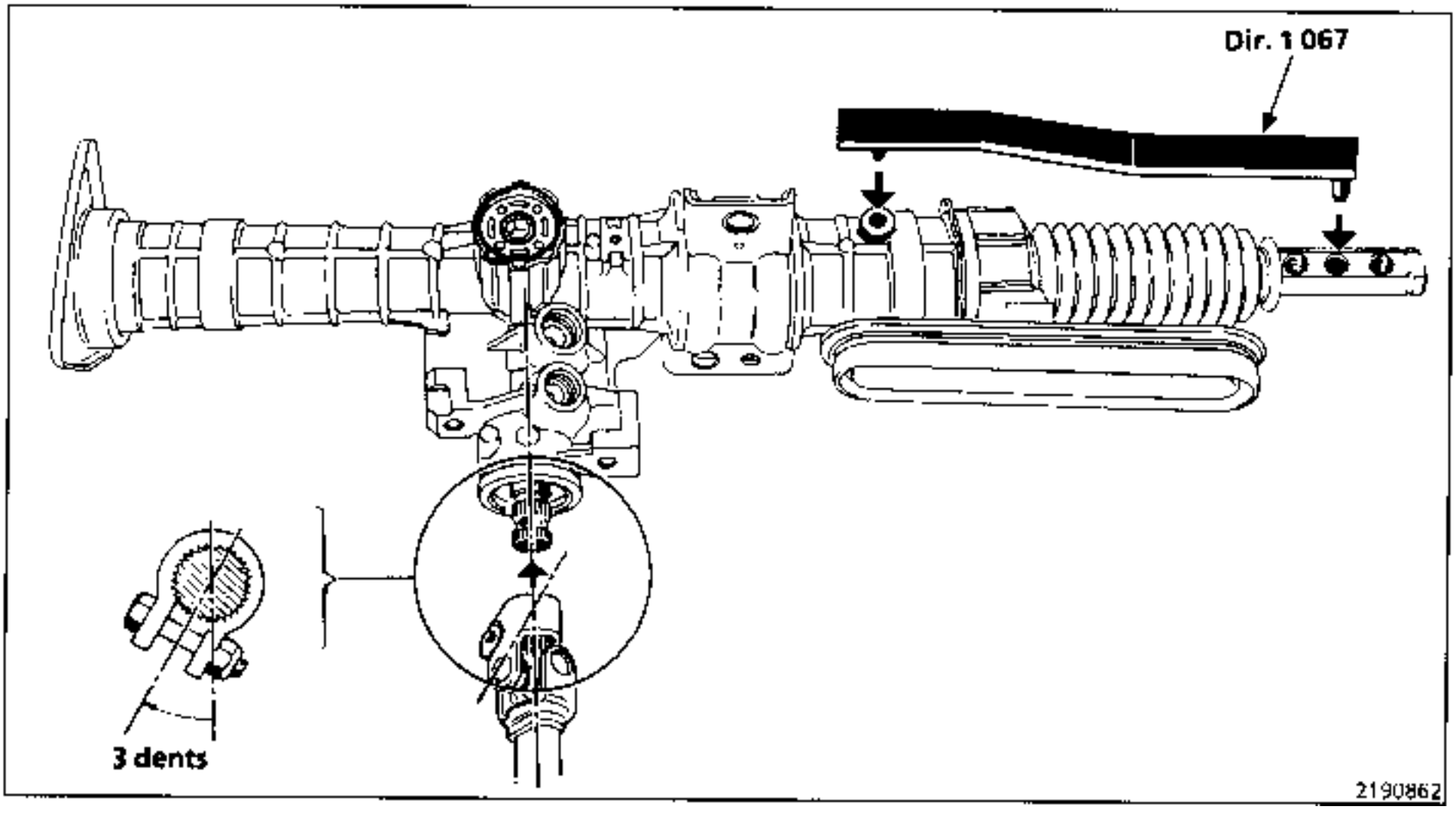
REFITTING

All types - conventional and power-assisted steering - right and lefthand drive.

The coupling universal joint must be positioned correctly so as to prevent any disturbance of the vehicle's roadholding.

Fit tool Dir. 1 067 to the steering box.

Bring the steering box, without fitting it, onto the centre bearing studs then engage the universal joint so that the mounting bolt centreline is in the lower horizontal position, then offset it by 3 teeth in the clockwise direction, as shown in the diagram below.



In this position, fit bolt (1) and tighten it.

Fit in place :
- the steering box on its anchorages, making sure that the intermediate shaft is properly positioned in its location,
- the centre bearing securing nuts,
- the flange and securing nuts on the shock absorber turret,
- a new PVC collar for holding the bulkhead gaiter on the steering box.

Torque tighten the securing points.

Power-assisted steering

Reconnect the pipes and the pipe mounting bracket.

All types

Move the steering rack to the righthand side.

Fit in place :
- the link/arm assembly.

NOTE : As the steering rack nose has threaded bolts, the bolts must be torque tightened.

Fit :
- the link securing bolts,
- the lock nuts on these bolts.

Depending on engine type

Refit :
- the power module leads,
- the diagnostic plug with its mounting.

All types

- the intermediate shaft in the steering wheel shaft,
- the sound-deadening cover,
- the cover under the steering wheel,
- the ball joints to the stem of the shock absorber.

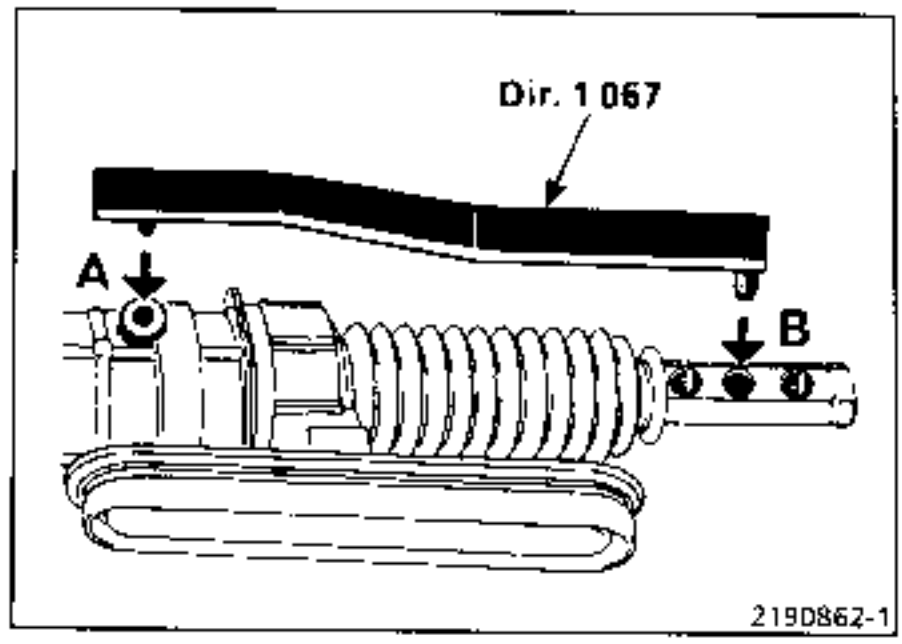
Power-assisted steering
*Fill the oil system with oil up to the level of the grille in the chamber. Turn the wheels from left to right (engine not running) so as to distribute the oil in the system. Repeat the operation with the engine running, then top up the oil (see section on "**Refilling the system**").*

All types

check and, if necessary, adjust the parallelism.

To do this :

fit tool **Dir. 1 067** in holes(A) and (B) of the steering box and rack.



In this position, fit the measuring equipment and check the parallelism.

If the steering plunger is knocking, before the steering box is replaced, it is essential to check that the plunger is properly set.

DETERMINING THE SOURCE OF THE KNOCKING

Take the rack bar on the side where the plunger is located and find the axial clearance (from front to rear). If there is knocking, adjust the plunger.

ADJUSTING THE VEHICLE

Unlock adjusting nut (1) by tapping back flanged portion (A).

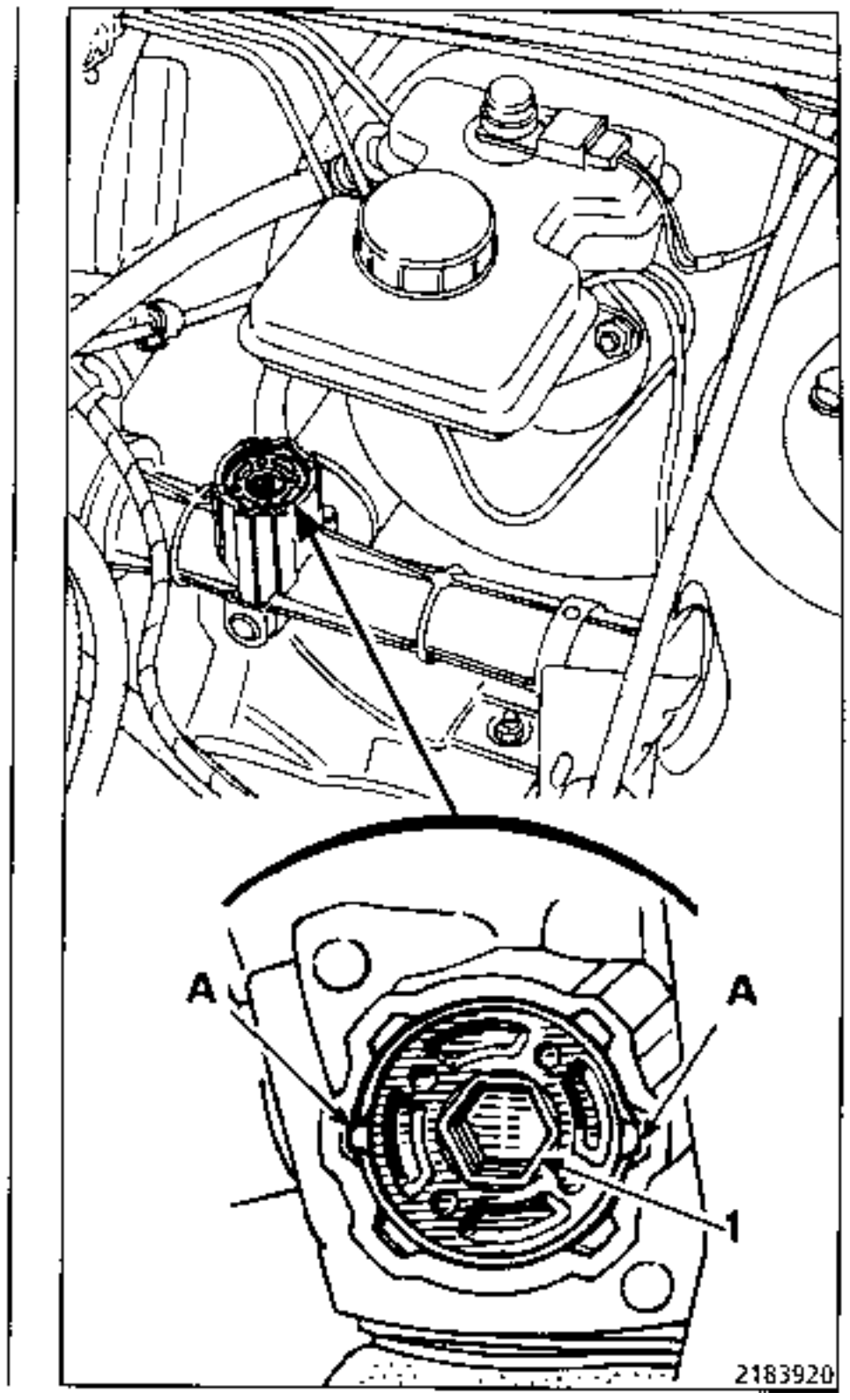
Tighten the adjusting nut by 2 notches using a 10 mm male hexagon head key. Check that the clearance has disappeared.

Maximum permissible clearance : **3 notches.**

Relock the nut using two opposite recesses in the steering box and folding down the nut flange.

This operation is performed :

- **After removing the steering** on all transverse engines.
- In-situ **without removing the steering** on all in-line engines.

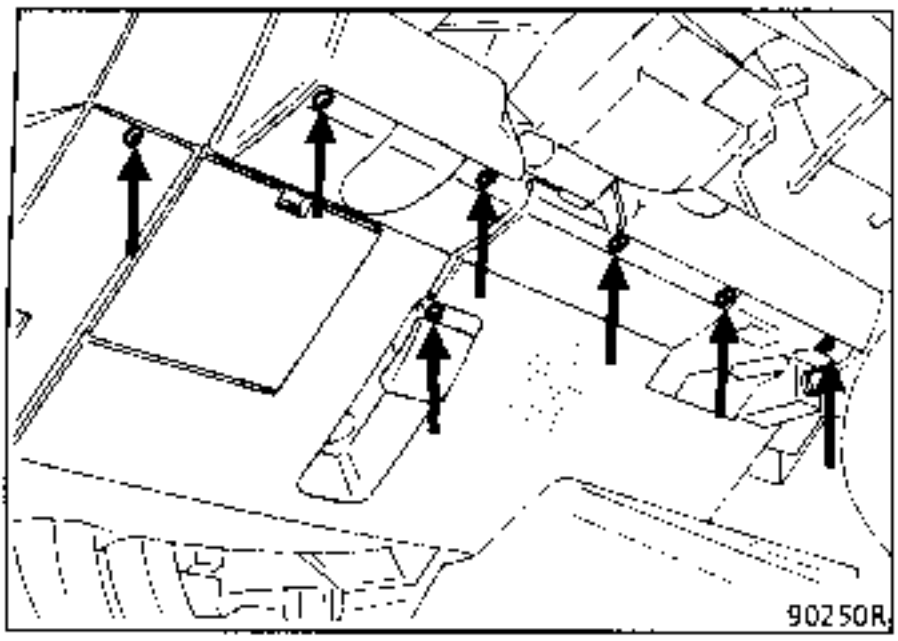


A locking lever located below the steering column enables the height of the steering wheel to be adjusted to suit the driver. In some cases, the tightness of this locking mechanism has to be adjusted.

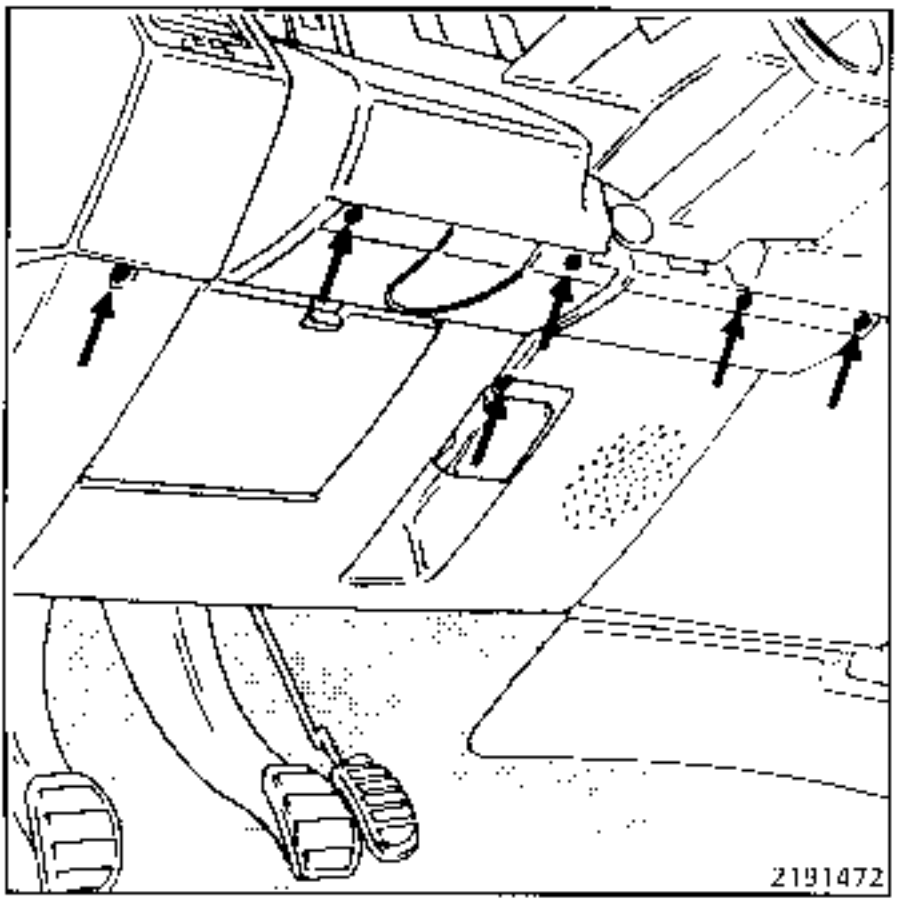
ADJUSTING THE DEGREE OF TIGHTNESS

Remove: the lower cover under the steering wheel.

1st TYPE



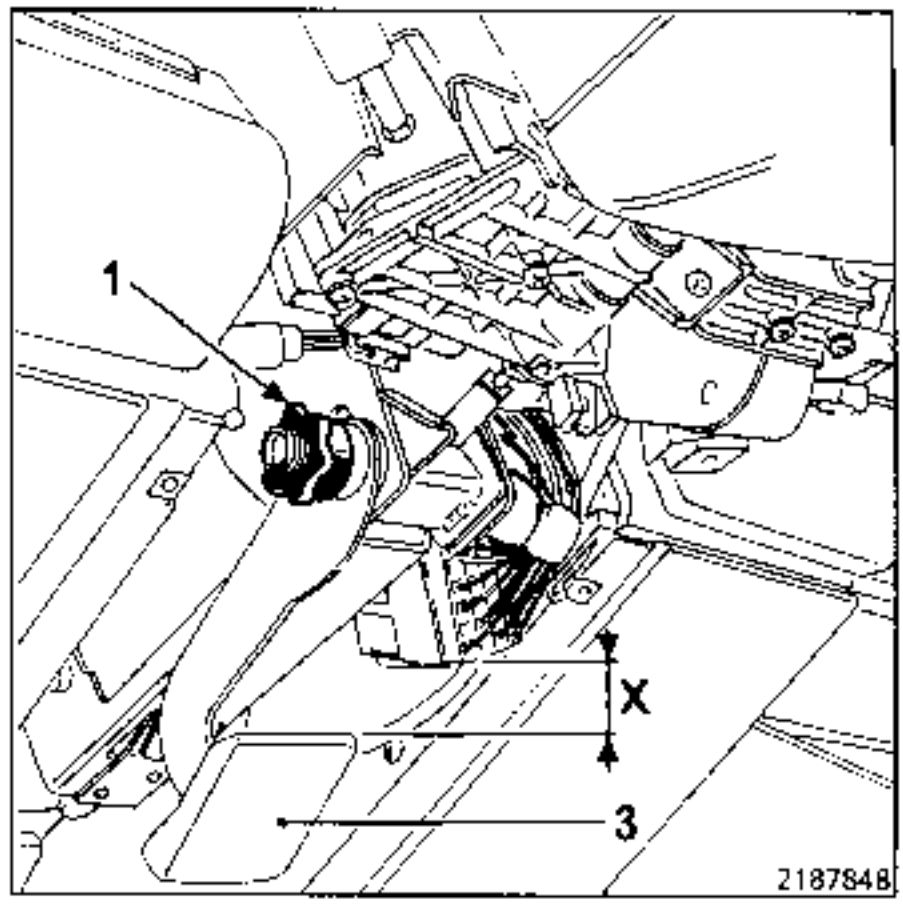
2nd TYPE



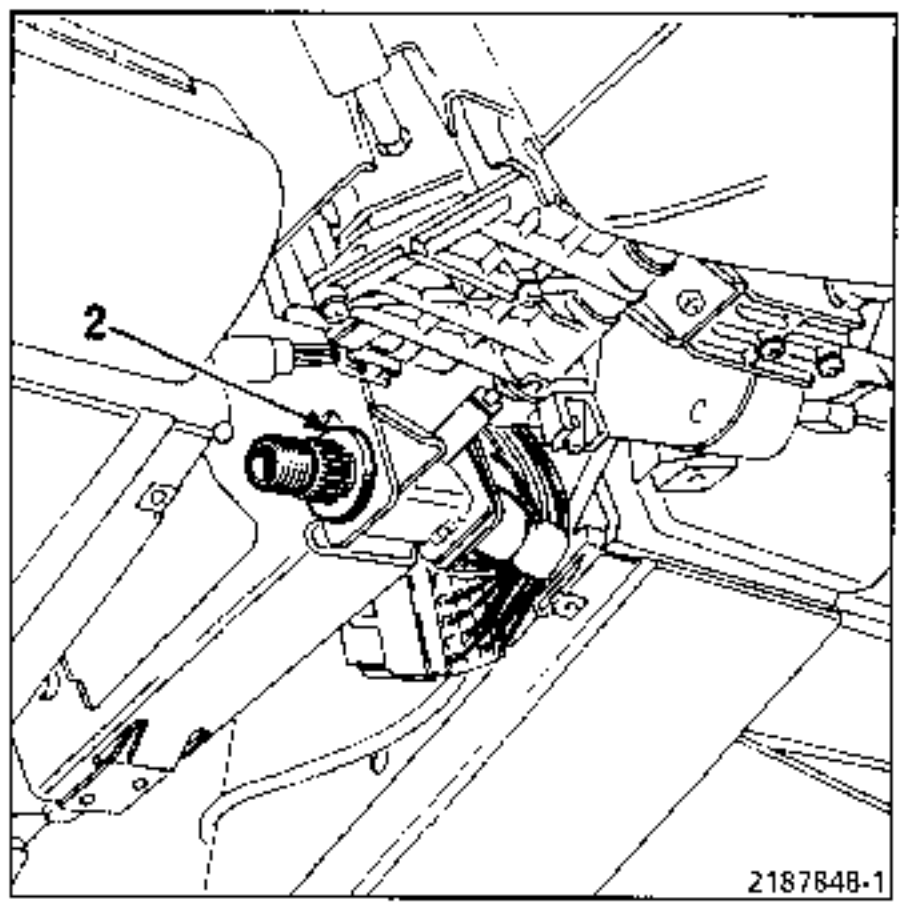
NOTE : To remove the cover under the steering wheel on type 1 vehicles, the glove compartment has to be opened.

Slacken nut (1) locking the lever.

Move the steering wheel shaft to the lowest position possible.



Lock the steering column by tightening nut (2) using locking lever (3).

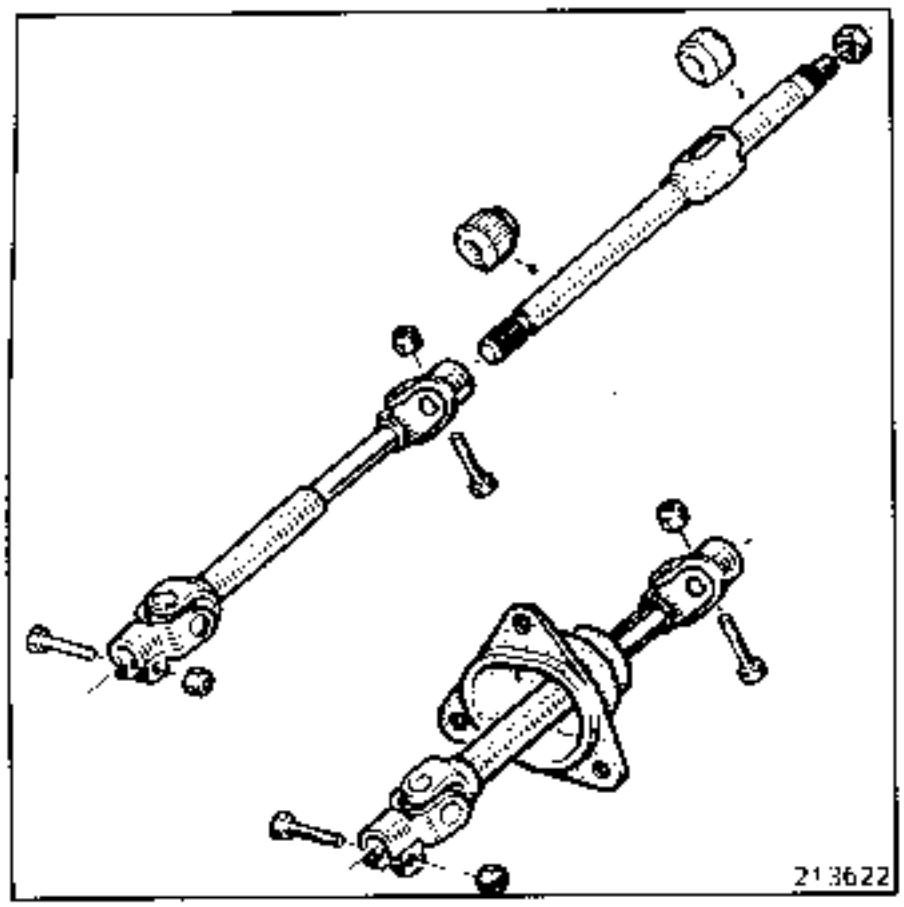


Position the locking lever (3) so that X = 30 mm away from the steering mounting.

Refit:
- nut (1),
- the lower cover under the steering wheel.

Check that the lever is accessible. If it is not, increase or reduce the distance by 10 mm.

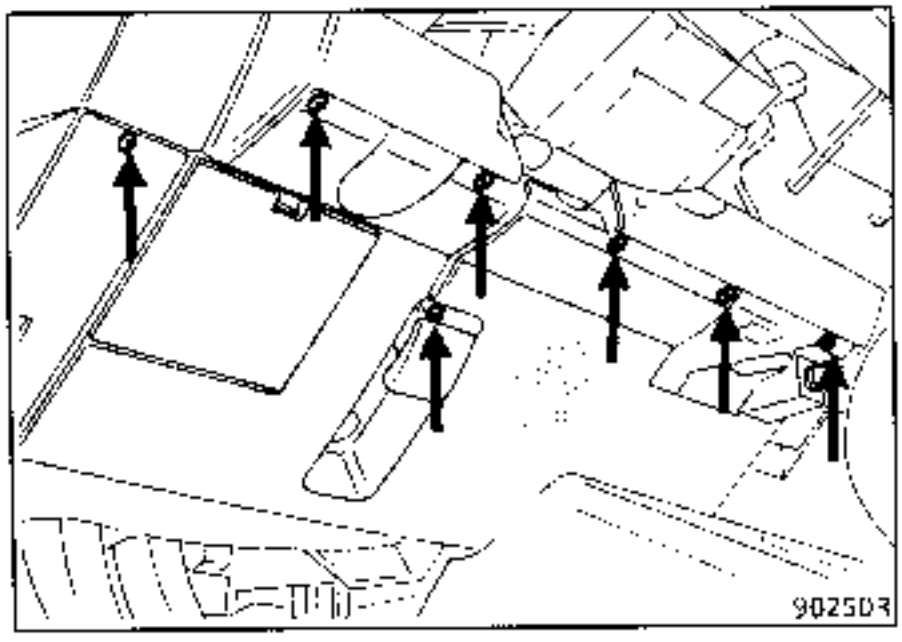
TIGHTENING TORQUES (in daN.m)	
Steering wheel nuts	4
Steering universal joint nuts (suggested torque)	2.5



REMOVAL

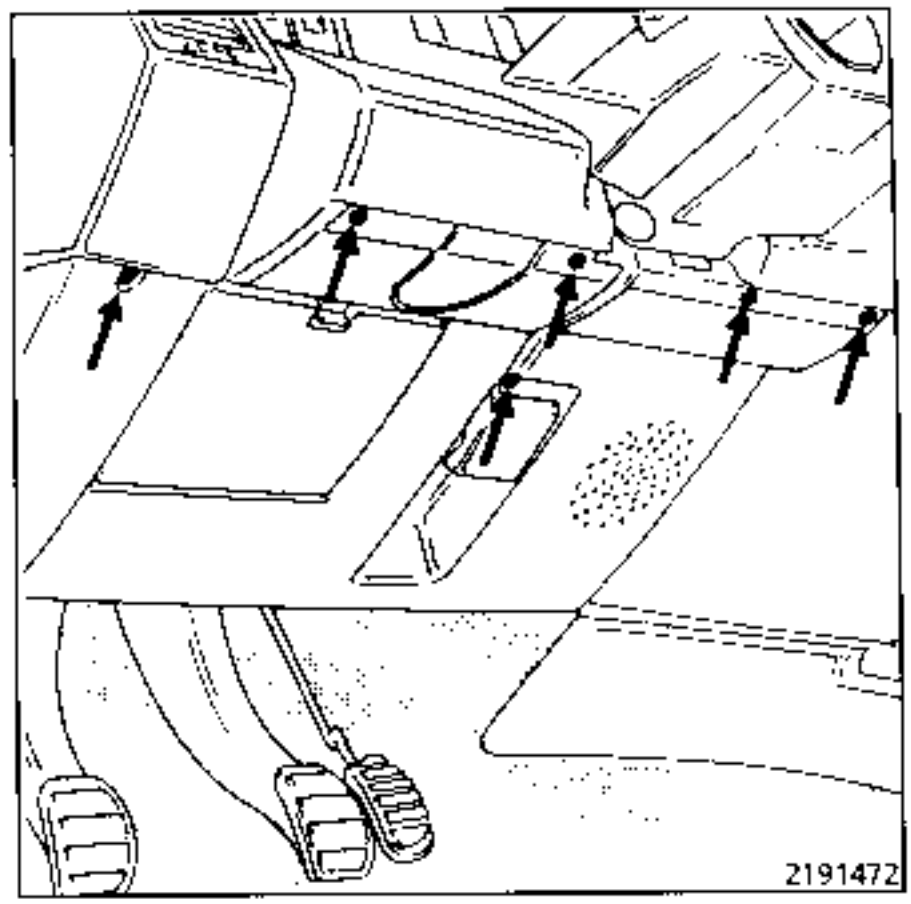
Remove :
- the lower cover under the steering wheel.

1st TYPE

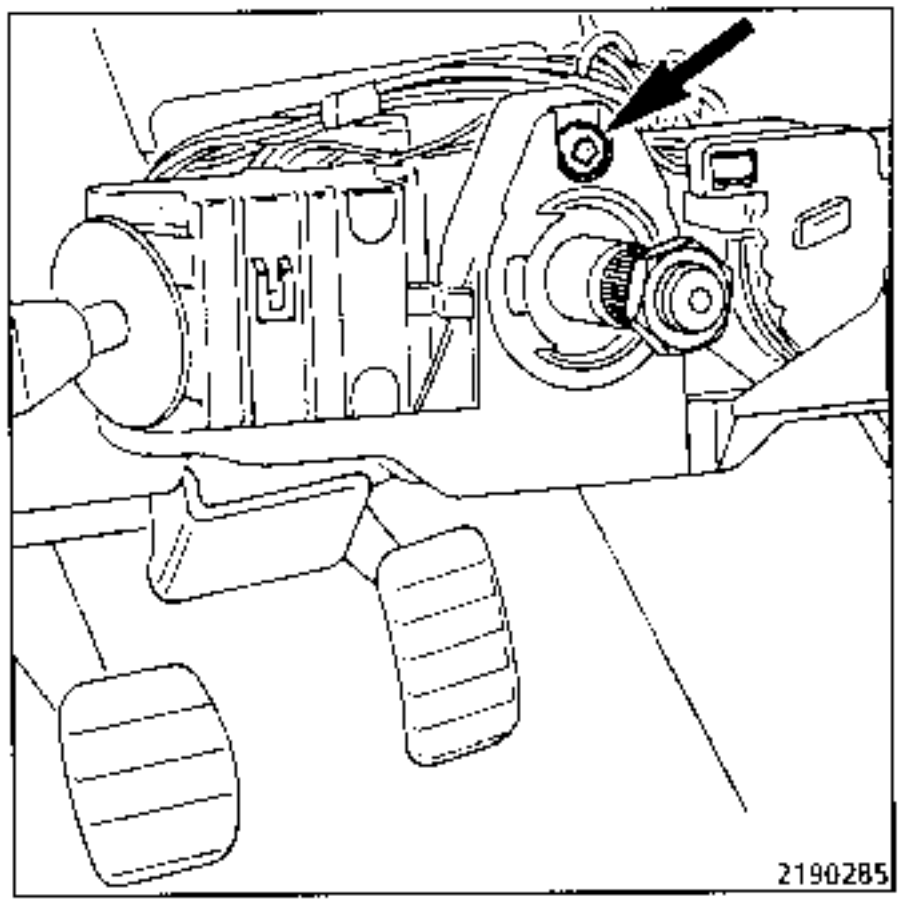


NOTE : Open the glovebox.

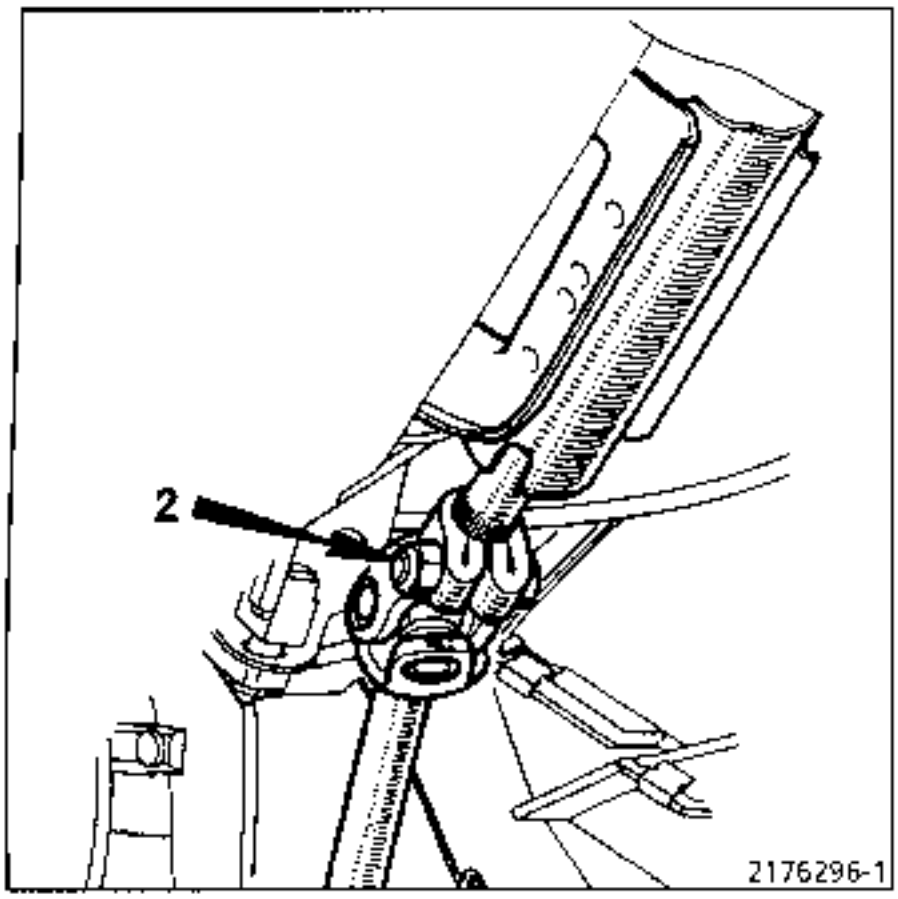
2nd TYPE



- the lower and upper steering wheel half shells,
- the steering wheel, after marking its position,
- the screw from the control switch on the steering wheel,

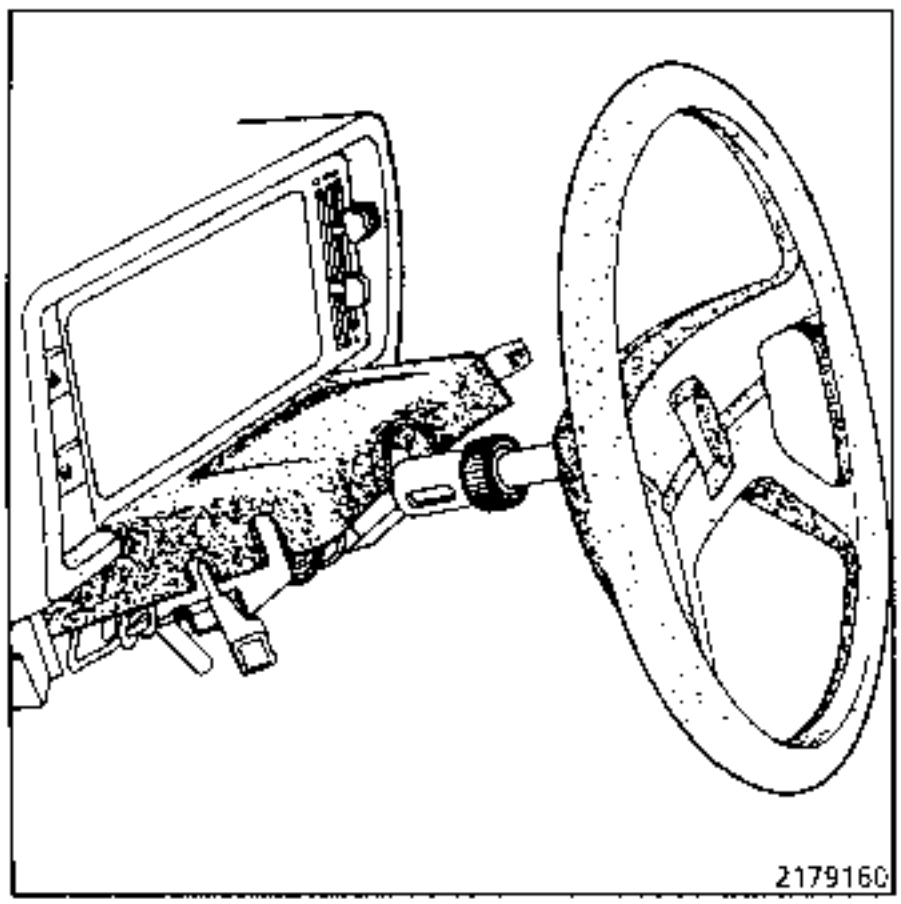


- bolt (2) securing the intermediate shaft and the steering wheel shaft.

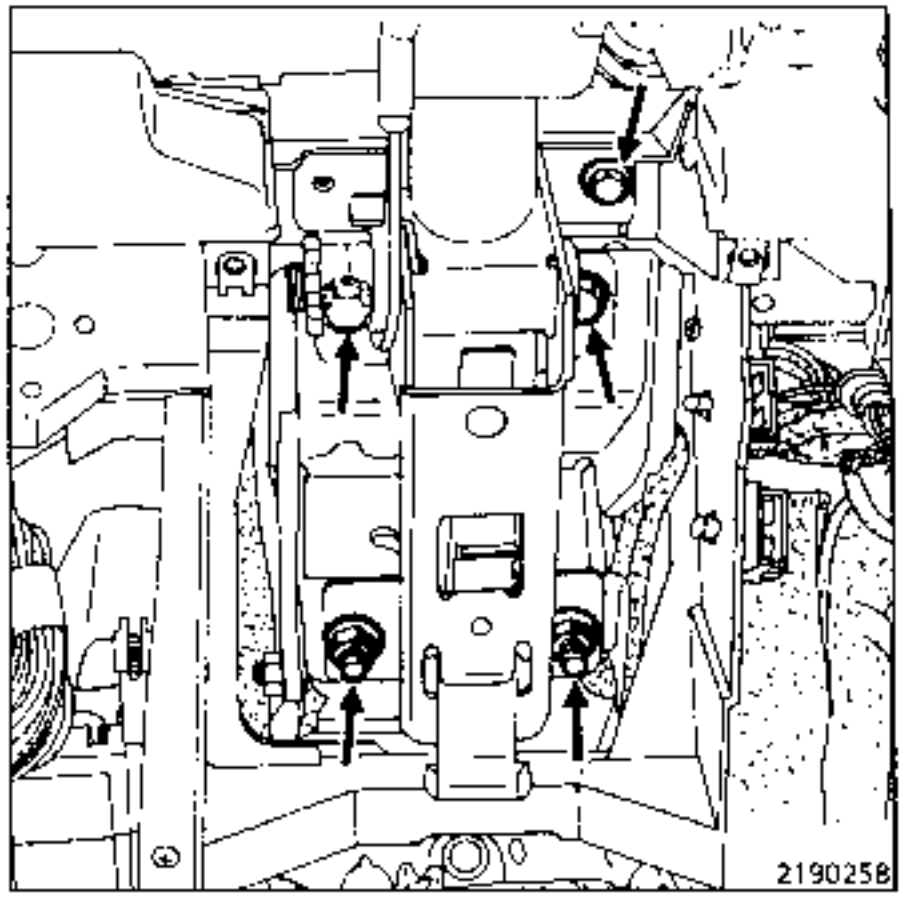


Temporarily refit the steering wheel with its nut, but do not tighten it.

Pull on the steering wheel to free the shaft and upper bush (make sure that the steering lock is completely free).



Remove :
- the bolt securing the dashboard to the steering column,
- the four bolts securing the steering column.

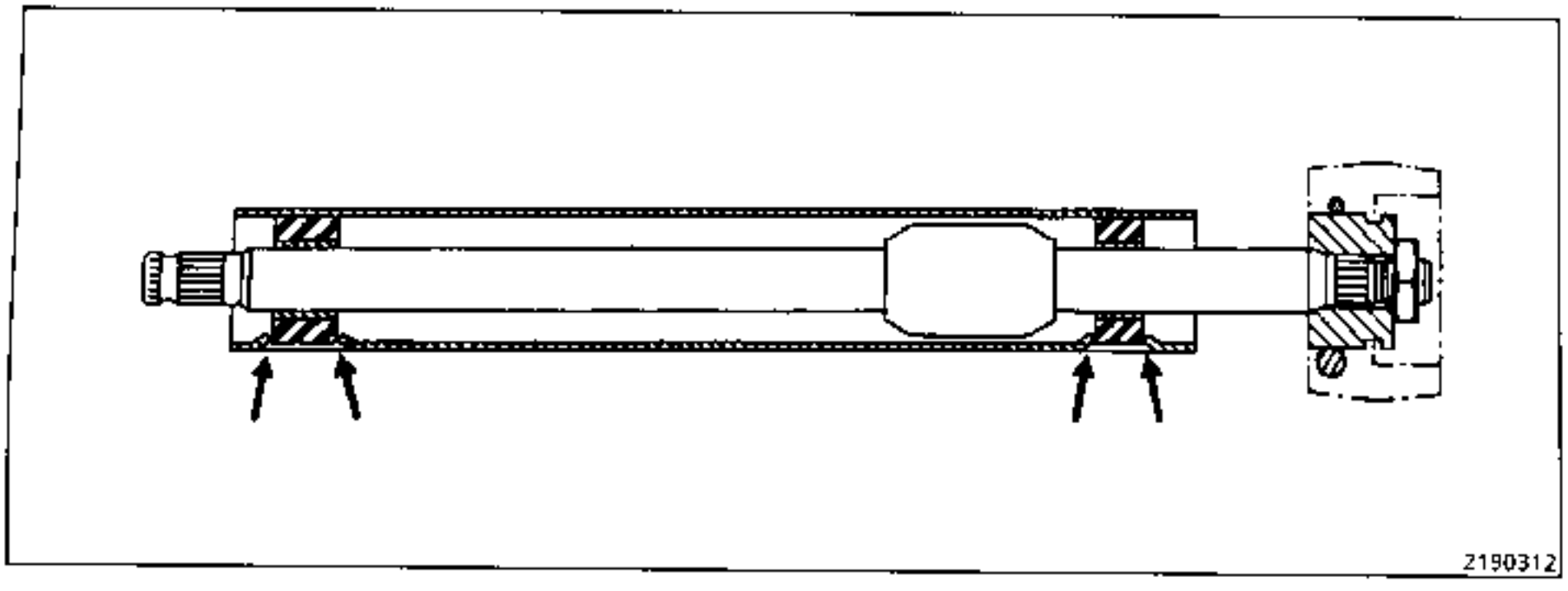


Disconnect the steering lock switch and remove the steering column.

Extract the lower bush using a piece of tubing with a **35 mm** outside diameter.

REFITTING

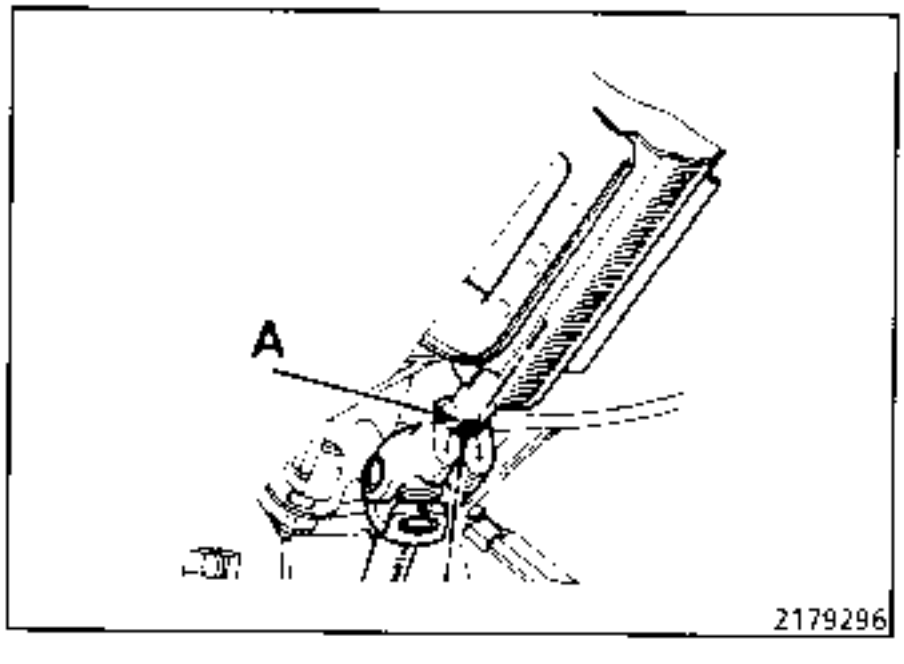
Fit in place :
- the NEW lower bottom bush, using a piece of tubing 35 mm outside diameter, after first smearing it with grease,
- the NEW top bush using a piece of tubing 35 mm outside diameter, after first smearing it with grease,



- the steering column.

Reconnect the steering wheel ignition switch.

Insert the steering wheel shaft in the steering universal joint, aligning flat portion (A) on the centreline of the slot and refit the key bolt.



Fit in place :
- the control switch on the steering wheel,
- the steering wheel half shells,
- the lower cover under the steering wheel,
- the steering wheel in the position marked on dismantling.

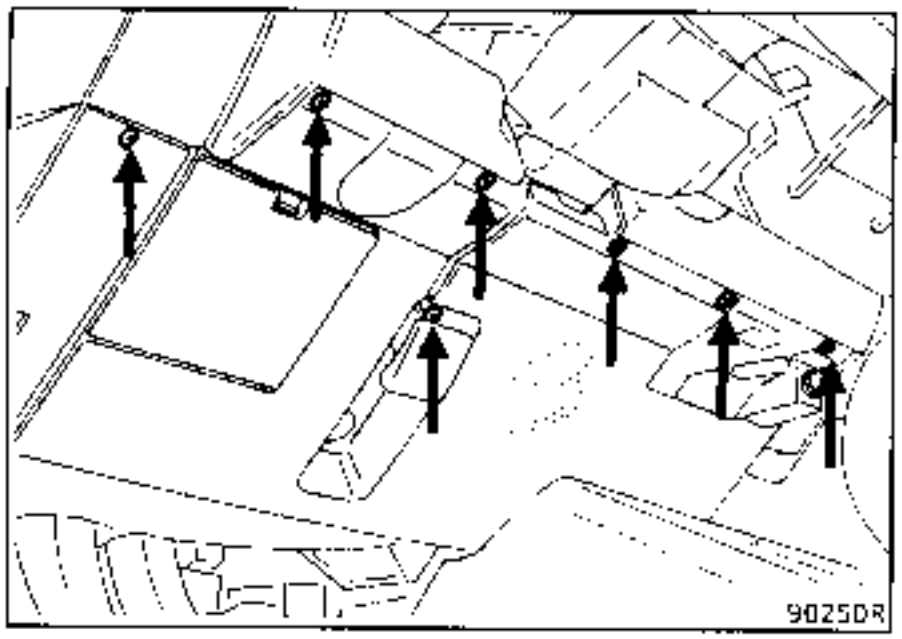
TIGHTENING TORQUES (in daN.m)	
Steering universal joint bolt (suggested torque)	2.5

REMOVAL

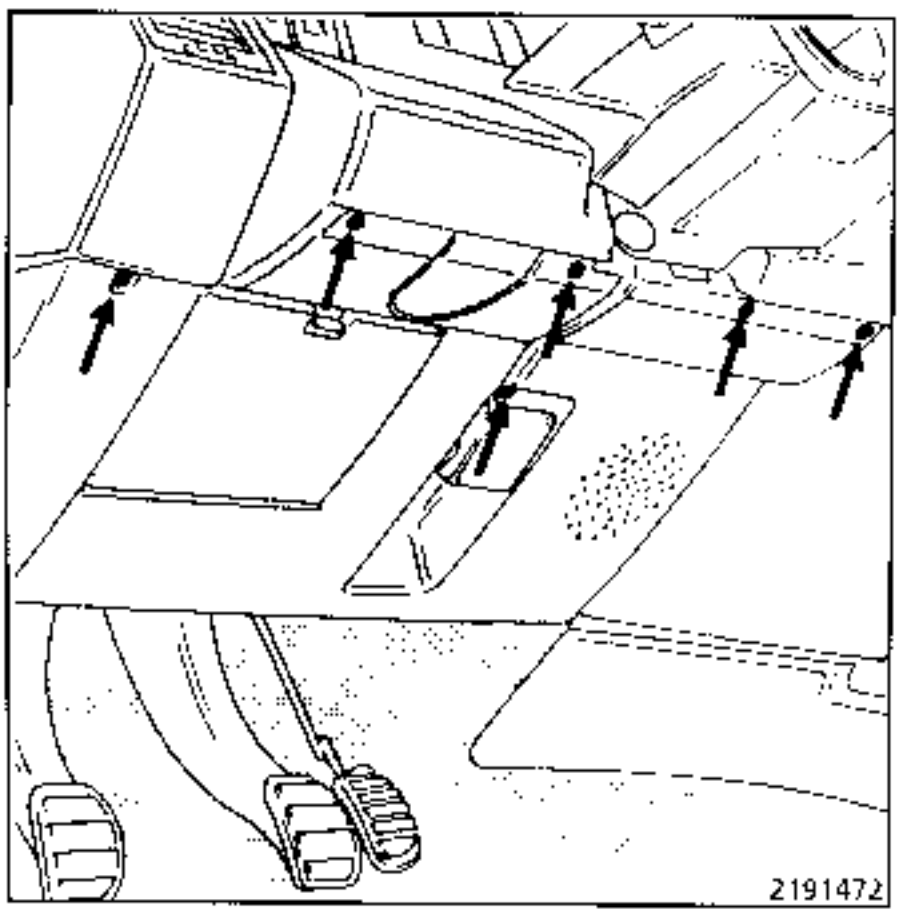
Remove:

- the cover under the steering wheel and the sound-deadening protector,

1st TYPE

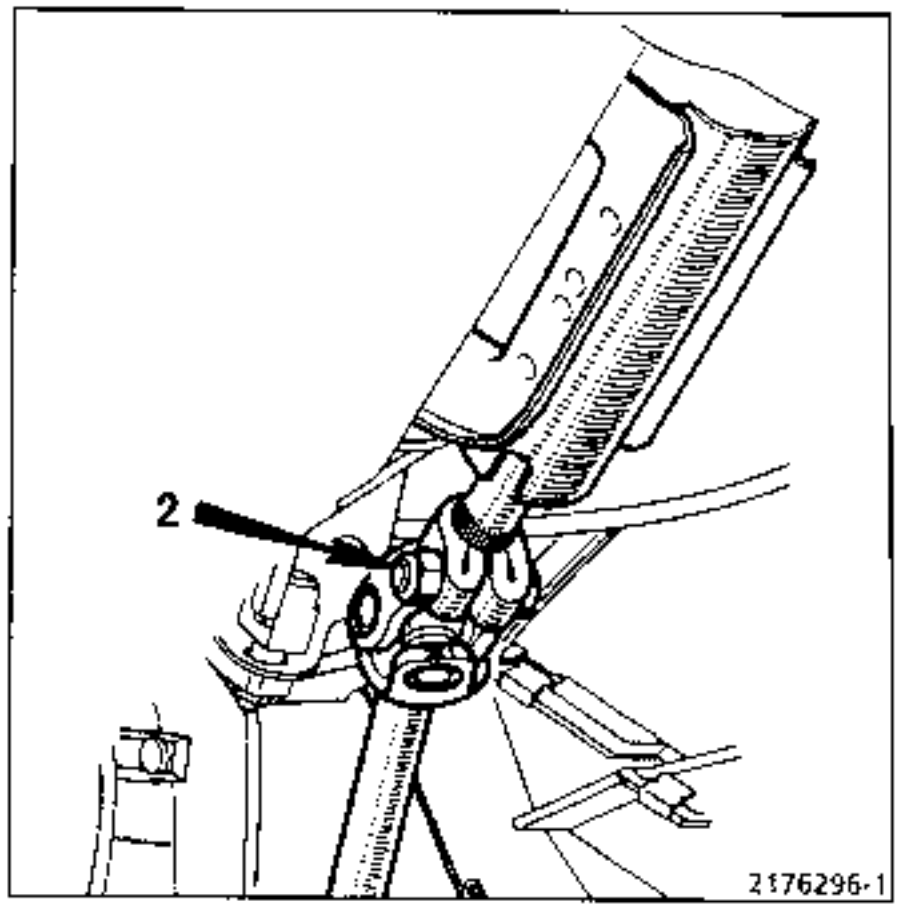


2nd TYPE

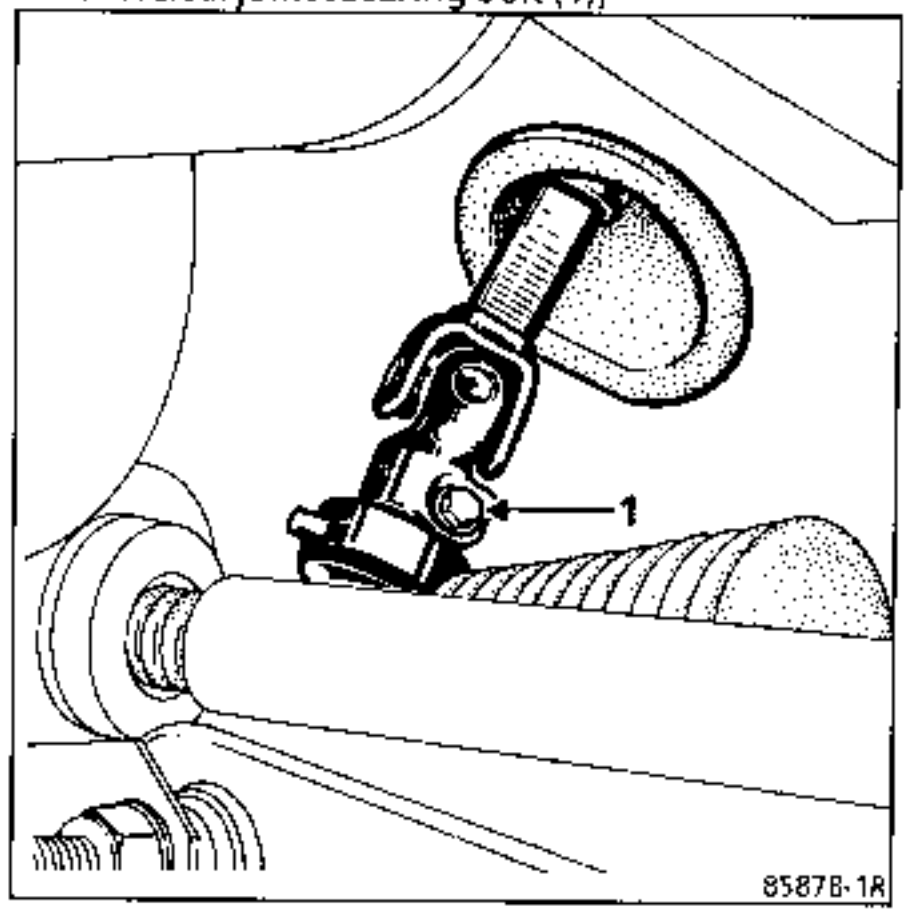


NOTE : To remove the cover under the steering wheel on vehicles of the first type, the glovebox must be opened.

- screw (2) securing the intermediate shaft to the steering wheel shaft,



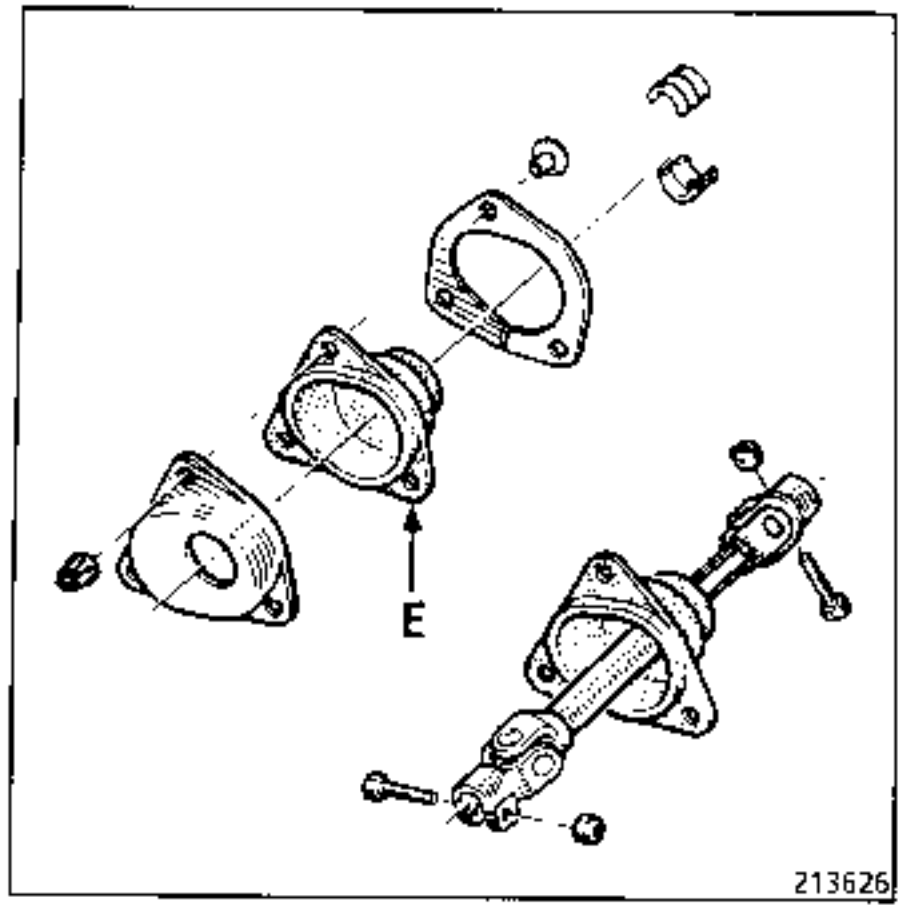
- the plastic protector (on vehicles with conventional steering),
- universal joint securing bolt (1),



- the collapsible steering wheel shaft.

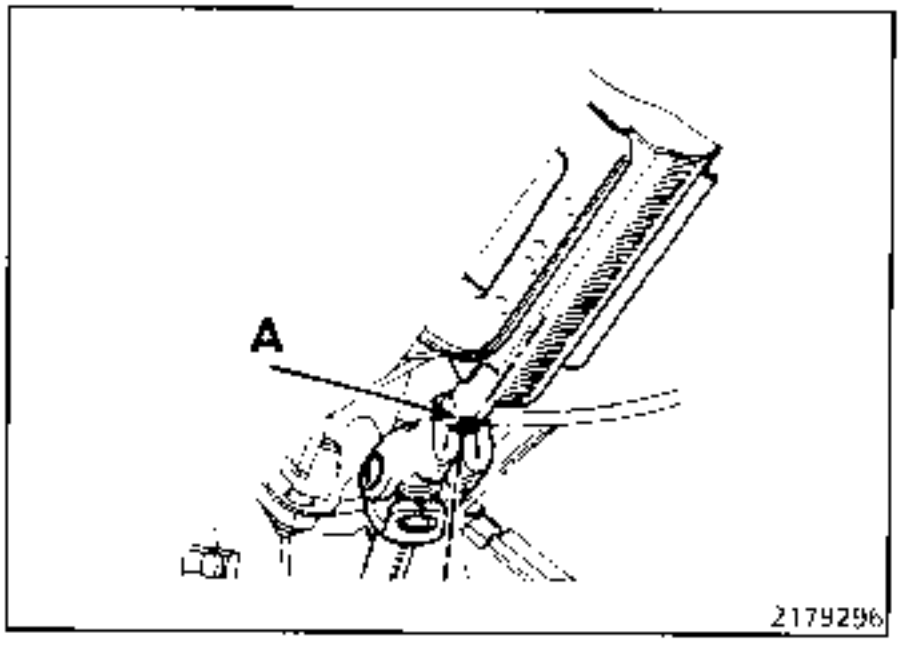
REFITTING

If necessary, change gaiter (E) on the bulkhead.



Fit in place :

- the collapsible steering wheel shaft and tighten universal joint bolt (1),
- the steering wheel shaft in the steering universal joint, aligning flat portion (A) on the centre-line of the slot and refit the key securing bolt,



- the sound-deadening protector,
- the cover under the steering wheel,
- the plastic protection (conventional steering).

The steering box assembly must be released and moved towards the front of the vehicle in order to remove the bolt connecting the collapsible intermediate shaft and the steering wheel shaft.

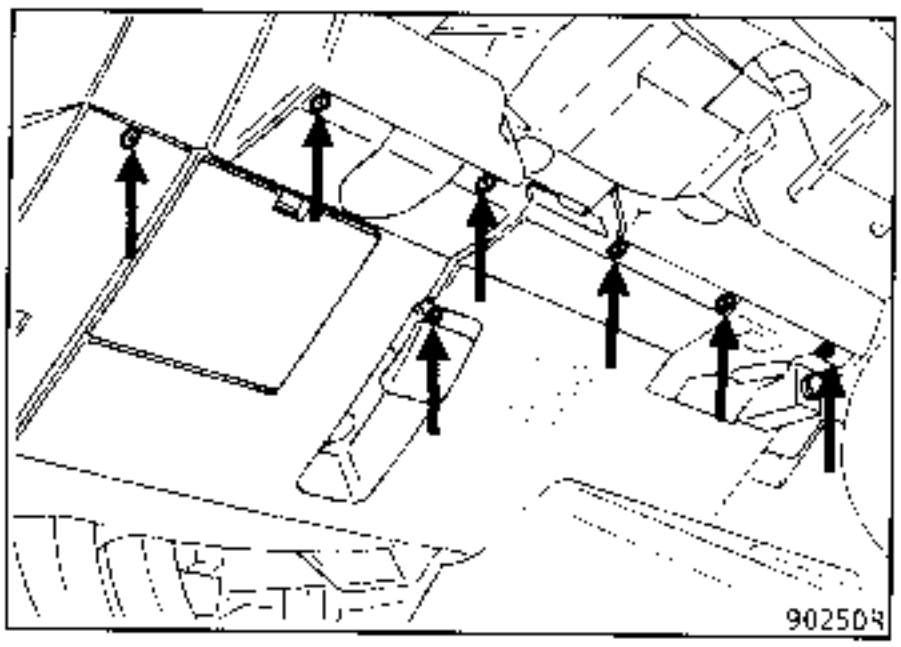
ESSENTIAL SPECIAL TOOLING		
T.Av.	476	Ball joint extractor
Dir.	1 067	Parallelism adjusting tool

TIGHTENING TORQUES (idaN.m)		▽
Centre bearing securing nut		5
Securing nuts on shock absorber turret		3
Steering ball joint nut		4
Bolts securing link to rack		4
Link bolt lock nut		3.5
Wheel bolts	4 bolts	9
	5 bolts	10

REMOVAL

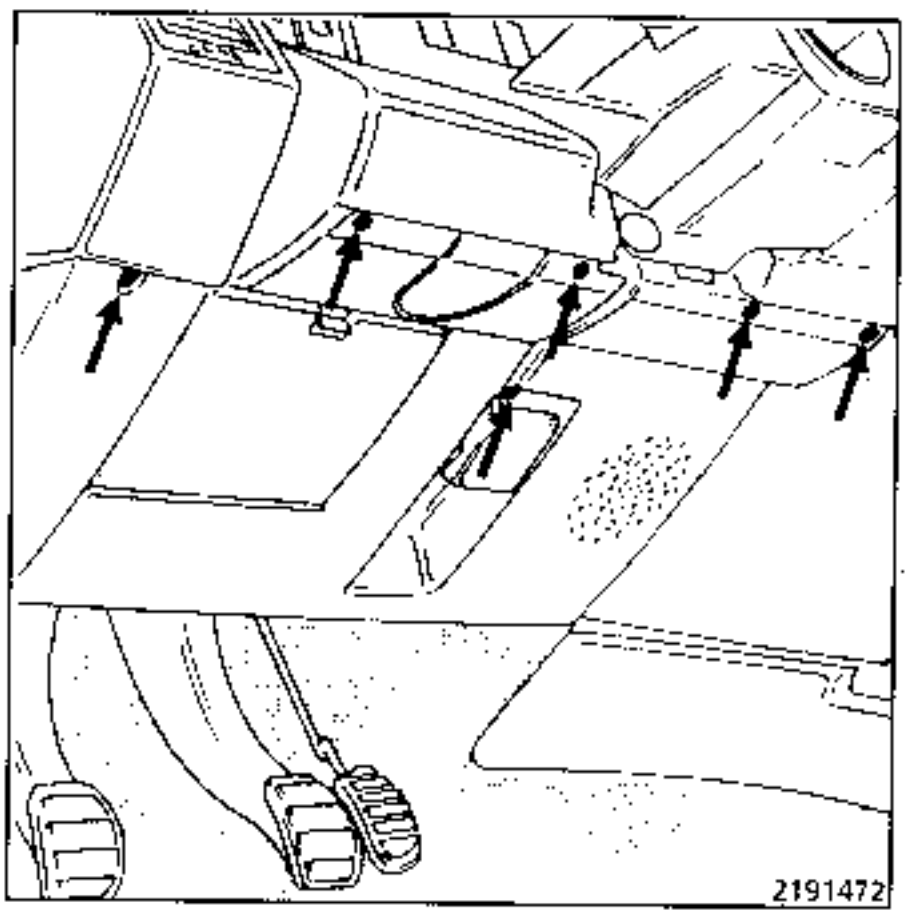
Remove the cover under the steering wheel and the sound-deadening protection.

1st TYPE



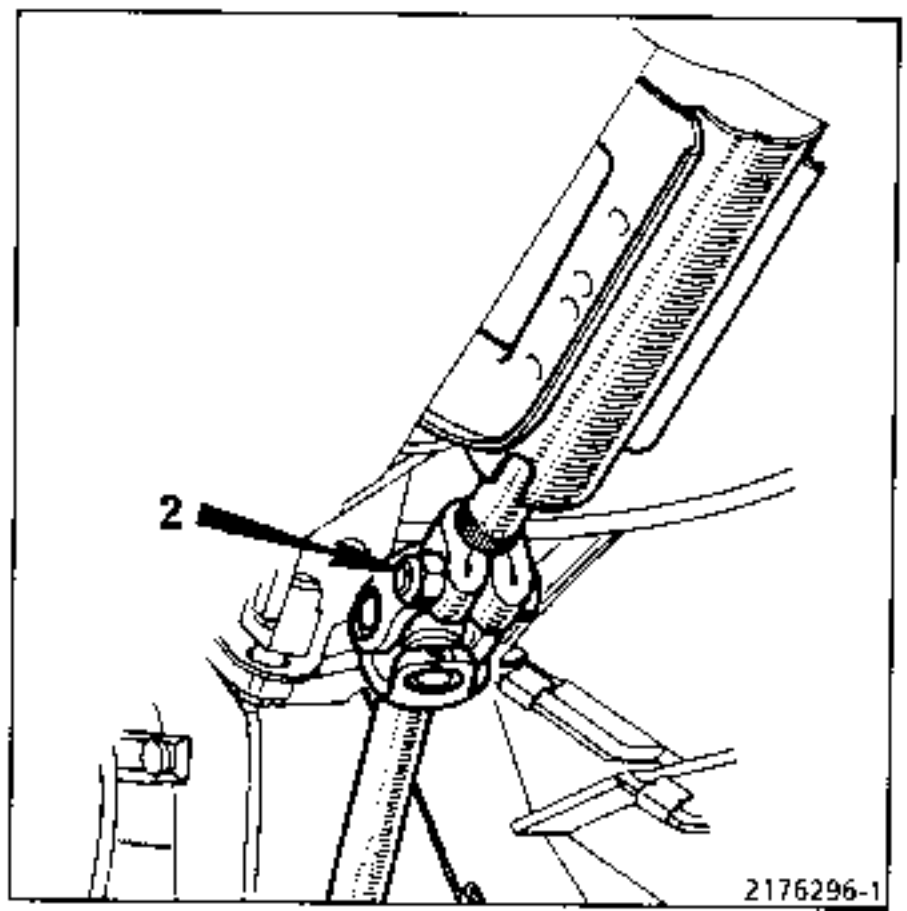
NOTE : On vehicles of the 1st type, the glovebox must be opened in order to remove the cover under the steering wheel.

2nd TYPE

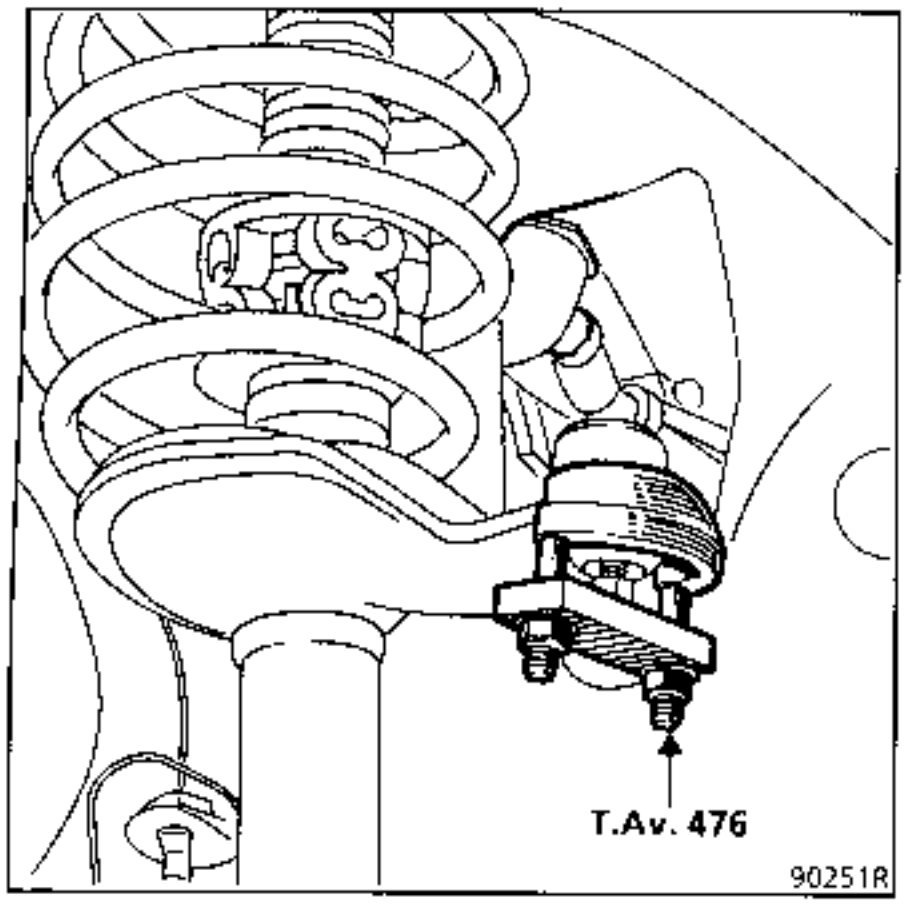


Move the steering rack to the righthand side and remove :

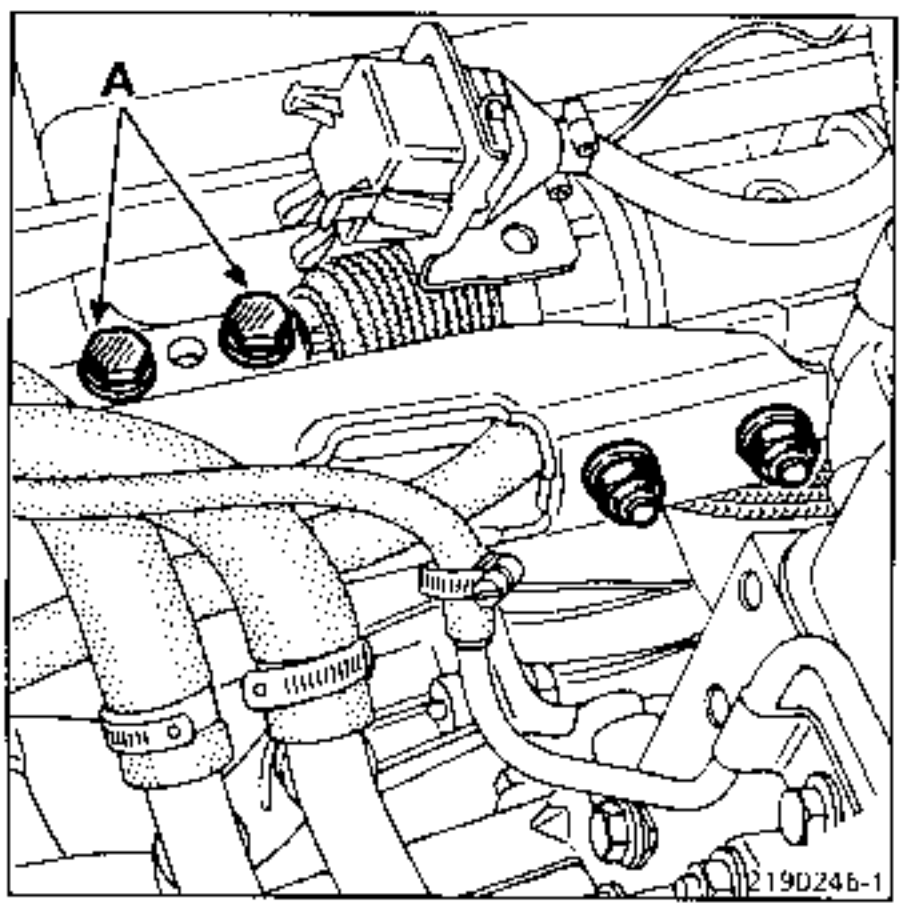
- bolt (2) securing the intermediate shaft to the steering shaft.



Disconnect the steering ball joints using tool **T.Av. 476**.



Remove the bolts (A) securing the steering arm link.

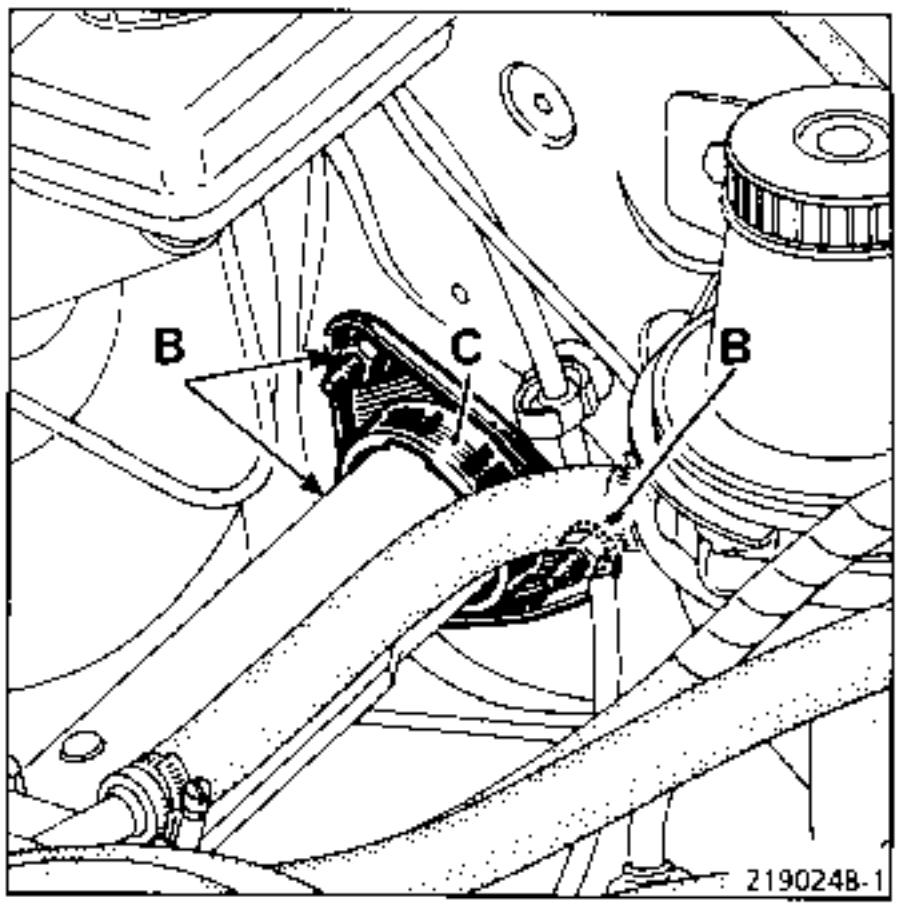


NOTE : As the steering rack nose has threaded bolt holes, the lock nuts must first be removed from bolts (A).

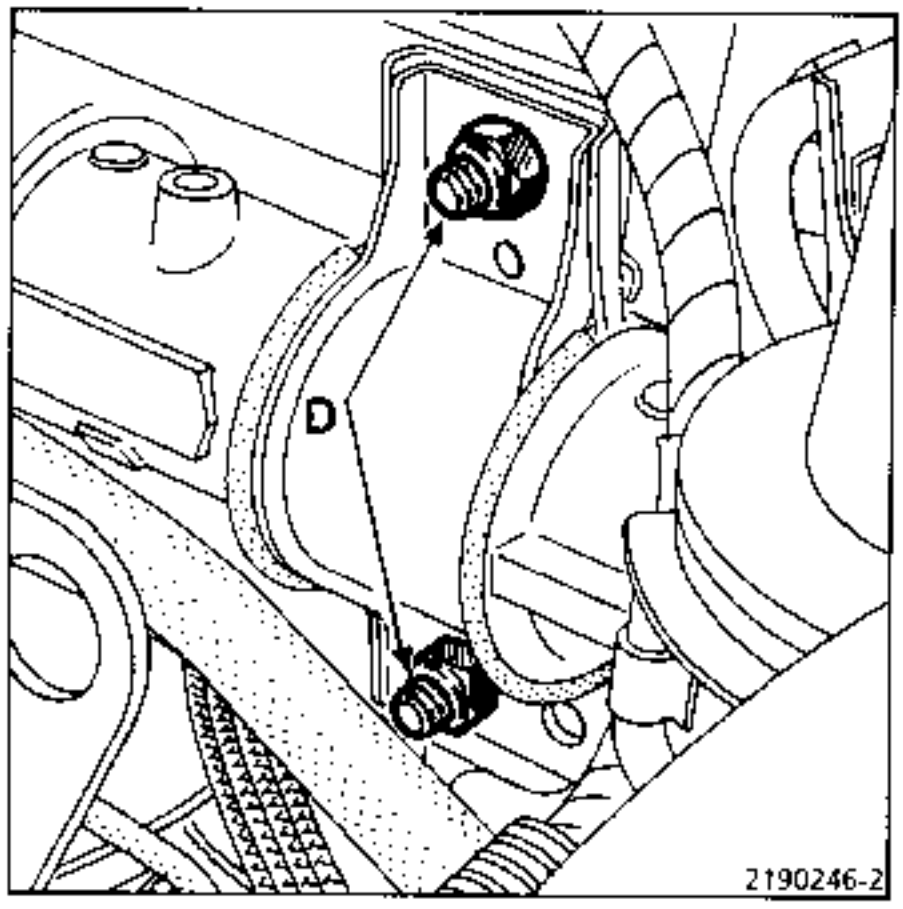
Free the link-steering arm assembly from the righthand side.

Remove :

- the three nuts (B) securing the steering body on the shock absorber turret and release the securing flange (C) from the studs on the body,



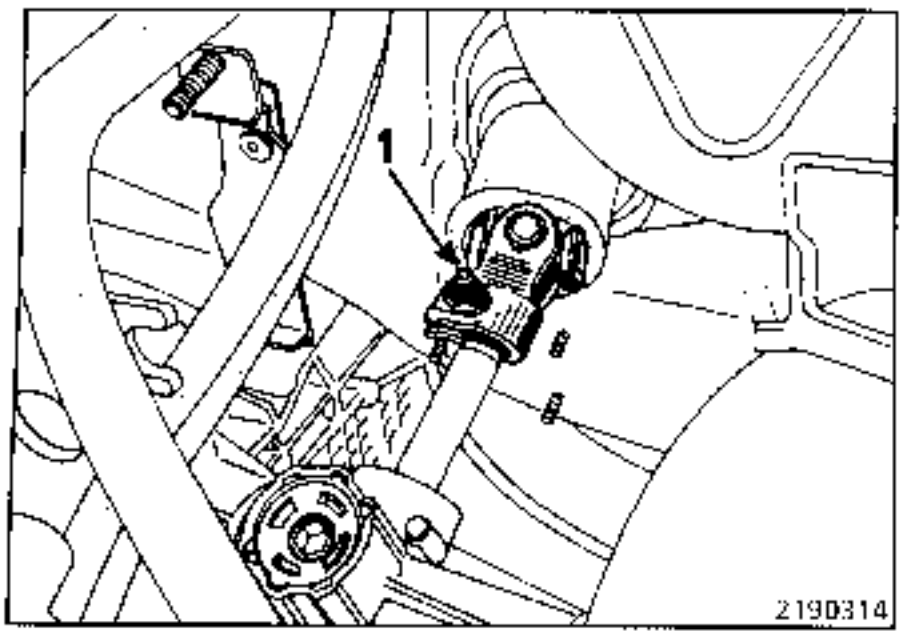
- the two nuts (D) from the centre bearing,



- the PVC collar holding the bulkhead gaiter on the steering box.

Free the steering box, moving it towards the front and remove :

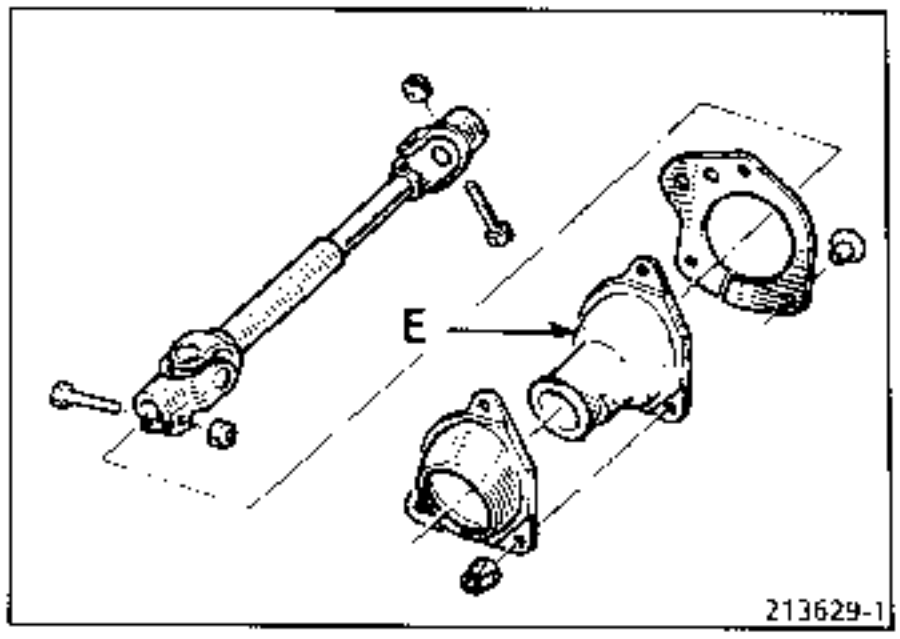
- **bolt (1)** securing the universal joint,



- the collapsible steering wheel shaft.

REFITTING

Change the gaiter (E) on the bulkhead, if necessary.

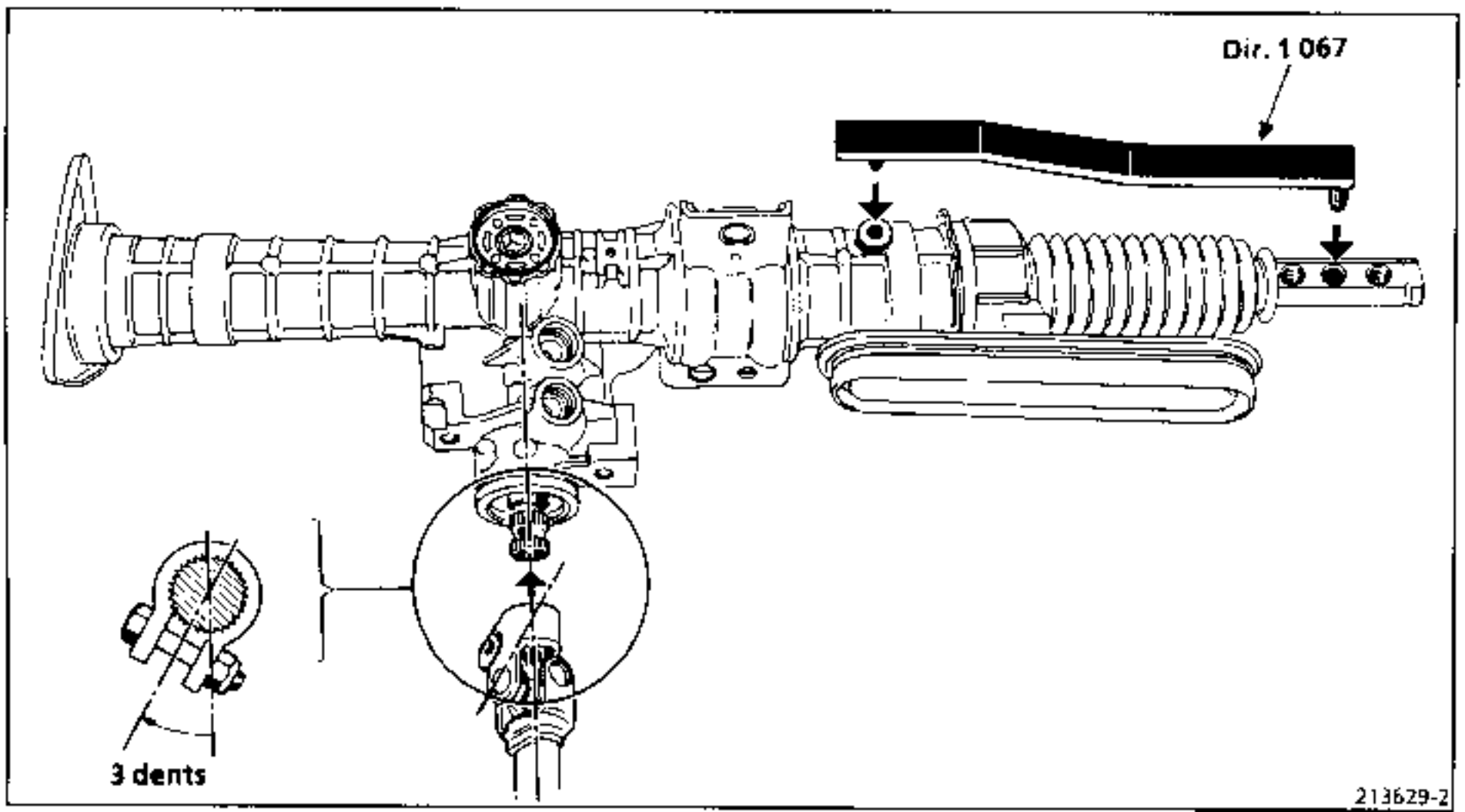


All types - conventional and power-assisted steering - right and lefthand drive.

The steering universal joint must be positioned correctly in order to avoid disturbing the vehicle's roadholding.

Fit tool **Dir. 1 067** to the steering box.

Move the steering box, without fitting it, onto the centre bearing studs then engage the universal joint so that the mounting bolt centreline is in the lower horizontal position, then offset it by **3 teeth** in the clockwise direction, as shown in the diagram below.



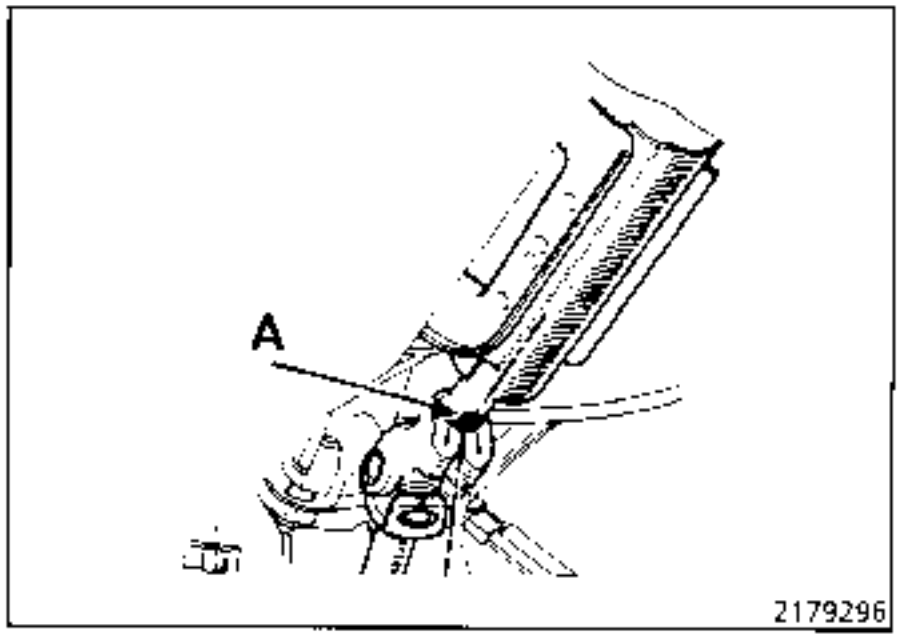
In this position, fit :
- the collapsible steering wheel shaft and secure universal joint securing bolt (1),
- the steering box on its anchorages, making sure that the collapsible shaft is correctly positioned in its location in the passenger compartment,
- the centre bearing securing nuts,
- the flange and securing nuts on the shock absorber turret,
- a new PVC collar, for holding the bulkhead gaiter on the steering box.

Torque tighten the mounting points.

Fit in place :
- the link.steering arm assembly,

NOTE : The bolts in the steering rack end with threaded holes must be torque tightened.

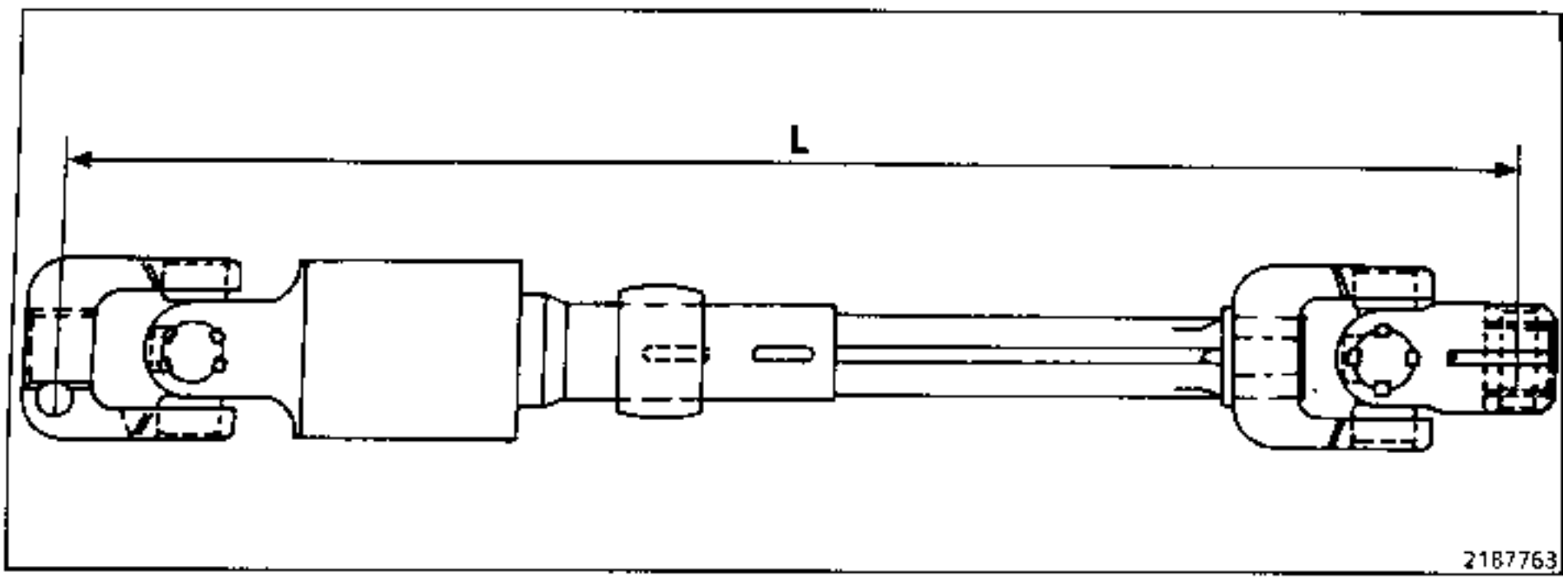
- the bolts securing the link,
- the lock nuts on these bolts,
- the steering wheel shaft in the steering universal joint, aligning flat portion (A) on the centreline of the slot and refit the key bolt,



- the sound-deadening protection,
- the cover under the steering wheel,
- the ball joints on the shock absorber stem.

CHECKING

When changing the steering, if the splines cannot be fully engaged, check the shaft length and change it if it is incorrect.



Transverse engine

Conventional steering, righthand drive and lefthand drive :

$L = 456.5 \pm 1$ mm

Power-assisted steering, righthand drive and lefthand drive :

$L = 426.5 \pm 1$ mm

In-line engine

Conventional and power-assisted steering, righthand drive and lefthand drive :

$L = 307.5 \pm 1$ mm

TIGHTENING TORQUES (in daN.m)	▽
M 10 x 100	1.3
Bolts securing master cylinder to brake servo	1.3

REMOVING

Drain the brake fluid reservoir then pull it upwards and remove.

Remove:
- the brake pipes, first marking their position,
- remove the two brake servo mounting nuts.

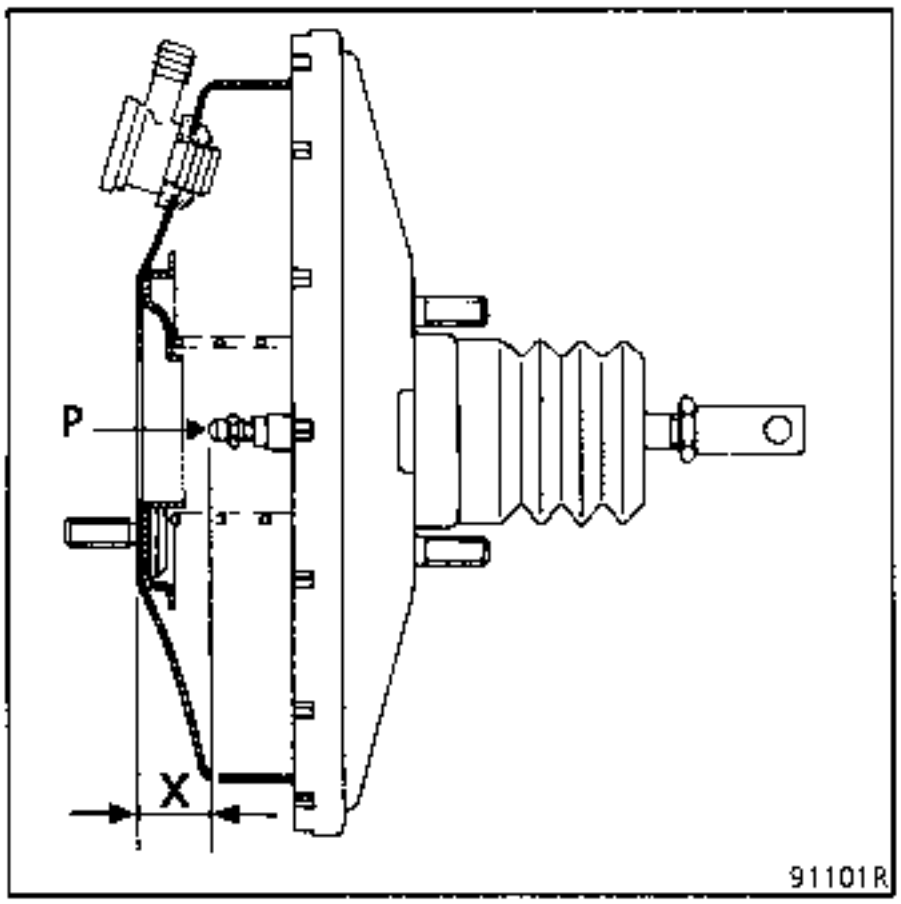
REFITTING

Check the length of the pushrod.

All engine types, transverse and longitudinal, right-hand and left-hand drive.

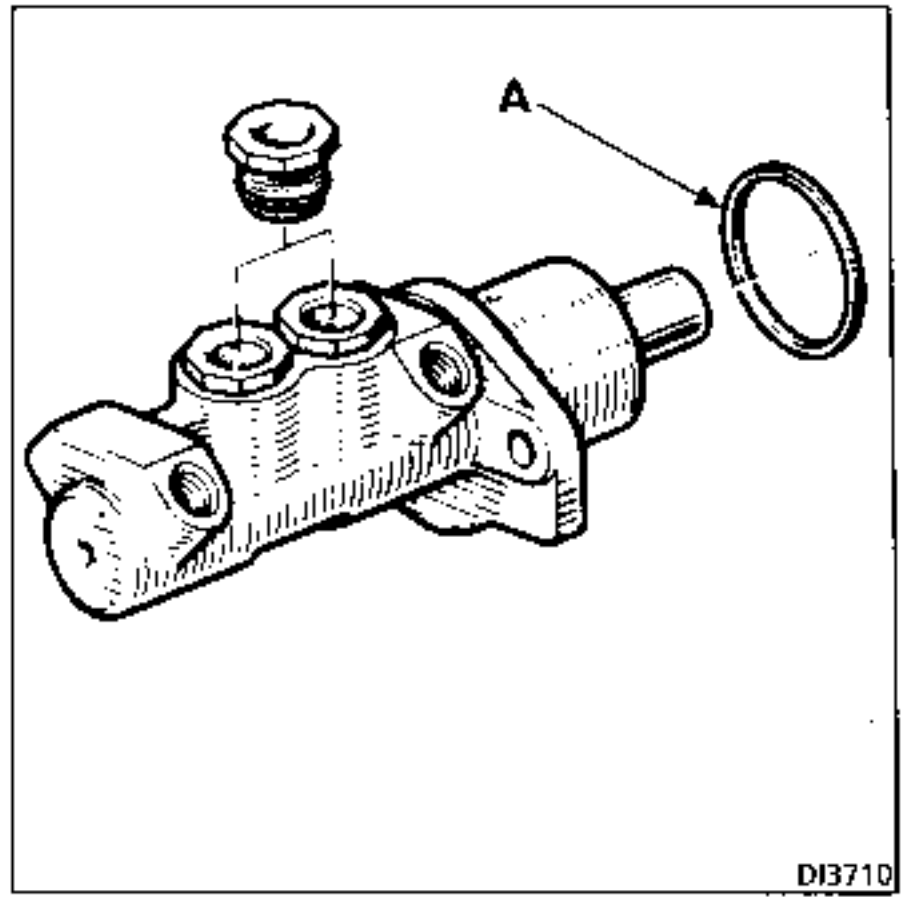
Dimension X = 22.3 mm.

Adjust according to model by rod (P).



NOTE: These vehicles are equipped with a master cylinder integral with the brake servo. The sealing of the brake servo is directly connected with the master cylinder. A new seal (A) must be fitted whenever any work is performed on these parts.

Fit the new master cylinder, aligning it with the brake servo so that pushrod (P) correctly enters its housing on the master cylinder.



Reconnect :

- the brake pipes in the correct position,
- the compensator reservoir, pressing on it so that it clips into place in the master cylinder.

Bleed the brake circuit.

TIGHTENING TORQUE (in daN.m)	
Bolts securing master cylinder to brake servo	1.3
Bolts securing brake servo to bulkhead	2

The brake servo unit cannot be repaired. Only the following items may be touched:
- the air filter,
- the check valve.

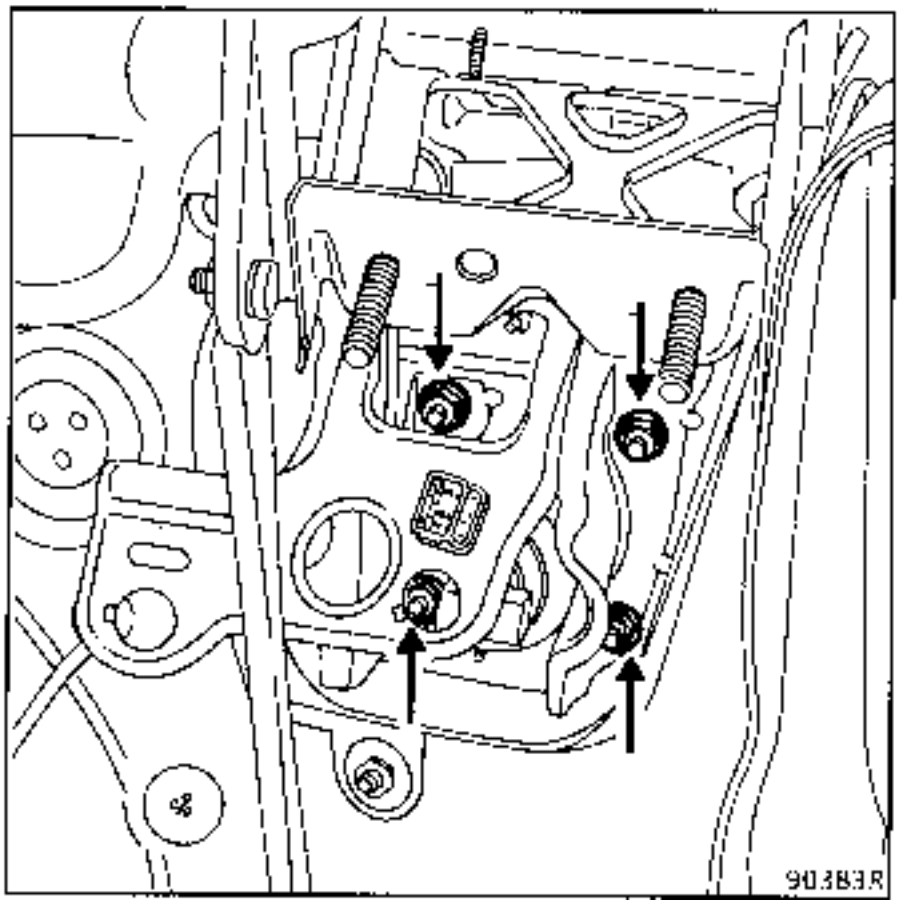
REMOVING

Disconnect the battery.

Remove the master cylinder.

Remove the clevis pin connecting the brake pedal to the pushrod.

Unscrew the brake servo mounting nuts and remove it.



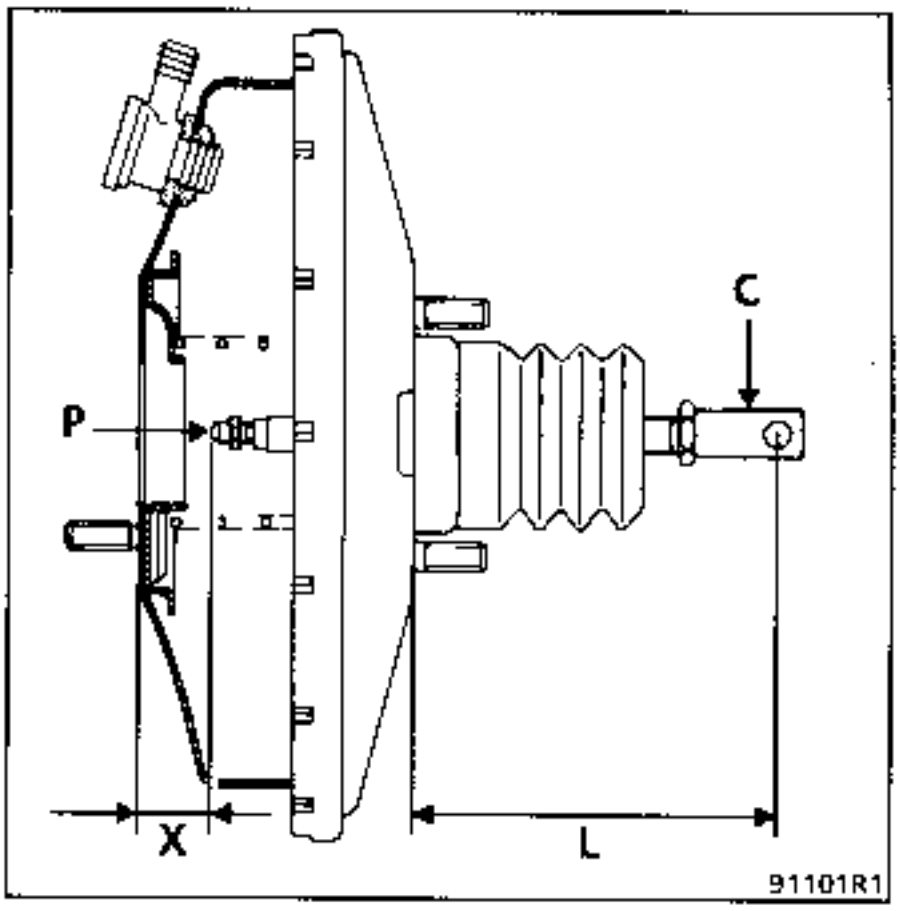
REFITTING

Transverse and in-line engines, right-hand and left-hand drive.

The following distances must be checked before refitting the brake servo:

- **L = 105 mm**
  adjustable according to model via rod (C),

- **X = 22.3 mm**
  adjustable according to model via rod (P).



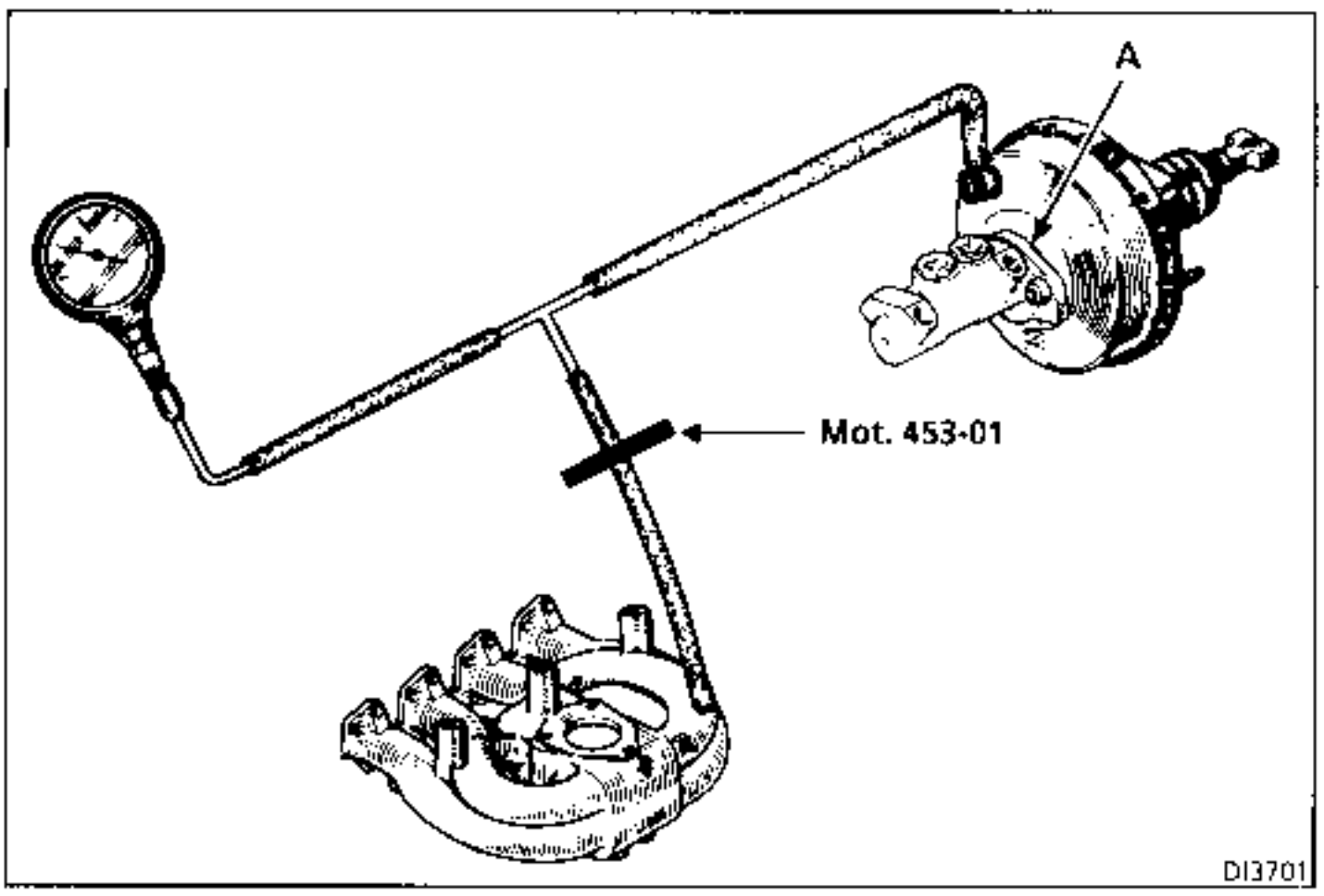
Fit the master cylinder (see instructions in relevant section).

Bleed the brake circuit.

ESSENTIAL SPECIAL TOOLING
Mot.453-01 Hose clamp
ESSENTIAL SPECIAL TOOLS
Vacuum pump (e.g. NAUDER* 7059-Z)

CHECKING FOR LEAKS

When testing a brake servo for vacuum loss, make sure that the lines between the servo and master cylinder are perfectly tight. If there are any leaks, replace seal (A).



The test for loss of vacuum in the brake servo must be carried out with the unit on the vehicle and with the brake hydraulic circuit operating correctly.

Using a "T" union and a piece of tubing which should be as short as possible, connect the **NAUDER*** vacuum pump into the line between the brake servo and the vacuum source (intake manifold).

Run the engine at idling speed for one minute.

Clamp the pipe (clamp **Mot. 453-01**) between the "T" piece and the vacuum source.

Stop the engine.

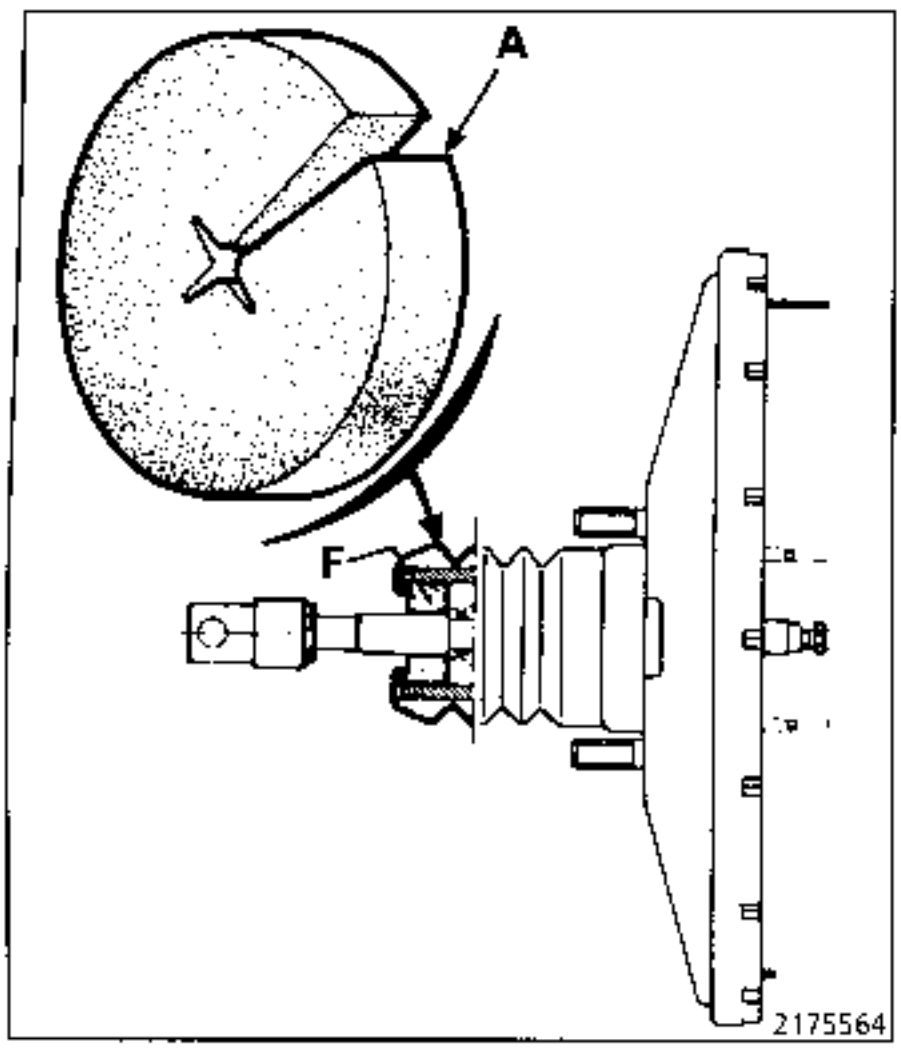
If the vacuum drops by more than **33 mbar (25 mm/Hg) in 15 seconds**, there is a leak which can be situated:

- either in the check valve (change it),
- or in the pushrod diaphragm (in which case the servo unit must be changed).

Should the brake servo cease to function, the braking system will continue to operate. However, considerably more pedal effort will be required to obtain the equivalent servo-assisted braking effect.

(*) Use it in the same way as a vacuum gauge.

CHANGING THE AIR FILTER



It is not necessary to remove the servo unit in order to change the air filter (F).

Remove the old filter (F) from behind the brake pedal, using a screwdriver or metal hook. Cut the new filter (see figure) as in (A), fit it around the pushrod and then push it into its location. Ensure that the filter spreads around the complete bore, thus preventing the entry of unfiltered air into the unit.

Brake servo check valve

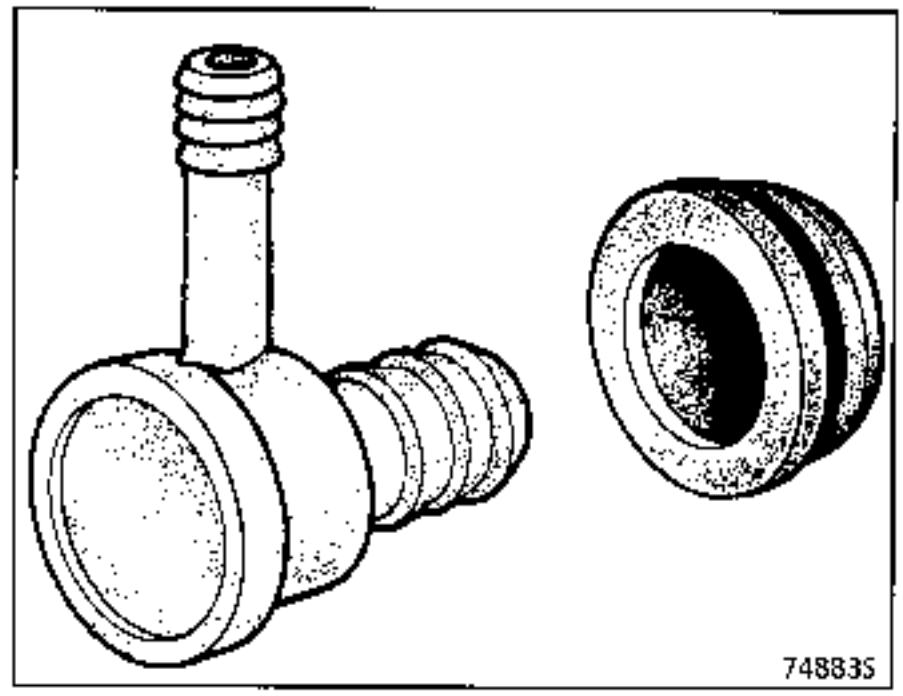
CHANGING THE CHECK VALVE

This operation may be carried out in situ.

REMOVING

Disconnect the vacuum inlet pipe from the servo unit.

Remove the valve from the rubber seal by pulling and turning at the same time.



REFITTING

Check the condition of the rubber sealing ring and the check valve.
Change if faulty.
Refit both parts.

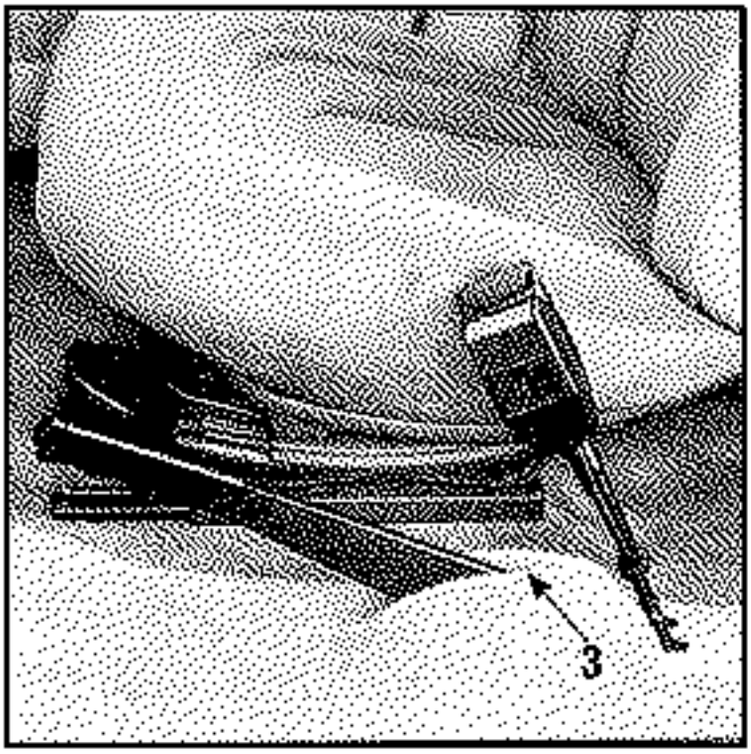
Release the handbrake, remove the pin from the central linkage (1).

Free the control rod from clip (2).

Remove:

- the cover from the base of the safety belts,
- the two bolts from the base of the safety belts.

Make a small slit in the carpet (3).



Disconnect the handbrake switch wire.

Unscrew the two bolts securing the lever mounting to the floor.

Remove the handbrake lever.

When refitting the lever, adjust its travel.

ADJUSTING

Incorrect adjustment of the handbrake with the cable too taut:

- prevents the automatic wear take-up system of the shoes operating properly,
- causes a "long" brake pedal.

Under no circumstances should the cables be re-tensioned to overcome this defect since it will reappear rapidly.

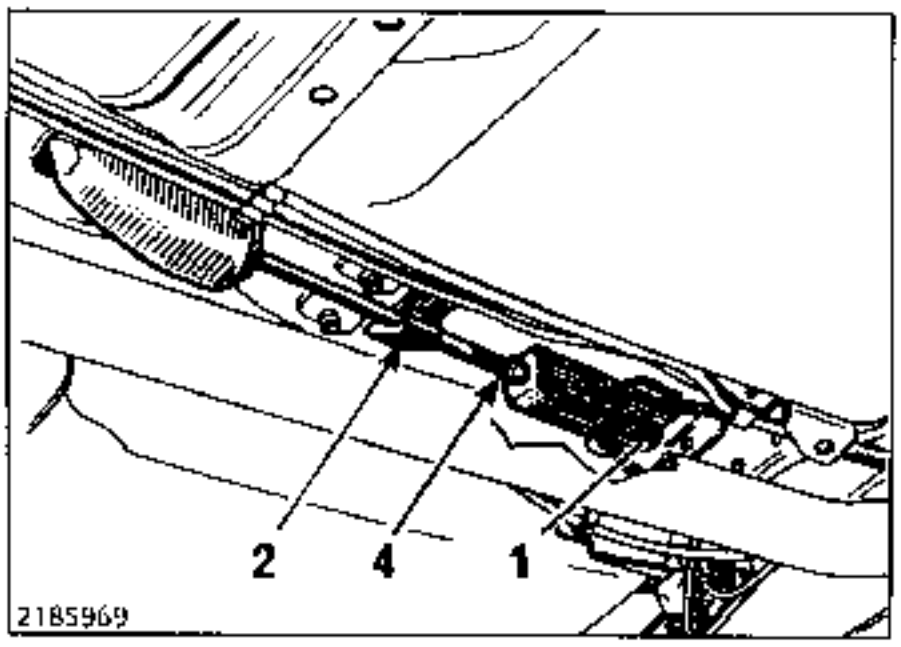
The handbrake is not an automatic wear take-up system, it must only be adjusted when the following are replaced:
- the pads,
- the cables,
- the control lever.

Adjustment at any other time is not allowed.

I - DRUM BRAKES

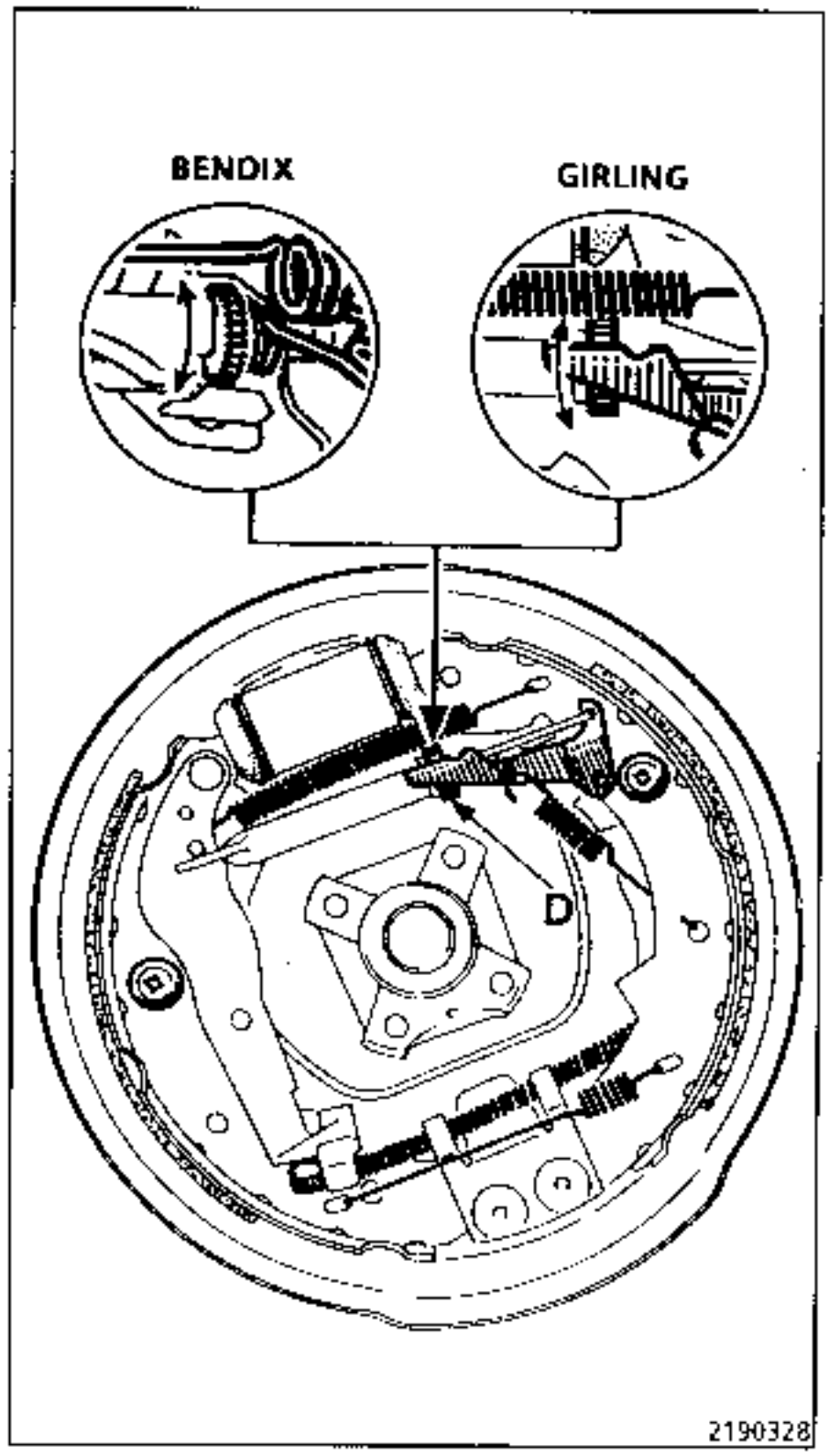
With the vehicle on a lift taking the weight under the body :

Release lock nut (4) and unscrew the central linkage completely.

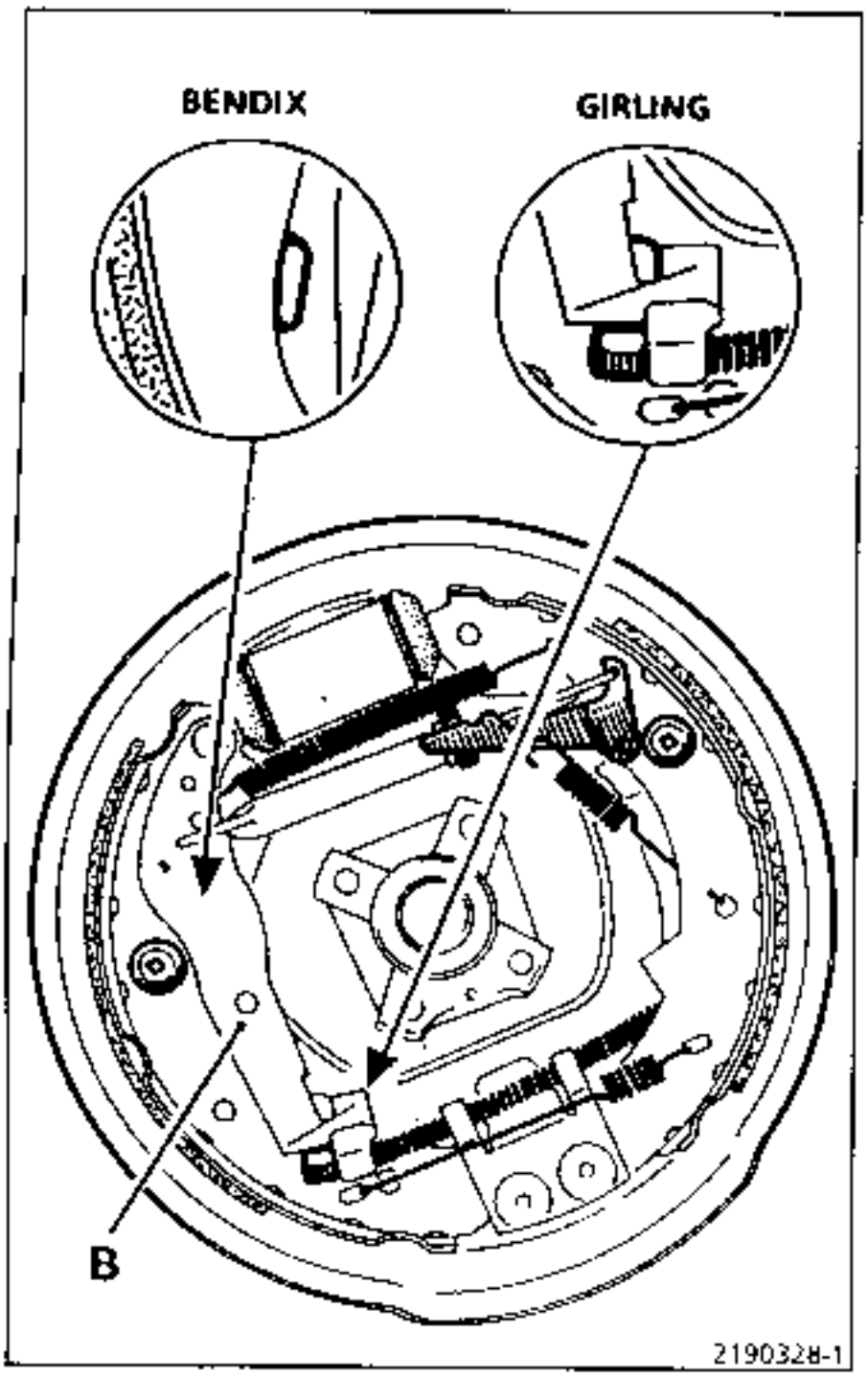


Remove:
- the two rear wheels,
- the two drums.

Check the operation of the automatic wear take-up system by moving round notched sector (D) (make sure that it turns properly in both directions), then slacken it by 5 to 6 teeth.



Make sure that:
- the cables slide properly,
- levers (B) of the handbrake bear correctly on the shoes.



Gradually tension the cables at the central adjustment point so that levers (B) lift off between the 1st and 2nd notches of the control lever travel and stay lifted off at the 2nd notch.

Tighten lock nut (4).

Fit the drums in place.

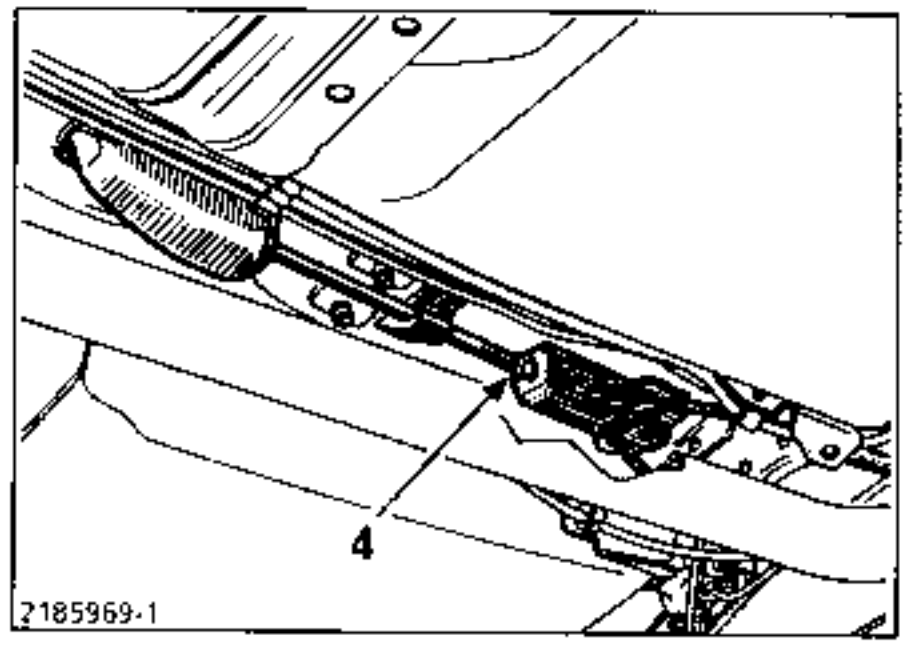
With the vehicle on its wheels:

Adjust the linings by depressing the brake pedal firmly and progressively several times and listen to the operation of the wear take-up system.

II - DISC BRAKES

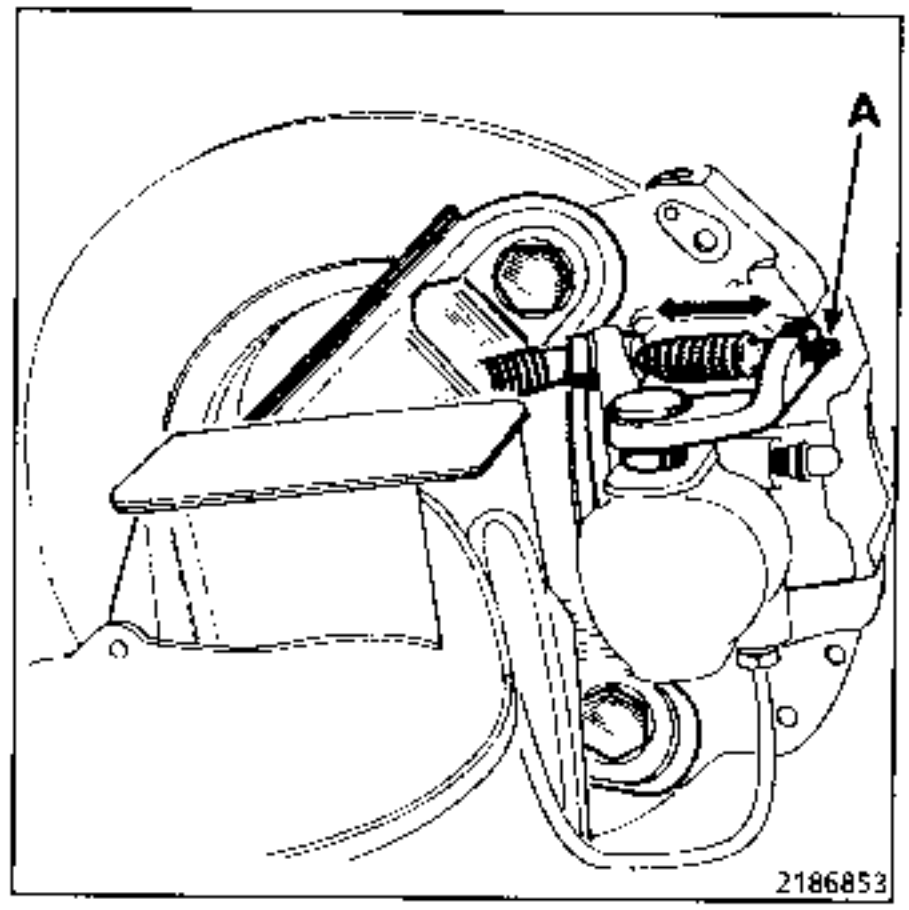
With the vehicle on a lift, take the weight under the body:

Release lock nut (4) and completely unscrew the central linkage.



Remove the two rear wheels.

Make sure that :
- the cables slide properly
- the handbrake levers move freely and move them right back towards the rear of the vehicle.



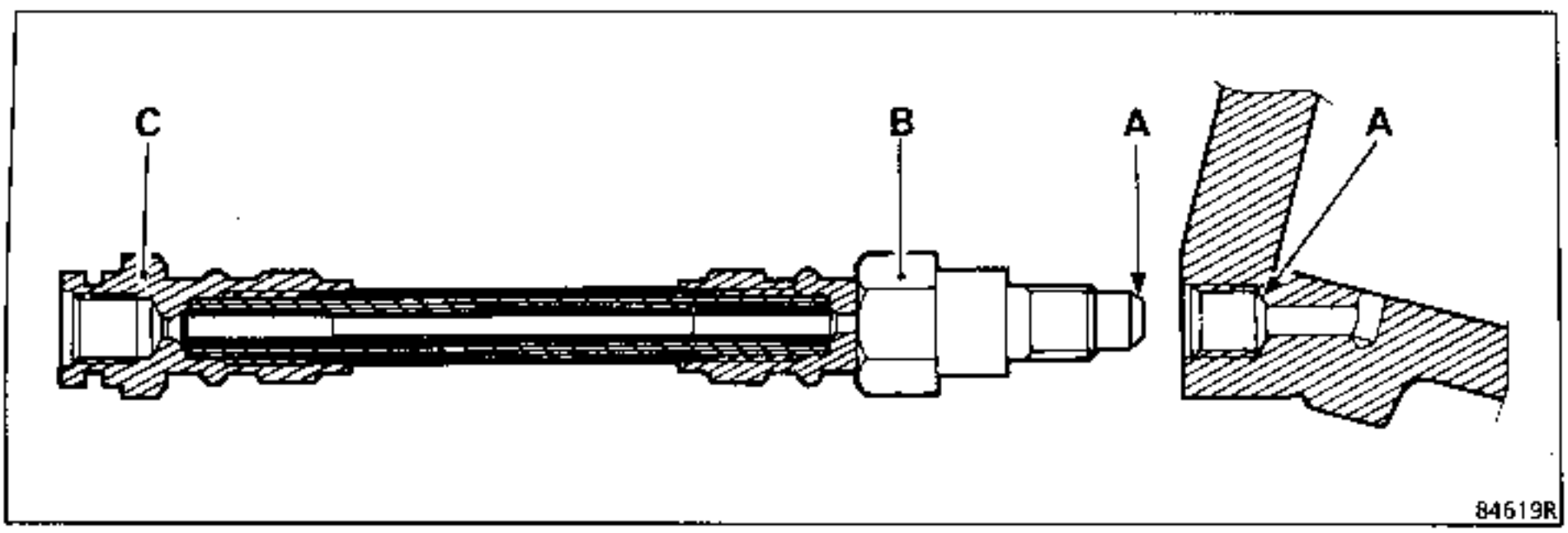
Gradually tension the cables at the central adjustment point so that end piece (A) comes into contact with the lever but does not move it.

Continue the adjustment procedure until the levers move away between the 1st and 2nd notch of control lever travel and at the 2nd notch still do not make contact.

Lock nut (4).

These vehicles are fitted with brake hoses which do not have copper sealing washers. Fluid tightness is achieved by the "taper-seating" between shoulder (A) of the union and the cylinder body.

TIGHTENING TORQUES (in daN.m)
B = 1.3
C = 1.3



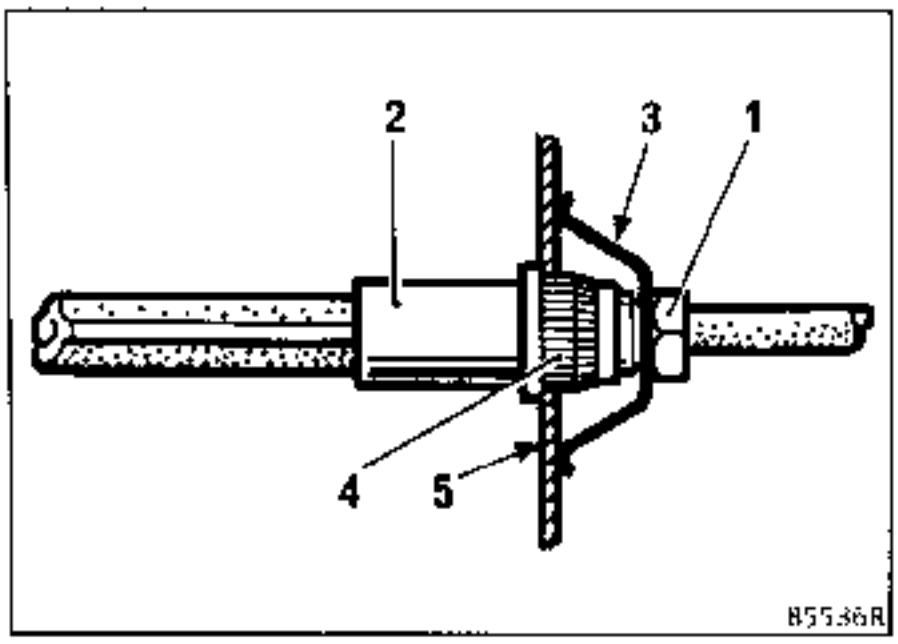
Changing

PRECAUTIONS TO BE TAKEN WHEN REMOVING AND REFITTING A WHEEL OR CALLIPER CYLINDER OR A BRAKE HOSE

In the interest of safety, it is essential that the following operations be carried out in the correct order to prevent the brake hoses becoming twisted and to avoid any risk of their coming into contact with any part of the suspension:

REMOVING

Unscrew the brake pipe union (1) from hose (2) until spring (3) slackens sufficiently to free the hose from the splines (4).



Unscrew the hose from the calliper. Release the calliper if necessary.

REFITTING

Refit the calliper and screw in the hose.

Tighten to a torque of 1.3 daN.m.

With the wheels hanging free and the steering centred, locate the female end of the hose in the retaining plate (5), ensuring that it is not twisted, then fit:

- the spring (3),
- the brake pipe to the hose making sure that the hose does not turn while the union is being tightened.

Bleed the brake circuit.

Testing principle

Depending on the version, these vehicles are equipped with a brake compensator which is either controlled by or is independent of the load.

The pressure is measured in an X formation by comparing the pressure on the rear wheels with a given pressure on the front wheels.

These double compensators have two completely separate circuits which act in an X formation on one front wheel and one rear wheel.

It is essential to check both circuits:

I : front right-hand wheel/rear left-hand wheel
II : front left-hand wheel/rear right-hand wheel

Load-controlled compensator

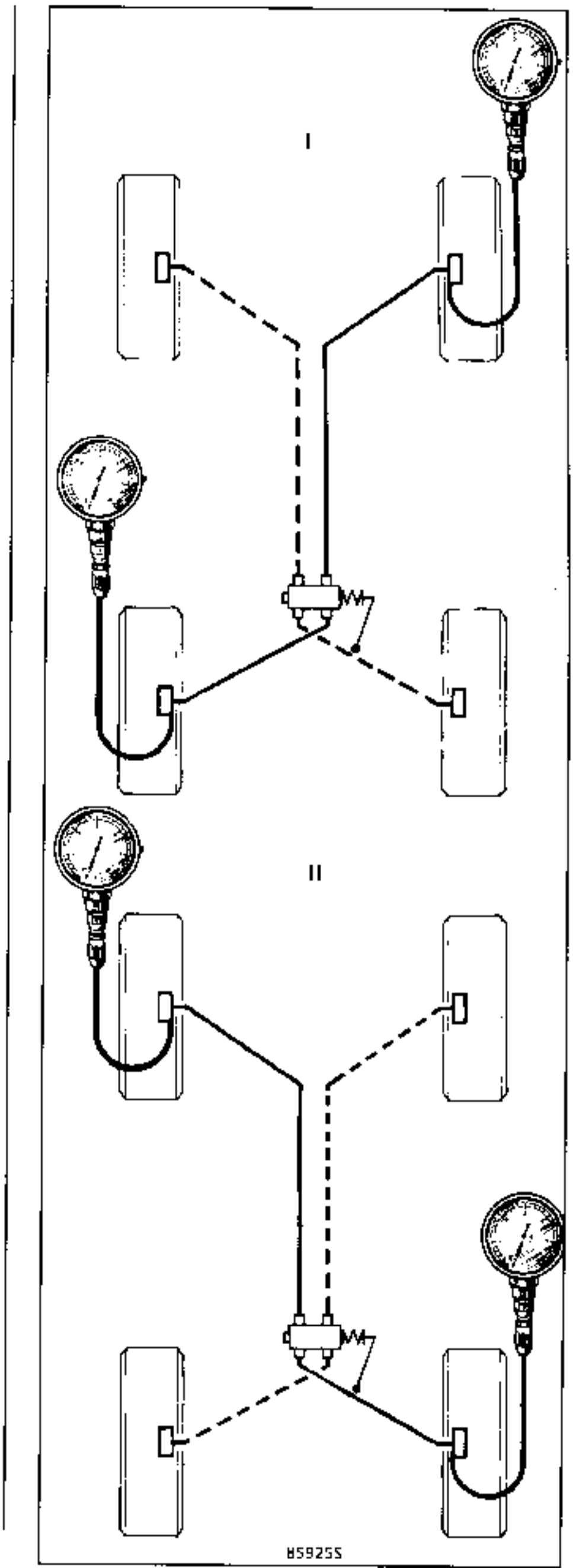
On load-controlled compensators, adjustment enables the pressure at the rear to be altered in accordance with the pressure at the front.

Fixed compensator (not controlled by load)

This type of compensator can only be checked. If the pressure on one or both circuits is incorrect, the assembly must be changed.

Fixed compensator integral with wheel cylinder

This type of compensator can only be checked. If the pressure is incorrect, the compensator - wheel cylinder assembly must be replaced.



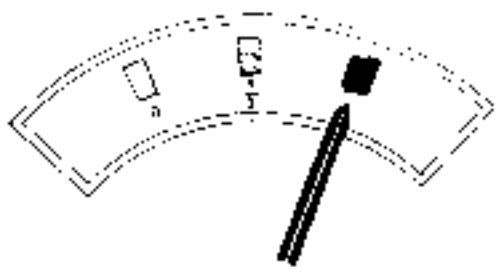
SETTING VALUES

The vehicles designated below, depending on assembly, are equipped:
- either with a fixed brake compensator,
- or with a fixed brake compensator integrated in the wheel cylinder.

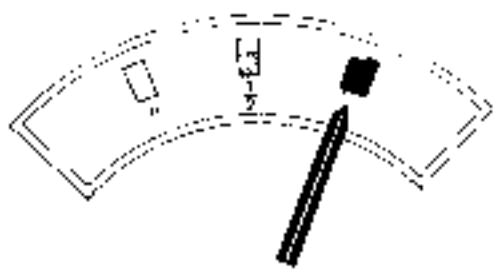
No adjustment can be made.

Type			Control pressure (1) (Bar)	
			FRONT	REAR
B481	B48D	B48H	60 →	34 +0 -4
L481	L48D	L48H		
B482	B48E	B48I		
L482	L48E	L48I		
B484	B48F	B48V		
L484	L48F	L48V		
K484	B48J			
L486	L48J			

The following vehicles are equipped with load-dependent compensators. These are checked and adjusted with the vehicle unladen, fuel tank full and driver on board.

Type			Amount of fuel in tank (driver in vehicle)	Control pressure (1) (Bar)	
				FRONT	REAR
B480	B48A	L48P	 909665	100 →	43 +0 -9
L480	L48A	B48R			
B483	B48C	L48R			
L483	L48C	B48Y			
B487	B48K	L48Y			
L487	L48K	B48W			
B488	B48O	L48W			
L488	L48O				
L489	B48P				
L485 L48L				100 →	39 +0 -8
L485 4 x 4 L48L 4 x 4				100 →	49 +0 -9
B483* L483* B487* L487* B488*	L488* B48P* L48P* B48K* L48K*			100 →	38 +0 -9
B48R* L48R* B48Y* L48Y*				100 →	39 +0 -8

SETTING VALUES (continued)

Type	Amount of fuel in tank (driver in vehicle)	Control pressure (1) (Bar)	
		FRONT	REAR
K480 K487 K48I K481 K488 K48J S481 K489 K48K K482 K48A K48O S482 K48E K48P K483 K48F K48V K486 K48H S48V S486 S48H K48W		100 → 43^{+0}_{-9}	
K483* K48K* K487* K488*		100 → 43^{+0}_{-9}	
K48R K48R*		100 → 39^{+0}_{-9}	
K483 4 x 4 K486 4 x 4 K48K 4 x 4 K48V 4 x 4	909665	100 → 56^{+0}_{-8}	

(1) A dual brake compensator is tested with two pressure gauges arranged in X formation.
(*) Vehicles equipped with ABS.

The checking and adjusting of the brake compensator must be carried out with the vehicle on the ground, one person on board, luggage compartment laden according to version (see paragraph on setting values).

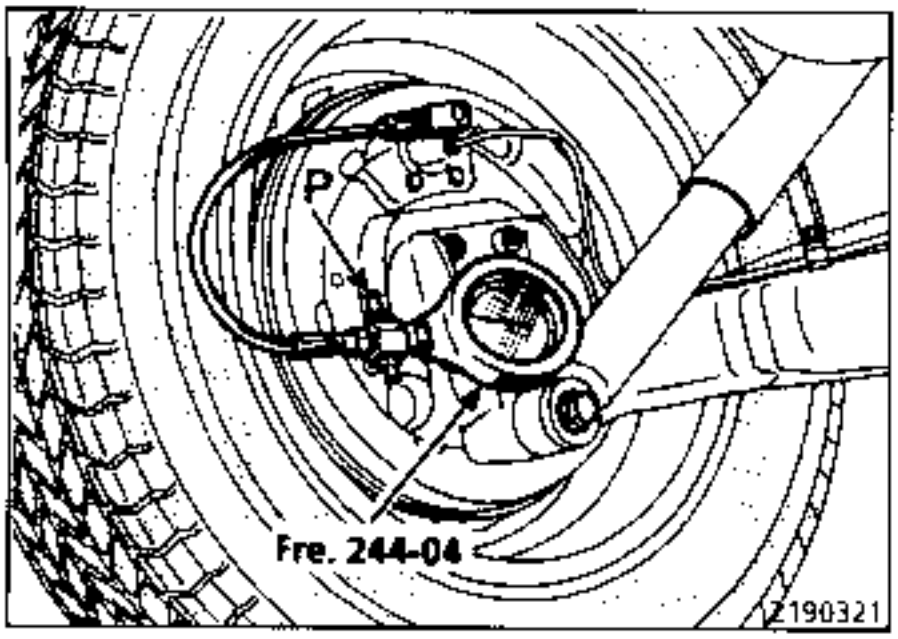
ESSENTIAL SPECIAL TOOLING	
Fre. 244-04	Pressure gauge for checking limiter calibration

CHECKING

Load the luggage compartment according to the version.

Connect two pressure gauges, **Fre 244-04** :
- one at the front right-hand side,
- one at the rear left-hand side.

Bleed the gauges through screw (P).



Operate the brake pedal progressively until the correct pressure setting is obtained on the front wheels (see table).

Then read off the corresponding pressure at the rear wheel and adjust if necessary.

Proceed in the same way for the other circuit, i.e.:
- one at the front left-hand side,
- one at the rear right-hand side.

If there is a great difference (values outside given tolerances) after the adjustment has been made, change the compensator.

ADJUSTING

1st TYPE OF ASSEMBLY

L481 - L482 - L486 - L48E - L48F - L48J

This compensator is not controlled by the load and cannot be adjusted.

2nd type of assembly

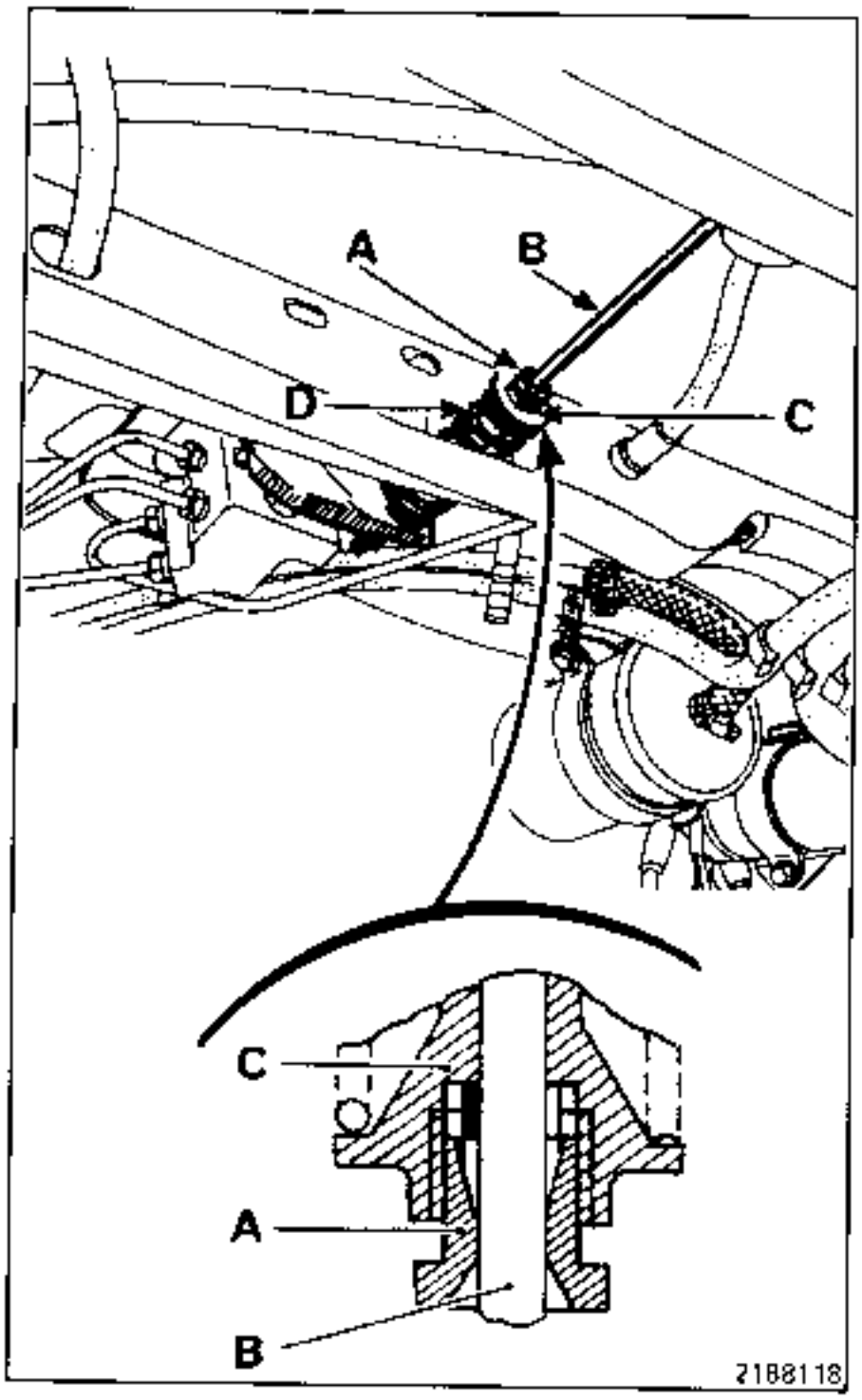
B481 - L481 - B482 - L482 - L486 - B48D - L48D - B48E - L48E - B48F - L48F - B48J - L48J - B48H - L48H - L48M - L48N - B48V - L48V - L48U - B48U

This compensator is integral with the wheel cylinder and cannot be adjusted.

LOAD-CONTROLLED COMPENSATOR (vehicles listed on previous page).

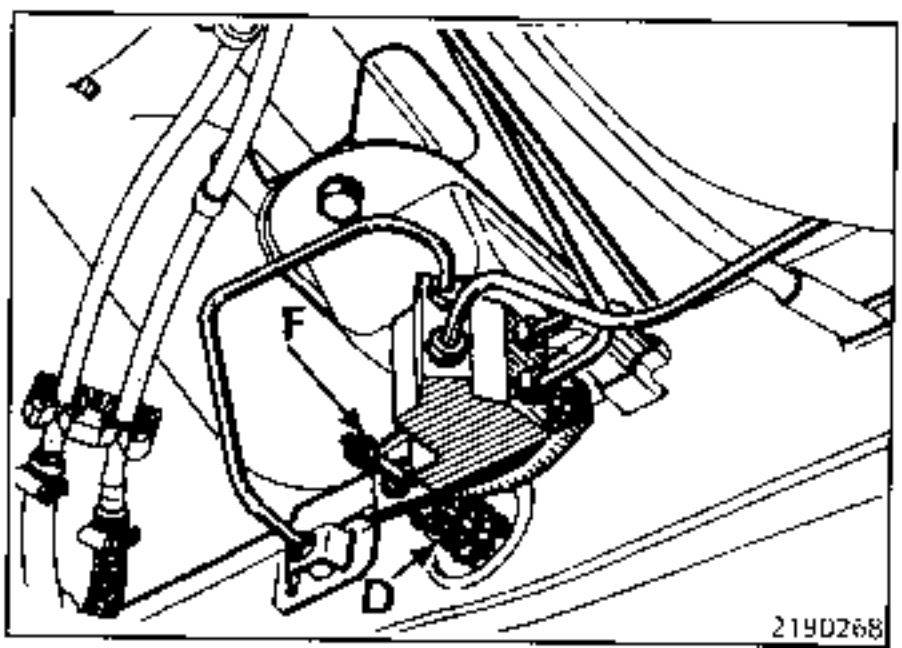
The adjustment is made by modifying the compression of spring (D).

CHECKING - ADJUSTING



To adjust:
- Unscrew lock nut (A) and alter the position of rod (B) in sleeve (C).

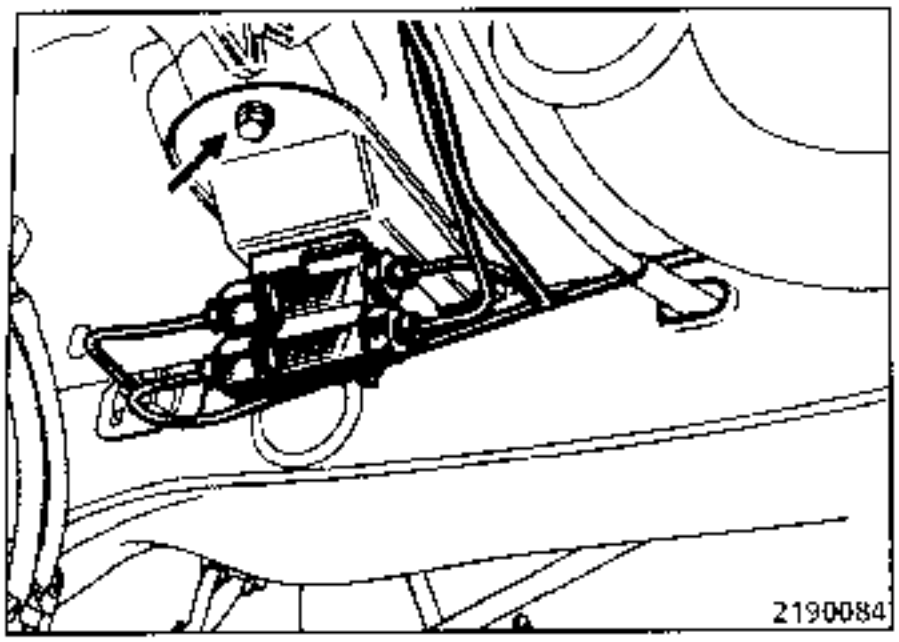
NOTE: The position of nut (F) must not be altered.



REMOVING

Disconnect :
- the pipes,
- the bolt securing it to its support.

1st TYPE OF ASSEMBLY - Fixed compensator

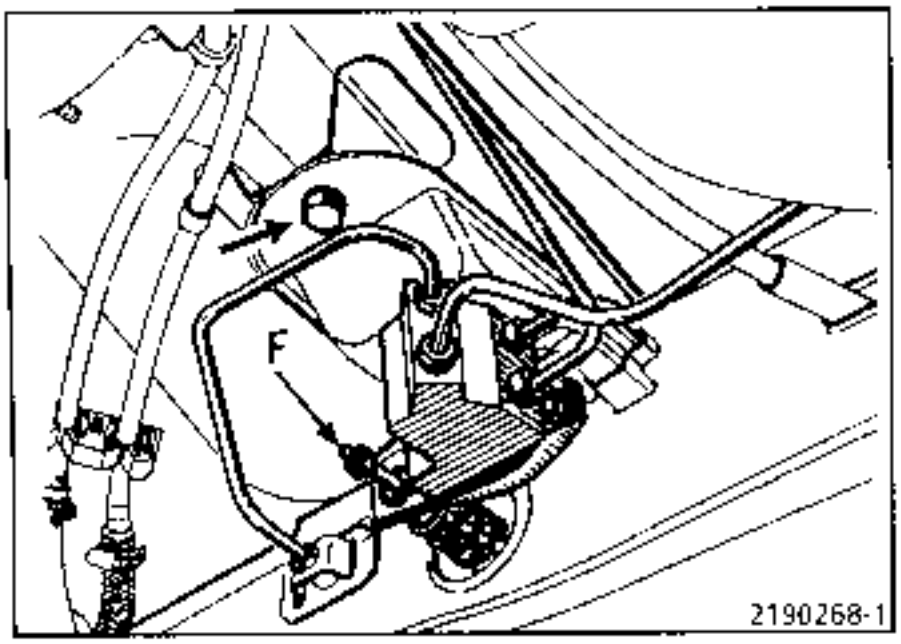


Tilt the support - compensator assembly then remove it.
Uncouple the compensator from its support.

2nd TYPE OF ASSEMBLY - Fixed compensator
Integral with wheel cylinder (see "**Rear wheel cylinder, Removing - refitting**").

LOAD-CONTROLLED COMPENSATOR
Unhook the control spring from the V-shaped profile. Tilt the support - compensator assembly then remove it.

NOTE : Do not alter the position of nut (F).

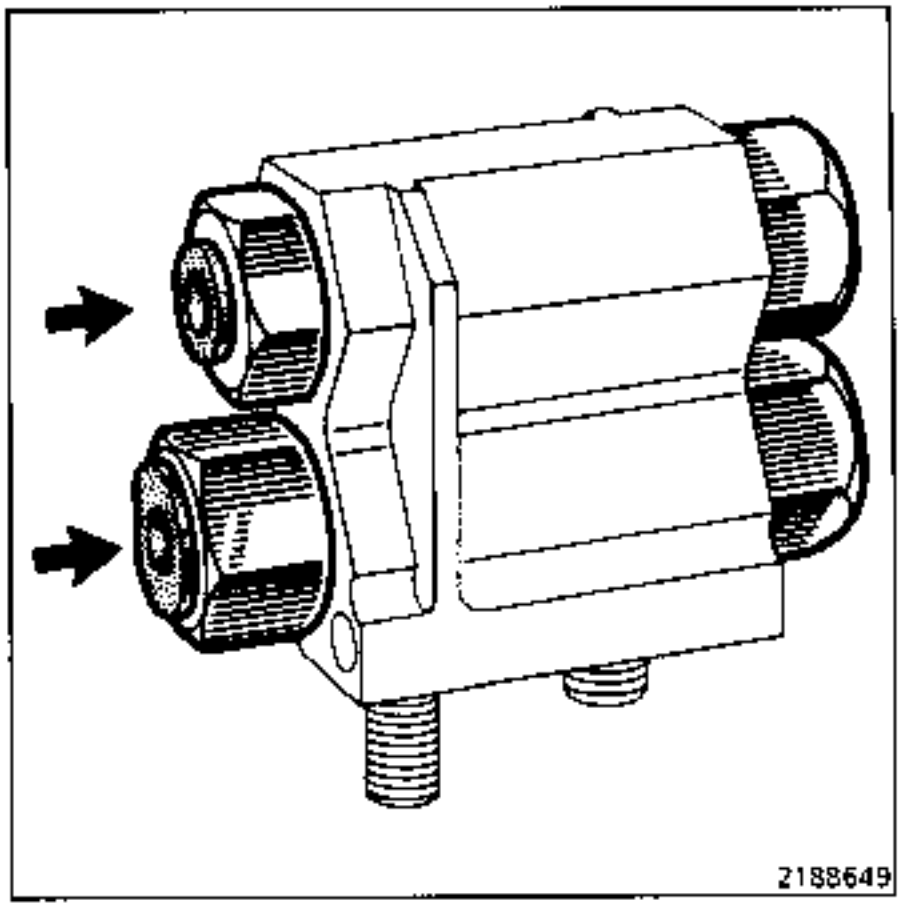


Uncouple the compensator from its support.

REFITTING

Special points

1st TYPE OF ASSEMBLY - Fixed compensator
The compensator inputs are on the side which has the small unions (of different heights).



All types

Bleed the brake system.

Check and, if necessary, adjust the pressure (see section entitled "**Checking - Adjusting**").

REPLACING

ESSENTIAL SPECIAL TOOLING		
Mot.	453-01	Hose clamp
M.S.	815	Bleeding apparatus
Emb.	1082	Tool for removing and refitting spring - activating capsule assembly

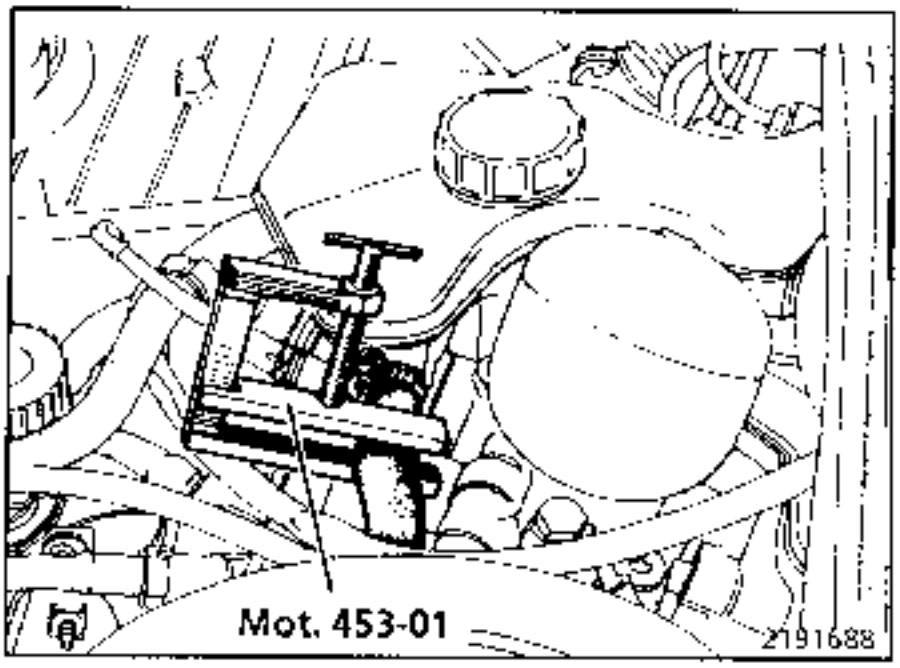
TIGHTENING TORQUES (in daN.m)	
Master cylinder securing nut	1.5
Union bolt	1.8

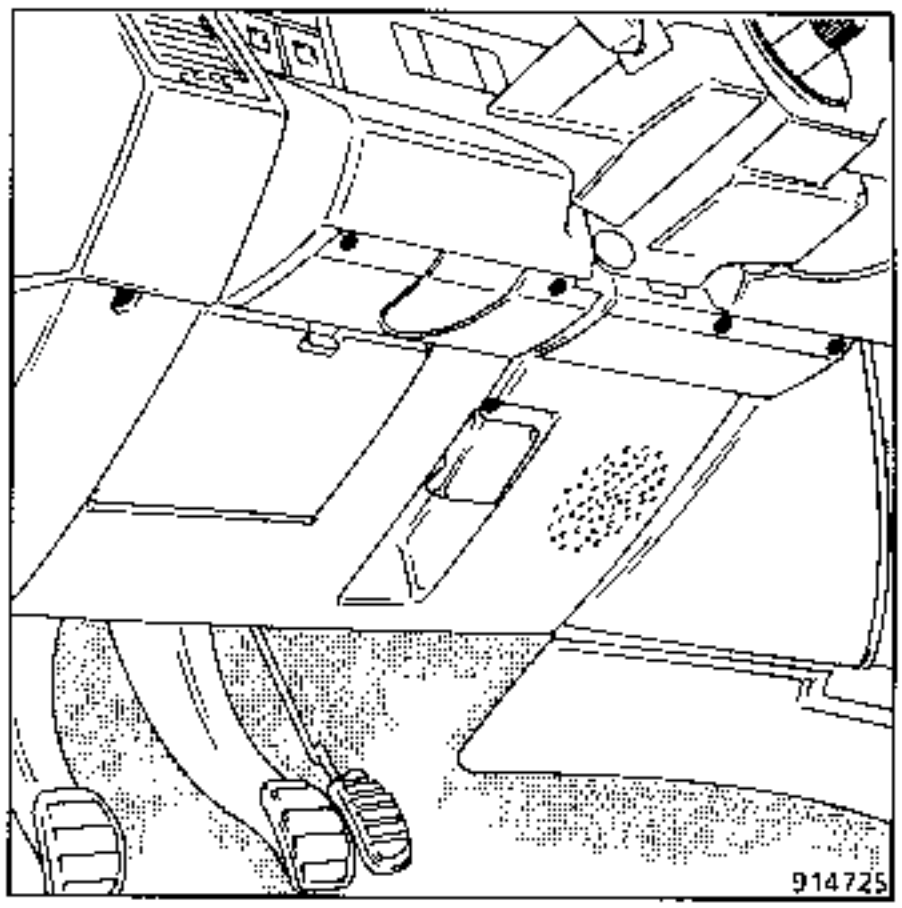
REMOVING

Disconnect the battery.

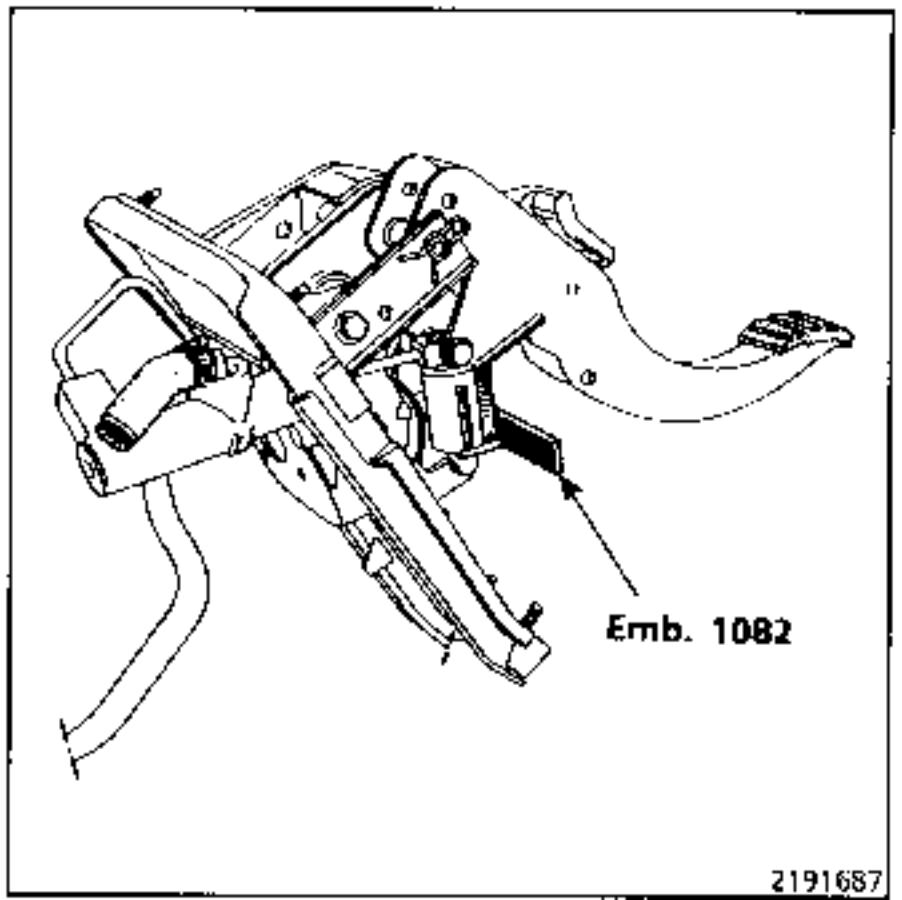
Fit clamp **Mot. 453-01** to the master cylinder feed hose.

Unscrew the master cylinder outlet hose union.





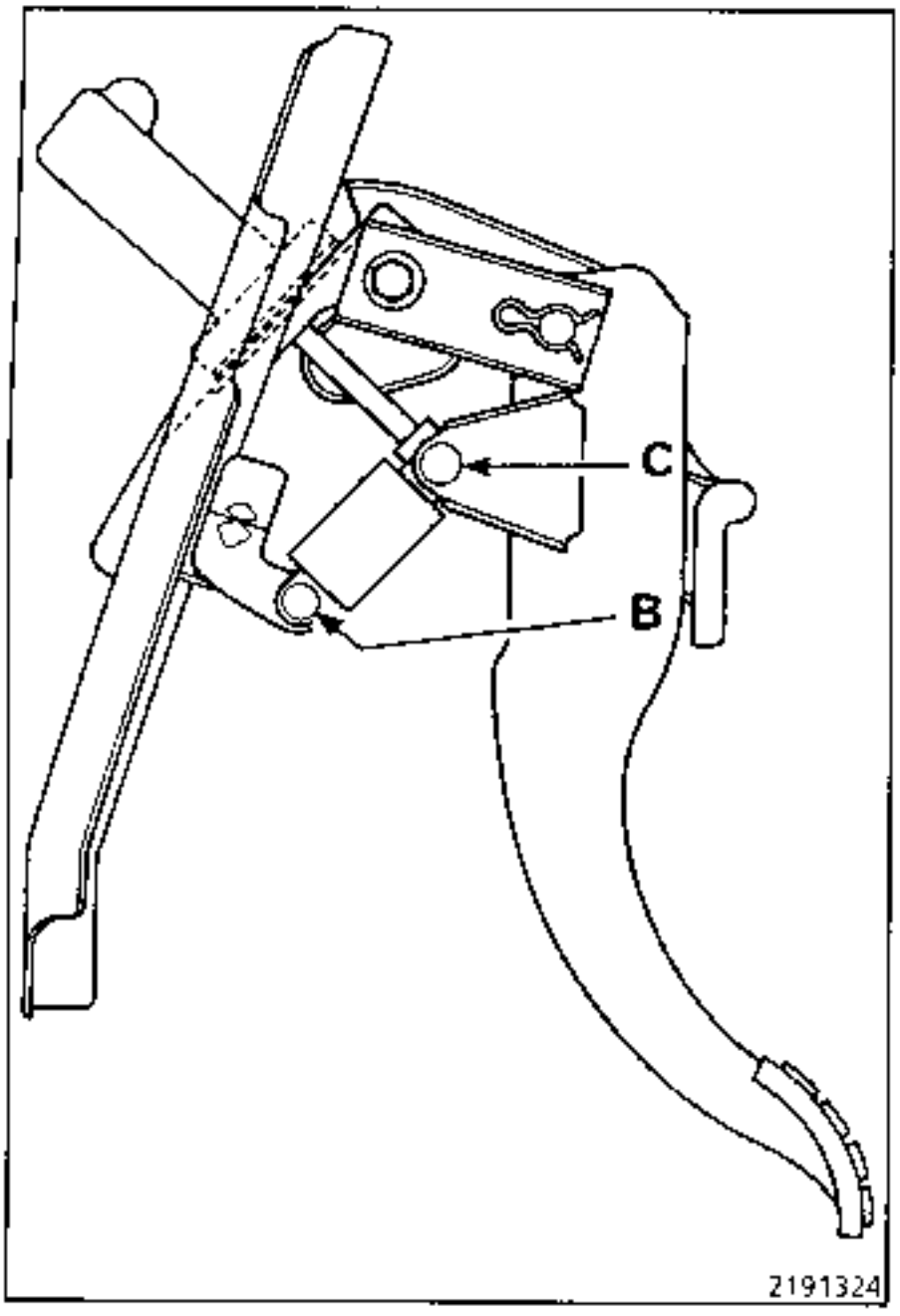
Fit tool **Emb. 1082** on the spring - activating capsule assembly.



REPLACING (continued)

Remove the circlip and rollpin from shafts (B) and (C).

Press down lightly on the pedal to extract shaft (B).



Free the unit.

Take out shaft (C) and remove the spring - activating capsule assembly.

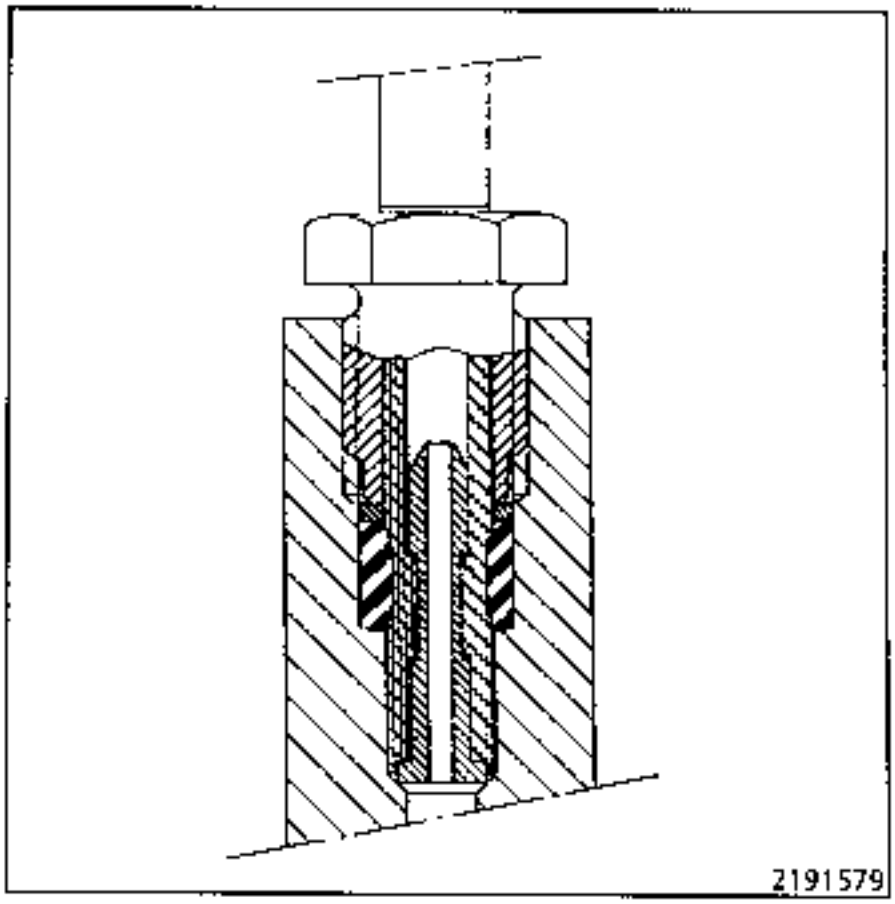
Remove the two nuts from the master cylinder mounting.

Disconnect the outlet and feed pipes from the master cylinder and remove it.

REFITTING - Special points

Fit in place the master cylinder pushrod assembly equipped with a new seal.

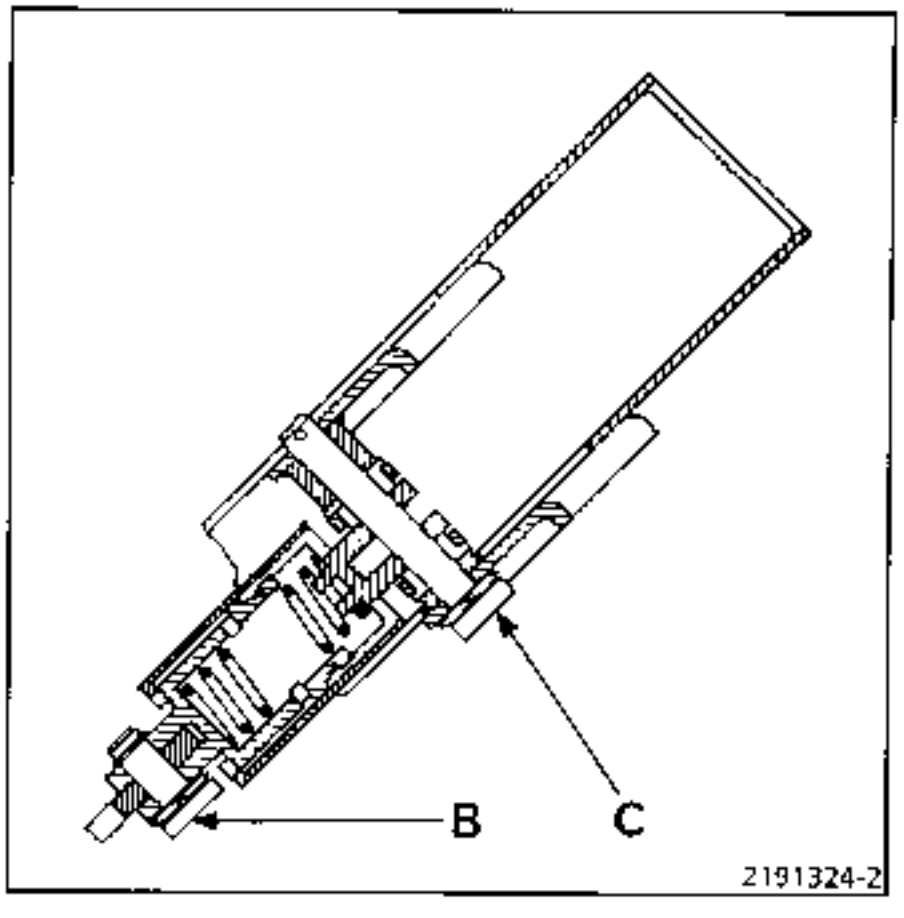
Connect the outlet hose equipped with the washer and a new seal.



ENSURE :

- the position of the seal and the flat washer,
- the tightening torques,
- the fitting direction of the spring - activated capsule assembly diameter at pushrod calliper end.

Coat the shafts with grease.



REPLACING (continued)

Place the pushrod calliper (equipped with the plastic bearings) between the spring - activating capsule assembly and the pedal.

Fit shaft (C).

Press down the pedal slightly to fit the assembly and shaft (B).

Remove the clamp from the feed hose.

Using apparatus M.S. 815 or the like, bleed the hydraulic circuit.

NOTE : The clutch pedal must be in its uppermost position when the bleeding operation is performed.

Bleeding the system by depressing the pedal :

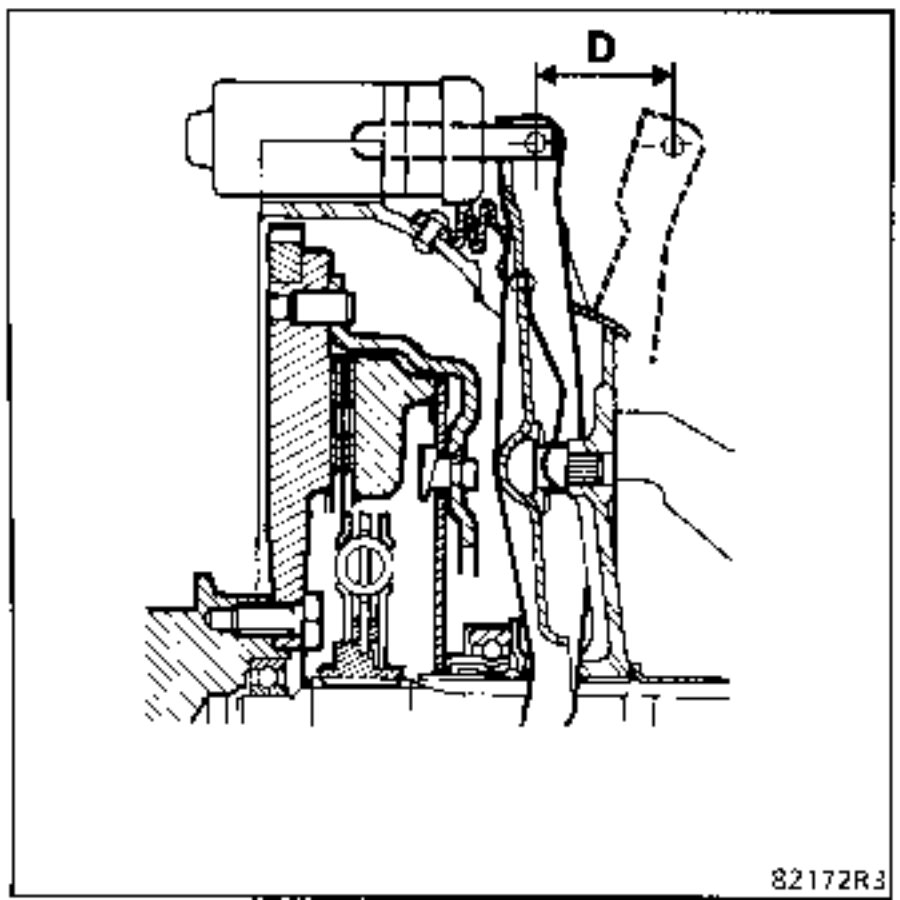
1. Bleed the feed hose (screw P).

2. Connect a hose immersed in a receptacle filled with brake fluid to the bleed screw and bleed the circuit.

As the assistance device holds the pedal on the floor, the pedal will have to be refitted each time.

Check the travel of the slave cylinder. It should be:

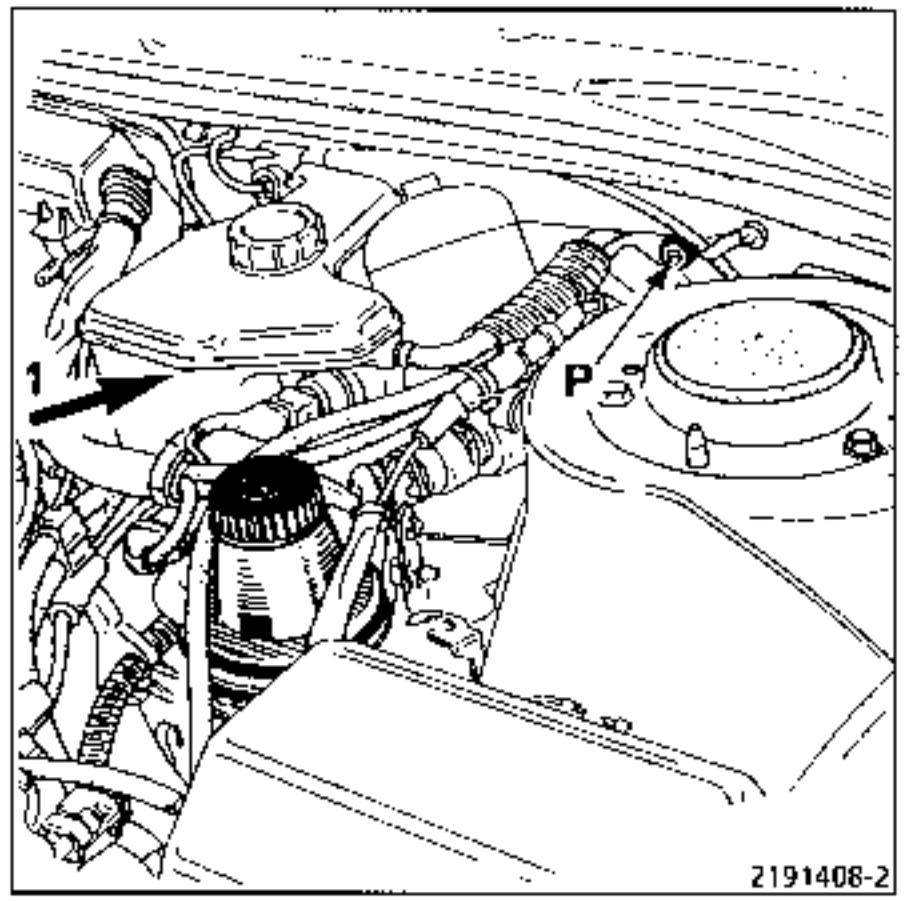
D = 11 mm minimum



Check the brake fluid level.

NOTE: The brake fluid level must be checked with the ignition switched on. When the fluid reaches the **MAX** mark, the accumulator is full.

Switch on the ignition and wait for the pump to stop.
If necessary, top up the brake fluid to the **MAX** mark (1).



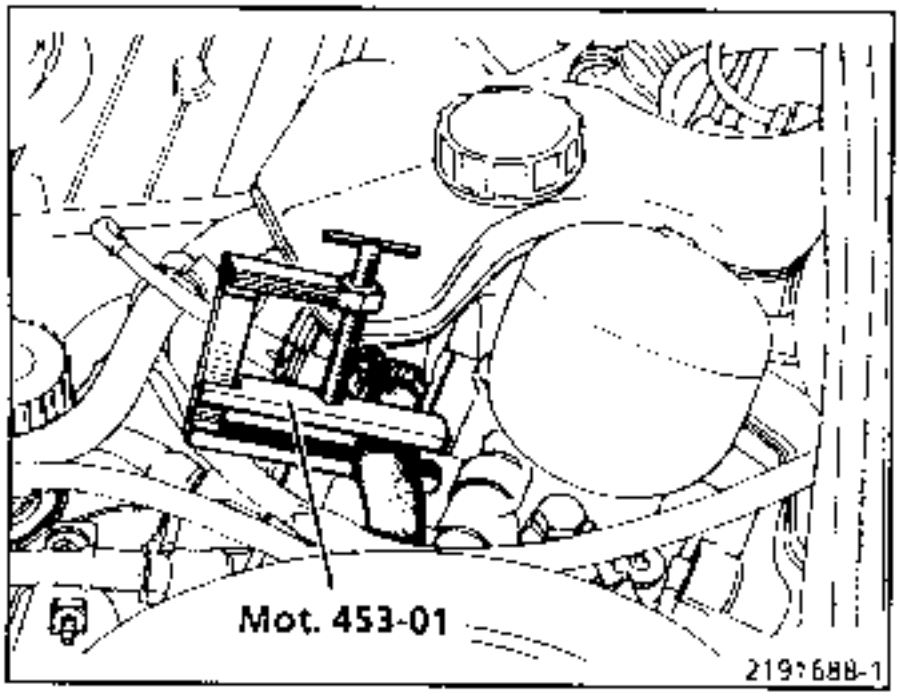
REPLACING

ESSENTIAL SPECIAL TOOLING	
Mot. 453-01	Hose clamp
M.S. 815	Bleeding apparatus

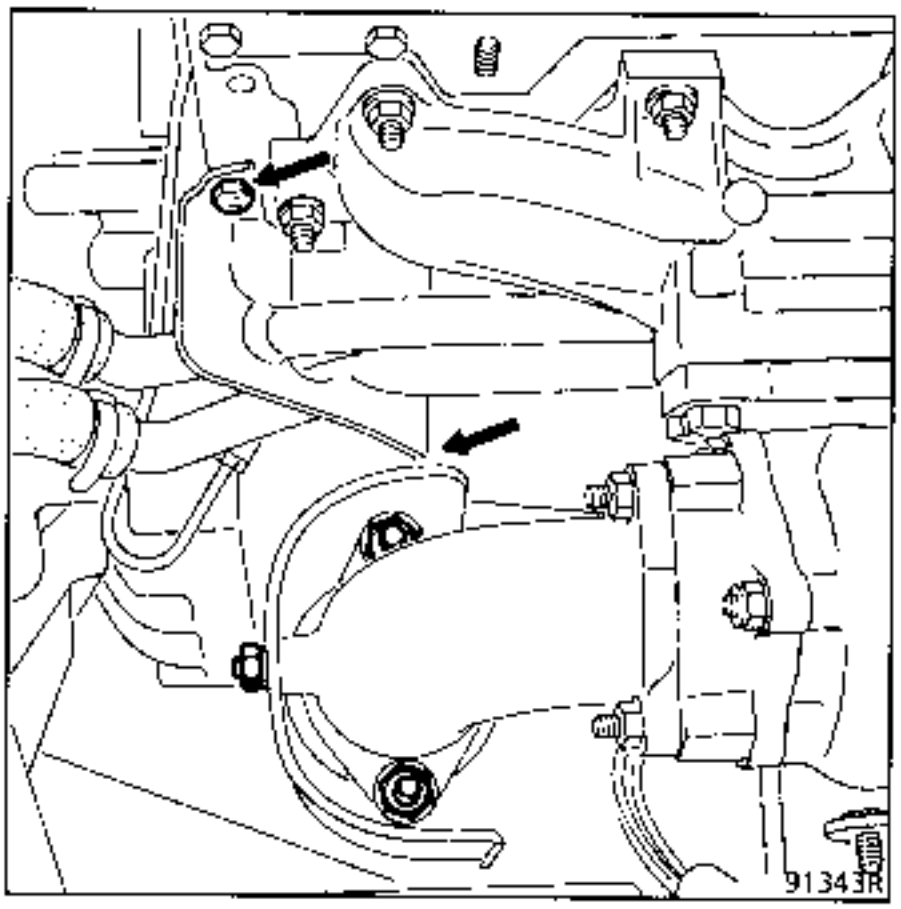
TIGHTENING TORQUES (in daN.m)	
Slave cylinder securing nut	1.5
Union bolt	1.8

REMOVING

Fit a clamp **Mot. 453-01** to the master cylinder feed hose.

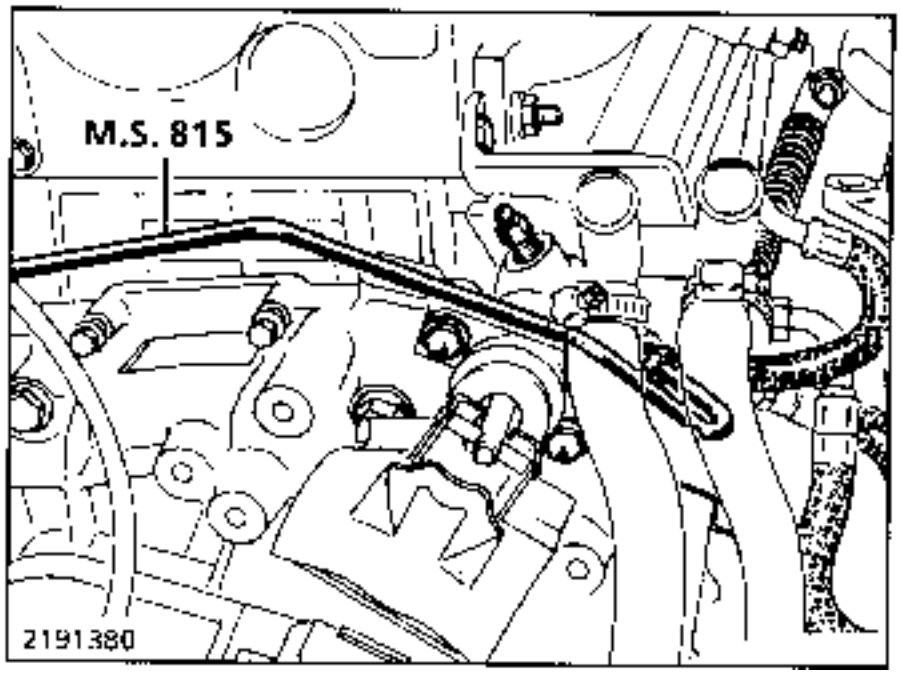


Remove :
- the turbo heat shield,
- the heat shield mountings from the slave cylinder.



Disconnect the feed hose from the slave cylinder.

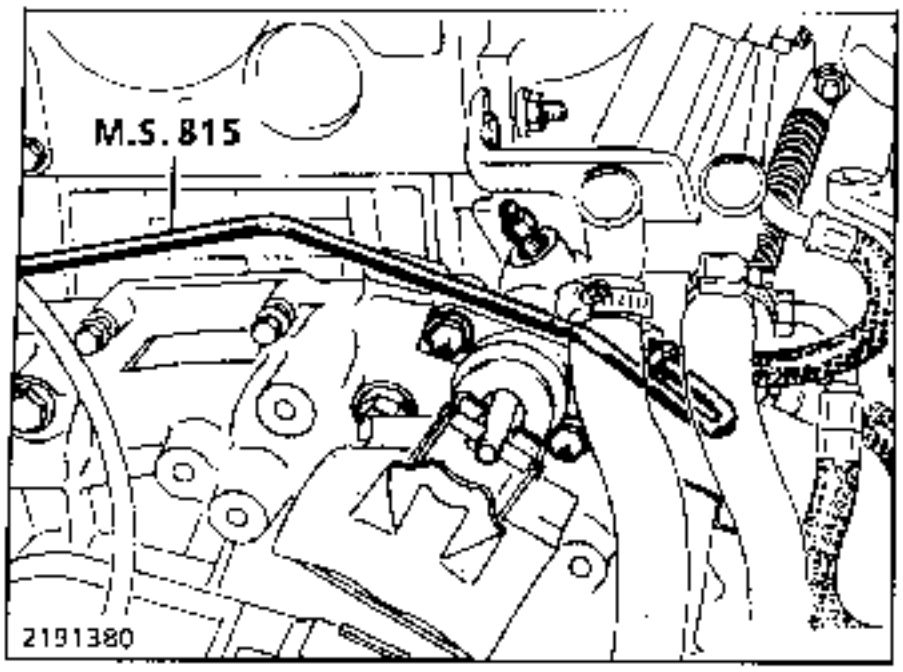
Remove the two mounting bolts from the slave cylinder and then remove the slave cylinder.



REFITTING

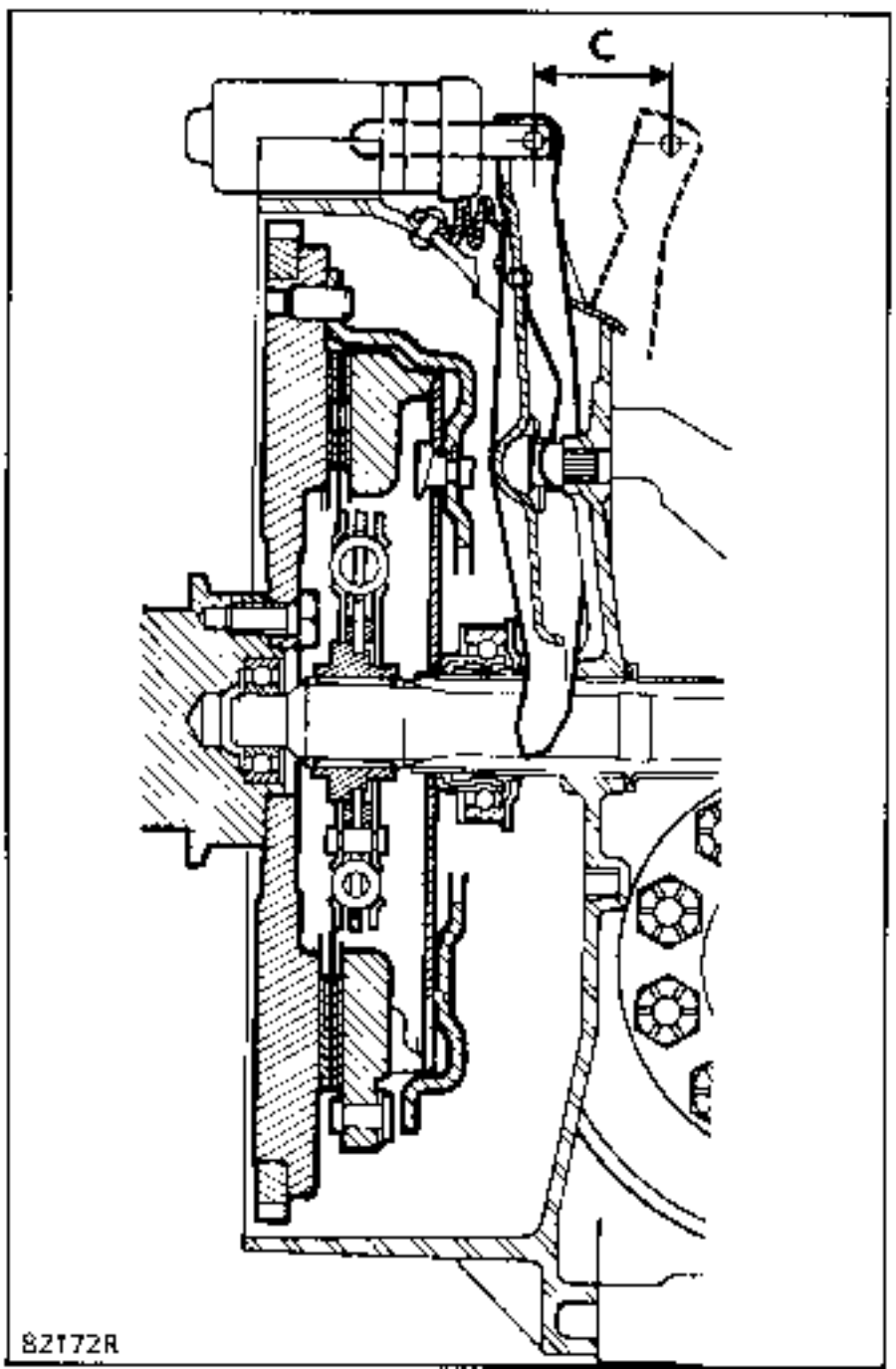
Secure the slave cylinder and reconnect its feed hose.

Bleed the circuit.



Check the travel of the slave cylinder. It should be:

C = 11 mm minimum

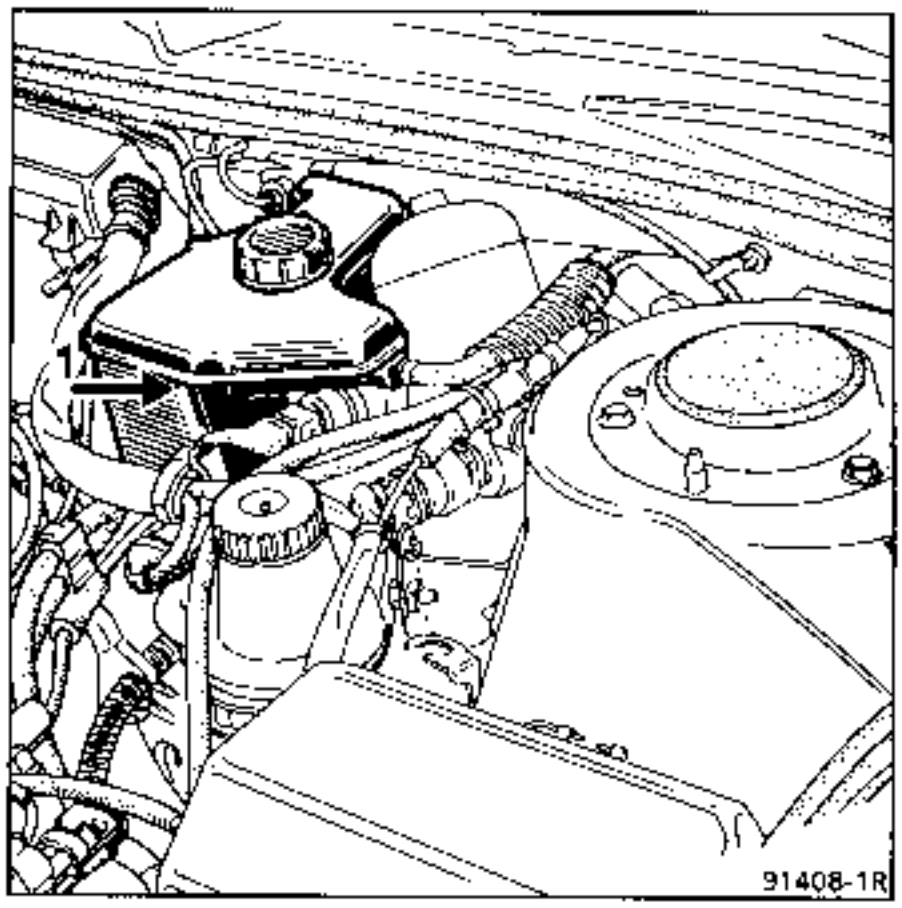


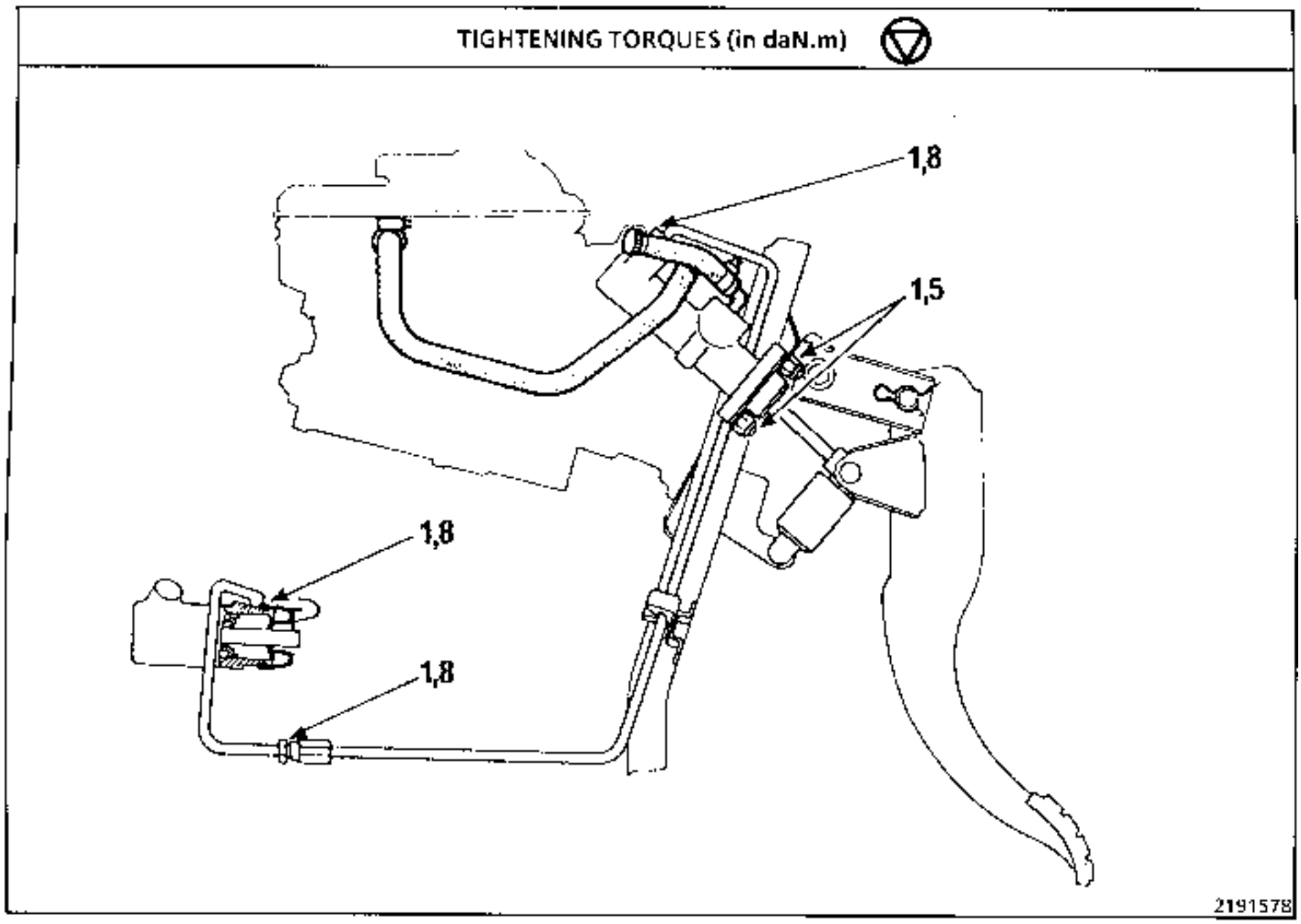
Check the brake fluid level.

ATTENTION: The brake fluid level must be checked with the ignition switched on. When the fluid reaches the **MAX (1)** the accumulator is full.

Switch on the ignition and wait for the pump to stop.

If necessary, top up the brake fluid to the **MAX** mark (1).





- The principle of this control system is the same as that for a brake control system.

- The clutch pedal acts on a master cylinder which causes the slave cylinder piston to move and act on a fork.

The clearance of the pedal cannot be adjusted.

Clutch control mechanical assistance.

"Bendix" control :

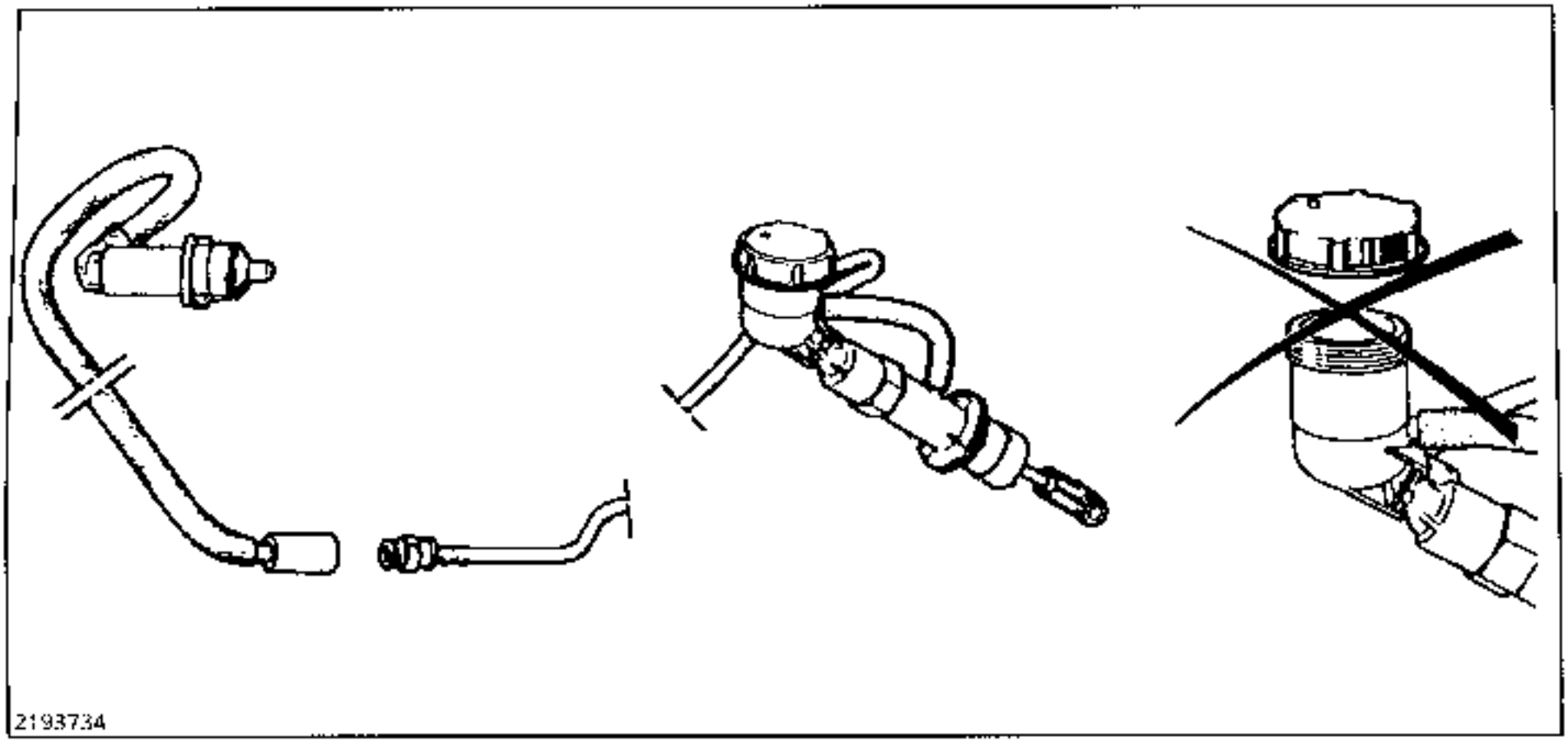
- The hydraulic circuit is supplied with a liquid contained in the brake fluid reservoir.

"Automotive Products" control :

- The liquid reservoir is integral with the master cylinder.
- This equipment is supplied ready filled and bled.

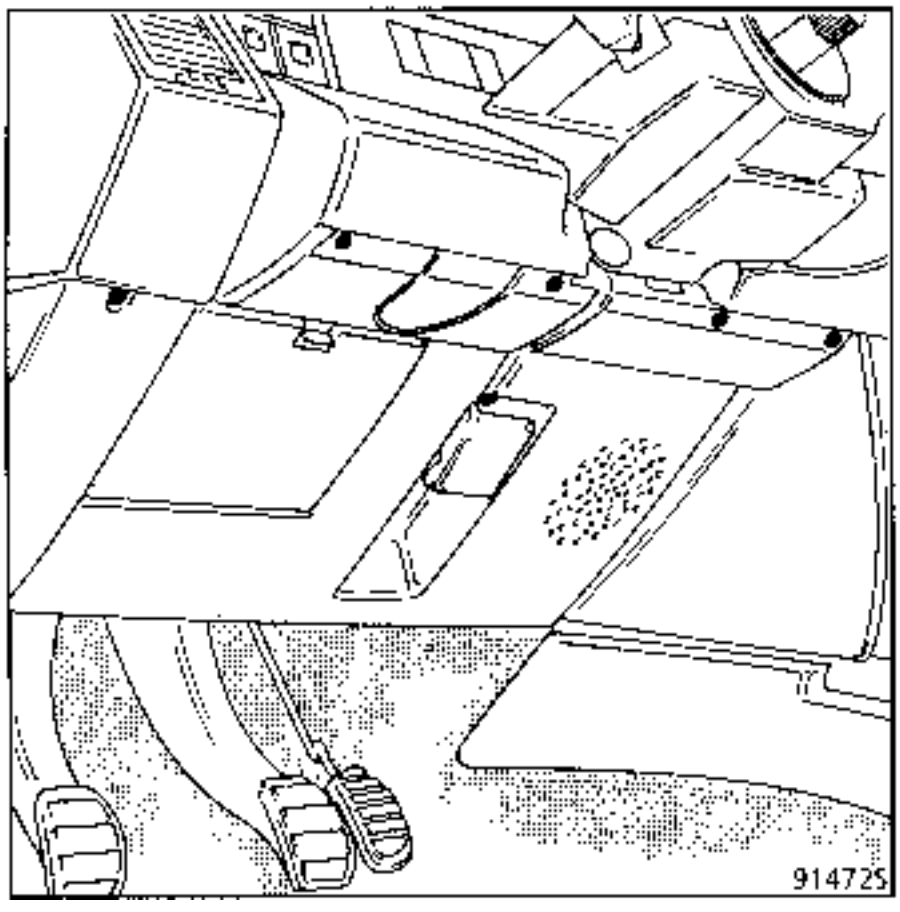
REMOVING - REFITTING :

This equipment is supplied, prefilled and bled in two parts (master cylinder and slave cylinder).
Consequently, if one part is replaced then the other part also has to be replaced.

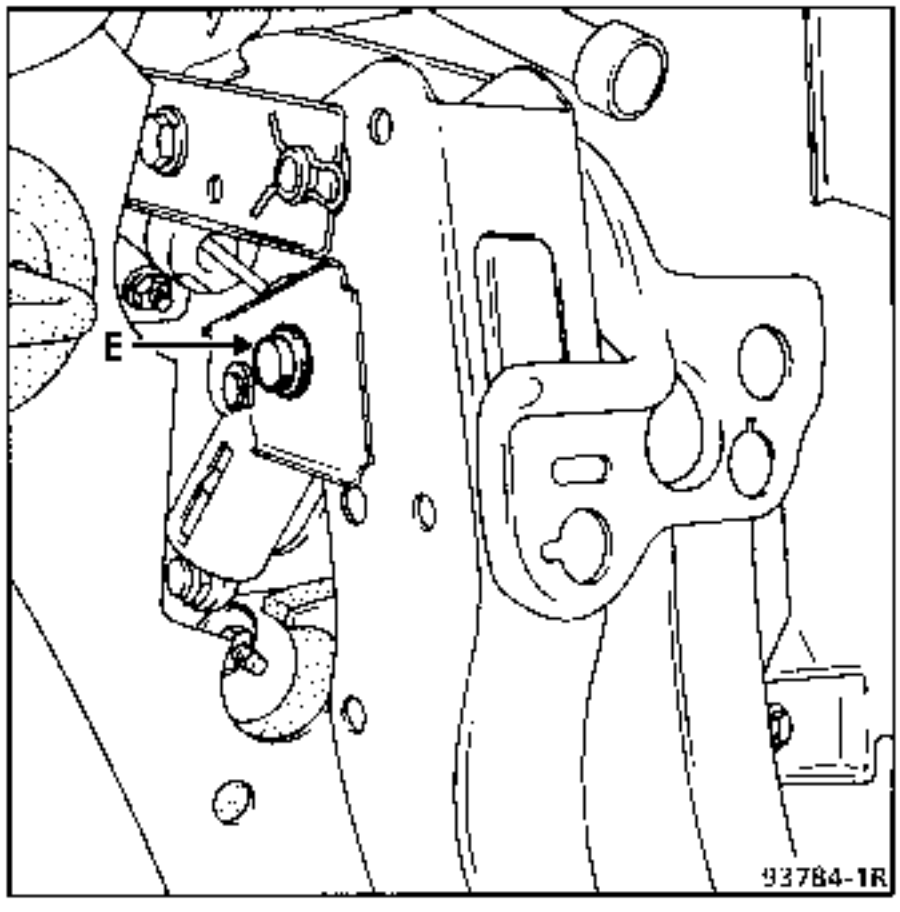


REMOVING

Removing:
- the lower cover from the dashboard (unclip the fuse holder connector),
- the ventilation duct.

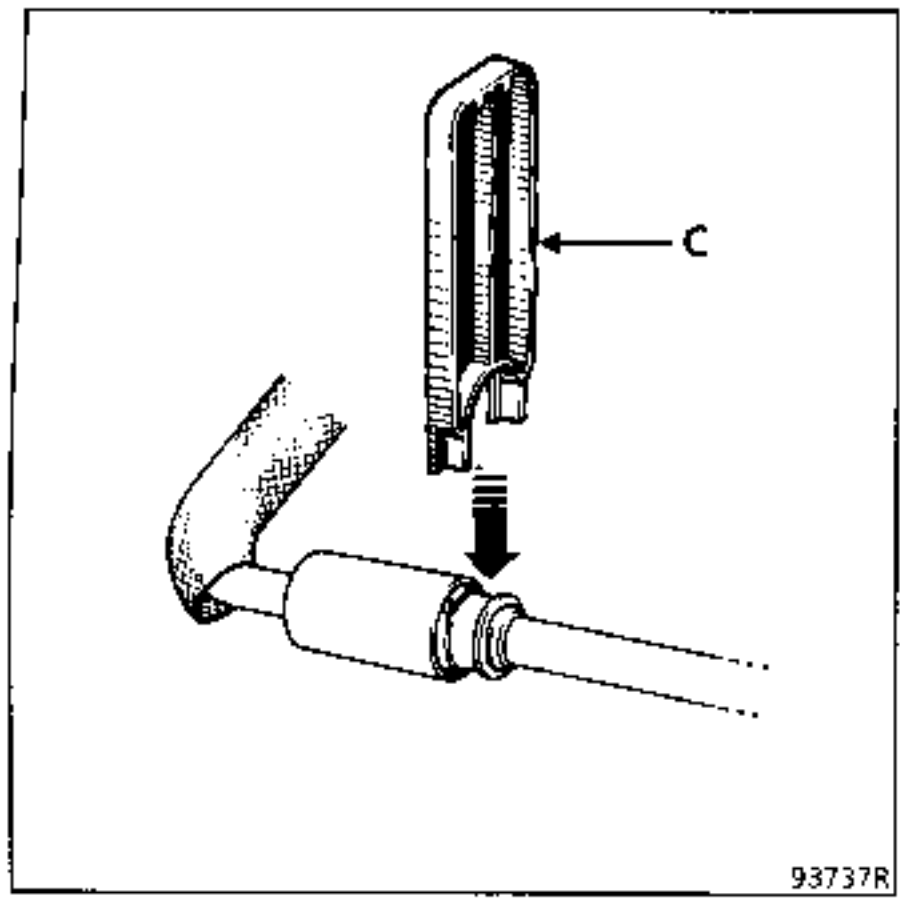


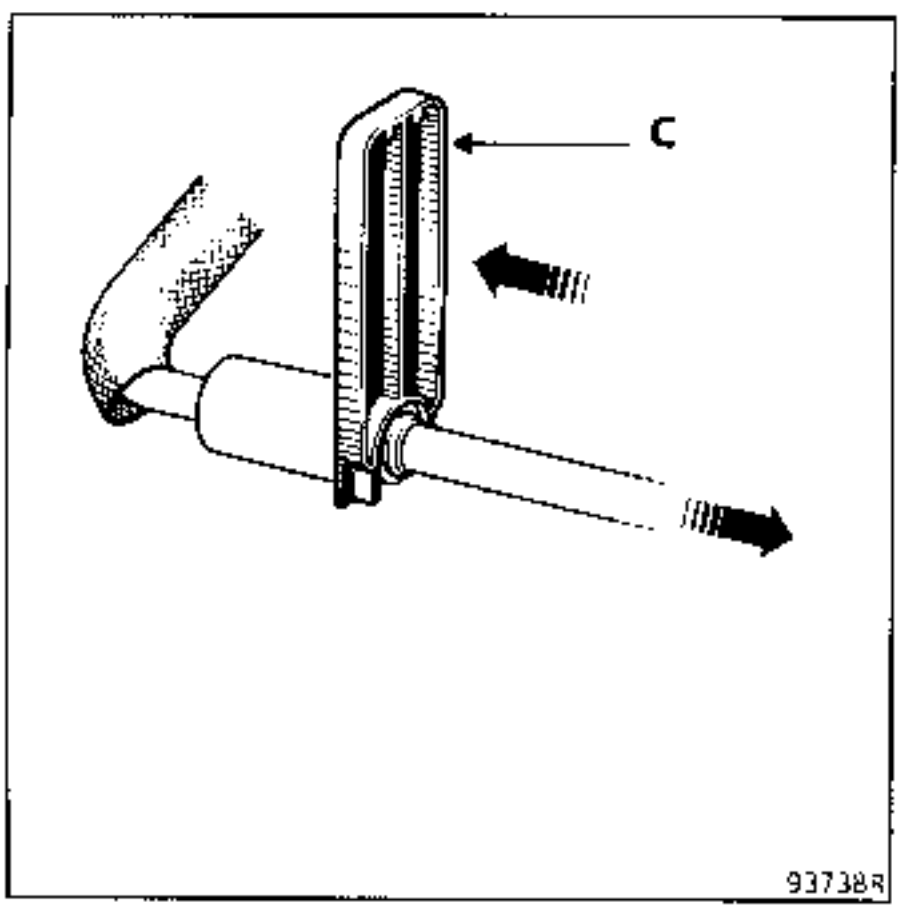
Remove the rollpin and shaft (E) from the master cylinder pushrod.



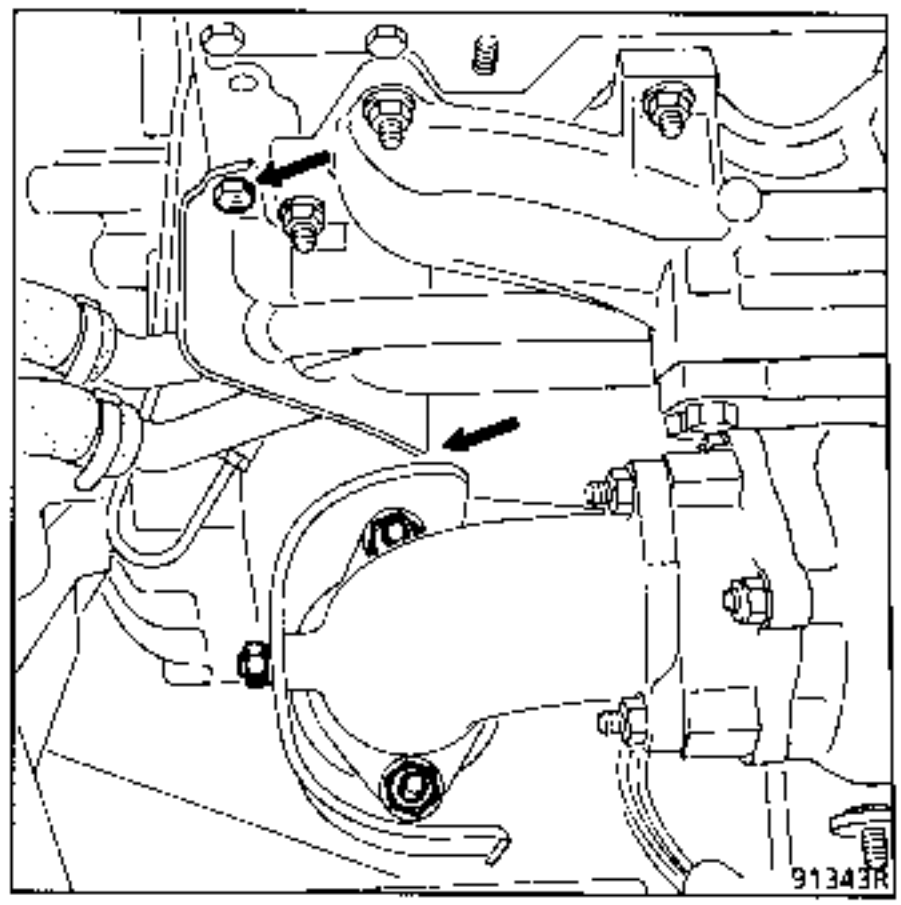
REMOVING (continued)

Using tool (C) supplied in the kit, disconnect the snap fastener from the master cylinder - slave cylinder connection hoses located on the top of the clutch casing on the left-hand side.

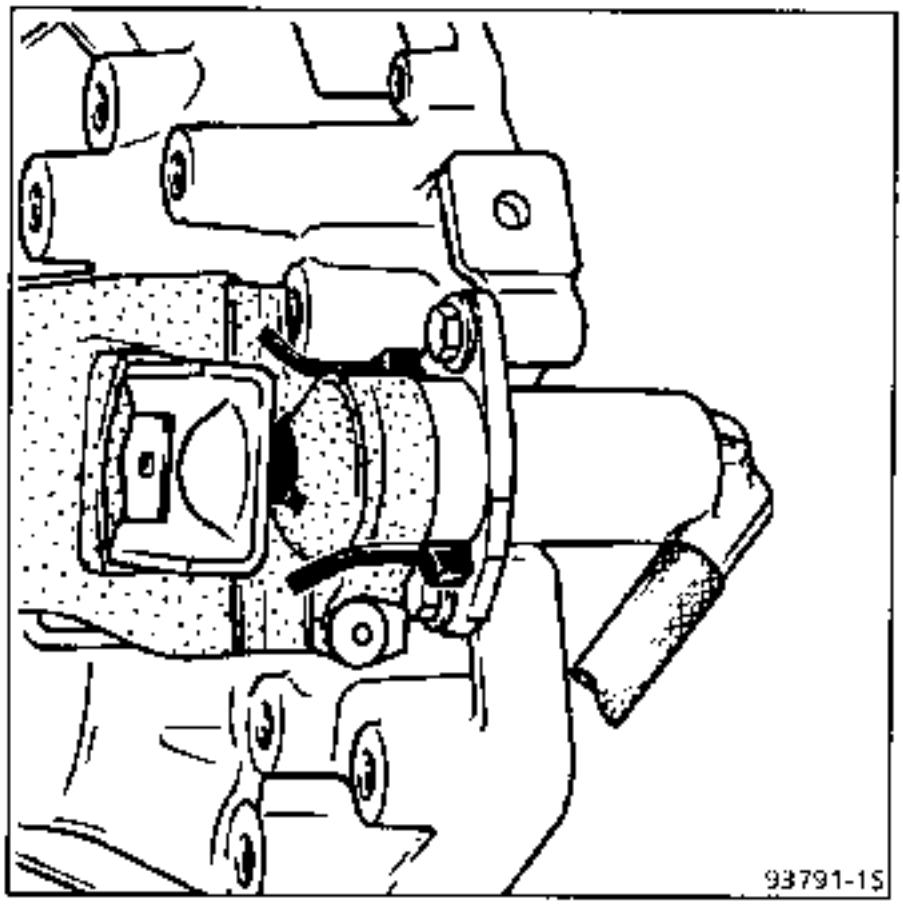




Remove:
- the heat shield from the turbo,
- the hose mounting and mounting from the slave cylinder heat shield,



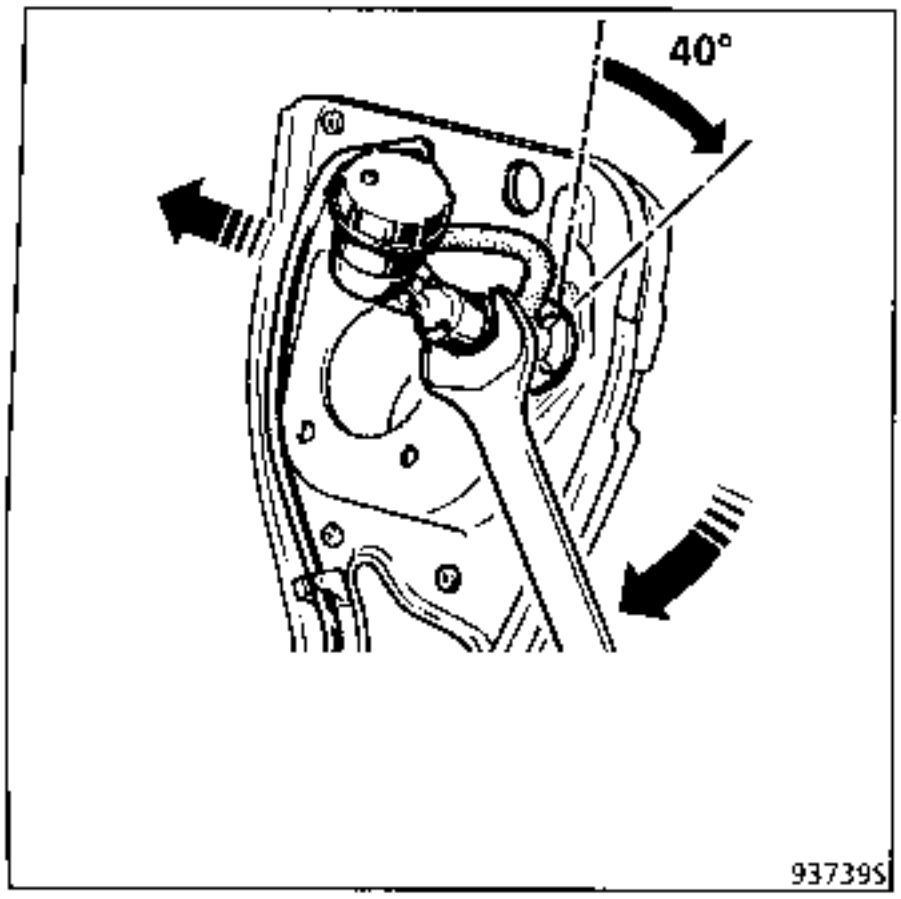
- the two bolts securing the slave cylinder.



Move the hoses away and remove the slave cylinder.

REMOVING (continued)

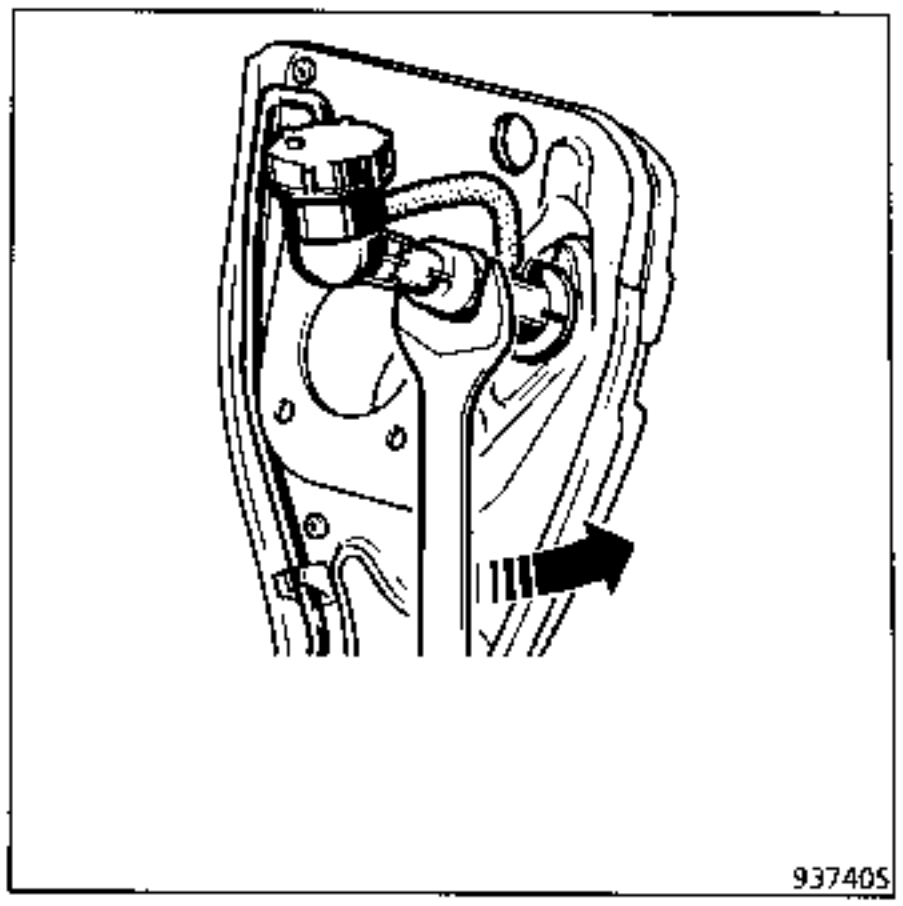
The master cylinder mounting is of a bayonet type; to remove it, turn the master cylinder body approximately 40° (arrow).



Free the hose line from its mounting on the plate and remove it together with the master cylinder.

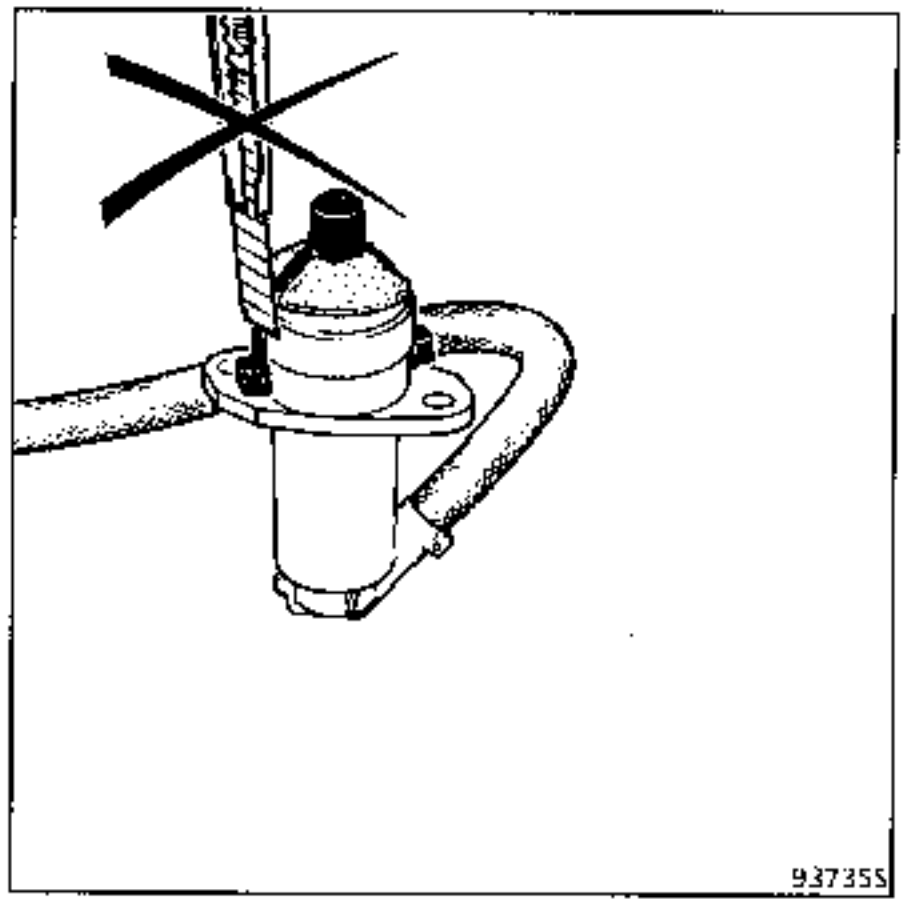
REFITTING

Fit in place the hose line and the new master cylinder.



Check that the position of the markings of the master cylinder and plate are opposite one another.

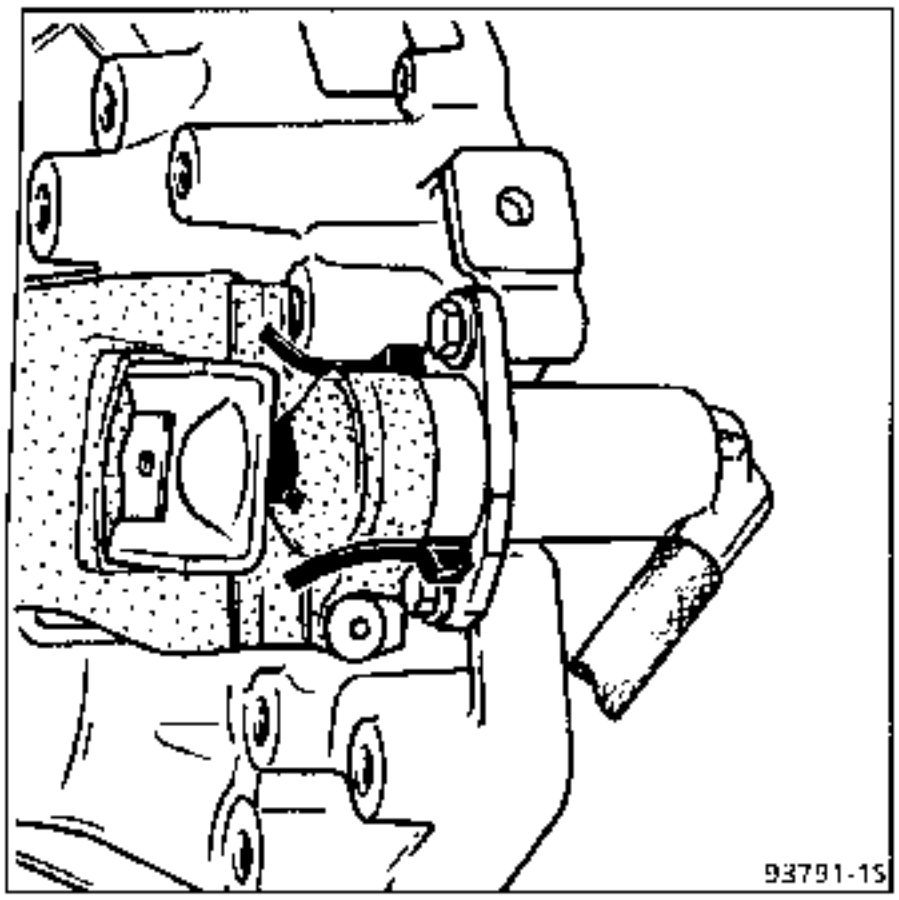
Slave cylinder:
Ensure that the retaining tabs on the pushrod are in place, do not cut them or remove them.



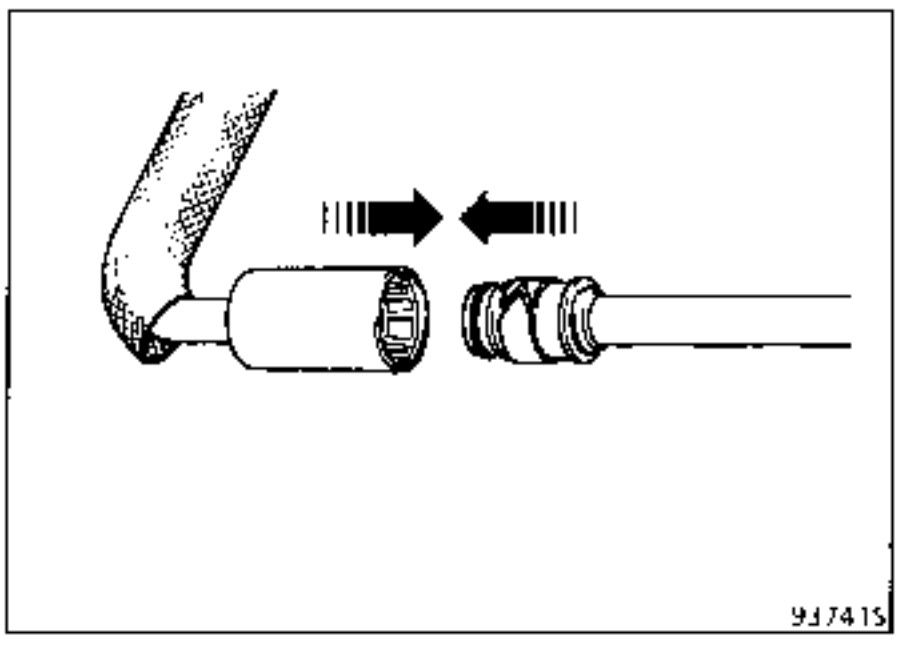
Take care not to damage or foul the quick-release connections.

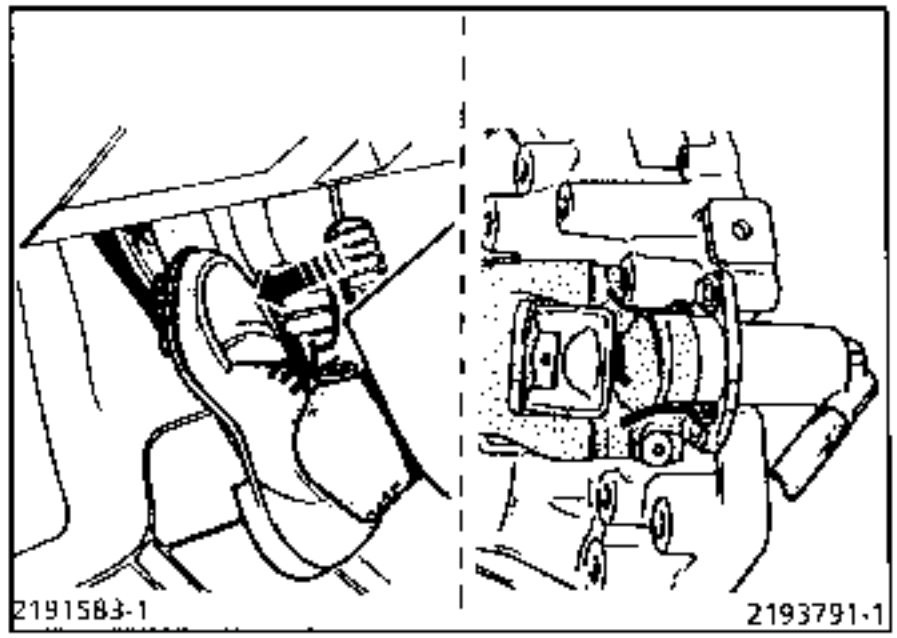
REFITTING (continued)

Mount the slave cylinder and its hose line.



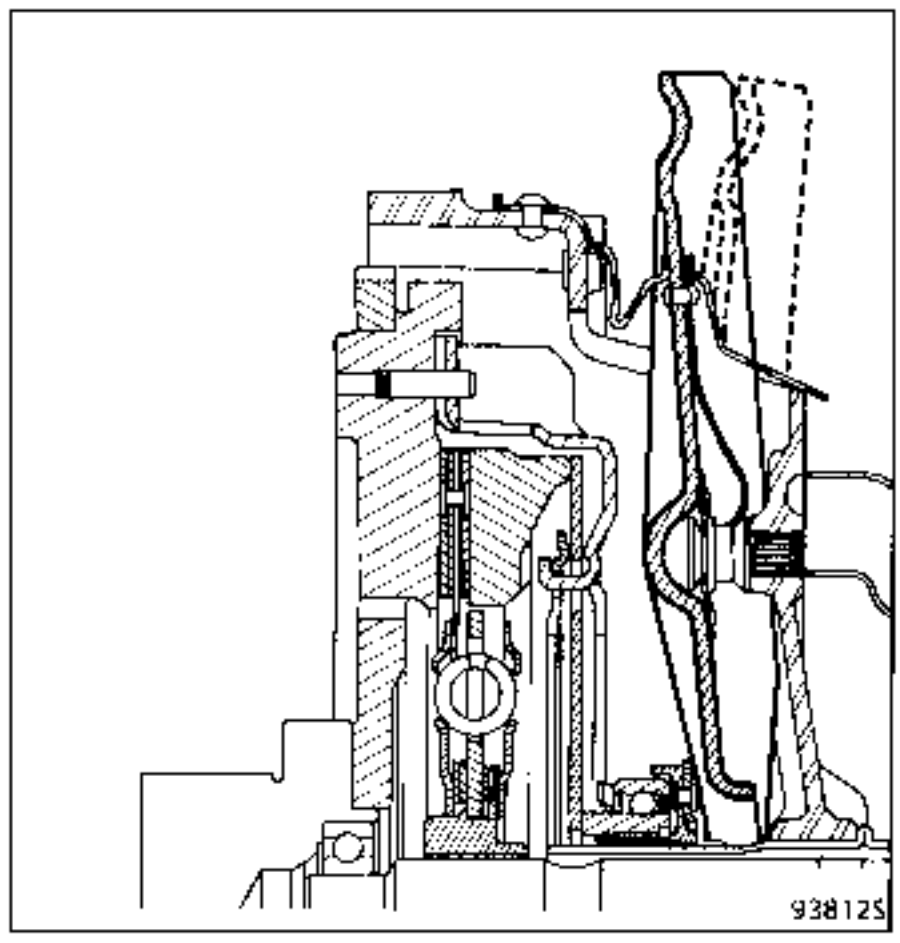
Connect the quick-release connections.





Press down fully on the clutch pedal and allow it to return gently to its top stop (2 or 3 times).

Check the fork movement travel. It should be:
X = 11 to 12 minimum.



It is **not permissible to top up the** fluid. The unit is supplied as two units (master cylinder and slave cylinder) and is already filled with fluid.

REPLACING

REMOVING

The lower part of the dashboard must be removed in order to remove the clutch cable.

Remove:

In the engine compartment unfasten the cable from the fork.

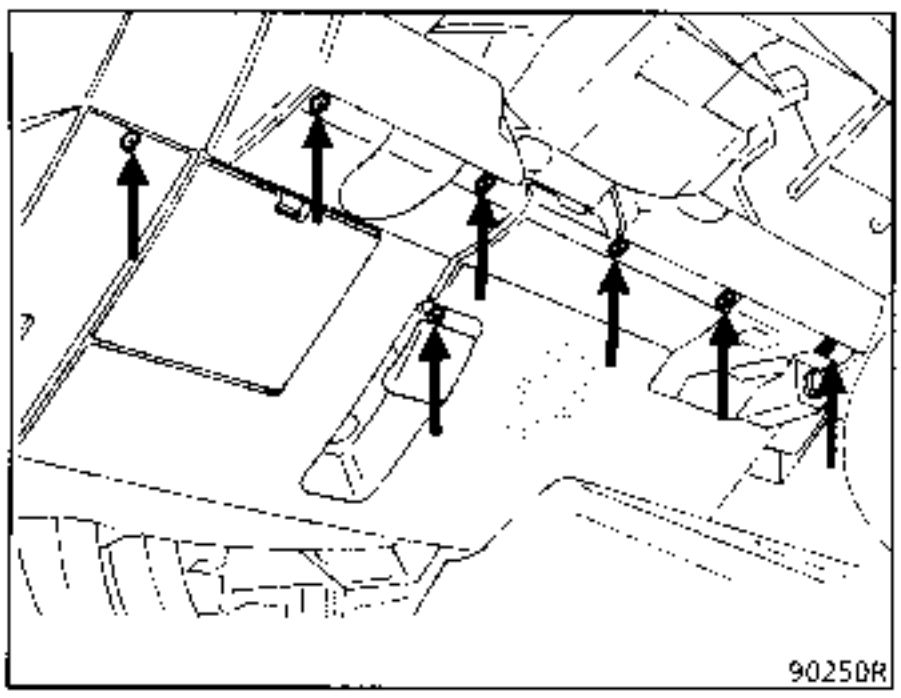
In the vehicle remove the mounting bolts from the dashboard lower cover.

Disconnect the cigar lighter.

Unfasten the fuse holder connectors.

Open the glove compartment.

Remove the lower cover.



Press the pedal to tension the cable.

Hold the cable in its sector housing (S).

Release the pedal, take the cable stop out of its housing.

Release the cable from the pedal assembly.

Remove the sheathing stop from the bulkhead.

Take out the complete cable via the engine compartment.

REFITTING

Via the engine compartment, pass the cable into the passenger compartment.

In the vehicle:

Place the cable on sector (S) and fit the cable stop in its housing.

Fit the cable in place at the clutch fork.

Ensure that the sheathing stop is aligned on the bulkhead.

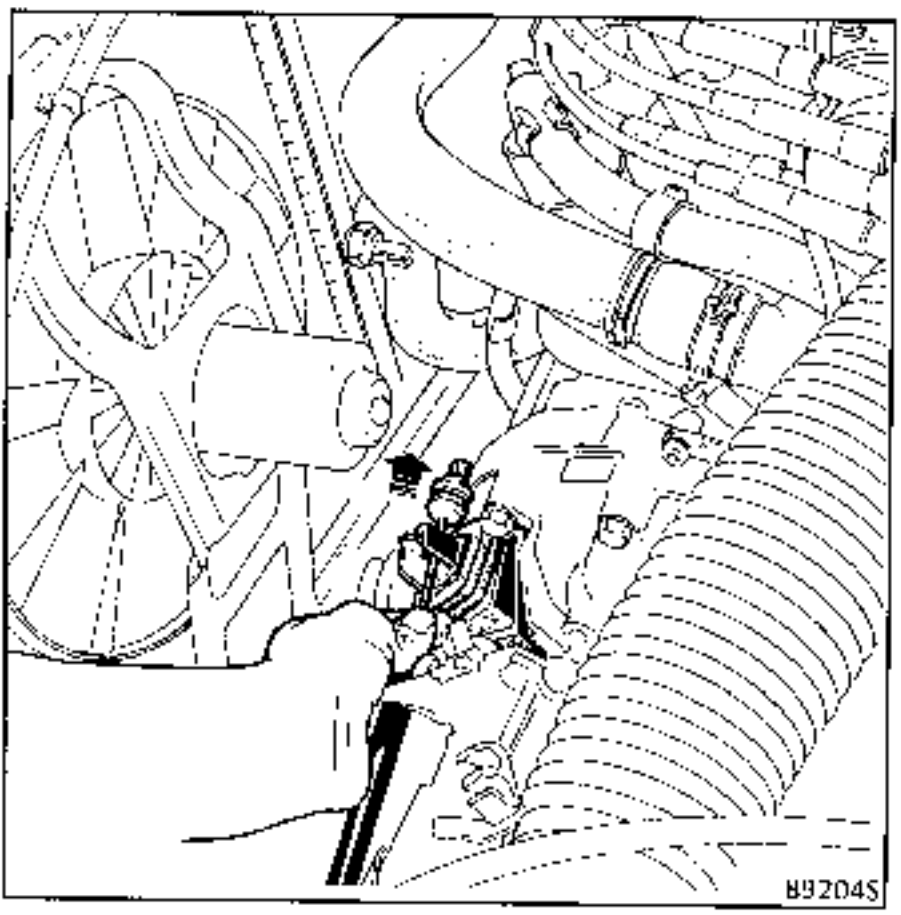
Press on the clutch pedal to clip the sheathing stop on the bulkhead. It will adjust automatically.

In order to ensure that the assembly is operating correctly:

1. Check that notched cam (C) pivots about its shaft.

2. Pull on the cable at the clutch fork on the gearbox.

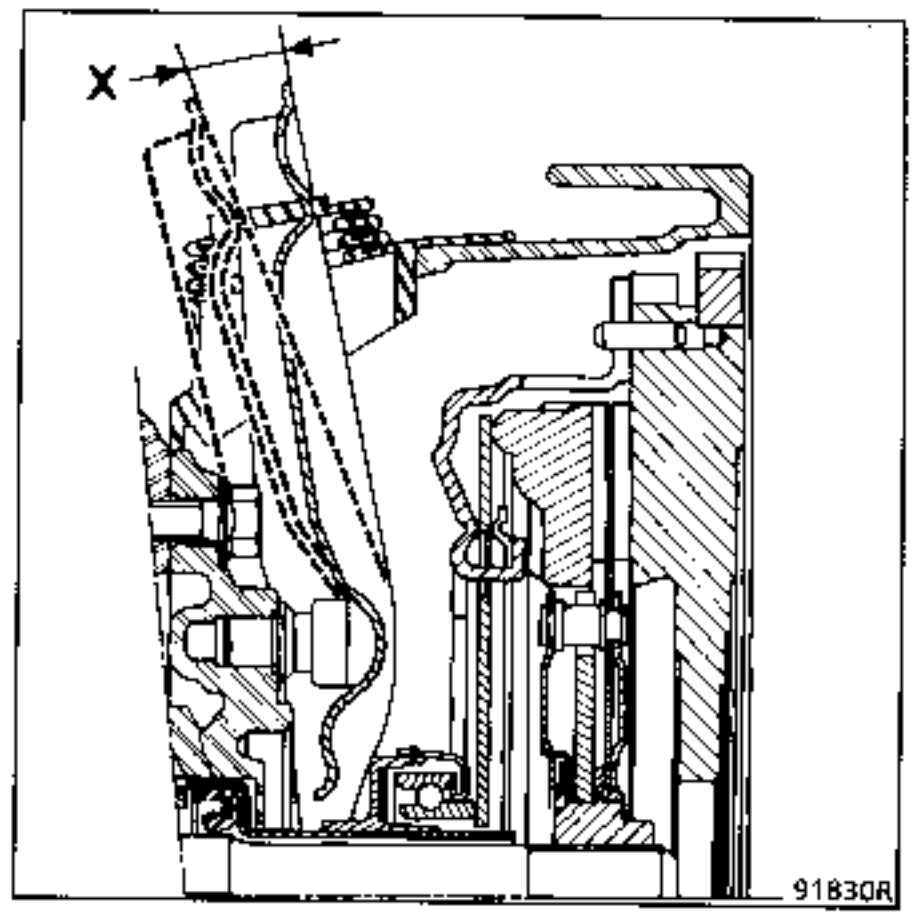
The cable should have at least **2 cm "slack"**.



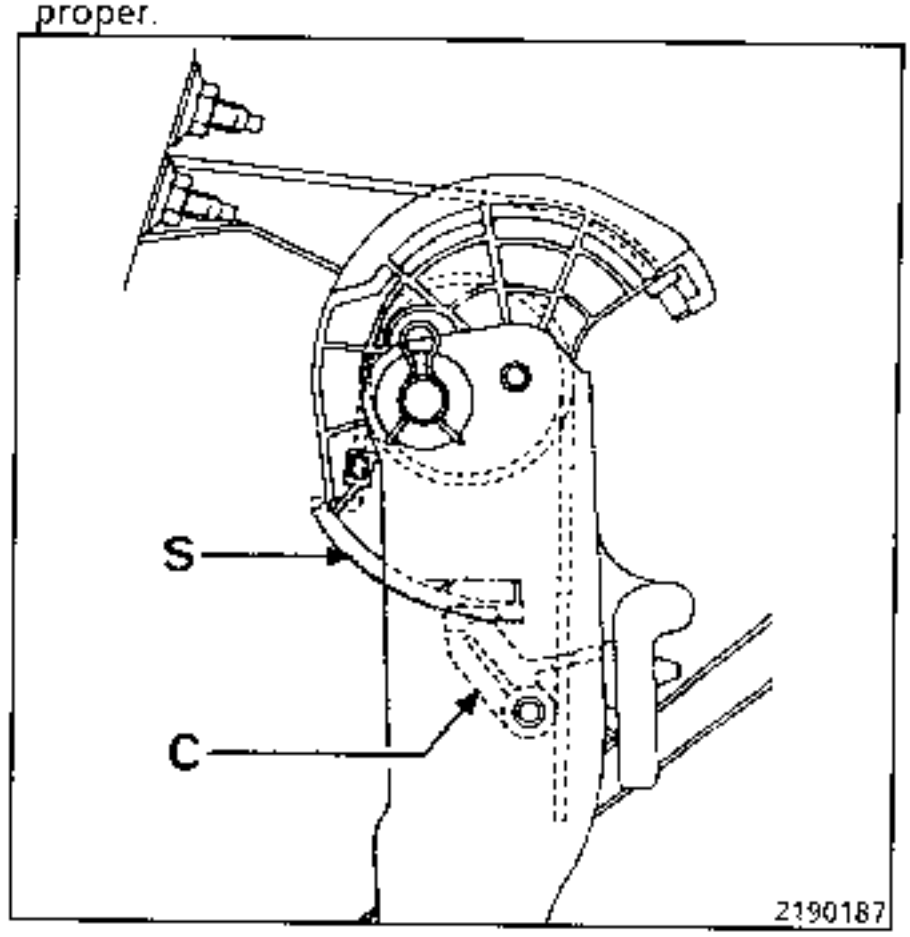
These checks enable you to check that notched cam (C) and toothed sector (S) are free in the **"clutch engaged"** position.

In-line engine: Special points

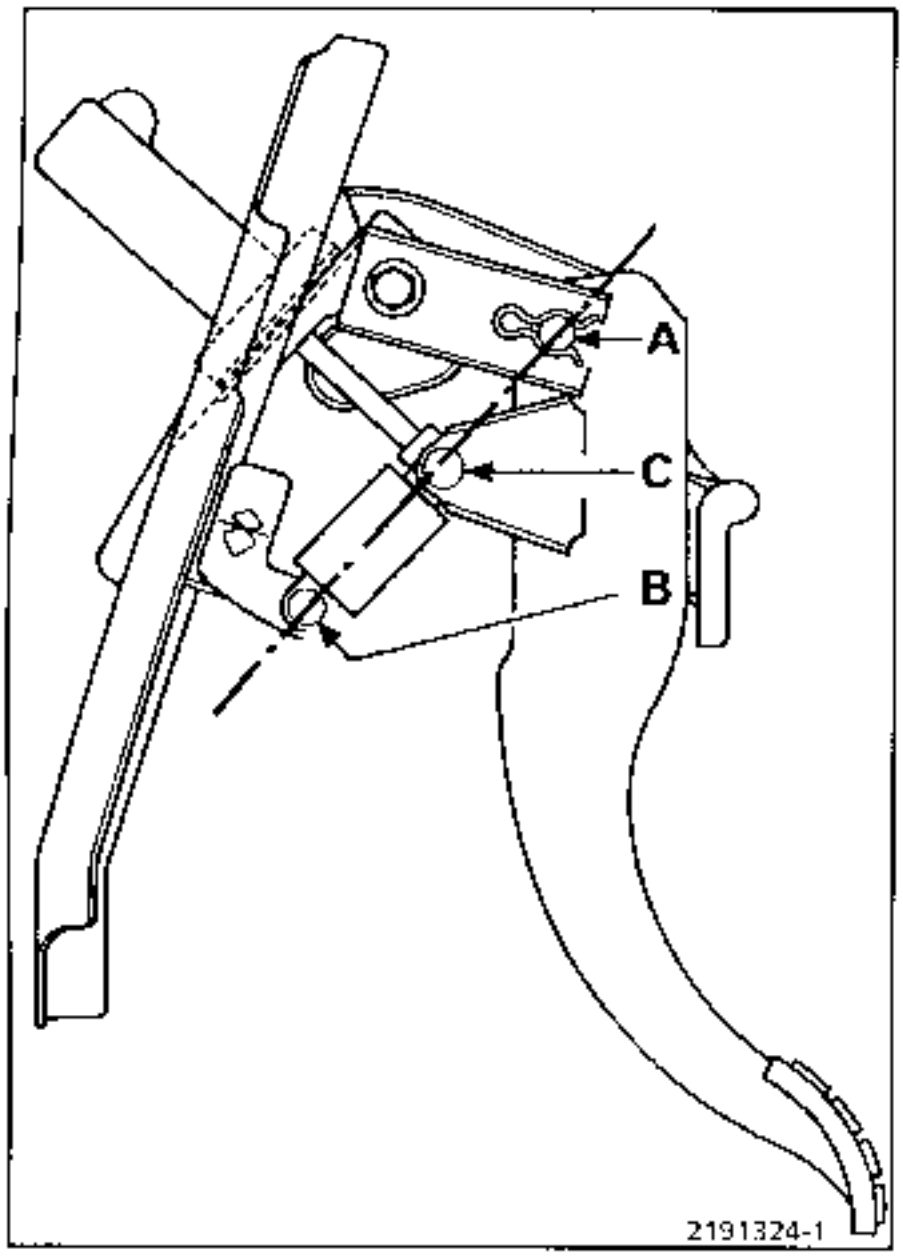
3. Check the clutch fork movement travel. It should be **X = 17 to 18 mm**.



These are preliminary checks to be performed before any operation is performed on the clutch proper.



This device consists of a spring - activating capsule assembly located between the clutch pedal and the pedal assembly mounting.

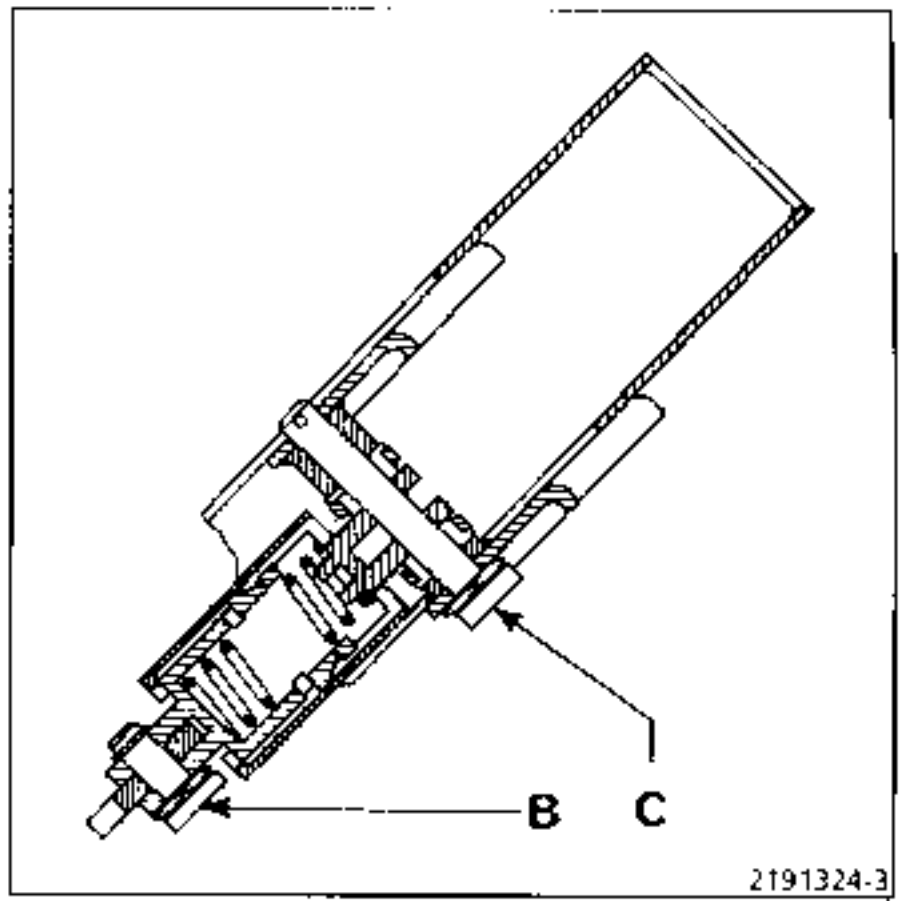


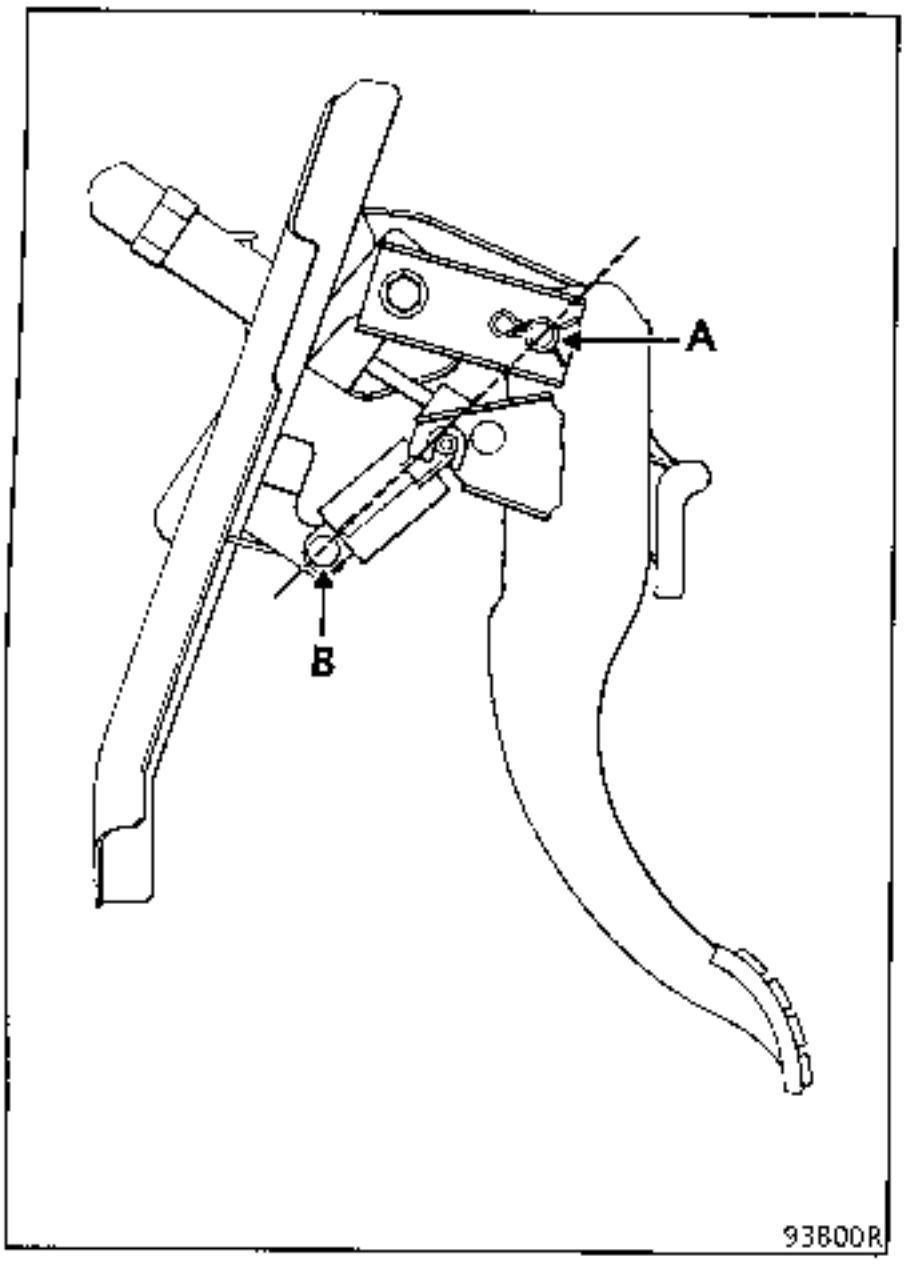
OPERATION

In the rest position, the assistance keeps the pedal in the upper stopping position.

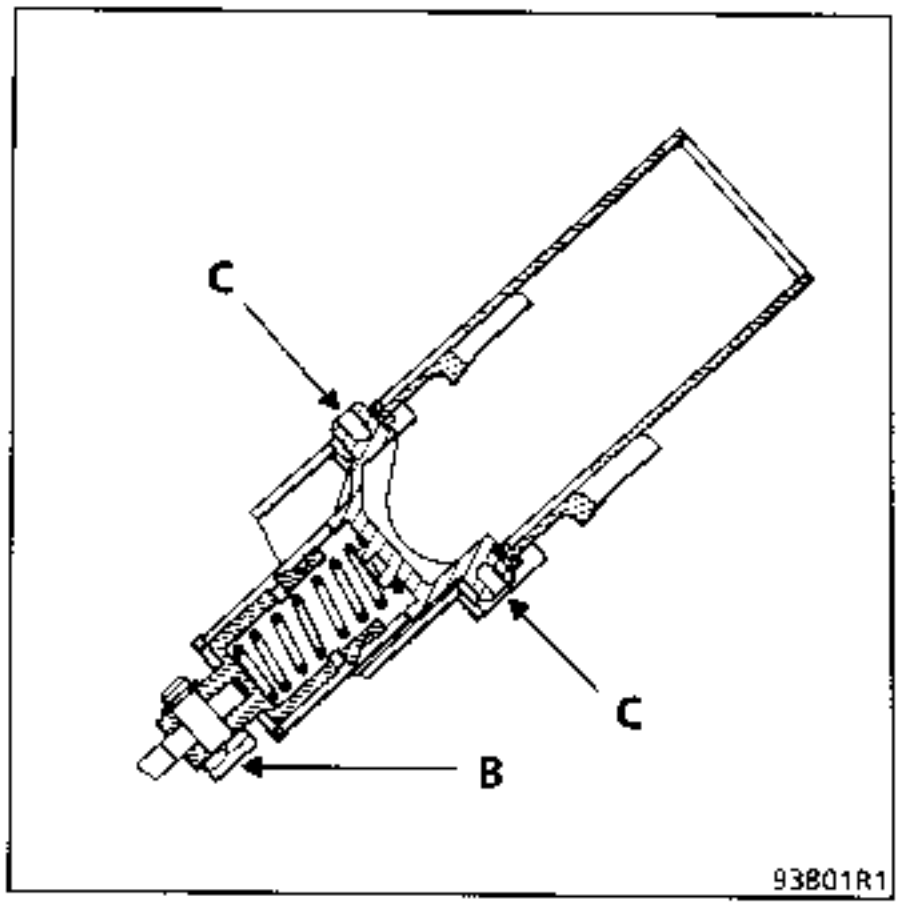
After crossing the inversion threshold (straight line AB), the spring slackens, thus decreasing the effort the driver needs to exert on the pedal (by approx. 18 %).

SECTION THROUGH THE SPRING - ACTIVATING CAPSULE ASSEMBLY





CROSS SECTION OF SPRING - ACTIVATING CAPSULE ASSEMBLY

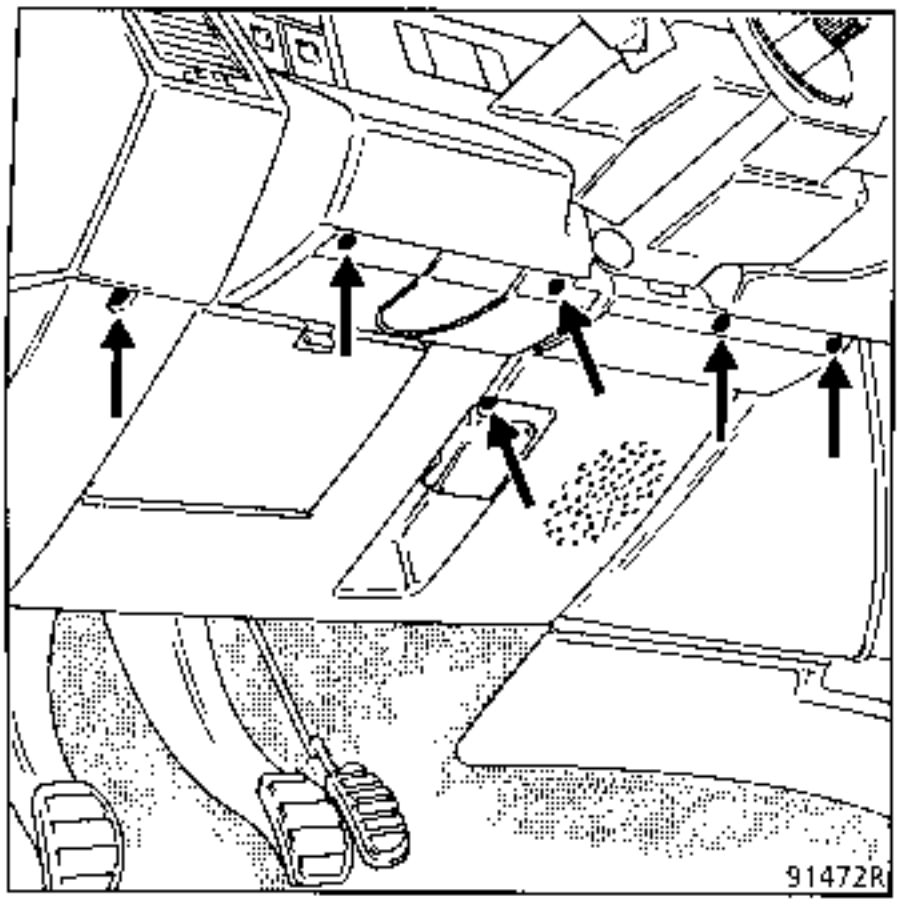


REMOVING

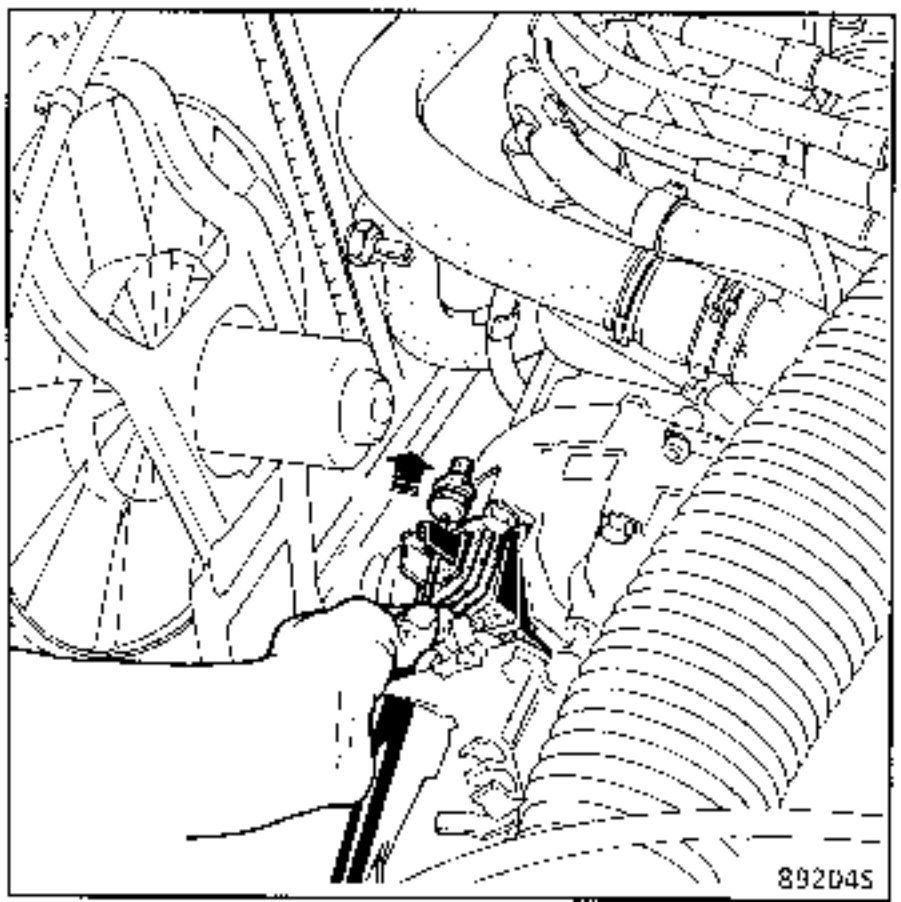
Disconnect the battery.

Remove:

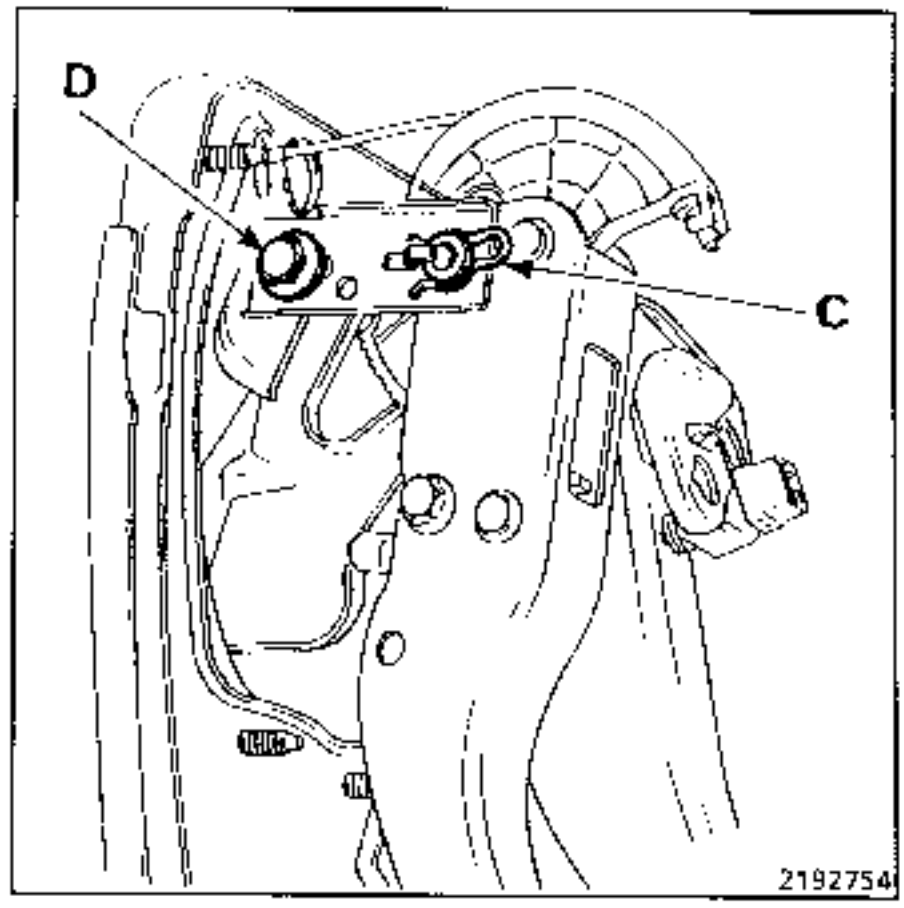
- the cover under the steering wheel (remember to remove the bolt located under the steering wheel column adjusting lever).



- Unfasten the fuse holder connectors.
- Remove the ventilation duct.
- Free the cable at the clutch fork end.



Using a hook remove clip (C).



Slacken bolt (D) and release the stiffener.

Free the cable from segment.

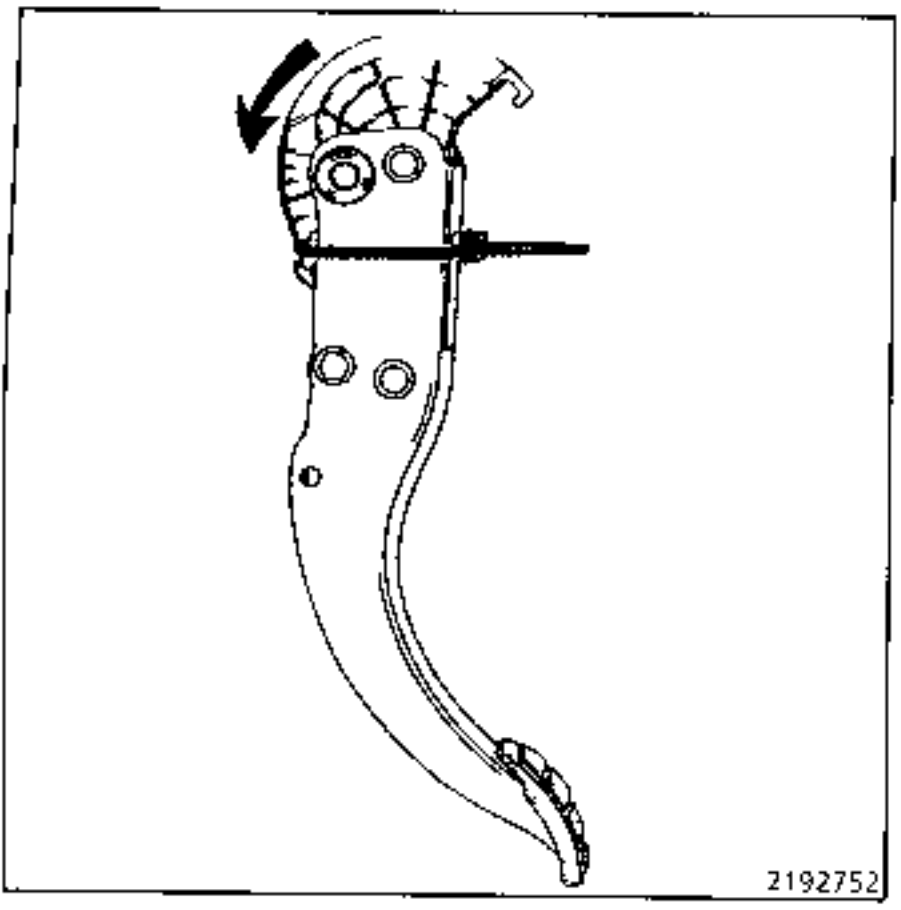
Take the pedal off the shaft.

Recover the elastic washer and plastic bearings.

REFITTING - Special points

Check that the notched cam pivots freely about its shaft.

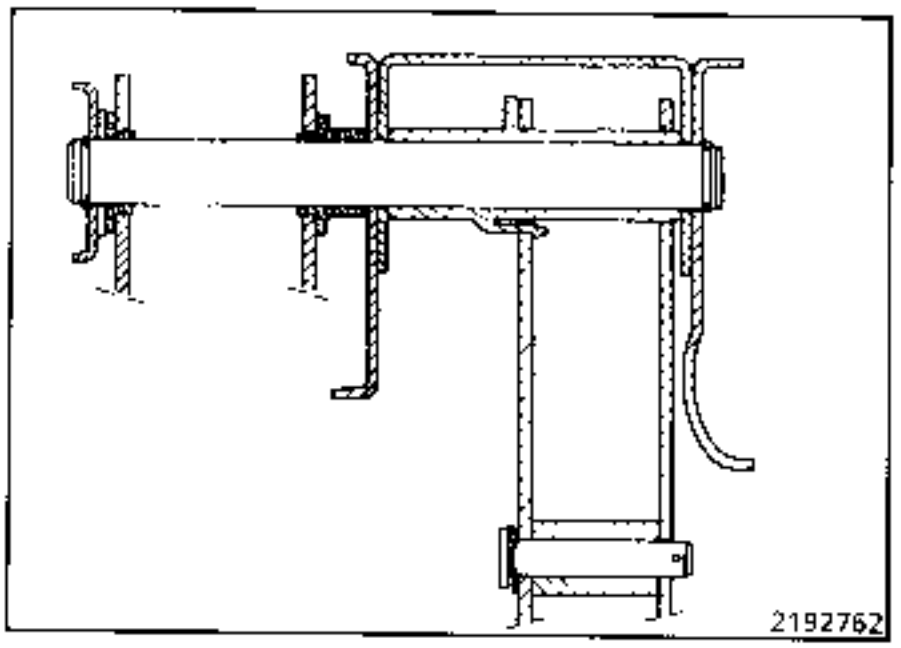
Compress the spring (arrow) on the wear take-up sector so that the aperture through which the pin passes in the sector coincides with those in the pedal.



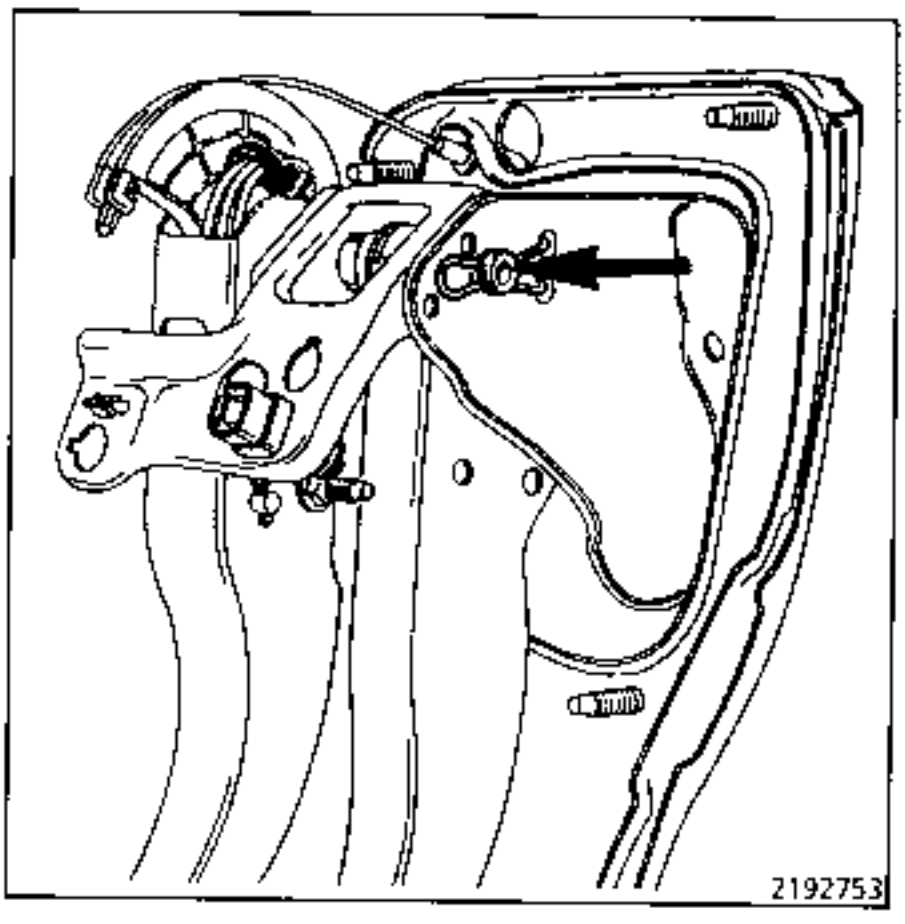
Using the clip immobilise the sector in this position.

Fit in place the plastic bearings, with the largest at the brake pedal end.

Coat the shaft, bearings, teeth of sector (S) and cam (C) with grease.



Fit the pedal in place, holding the shaft at the right-hand end.



NOTE : Never hit the shaft with a hammer to refit it.

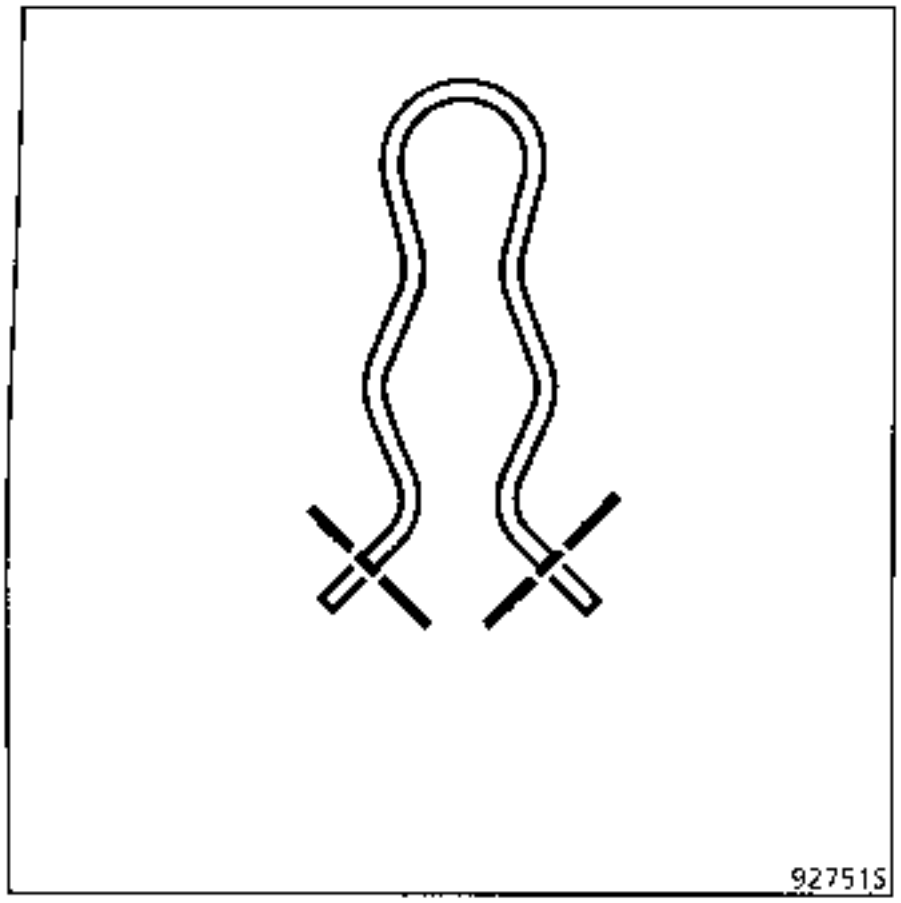
Fit:

- the plastic washer,
- the stiffener and tighten its mounting bolt (D),
- the cable stop on the sector.

REFITTING (continued)

Fit the clip in the groove on the shaft.

To make it easier to fit the clip, shorten the ends by 5 mm.



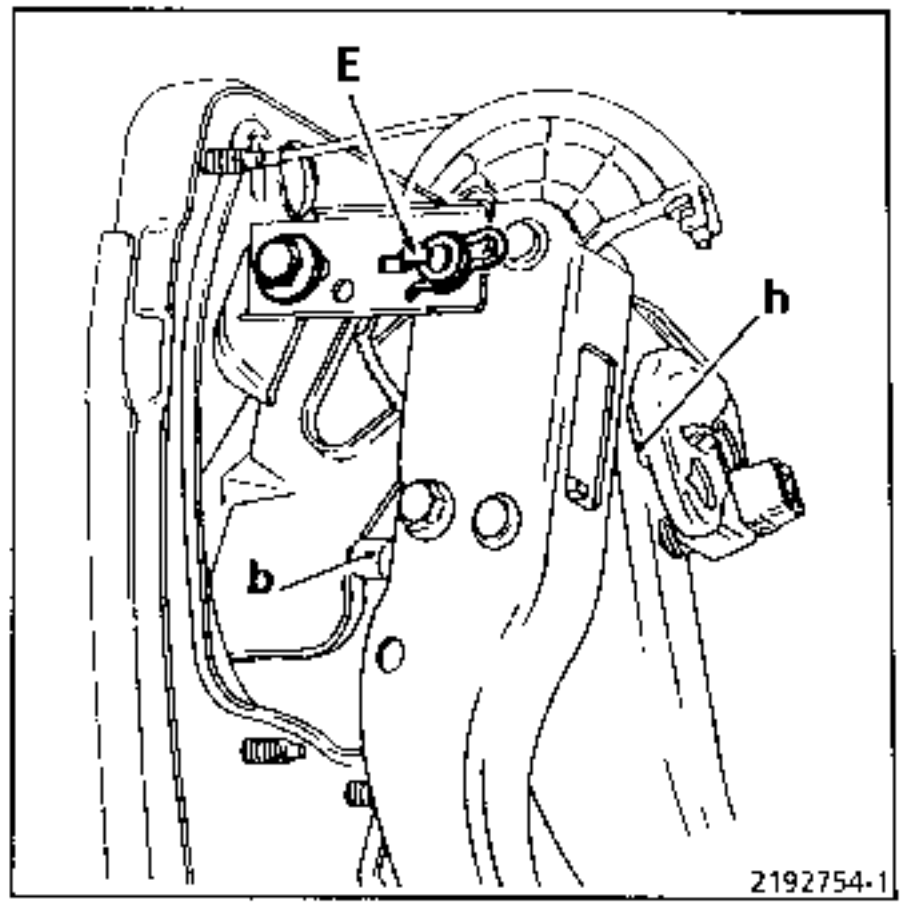
Remove the locking clip from the wear take-up sector.

Ensure:

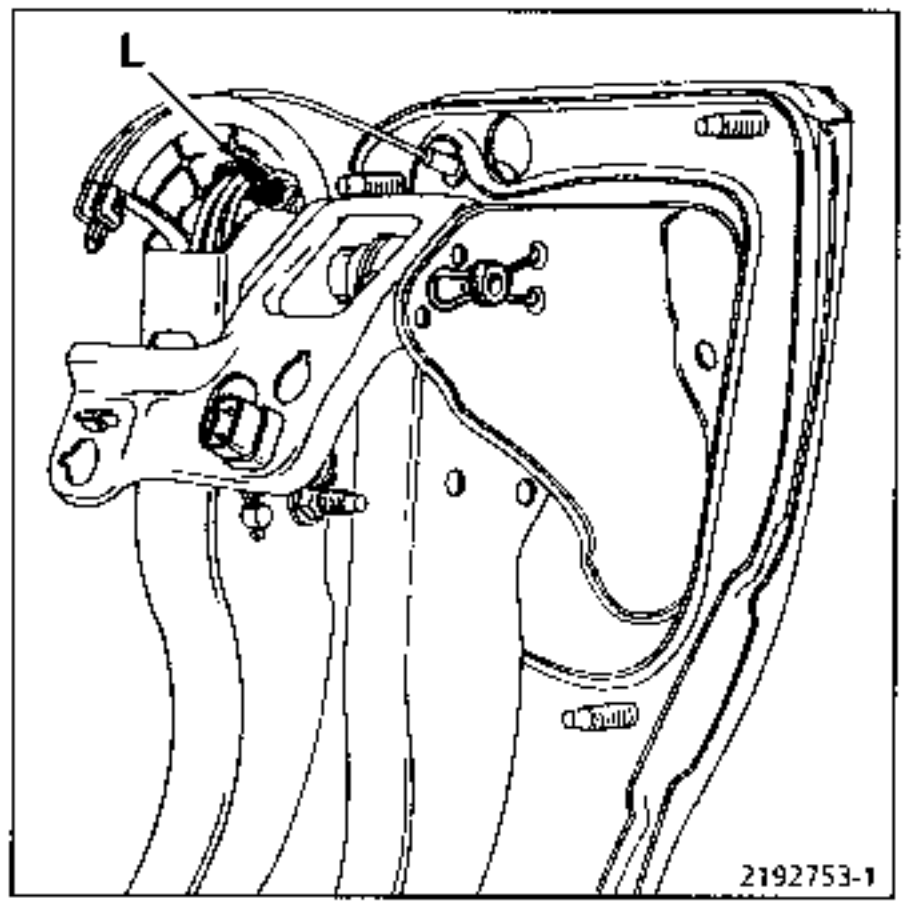
- that the clips are correctly positioned in the shaft grooves;
- the bottom stop (b) and top stop (h) are fitted on the plate,
- that clip (L) retaining the return spring coils is fitted.

Fit the cable in place on the sector.

Check that the sheathing stop is correctly clipped on the plate.



NOTE : From now onwards the stiffener has a locking spur (E) preventing all risk of the shaft moving.



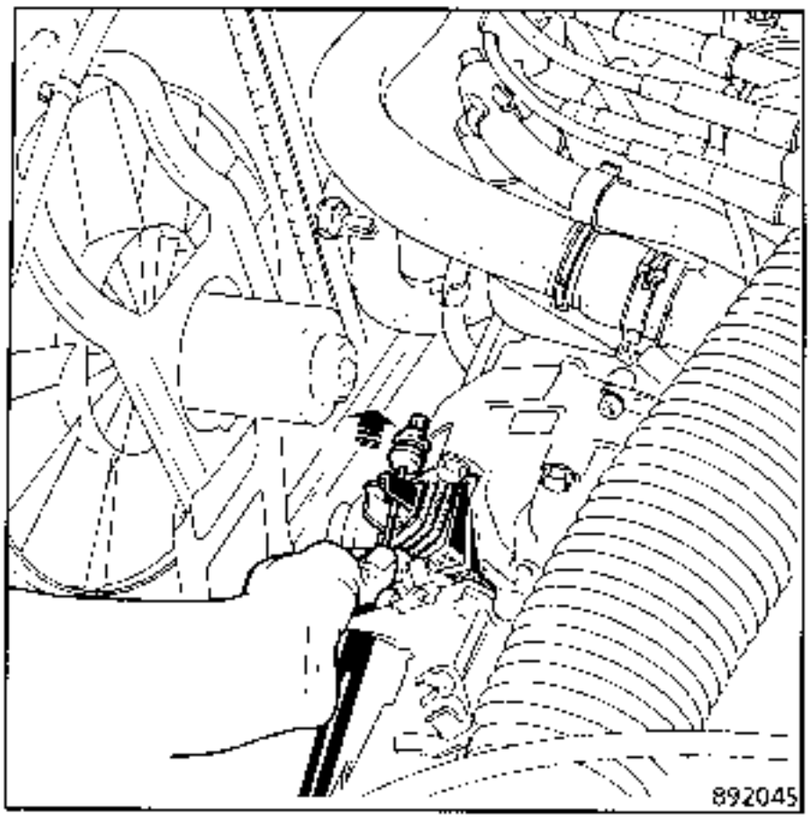
Fit the cable in place at the fork end.

Check that the assembly operates correctly.

With the pedal in the rest position and clutch in the engaged position.

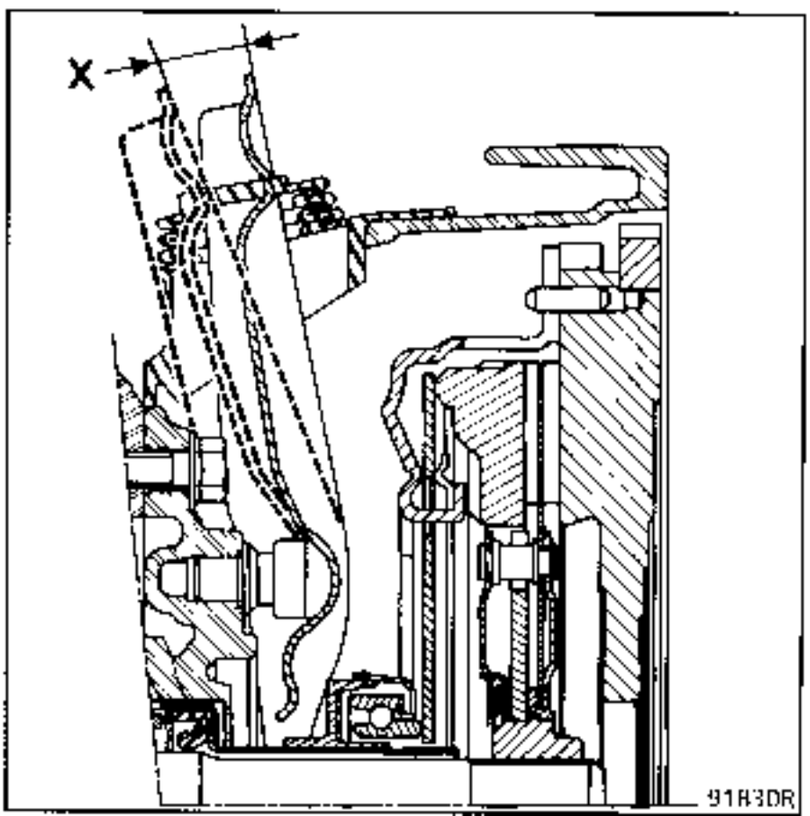
Pull on the cable at the level of the clutch fork on the gearbox.

The cable should have at least **2 cm "slack"**.

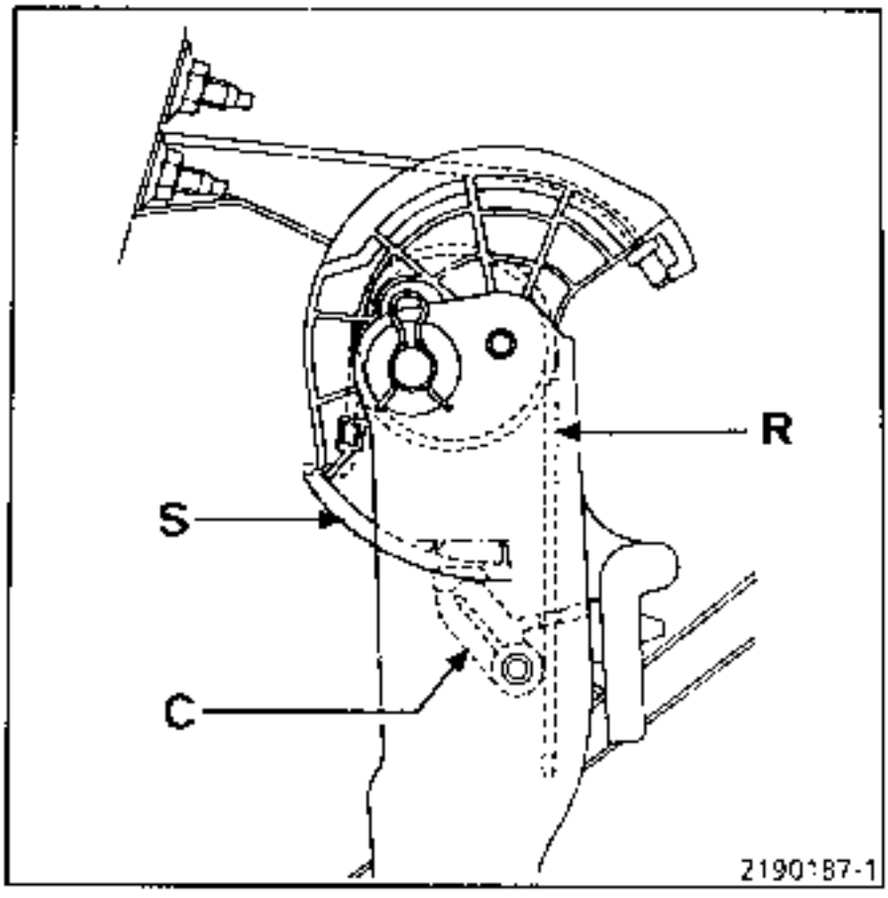


Check the fork movement travel. It should be:

X = **17 to 18 mm** minimum



CROSS SECTION



OPERATION

WEAR TAKE-UP

Spring (R) permanently pulls on wear take-up segment (S).

The cable is always taut, which entrains the fork and thus causes the stop to **bear constantly on** the diaphragm.

Adjustment is automatic.

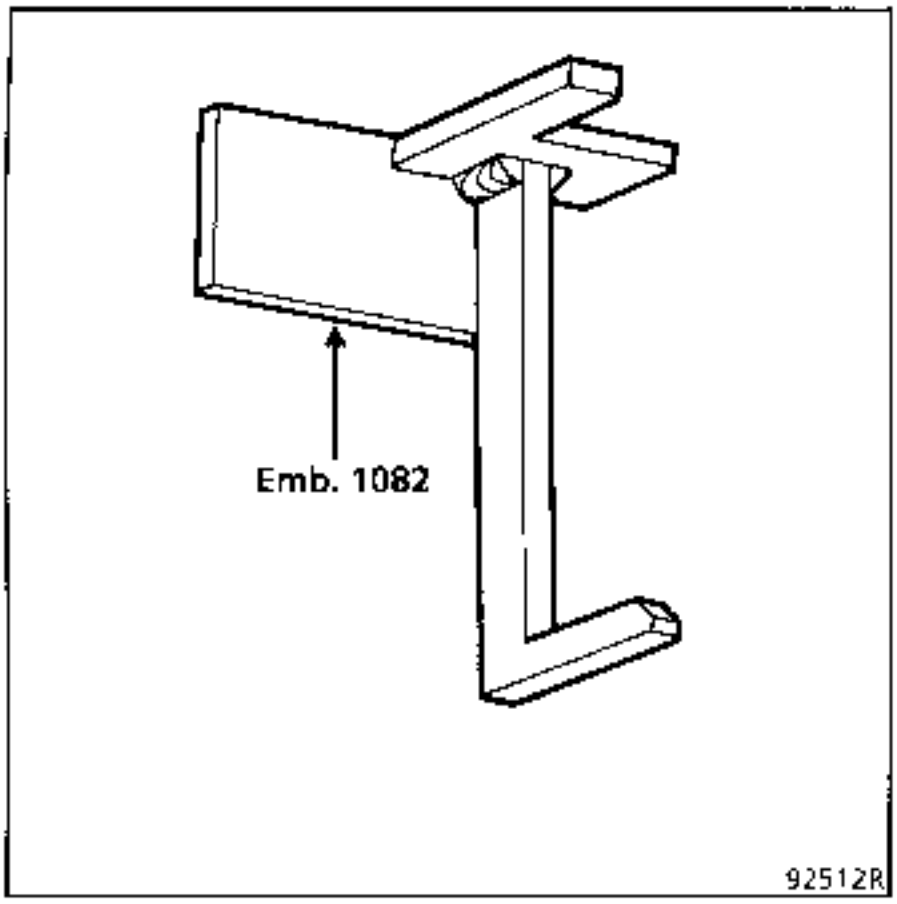
CLUTCH "DISENGAGEMENT" FUNCTION

By depressing the pedal, the teeth on the wear take-up segment (S) of the pedal mesh on the toothed cam (C) to prevent its pivoting and enable the cable to be pulled.

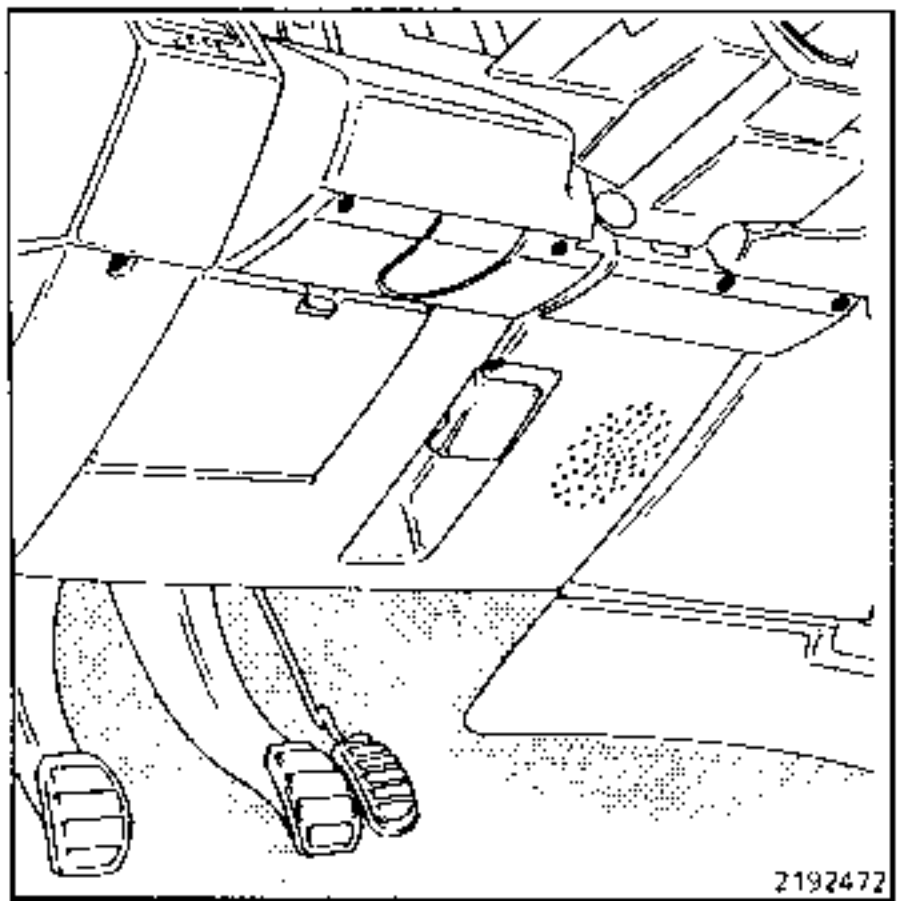
REMOVING - REFITTING

ESSENTIAL SPECIAL TOOLS	
Emb. 1082	Tool for removing - refitting spring - activating capsule assembly

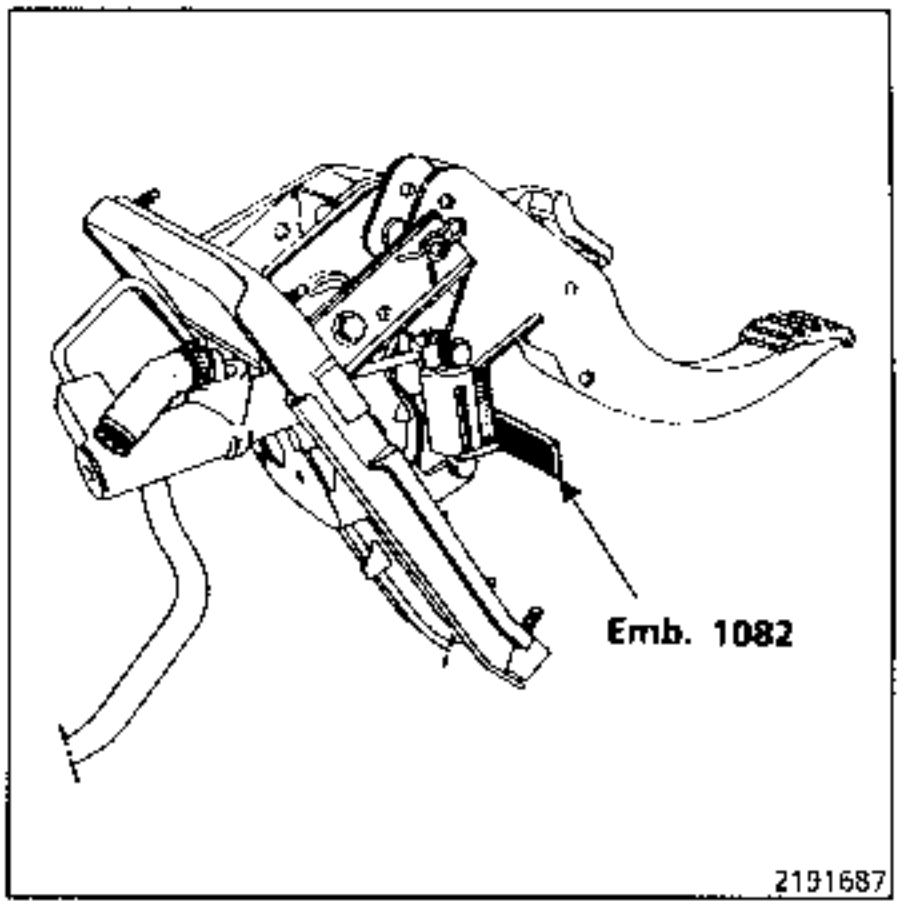
In order to remove and refit the spring - activating capsule assembly, it must be locked in the compressed position using tool Emb. 1082.



Remove:
- the lower cover from the dashboard (unclip the fuse-holder connectors),
- the ventilation duct.



Fit tool Emb. 1082 in place on the spring - activating capsule assembly.



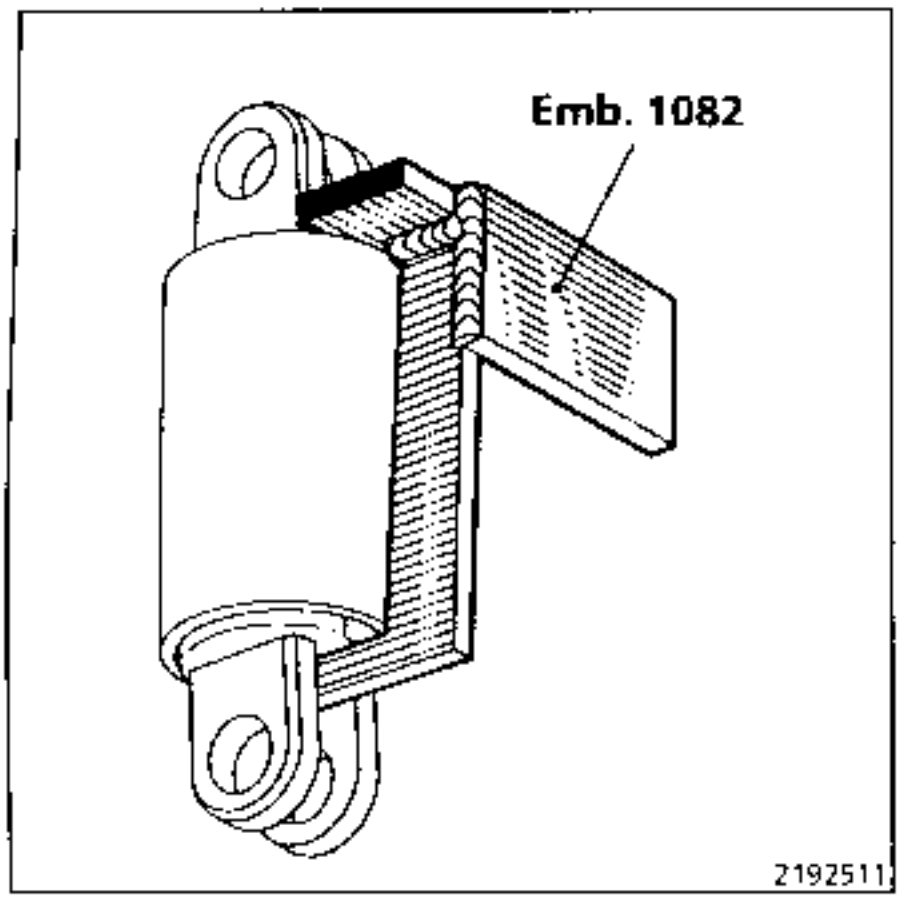
Remove the circlip and rollpin from shafts (B) and (C).

Press down on the pedal to extract shafts (B) and (C).

Take out the spring - activating capsule assembly and the tool.

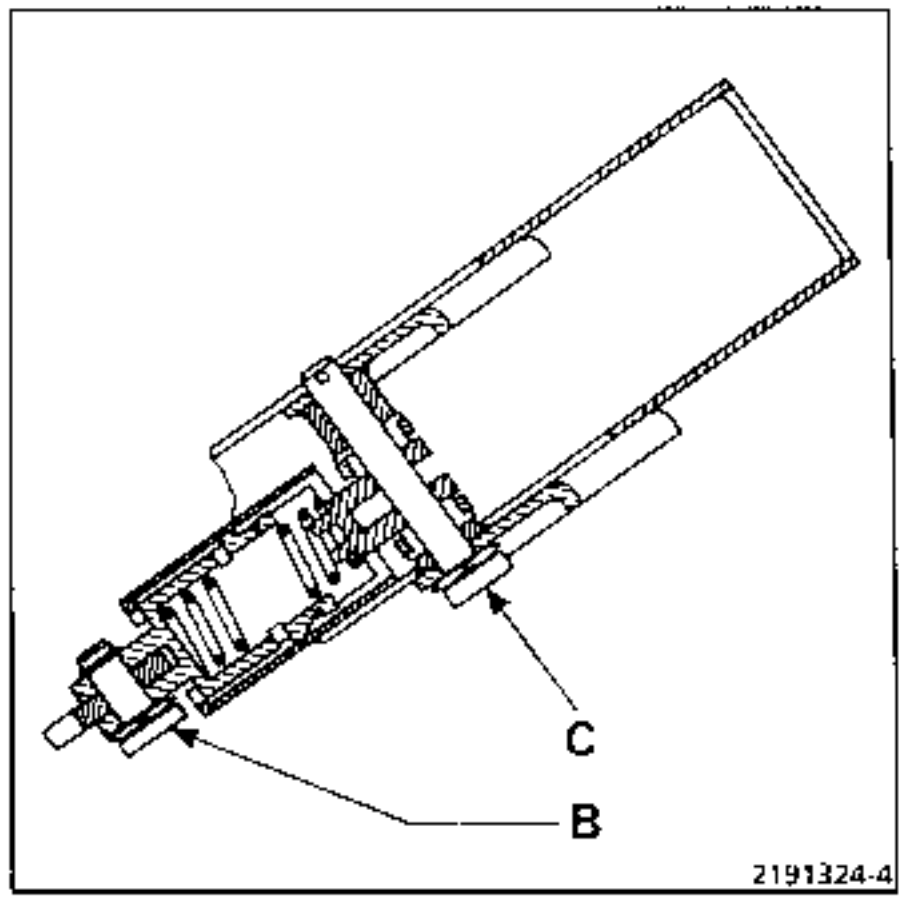
REFITTING - Special points :

If a new part is being fitted, compress the spring - activating capsule assembly in a vice and fit tool **Emb. 1082**.



Fit the parts the correct way round: the section of the capsule with the larger diameter must be at the pushrod end).

Coat the shafts with grease.



Fit the pushrod calliper (equipped with its plastic bearings) between the spring - activating capsule assembly and the pedal.

Fit shaft (C).

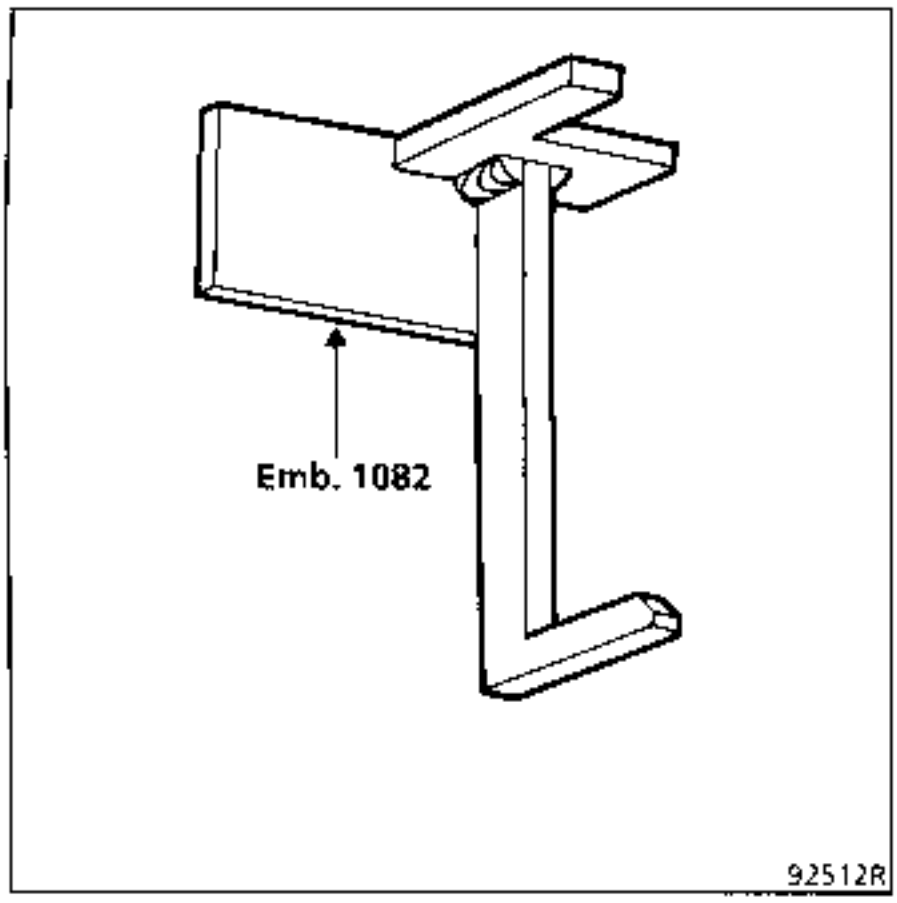
Depress the pedal slightly so that the capsule and shaft (B) can be fitted.

Remove tool **Emb. 1082** and refit the circlip and rollpin.

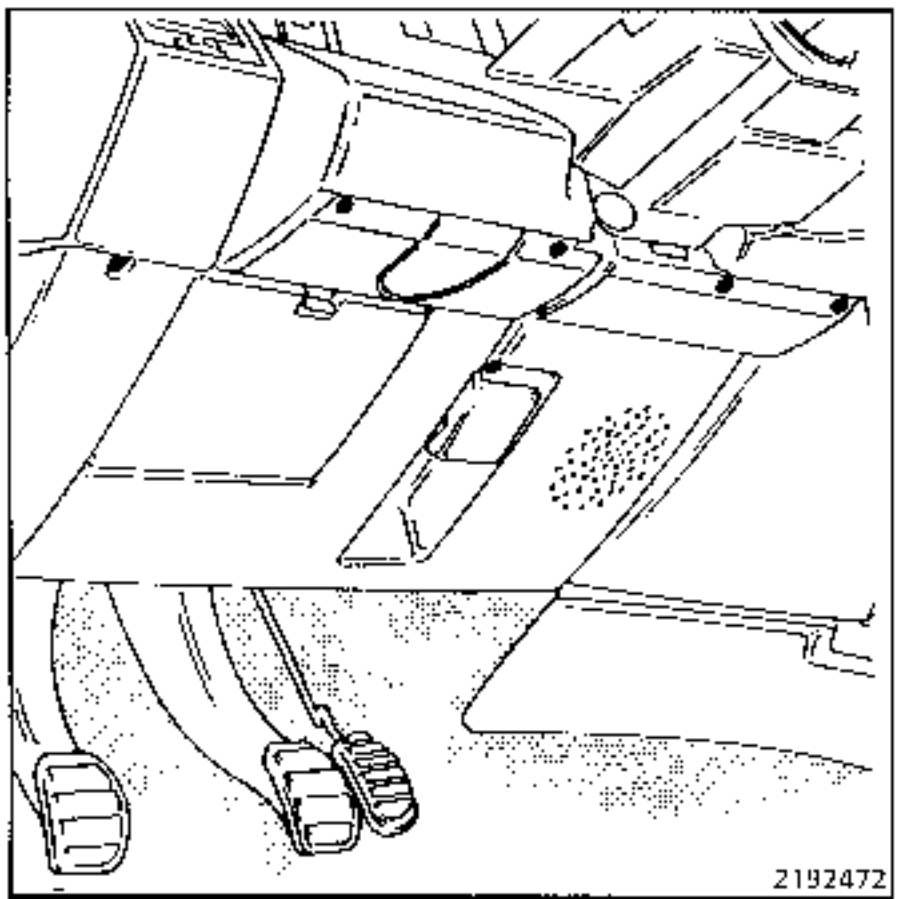
REMOVING - REFITTING

ESSENTIAL SPECIAL TOOLING	
Emb. 1082	Clutch control spring - activating capsule assembly fitting and removal tool

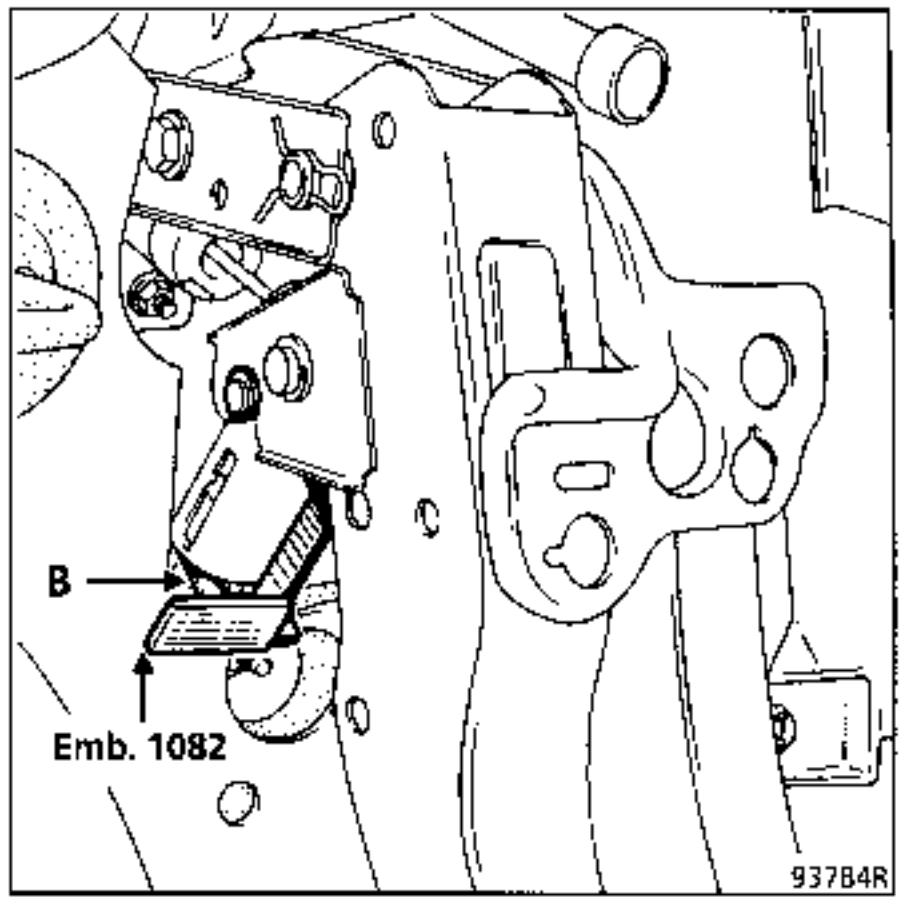
In order to remove and refit the spring activating capsule assembly it must be locked in the compressed position using tool **Emb. 1082**.



Remove:
- the lower cover from the dashboard (unfasten the fuse holder connectors);
- the ventilation duct.



Fit tool **Emb. 1082** in place of the spring activating capsule assembly.



Remove the circlips and shaft (B).

Press on the pedal to remove the shaft.

Take out the spring activating capsule assembly and tool.

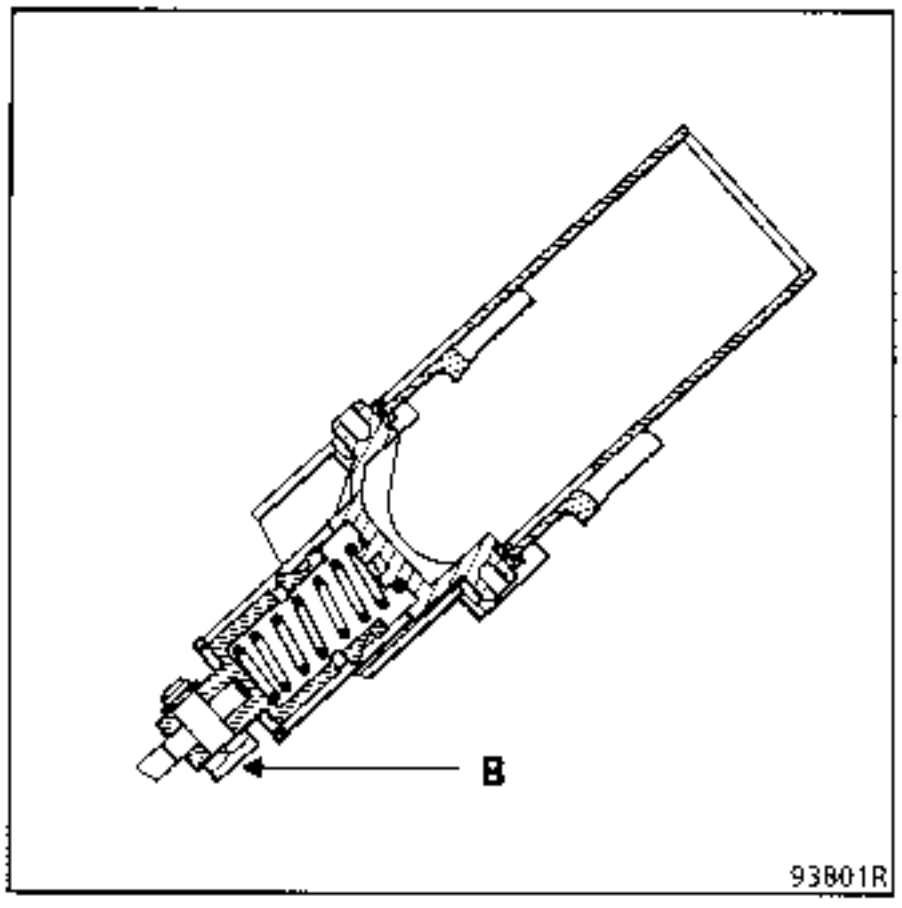
REFITTING - Special points:

If a new part is to be fitted, compress spring - activated capsule assembly in a vice and fit in place tool **Emb. 1082**.

At the pedal end, check the condition and the position of the plastic bearings.

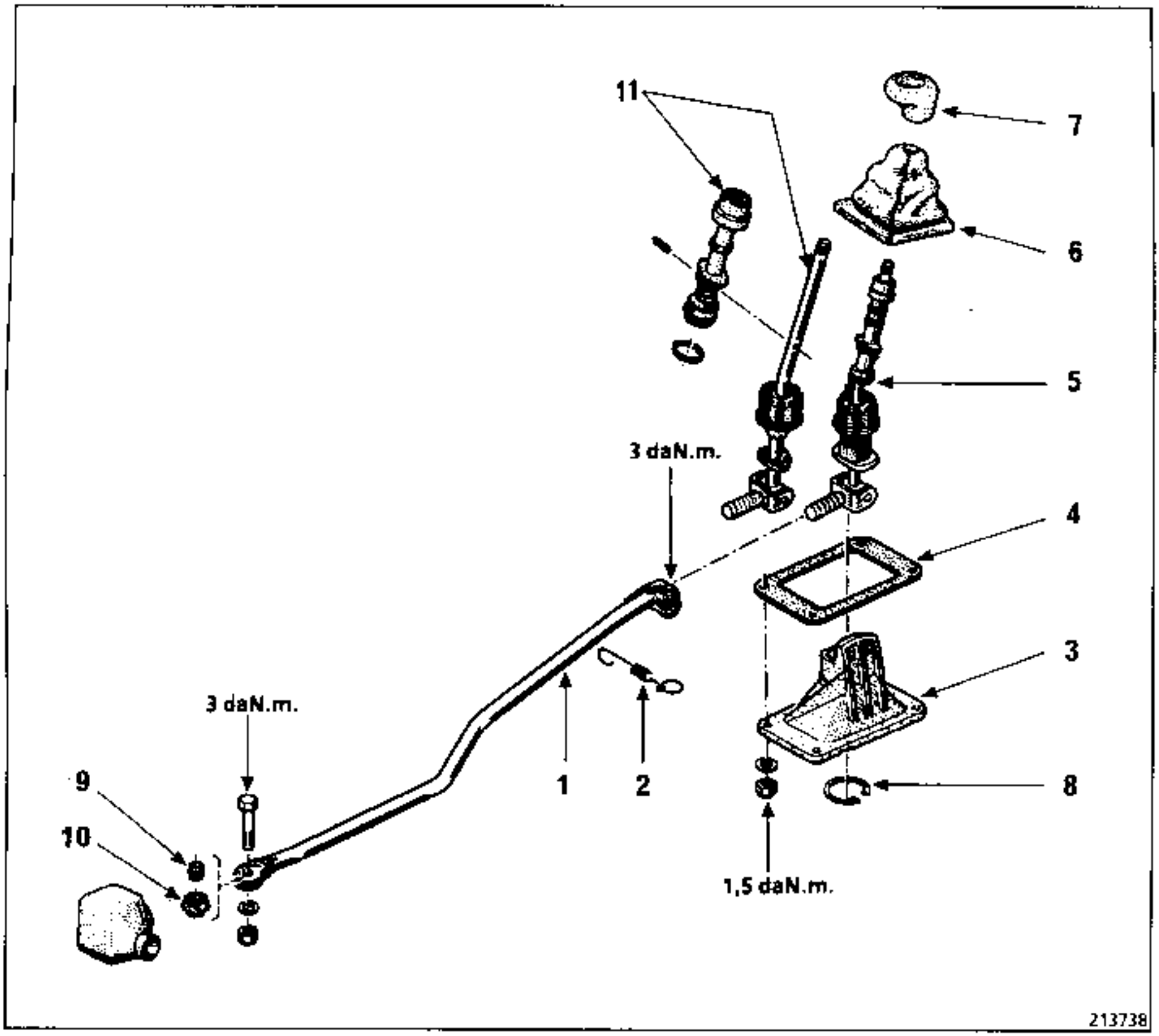
Coat the shafts with grease.

Fit the unit shafts in their bearing on the pedal then press it in slightly to fit shaft (**B**) in place.



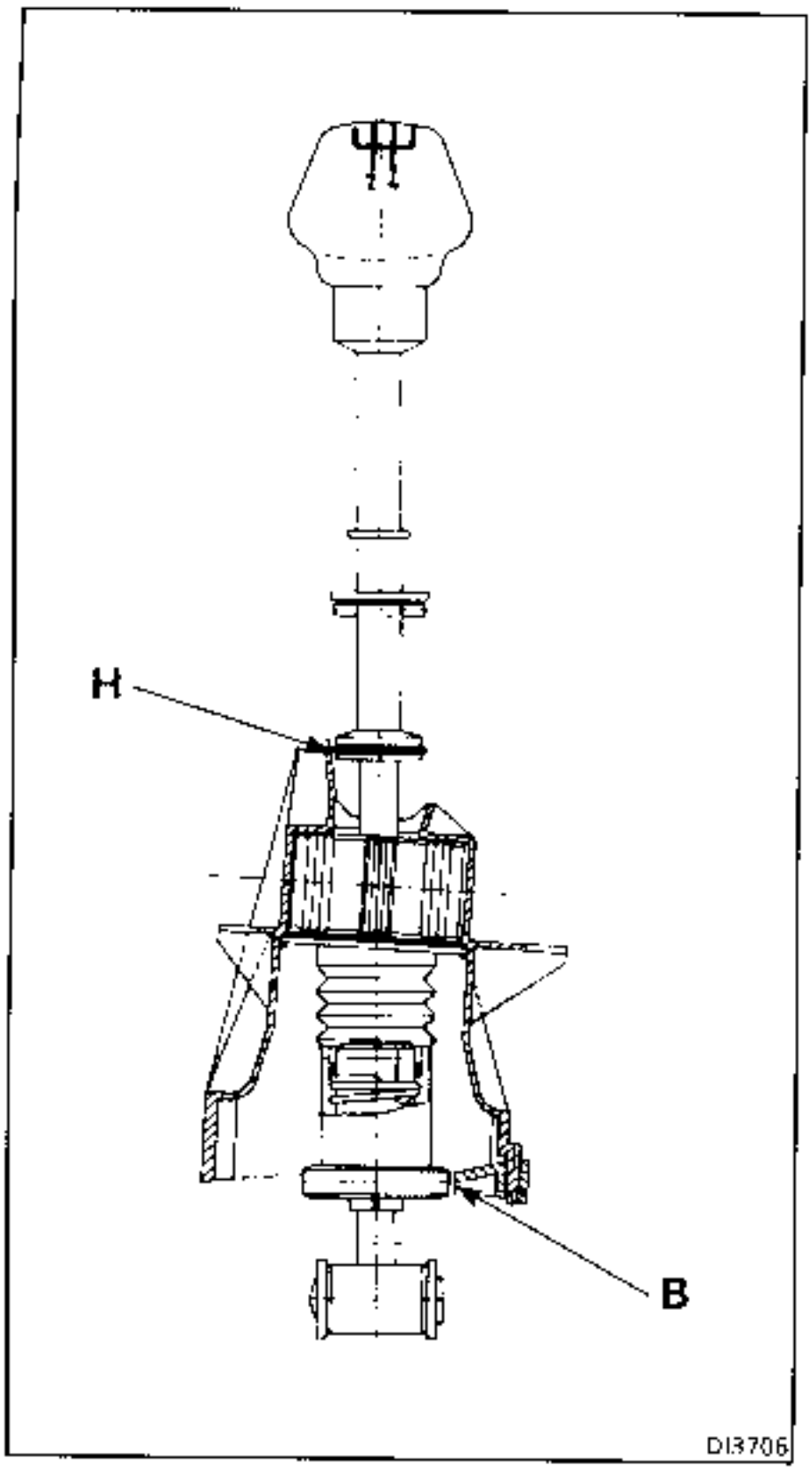
Remove tool **Emb. 1082** and refit the circlips on the shaft.

EXPLODED VIEW AND TIGHTENING TORQUE



1 Connection rod
2 Return spring on third speed/fourth speed line
3 Housing
4 Base
5 Assembled lever and rings (double lock control)
6 Gaiter
7 Knob
8 Stop ring
9 Bush
10 Sleeve
11 Lever and ring (single lock control)

Since May 1988, X48 vehicles have been equipped with a double lock external gear control which prevents reverse gear being selected at the wrong time instead of first gear without unlocking the ring.

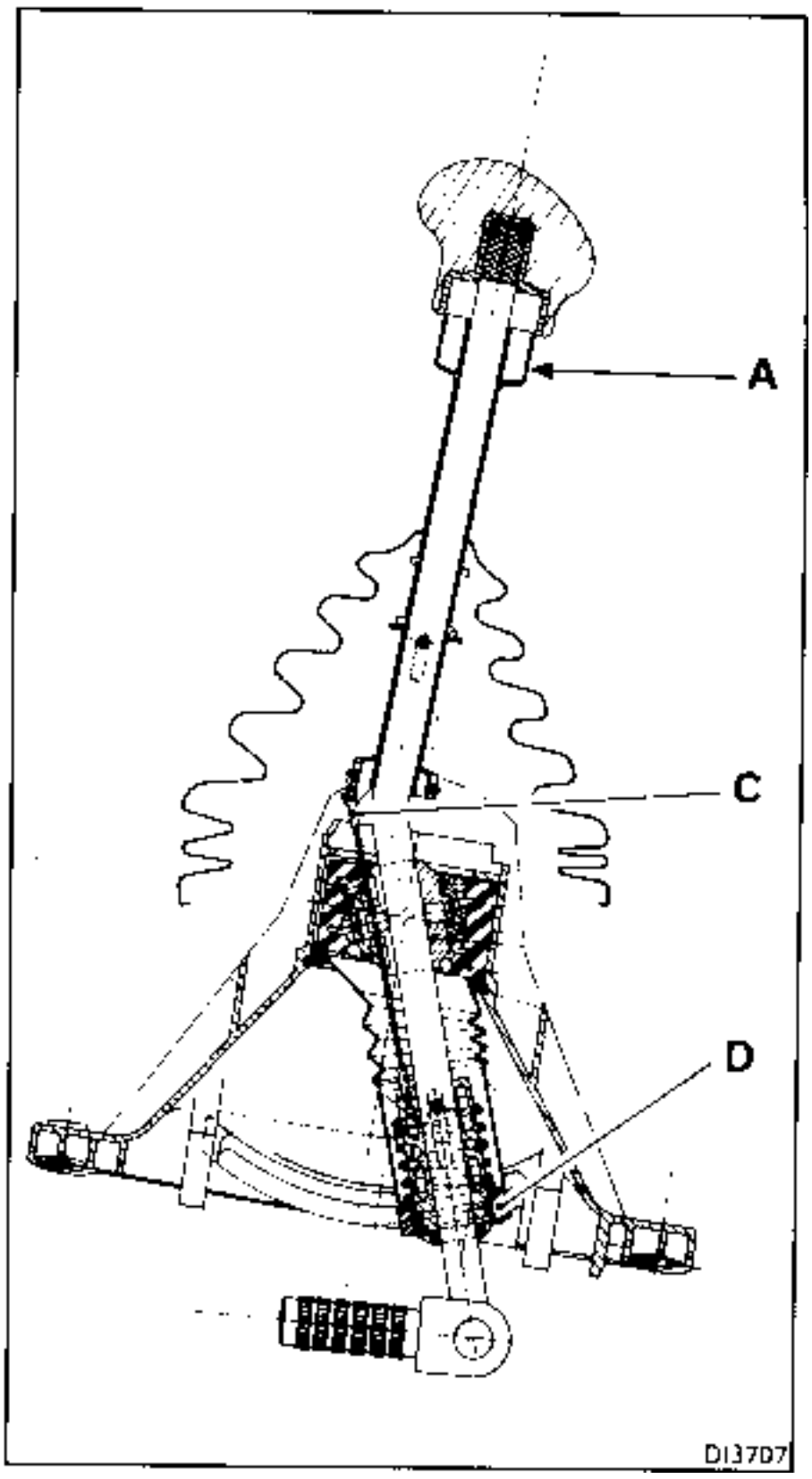


OPERATION

Upper ring (A) acts by means of a cable (C) and a second ring (D) located on the lower part of the lever.

Reverse gear is therefore prevented from being selected via the lower stop (B) and upper stop (H) acting synchronously.

NOTE: This control must be adjusted with first gear engaged.



TIGHTENING TORQUES (in daN.m)	
Nut securing unit to body	1.5
Bolt on clip securing connecting rod to clevis	3

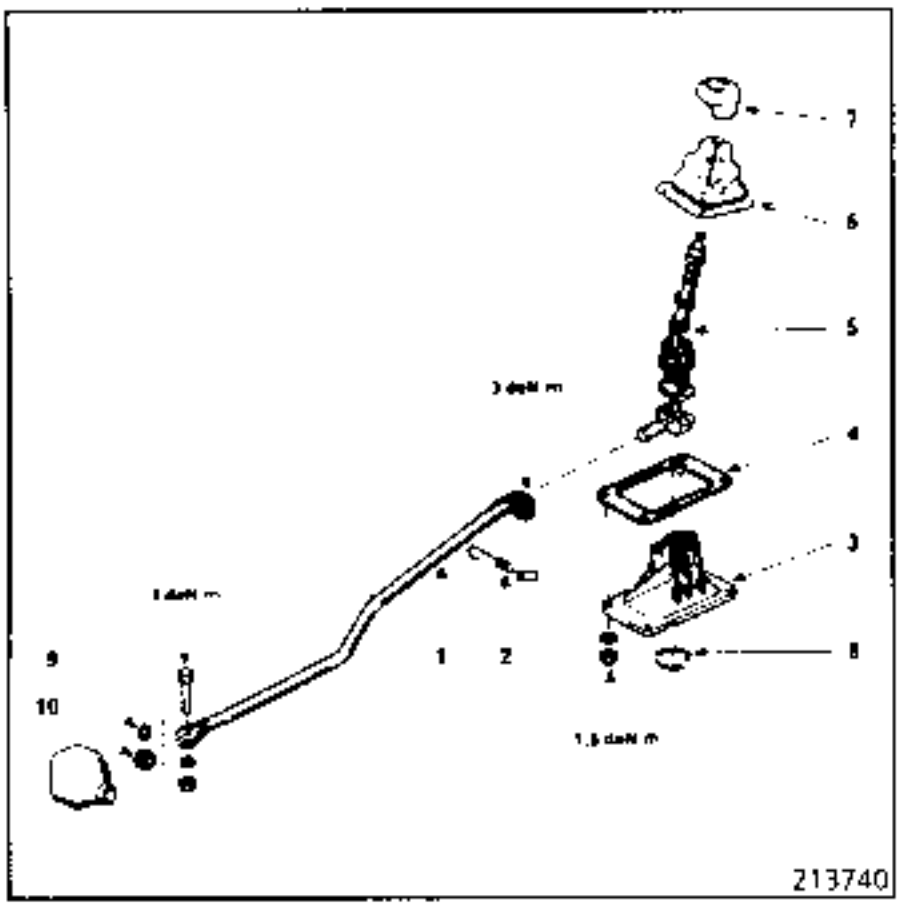
CONSUMABLES
33 Medium grease : Control lever articulation

REMOVING

In the vehicle, release gaiter (6) from the console.

Under the vehicle, disconnect:
- the flexible mountings from the exhaust pipe,
- return spring (2),
- connection rod (1) from the lever clevis.

Remove the nuts securing the casing and take out the assembled casing - lever assembly, moving aside the exhaust pipe.



Fit the gear lever clevis in a vice fitted with soft jaws and remove:
- knob (7),
- gaiter (6),
- stop ring (8).

Take out the assembled ring and lever assembly from the casing.

NOTE: The **Parts Department** supplies in exchange the assembled ring and lever assembly.

REFITTING - Special points :

Coat the lever articulations with **33 Medium** grease.

Bond knob (7) on to lever.

Adjust the control.

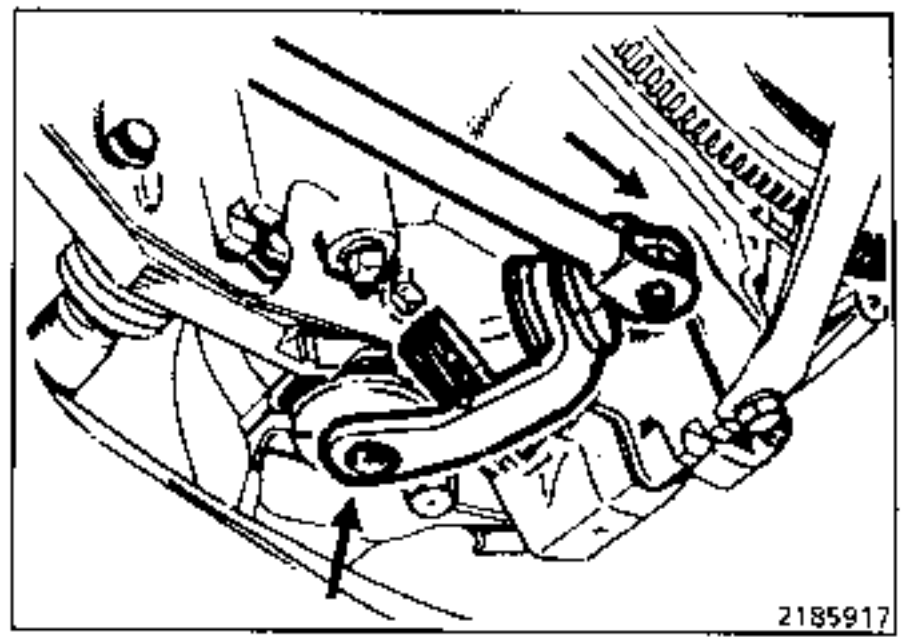
Torque tighten the nuts and bolts as specified.

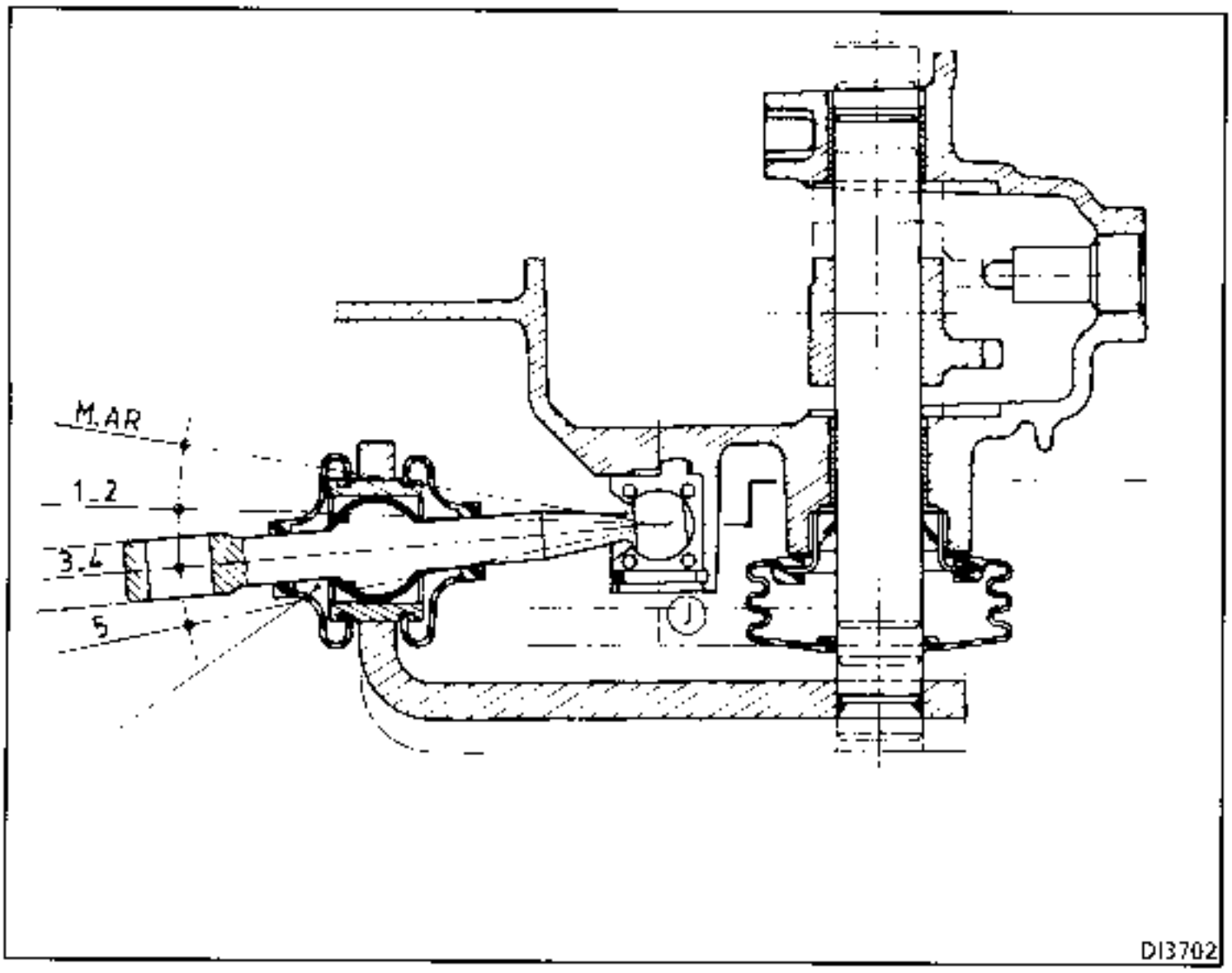
ADJUSTING

TIGHTENING TORQUE (in daN.m)	▽
Bolts on clip securing connecting rod to clevis	3

Select second gear at the gearbox and lock the gearbox input lever in its end position.

In the vehicle: unclip the gaiter from the console.

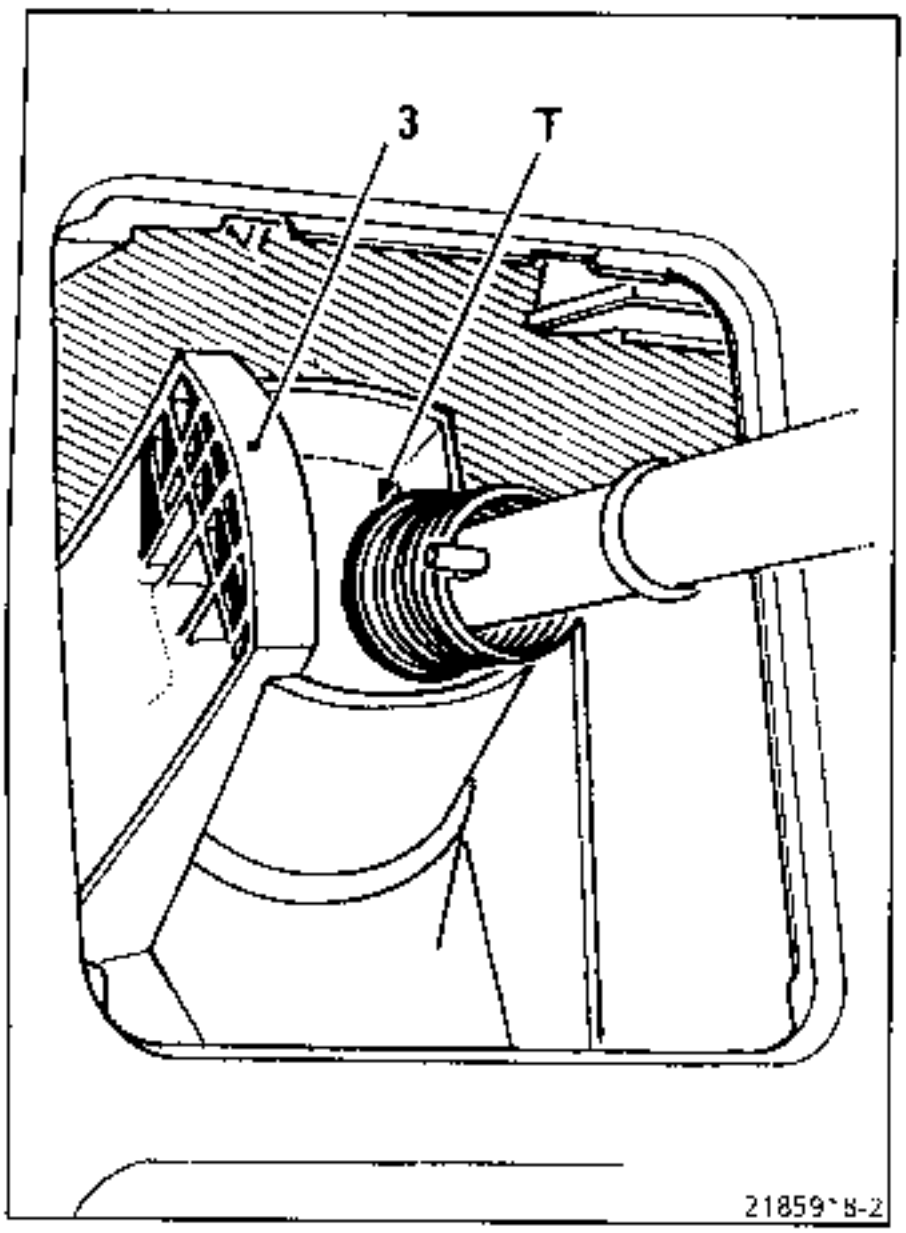




Under the vehicle: disconnect spring (2) then slacken bolt (V) securing the clip to connecting rod (1).

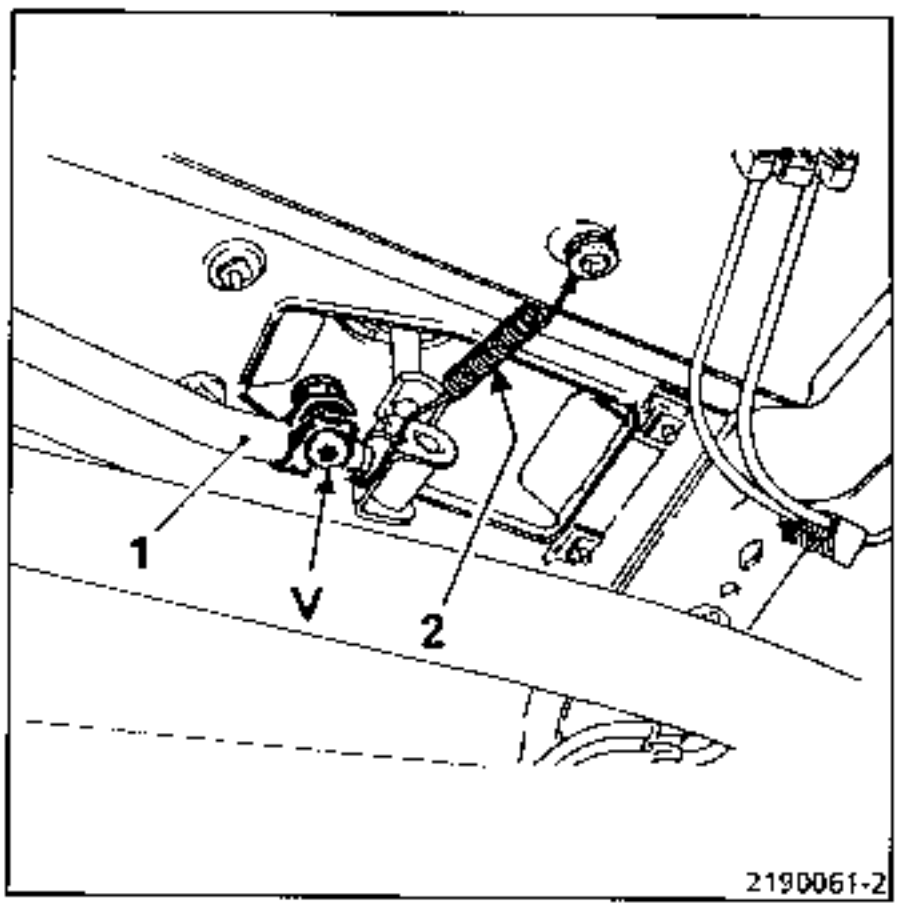
ADJUSTING (continued)

Place O-ring (T) right up against casing ramp (3).



Note: In order to prevent the parts returning automatically to the earlier setting, it is sometimes necessary to turn the lever clevis in the connection rod.

Leave a space of **5 mm** between the connecting rod and the clevis.
In this position:
- Tighten bolt (V).
- Check that the clip is correctly tightened on connecting rod (1).
- Refit spring (2) and the gaiter.



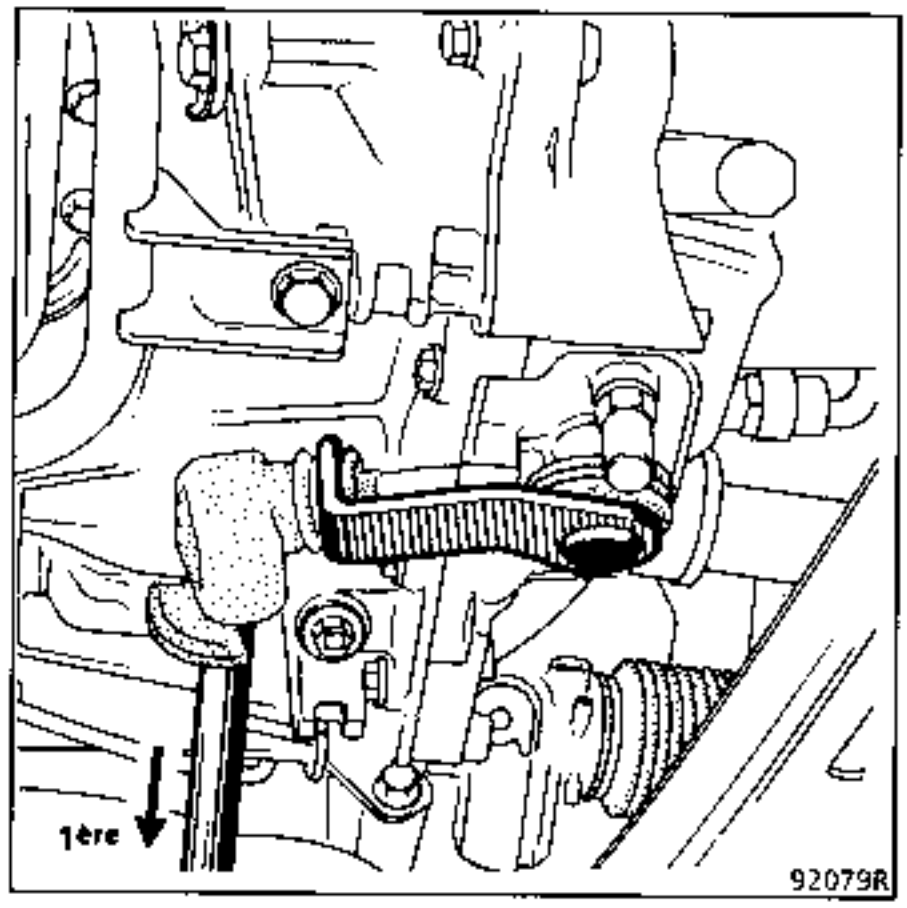
Check that the gears can be selected.

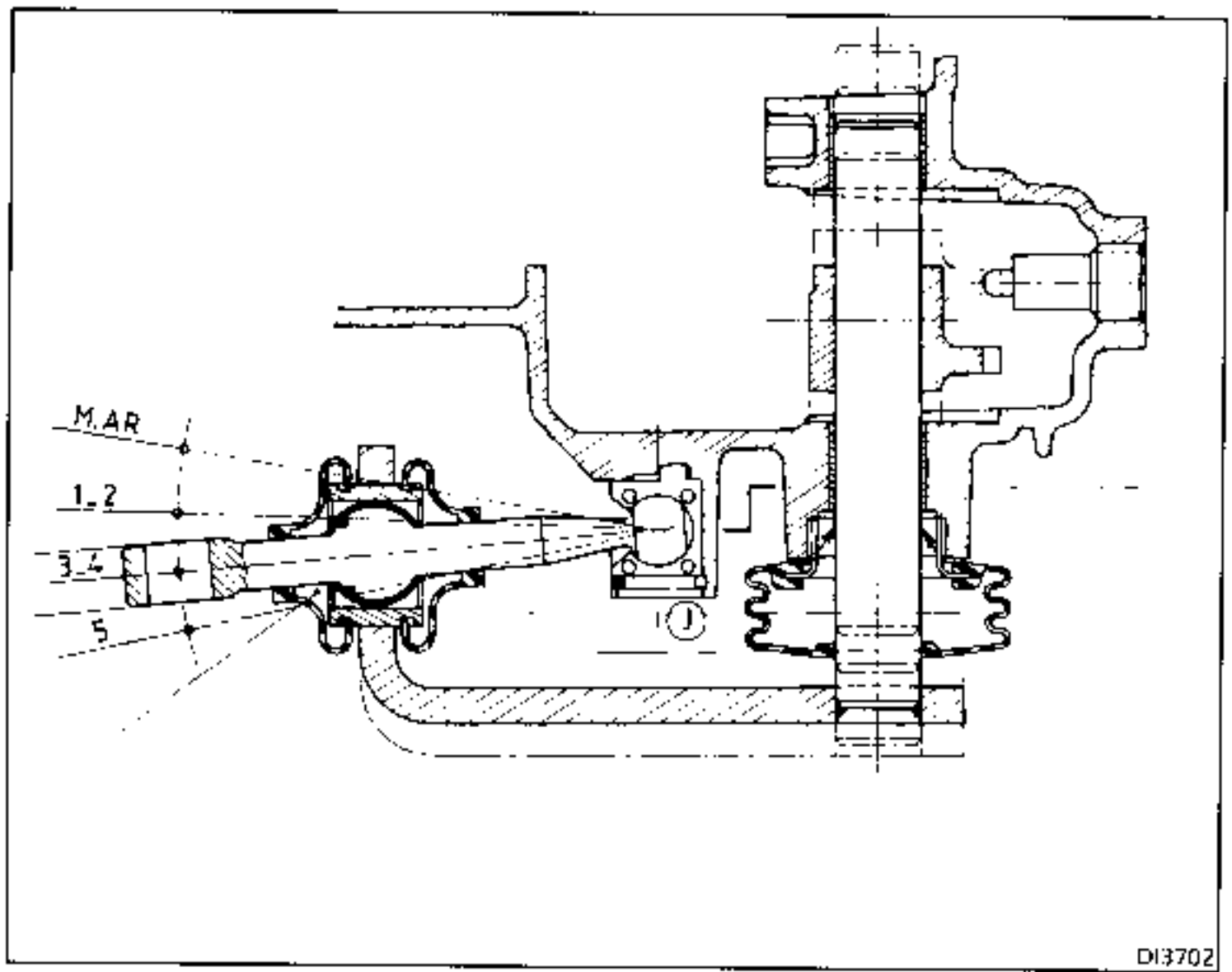
ADJUSTING

ESSENTIAL SPECIAL TOOLING	
B.Vi. 1133	Block for locking JB gearbox input lever in 1st gear

TIGHTENING TORQUE (in daN.m)
Bolts on clip securing connecting rod to clevis 3

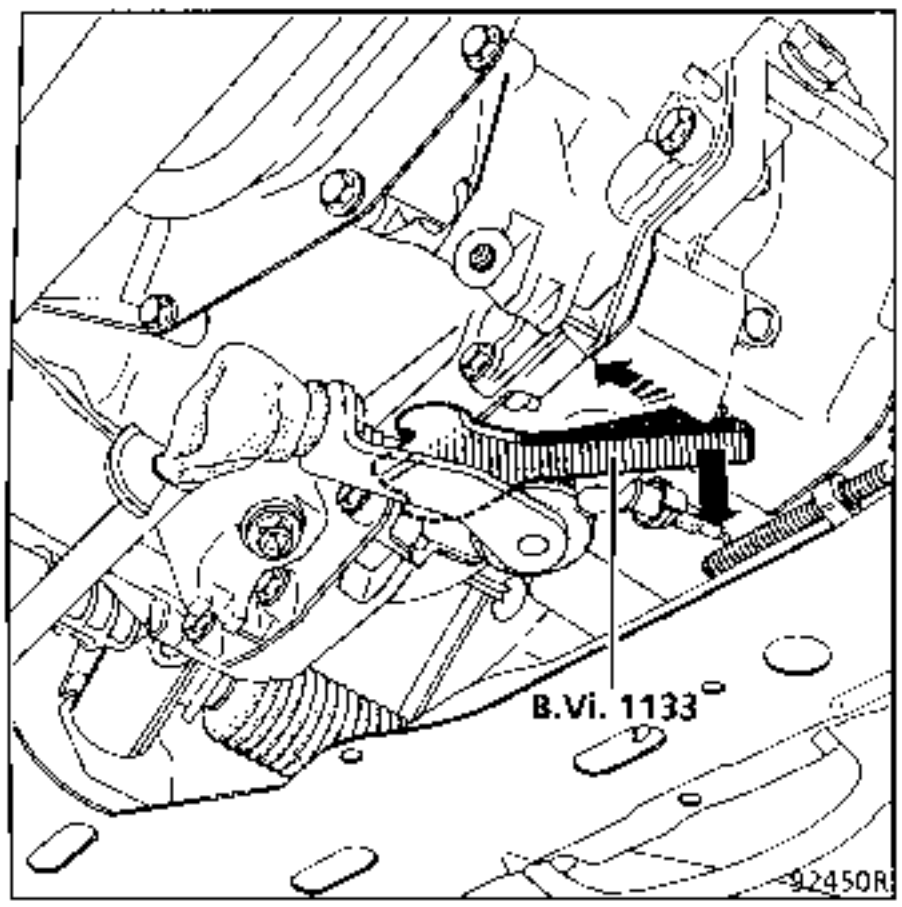
Select 1st gear at the gearbox.



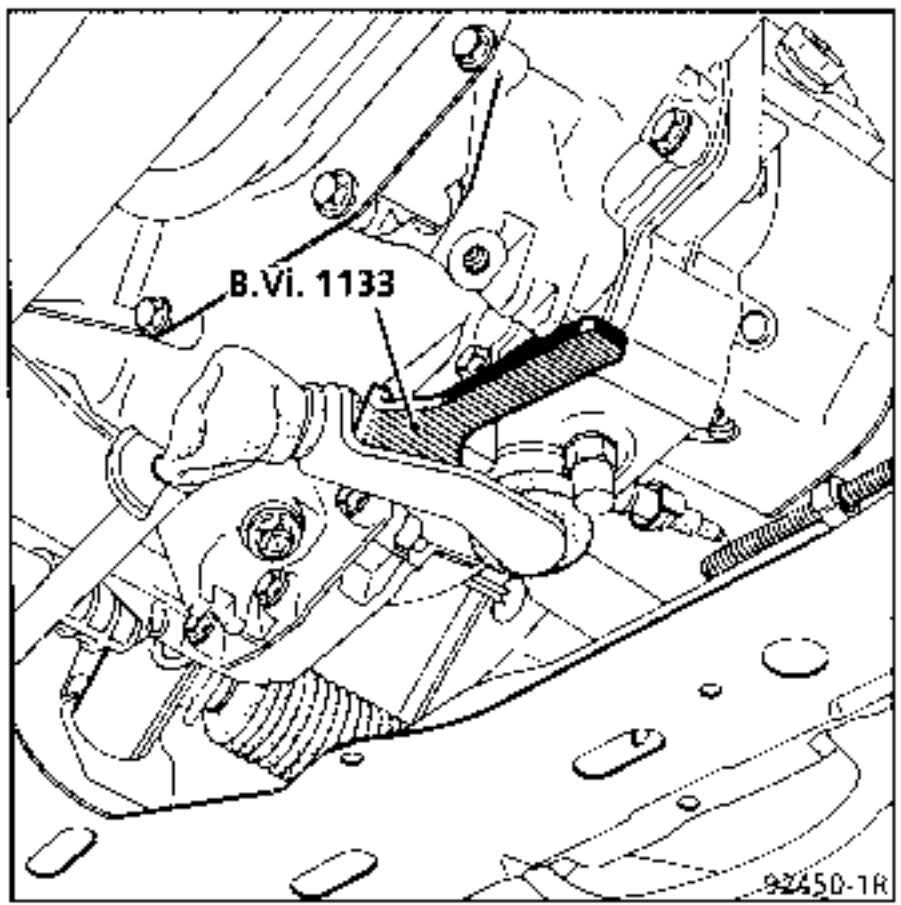


ADJUSTING

Fit in place tool **B.Vi. 1133** in order to take up the clearance.

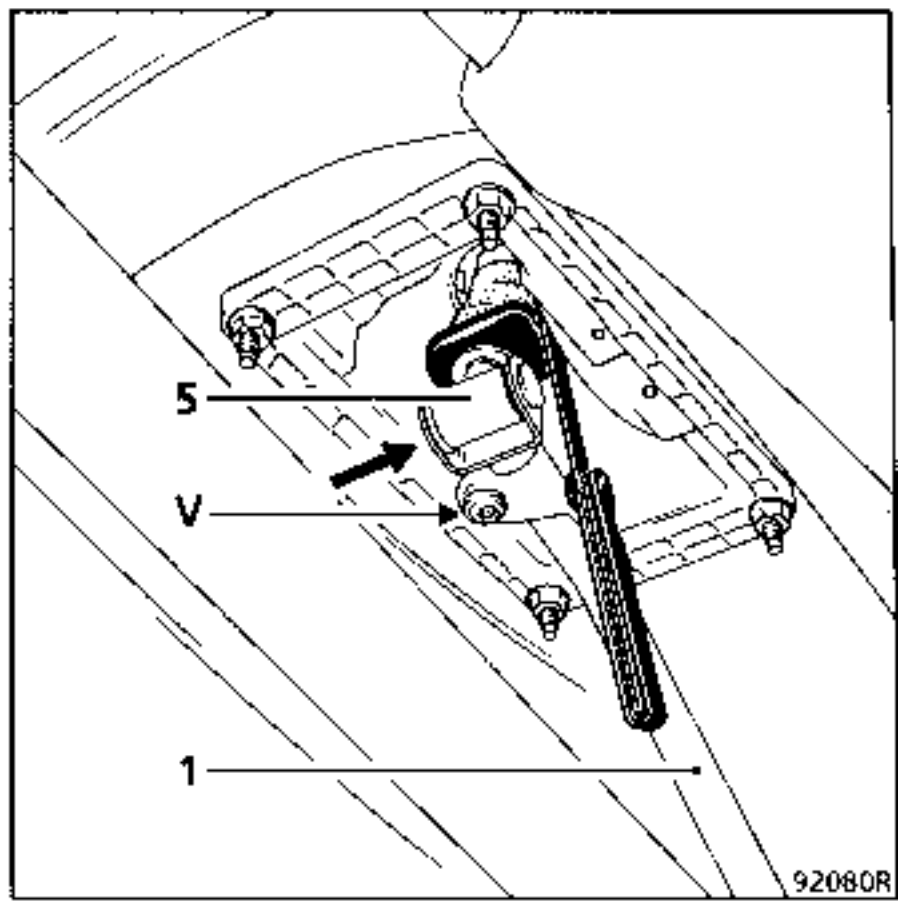


At the same time, pull the end of the tool downwards and pivot it through approximately **45°** until it is up against the spur on the casing.



Fit connecting rod **(1)** on lever clevis **(5)**, leaving a space of approximately **5 mm** between the connecting rod and clevis.

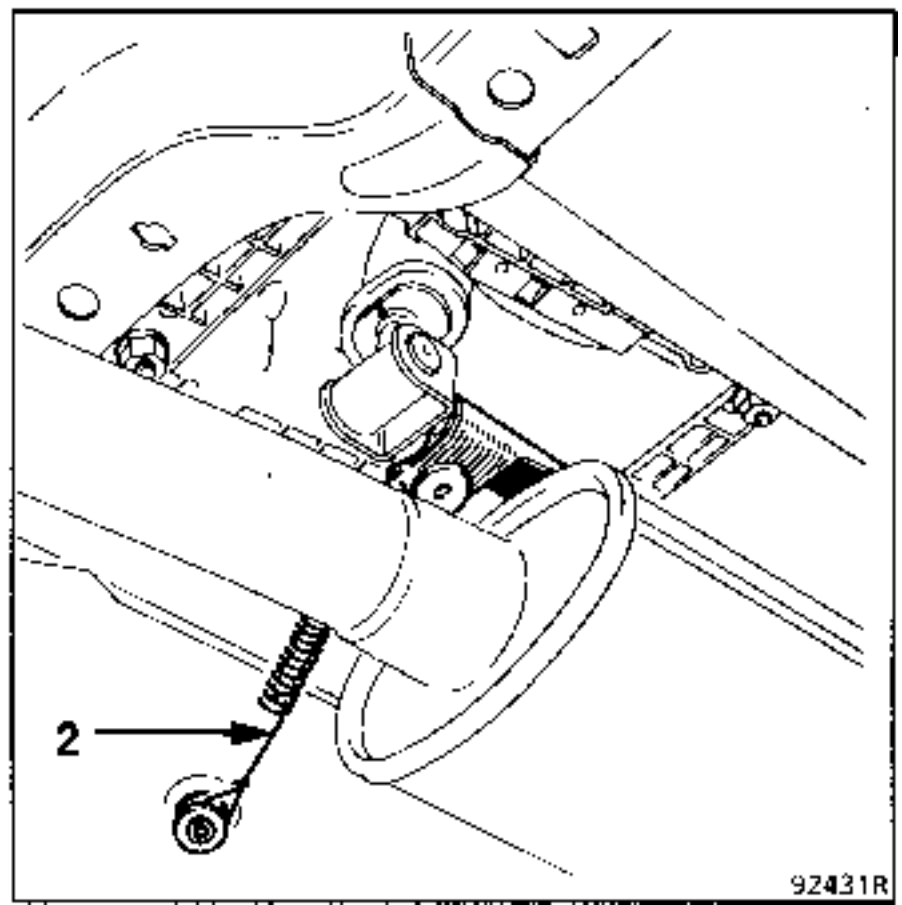
Press the lower lever spring against the casing ramp, fitting a **2 mm** shim.



In this position, tighten bolt **(V)**.

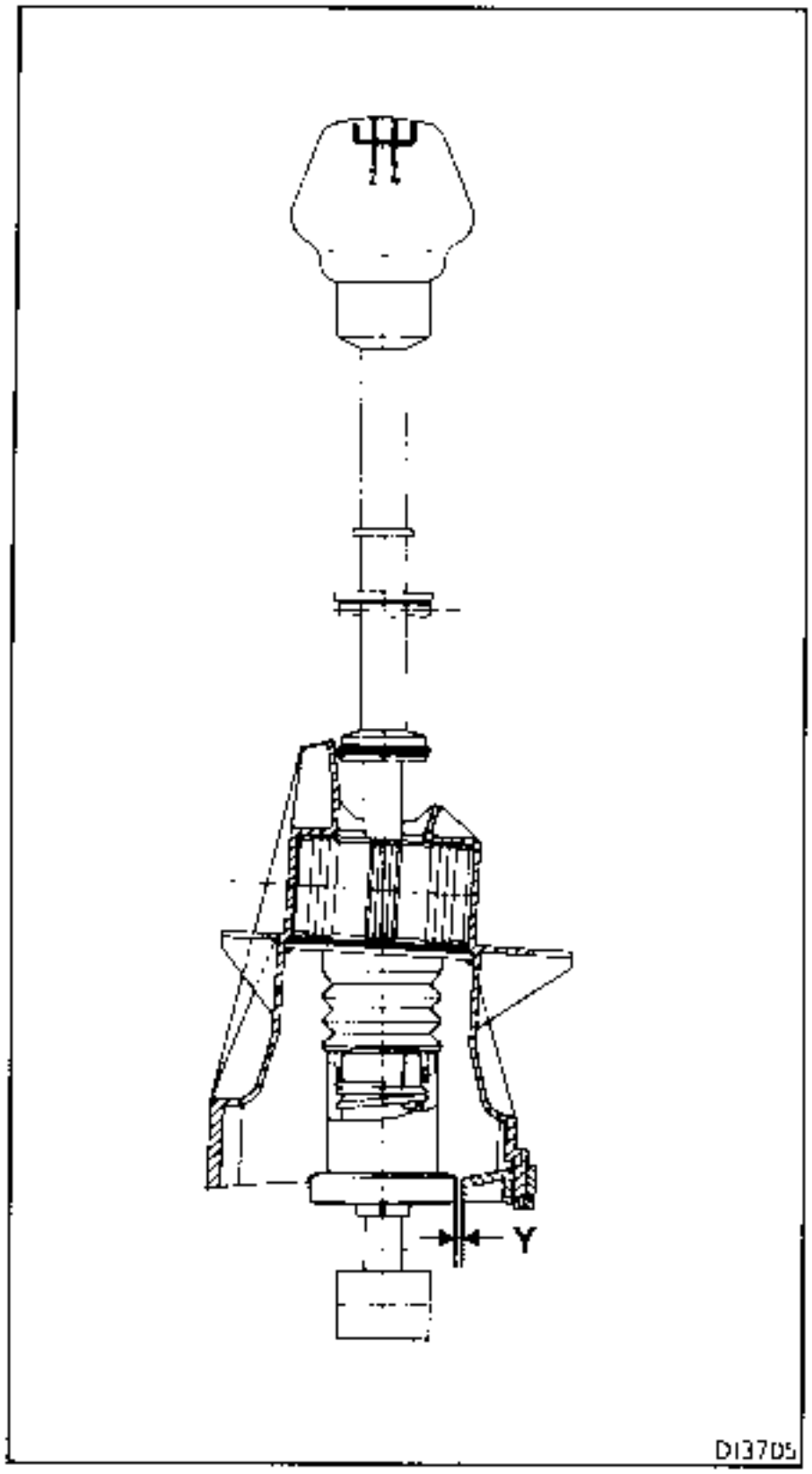
NOTE: In order to avoid the parts returning to an earlier setting, it is sometimes necessary to turn the lever clevis in the connecting rod.

Remove the tool and fit in place return spring **(2)**.



ADJUSTING

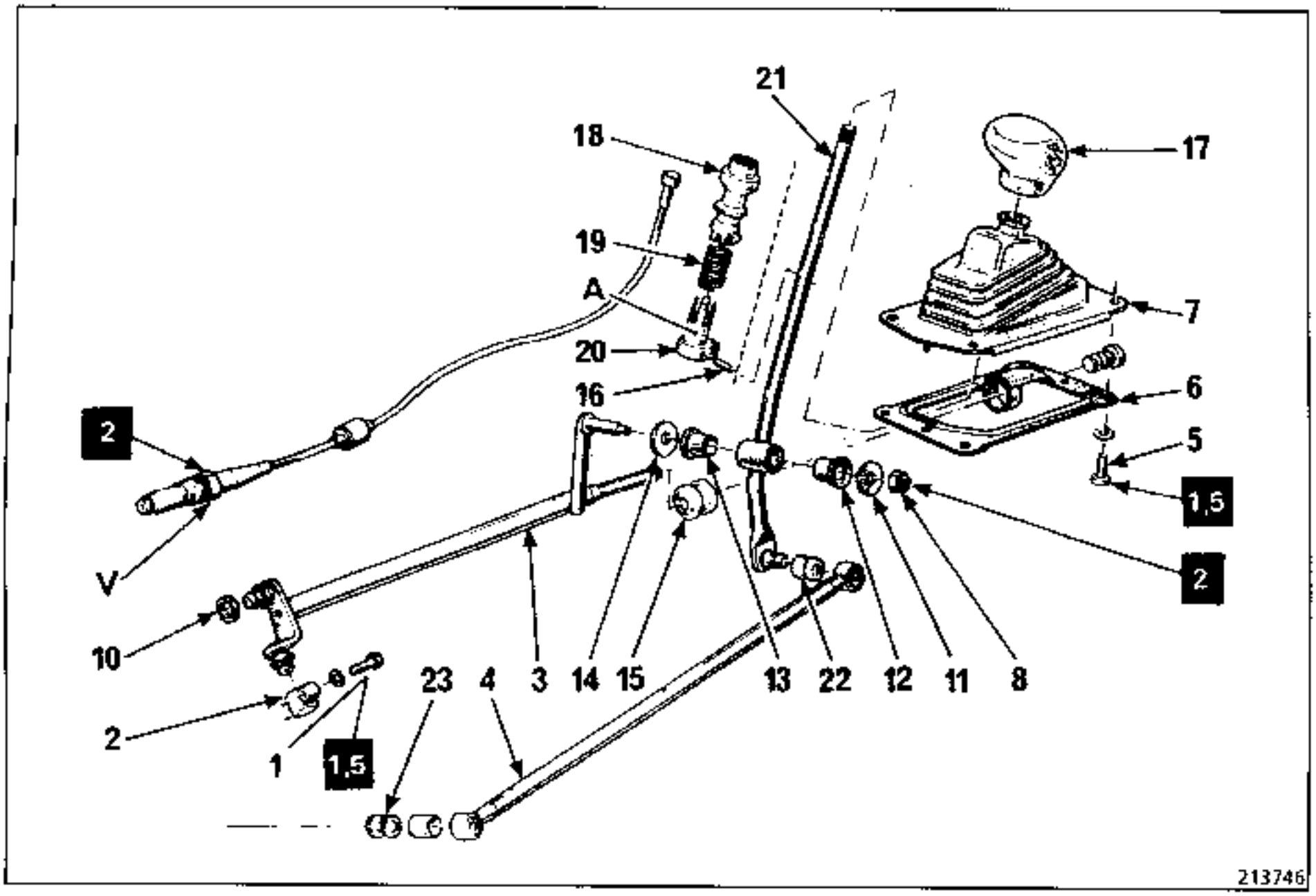
Check the resultant clearance "Y" which should be between **2** and **5** mm.



Remove tool **B.Vi. 1133**.

Check that the gears can be selected.

DOUBLE BAR CONTROL



DISMANTLING

Remove parts (1) to (8) in order.

Recover parts (9) to (14).

Remove part (15) from part (6).

Remove the roll pins from (16).

Remove parts (17) to (20) in order.

Recover part (21).

If necessary, replace (22) and (23) :
- green part fitted at gearbox end,
- natural colour part mounted at lever end.

REASSEMBLY - Special points :

Bond (17) to lever (21).

Place a few drops of 33 Medium grease inside (15), (22) and (23).

Torque tighten the nuts.

NOTE: This type of control system cannot be adjusted.

Tightening torques in daN.m.

REMOVING - REFITTING

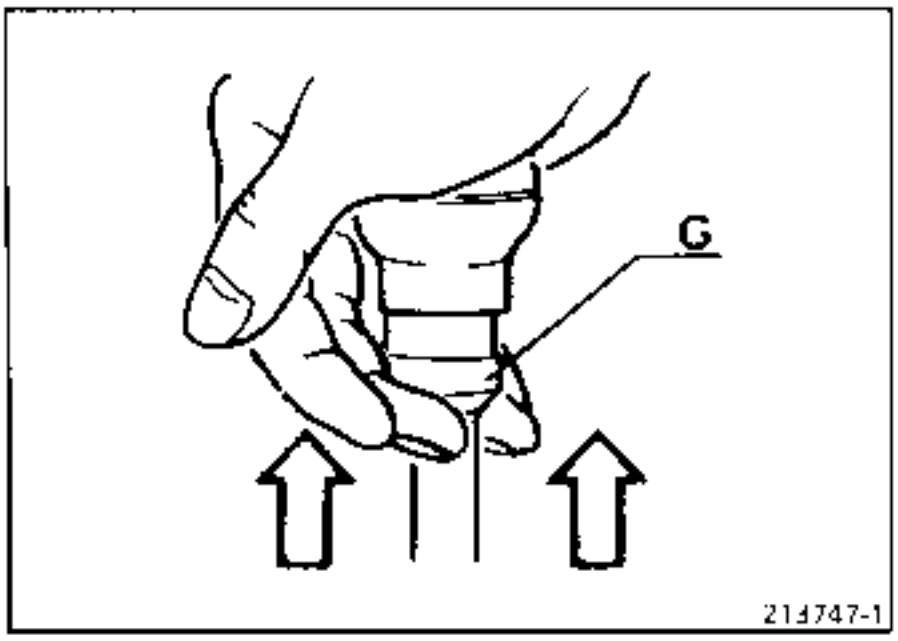
REVERSE GEAR POSITIVE LOCKING SYSTEM

This system prevents reverse gear being selected at the wrong time when changing rapidly from 3rd to 2nd gear.

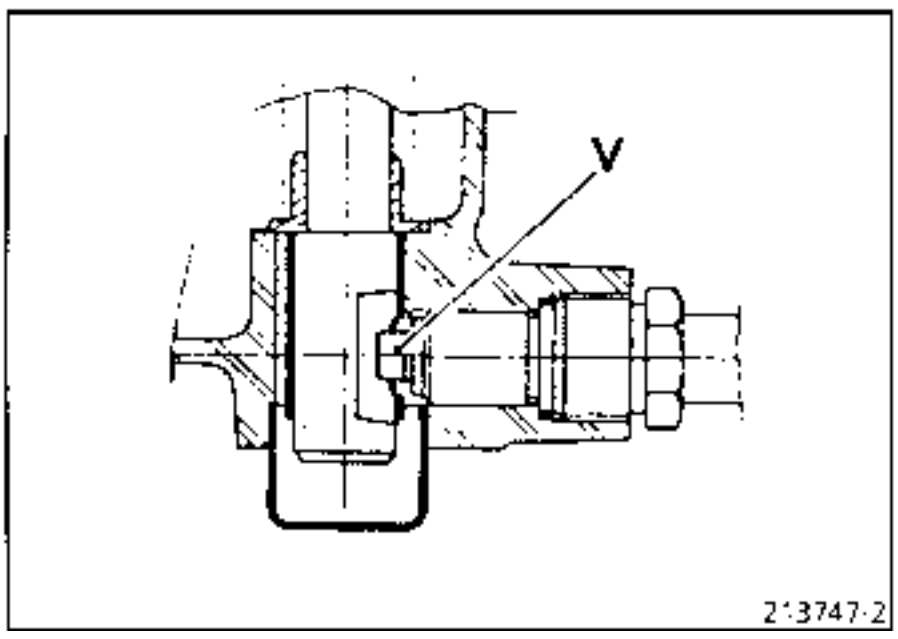
Operation

To select reverse gear, lift ring (G) and move the lever; by means of a cable, the ring acts on the finger of a lock (V) mounted on the gearbox rear casing.

As this finger moves aside, it enables reverse gear to be selected.



21d747-1

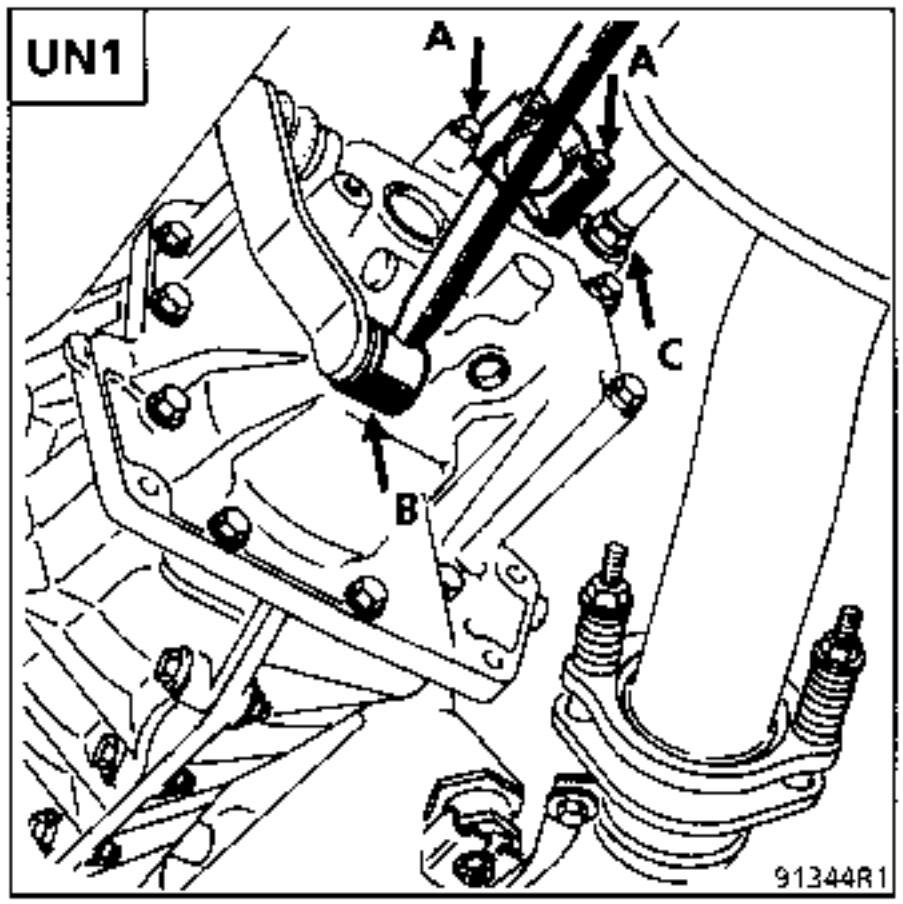


21d747-2

Remove:

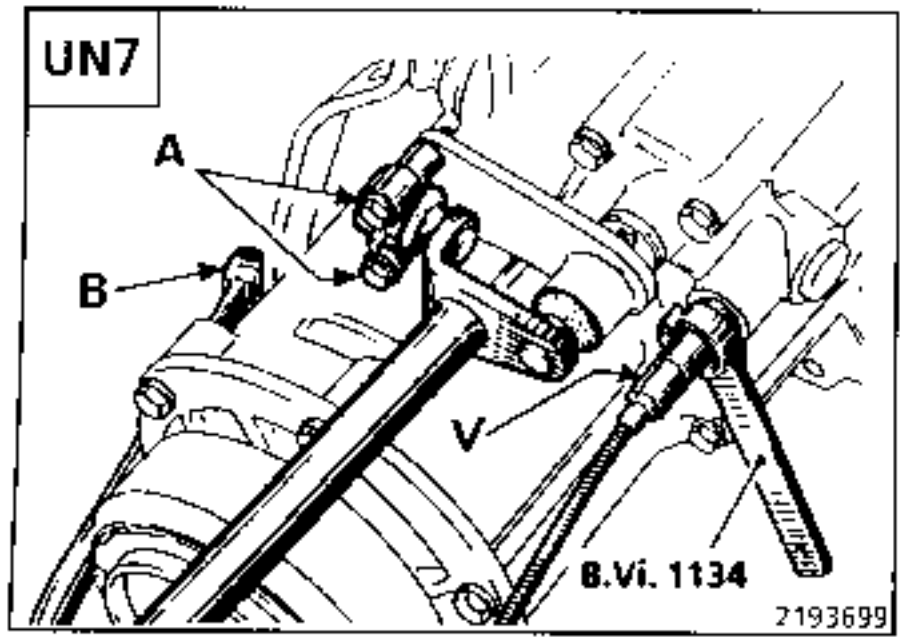
- At (A) the two bolts from the ball joint cover
- At (B) uncouple the ball joint
- At (V) remove the reverse gear lock (using a locally manufactured spanner).

UN1



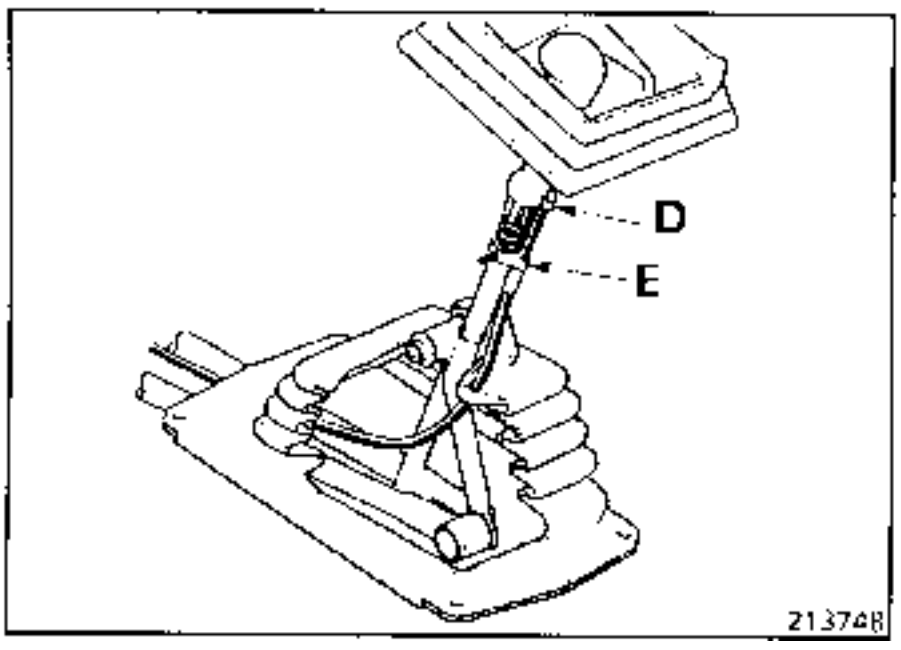
91344R1

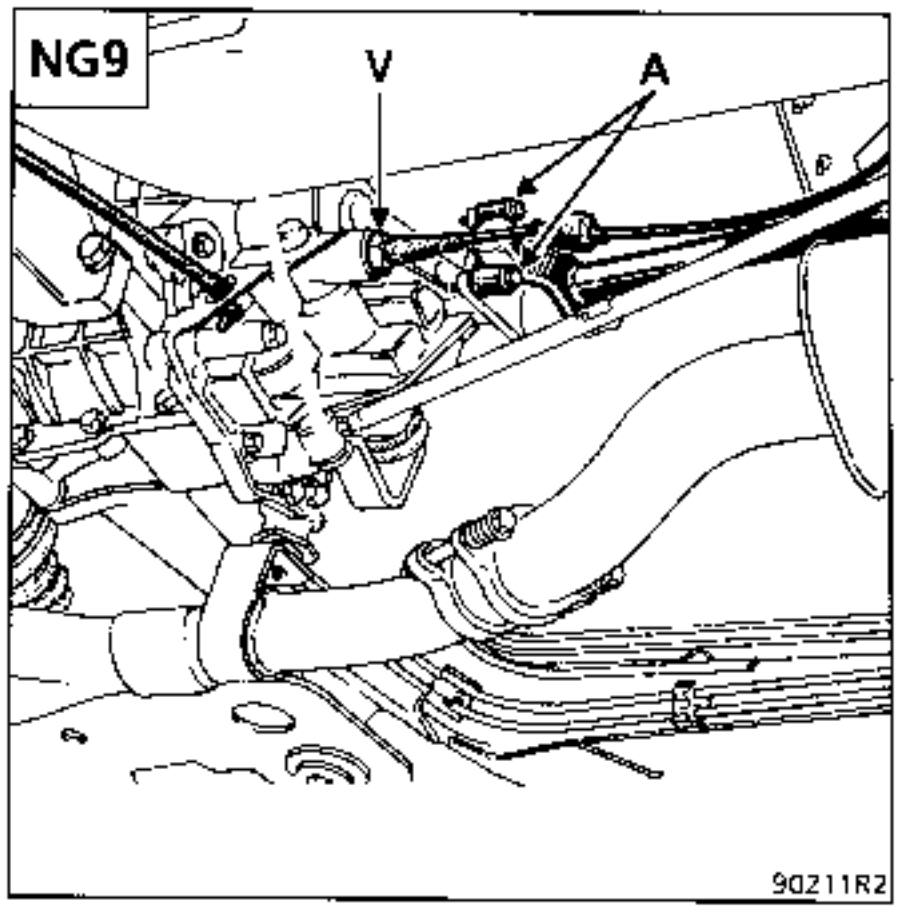
REMOVING - REFITTING



Removing the cable :

- Raise the gaiter in the passenger compartment.
- Unfasten end piece (D) and sheathing stop at (E).





REFITTING

Place a bead of **RHODORSEAL 5661** paste (e.g. **CAF 4/60 THIXO**) on the lock threads and torque tighten to **2 daN.m**.

Tighten the bolts and nuts to the recommended torque.

Reminder: This control cannot be adjusted in any way.

K48 4 x 4 vehicles are equipped with a pneumatic dog clutch control for the prop shaft and for locking the rear differential.

The control lever (pneumatic valve) located on the central console enables the following three positions to be selected:

- at (**A**): **4 x 2** position: normal running, front wheel drive for using the vehicle on ground with a good grip;

- at (**B**): **4 x 4**: 4-wheel drive via dog clutch connection of prop shaft, **4 x 4** warning light illuminated on centre console;

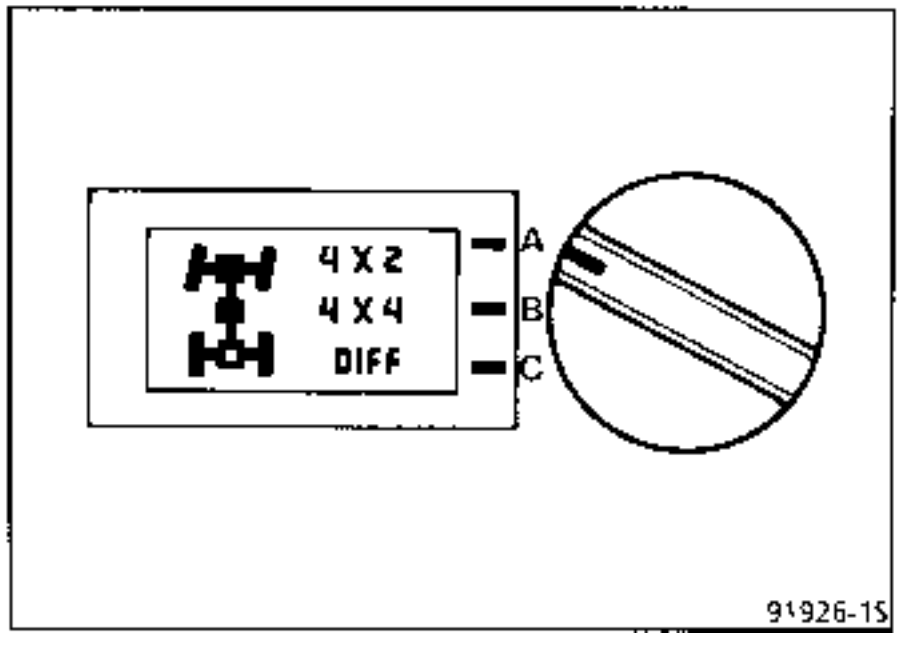
- at (**C**): **DIFF**: 4-wheel drive with in addition a blocked differential by dog clutch engagement. **4 x 4** and DIFF warning lights illuminated on console and DIFF illuminated on instrument panel.

This latter position to be used in exceptional circumstances enables difficult cases to be overcome when one of the two rear wheels can no longer transfer any torque owing to the wheels spinning. It is essential to release the rear differential as soon as the vehicle is freed.

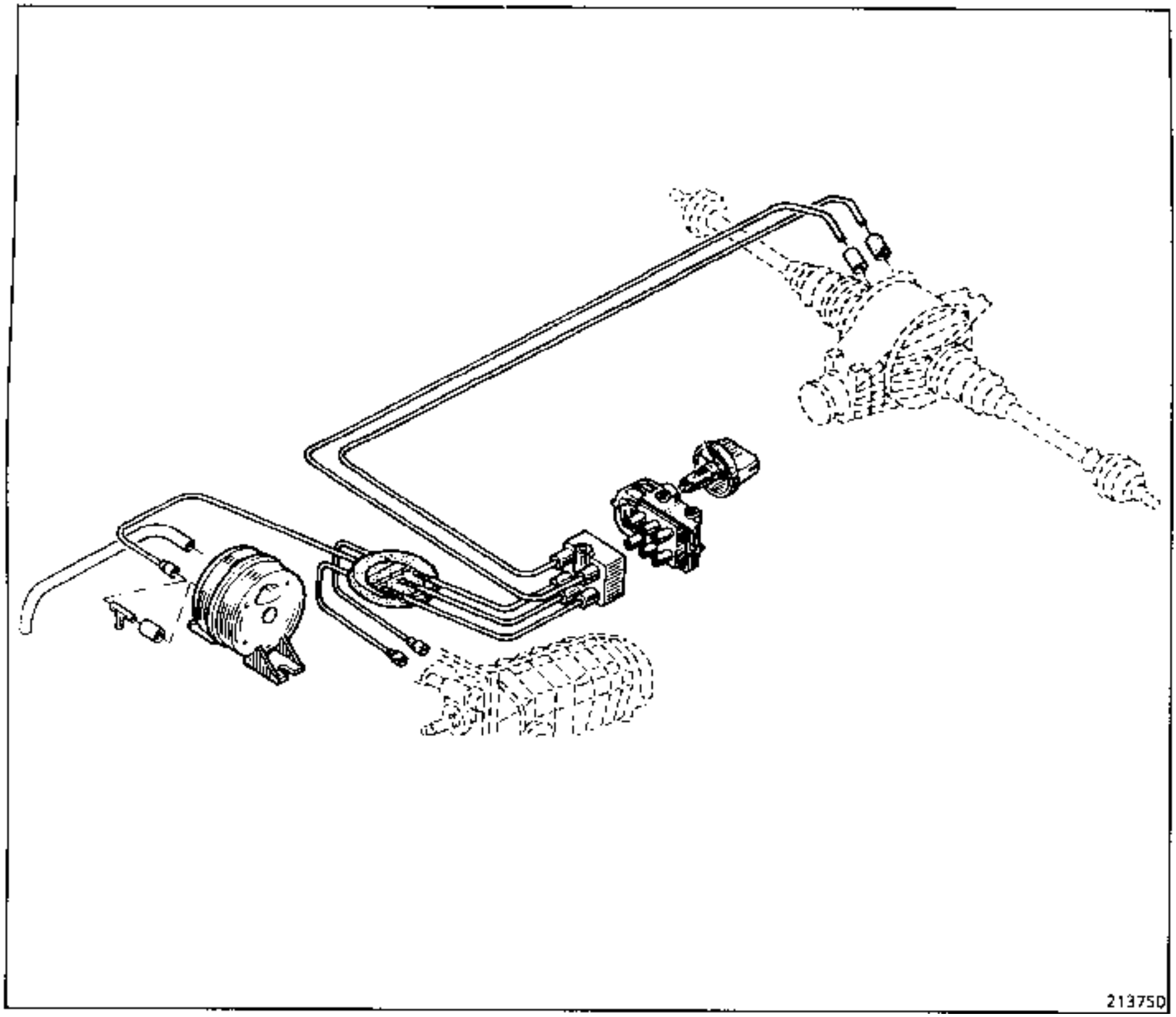
Parking manoeuvres :

On ground with good adhesion, these must be performed with the vehicle in **4 x 2**.

In effect, in the 4-wheel drive position, the scuffing of the tyres resulting from parking manoeuvres causes the steering to harden and harmful stresses to be applied to the drive shafts which would render it difficult or even impossible to release the dog clutch connection to the prop shaft.

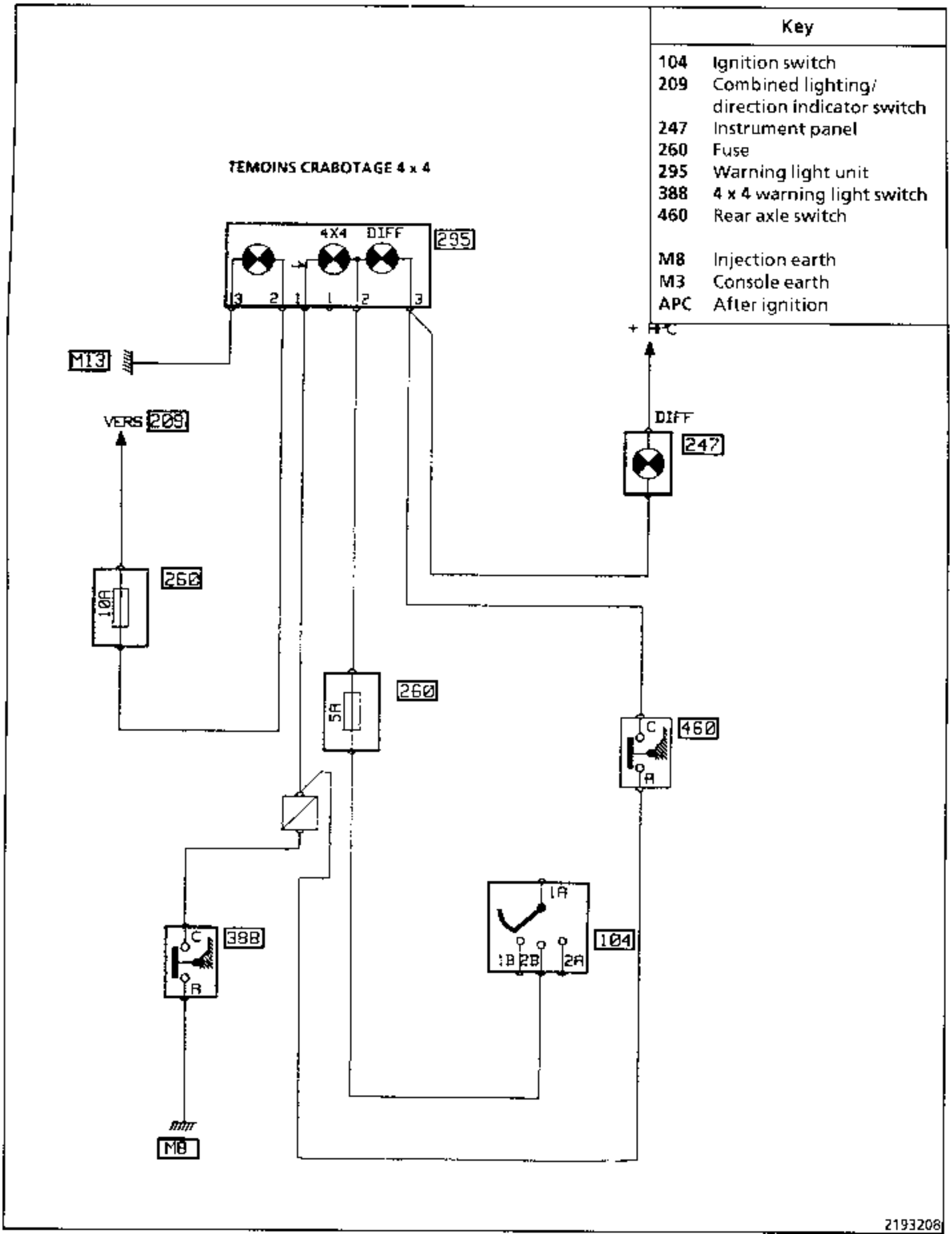


EXPLODED VIEW

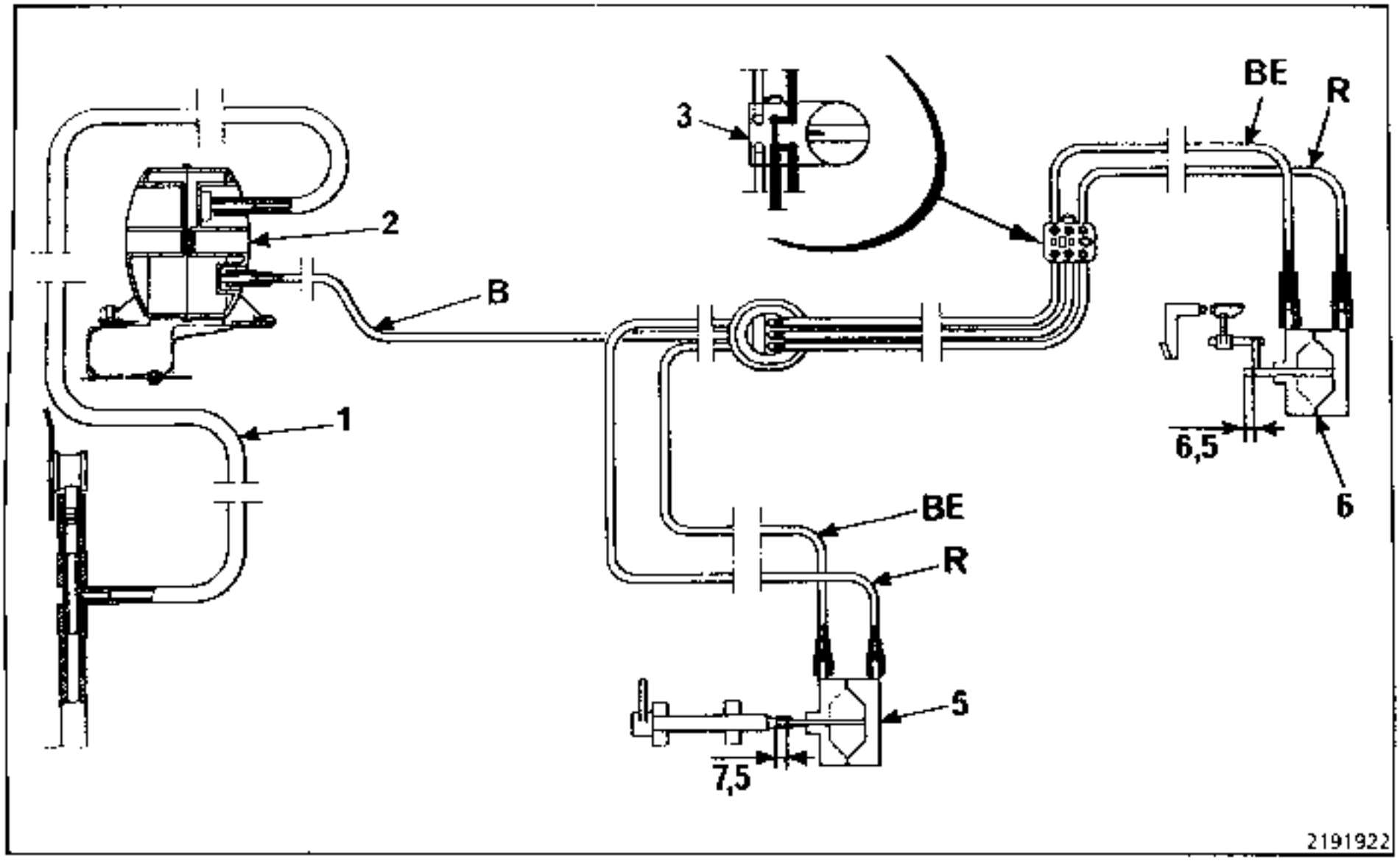


21375D

OPERATING DIAGRAM



PNEUMATIC CONTROL : servo-system assembly

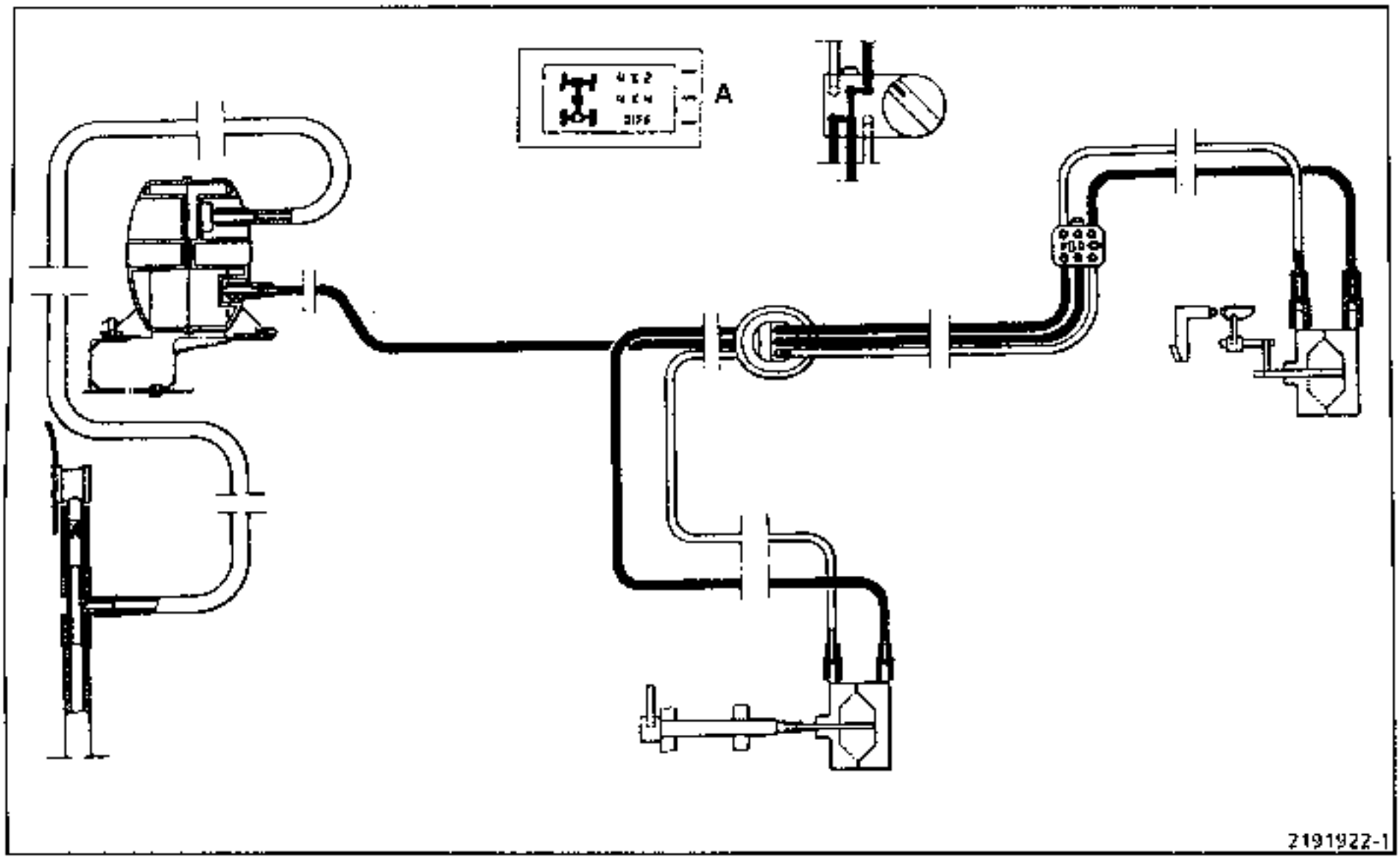


Hose colours :

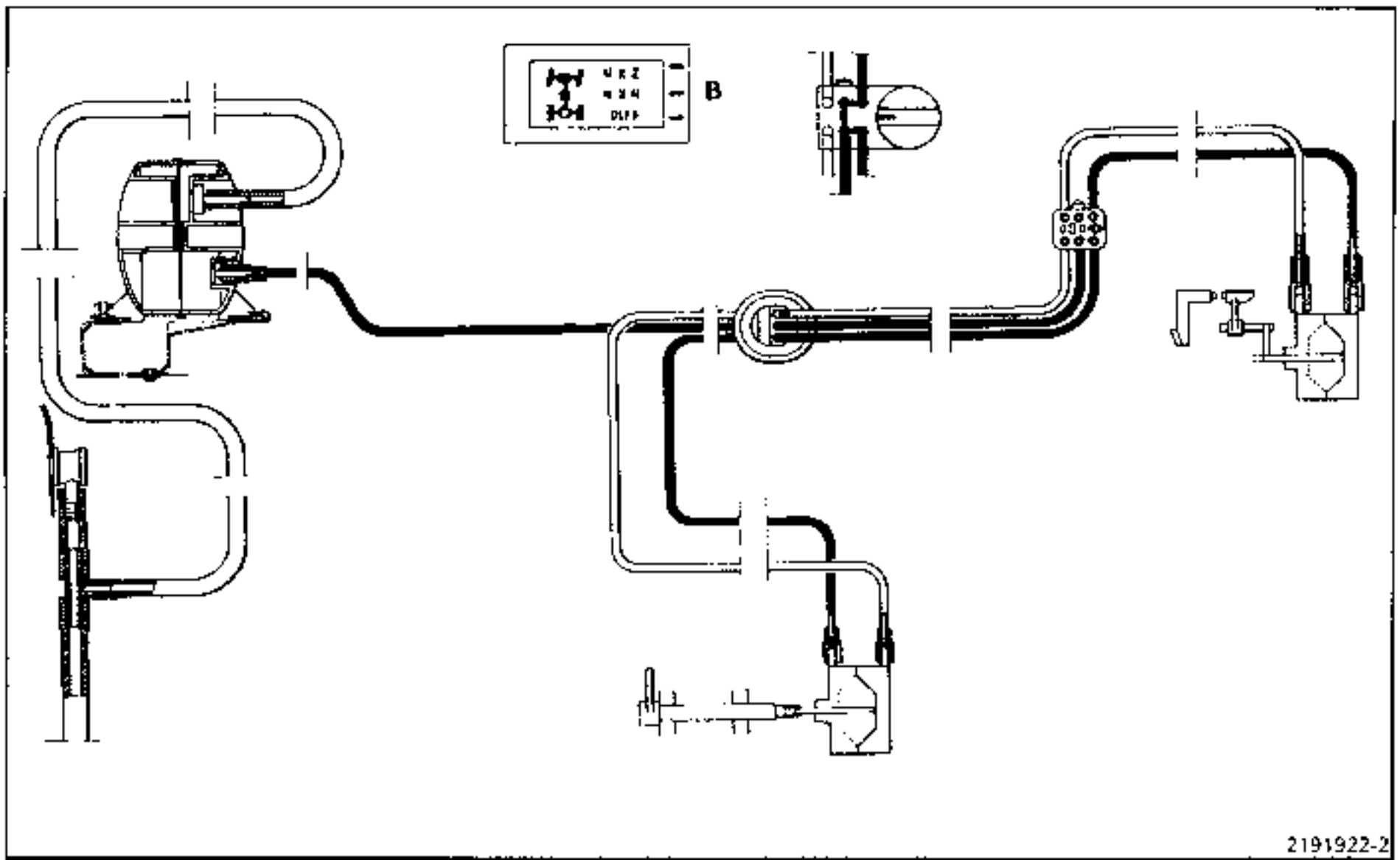
B : White
BE : Blue
R : Red

1. Vacuum supply hose coming from manifold on petrol engine or vacuum pump on diesel engine
2. Vacuum reservoir
3. Pneumatic control valve
4. Connector on pneumatic valve
5. Vacuum capsule for dog clutch engagement of prop shaft on NG7 gearbox
6. Vacuum capsule for locking rear differential on **OT2**.

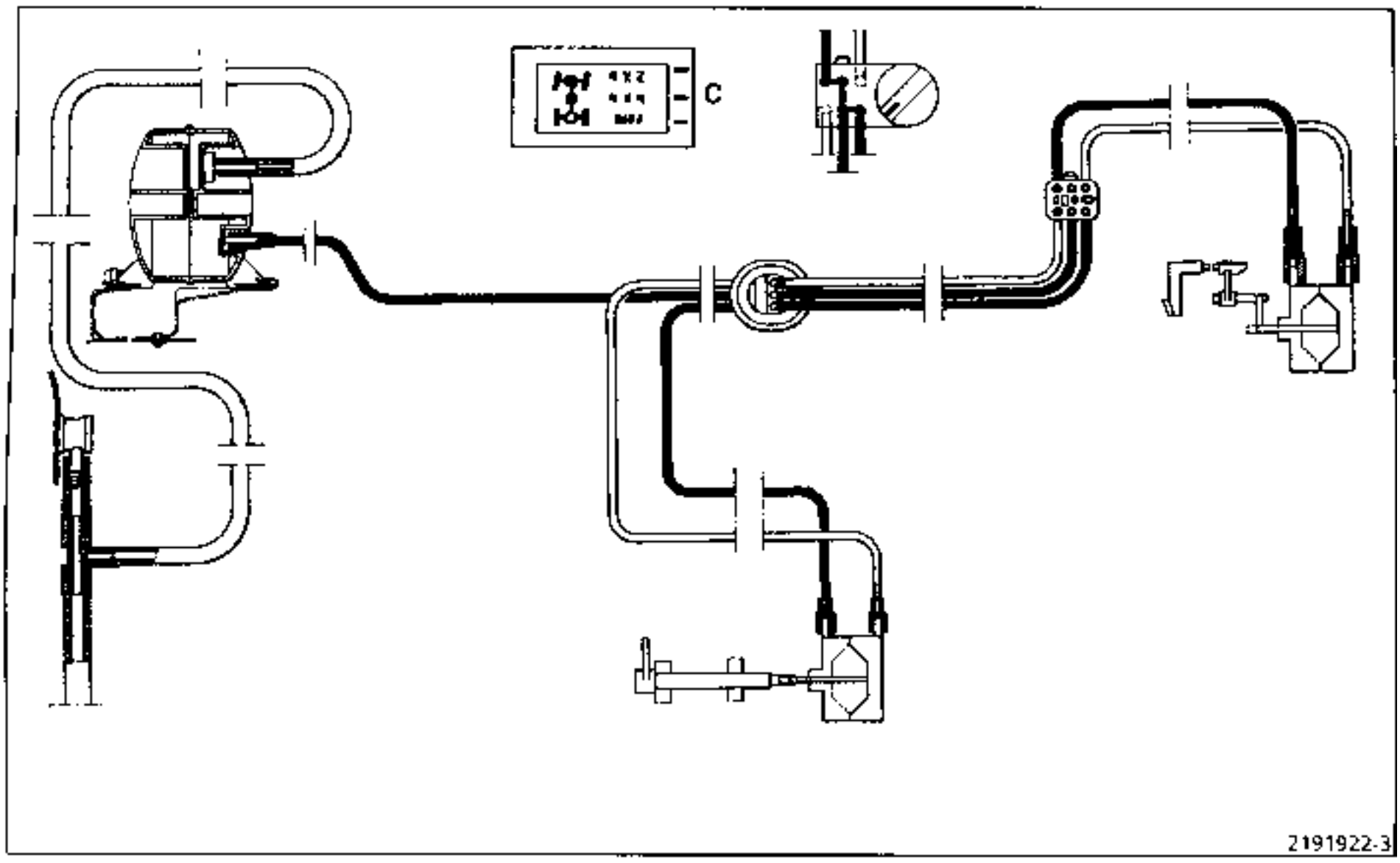
A : 4 x 2 position



B : 4 x 4 position



C : 4 x 4 with locked differential position



2191922-3

NOTE

The dog clutch locking the differential cannot be engaged in the tooth on tooth position with the control in position C; in this case the warning light does not illuminate either. Dog clutch engagement occurs at the moment when the wheels turn at different speeds.

CHECK

In the event of any operating incidents check:

- that the hoses are in good condition and correctly connected;
- with the engine idling, check alternately the vacuum in the three positions of the control lever;
- disconnect a vacuum hose and in its place connect vacuum gauge **M.S. 870**; the value of the vacuum obtained should be greater than **300 mbar**;
- the operation and sealing of the vacuum capsules.

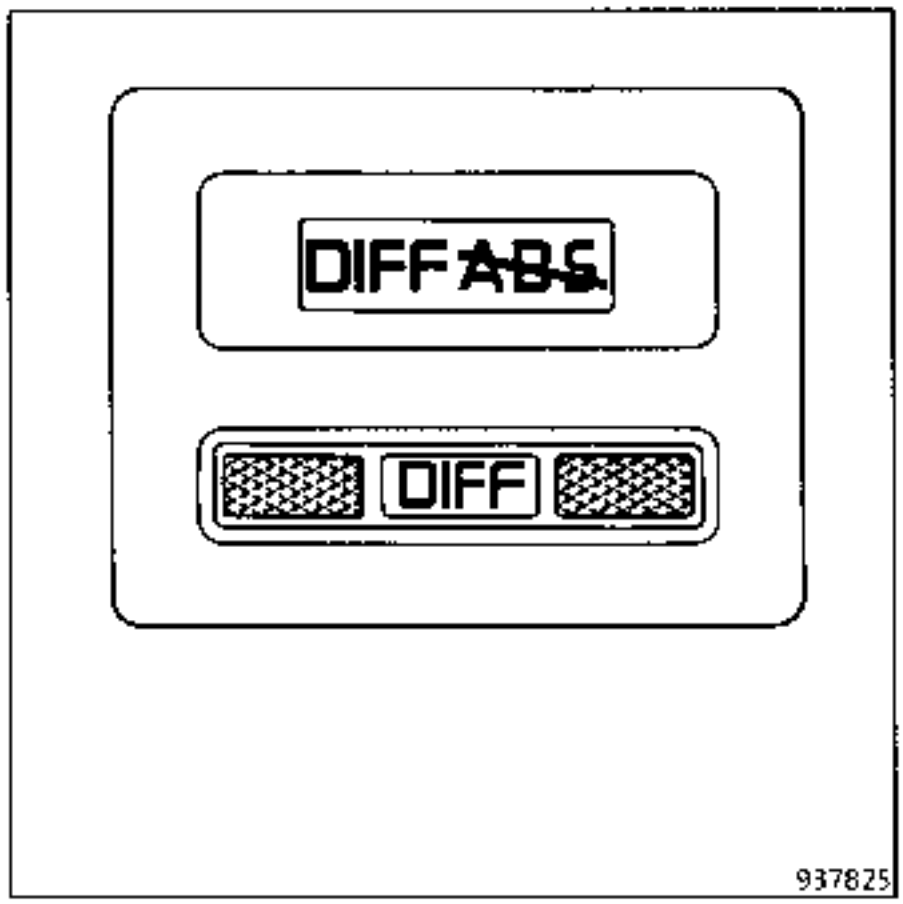
ELECTRO-PNEUMATIC CONTROL FOR LOCKING THE REAR DIFFERENTIAL

Two special points accompany the blocking of the rear differential:

- Cancellation of the operation of the ABS

- Exclusive use in 1st and reverse, unblocking being automatic in any gear other than these two

The system is controlled by means of a push button located on the dashboard below a display which is connected electrically to it:



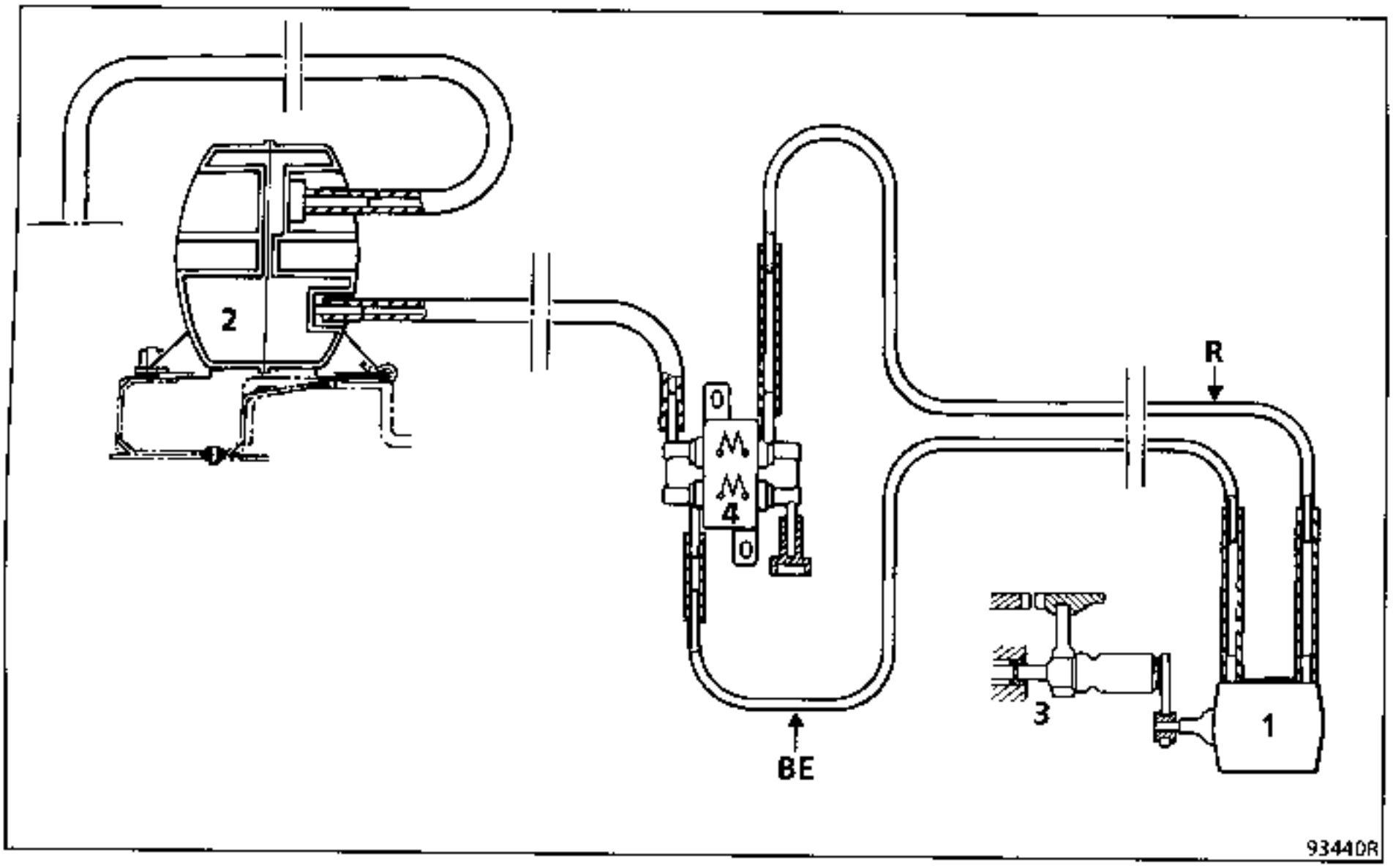
- Push button depressed, the display is blank and the rear differential is free.

- Push button released, two particular cases may arise:

  . Display shows "DIFF ABS": the rear differential is locked and the ABS cancelled when 1st gear or reverse are engaged.

  . The display flashes: blocking is requested but not carried out.

Electro-pneumatic control : assembly



The pneumatic control essentially comprises:

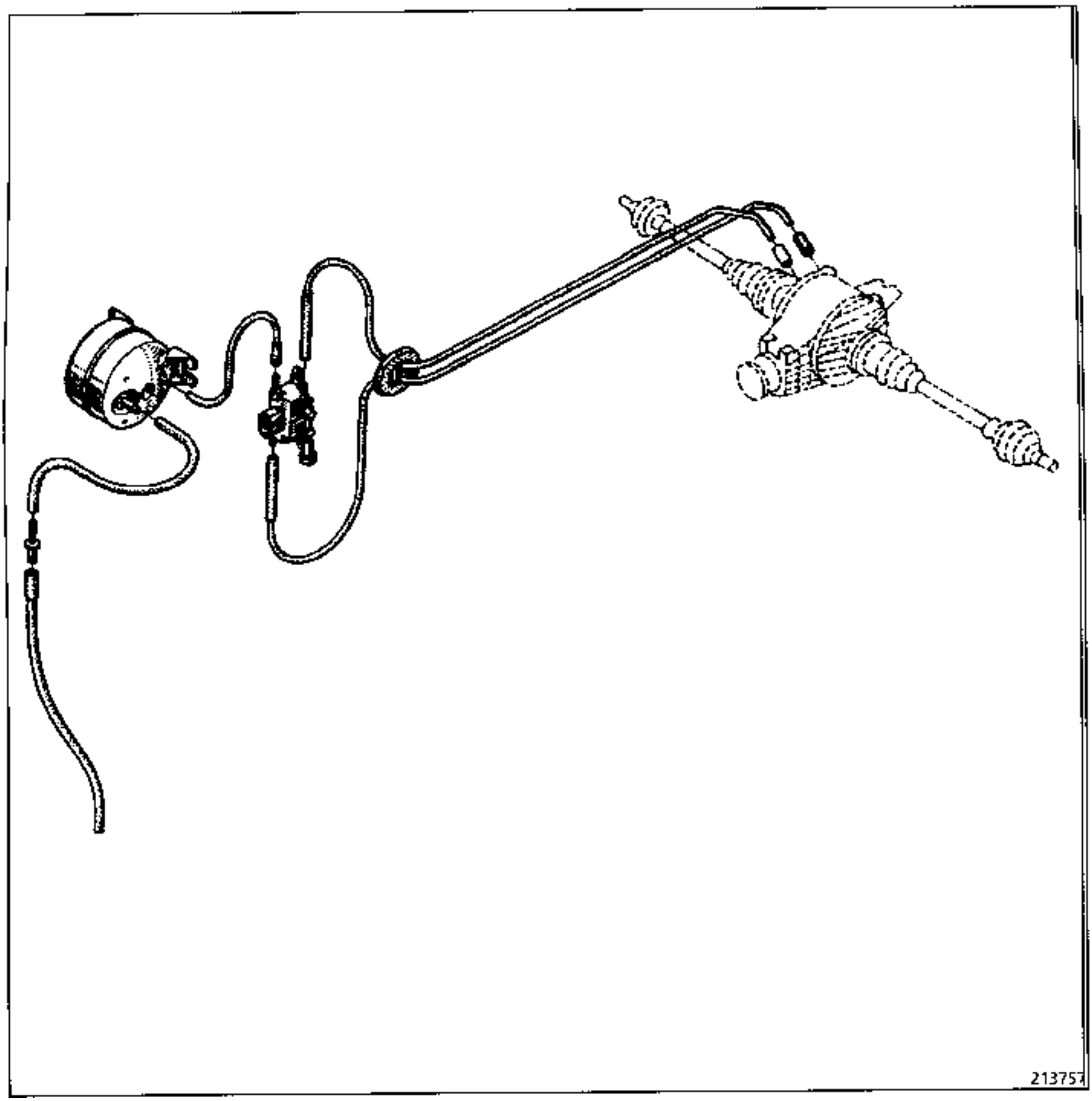
- A vacuum capsule (**1**), subject to the engine vacuum via a vacuum reservoir (**2**) so as to move dog clutch fork (**3**) on the **OT2** axle
- A solenoid valve (**4**) supplied with positive power via the push button on the dashboard
- Two switches connected to 1st gear and reserve gear which earth the solenoid valve; at the same time electrical data is sent to the ABS computer

Hose colours:

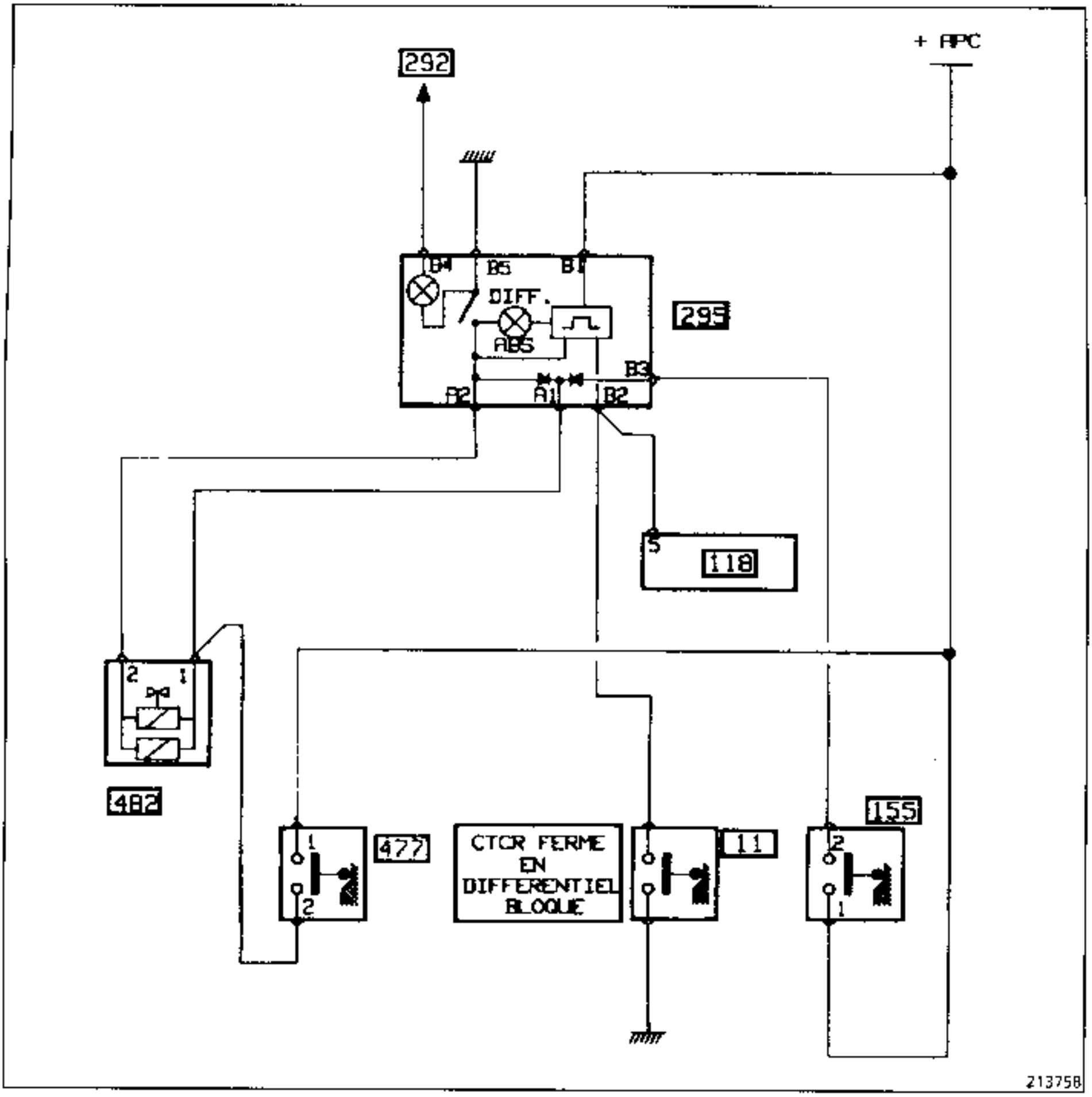
BE : Blue

R : Red

Electro-pneumatic control : assembly



4 x 4 WIRING DIAGRAM

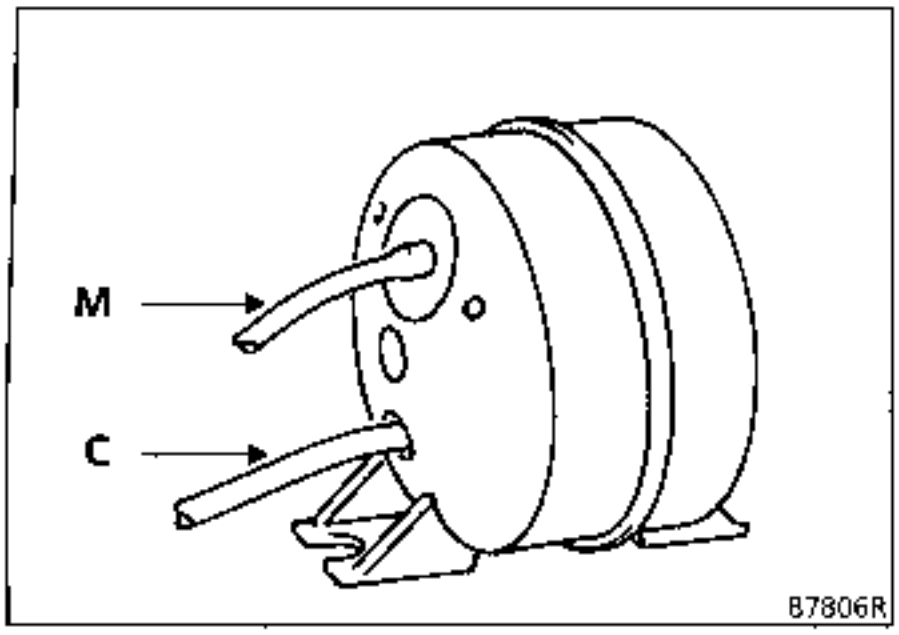


Key	
11	Dog clutch switch
118	ABS computer
155	Reverse light switch
292	Lighting rheostat relay
295	4 X 4 control unit
477	1st speed switch
482	Dog clutch control solenoid valve
APC	After ignition

Vacuum reservoir :

It is secured on the closure panel above the bulkhead on the right-hand side.

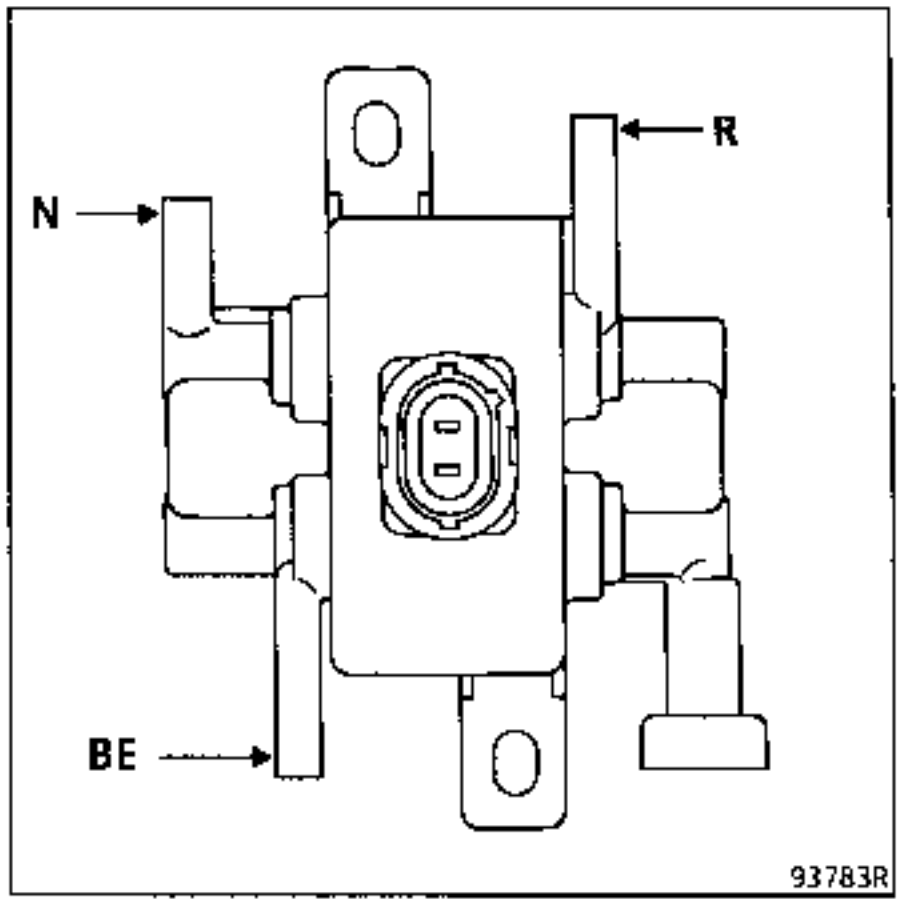
It is connected at (M) to the inlet manifold connection hose and at (C) to the solenoid valve.



Solenoid valve :

It is located next to the vacuum reservoir, behind the coolant reservoir chamber.

Ensure that the hoses are connected correctly.



BE : Blue

N : Black

R : Red

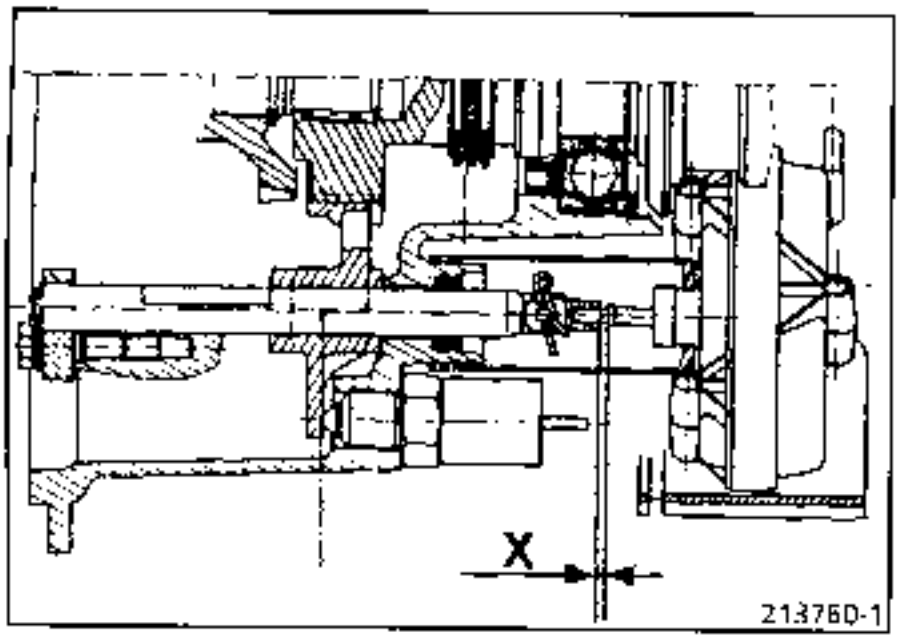
SPECIAL POINTS

Fitting the clevis to the vacuum capsule:

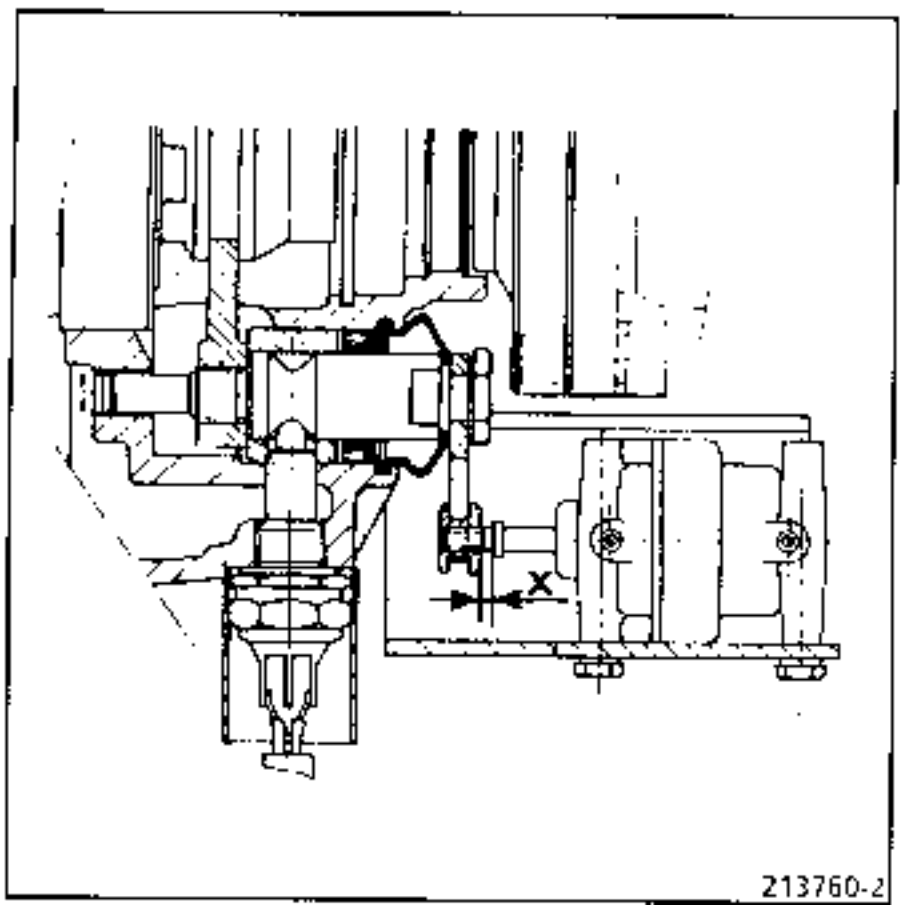
When replacing the vacuum capsule, ensure that the distance for positioning the clevis on the control rod is correct.

X = 2 to 3 mm.

On **NG7** gearbox.

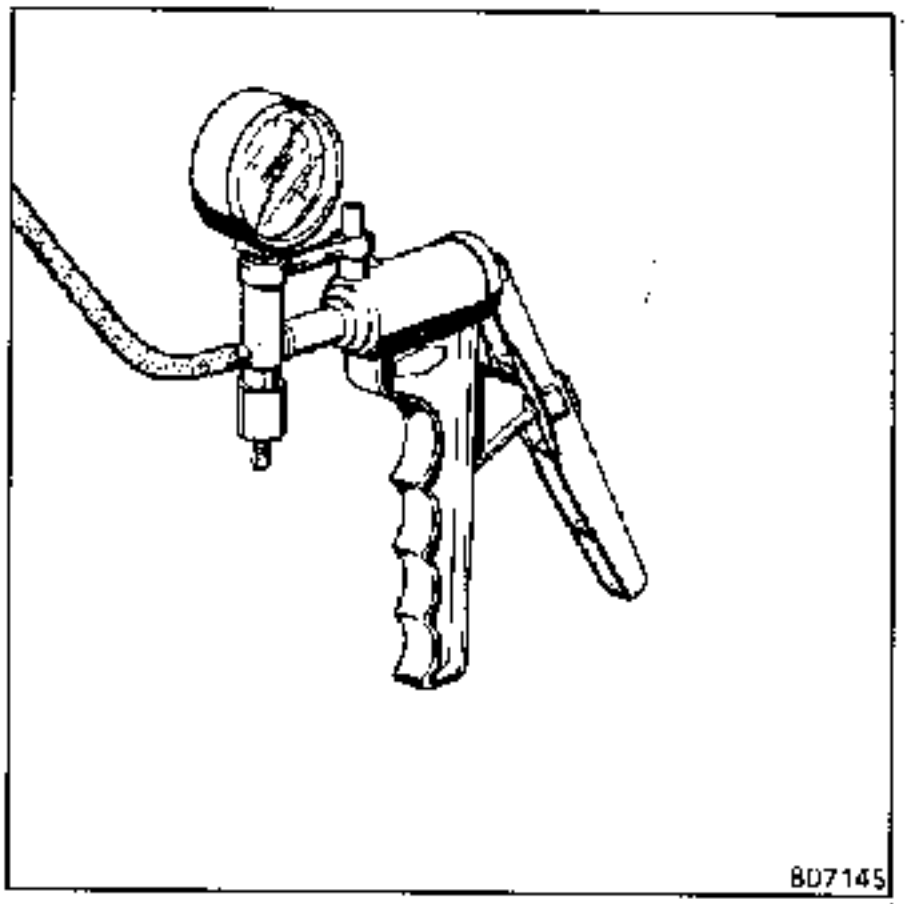


On **OT2** rear axle



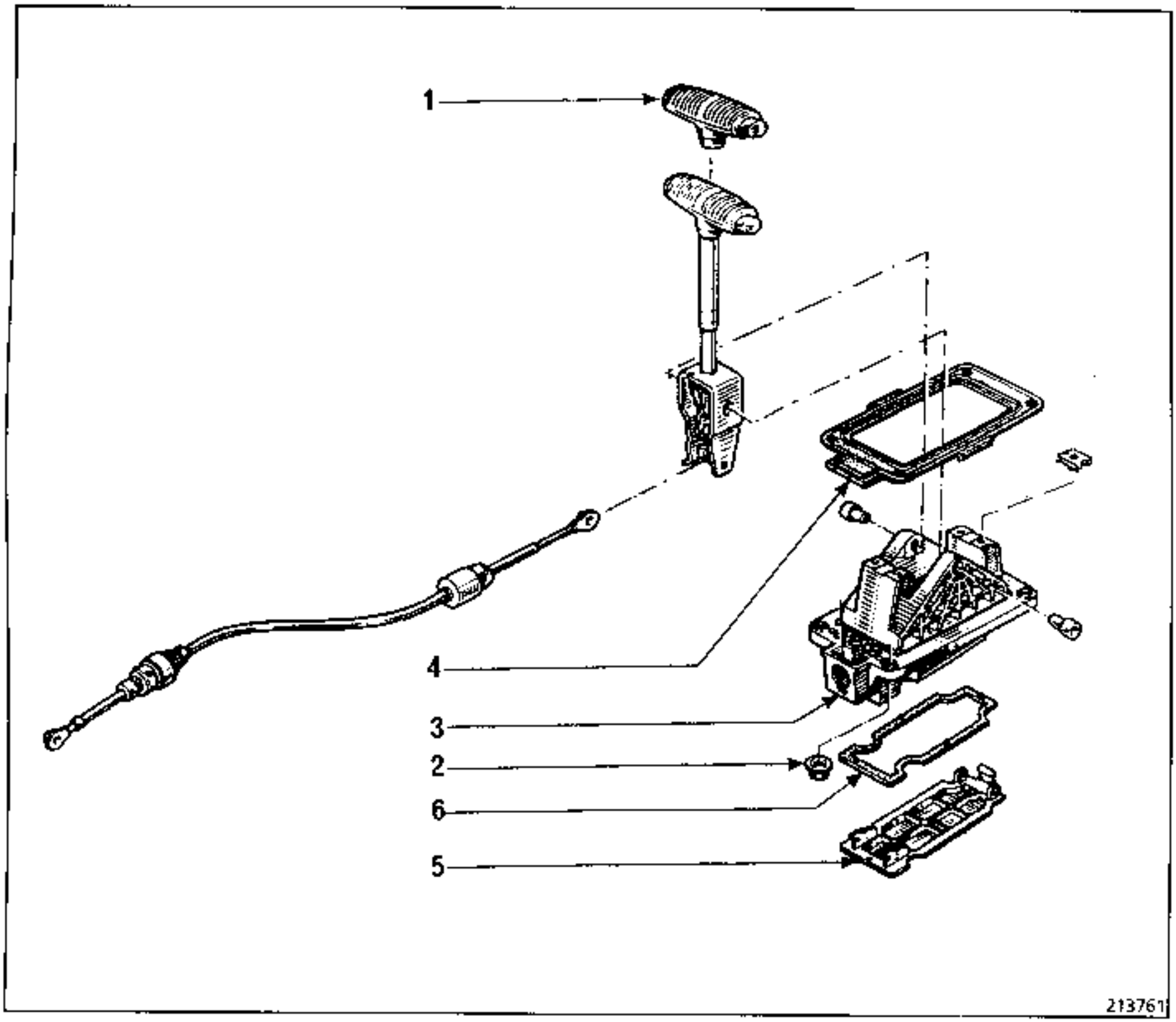
CHECKING THE VACUUM CAPSULE

Connect a manual vacuum pump alternately to the two capsule inlets.



Vacuum to be applied	After needle controlling rod has moved:	
	STABLE	DROPS
0.3 to 0.8 bar	GOOD	INCORRECT

EXPLODED VIEW



1 Control lever handle

2 Nut retaining lever under floor panel

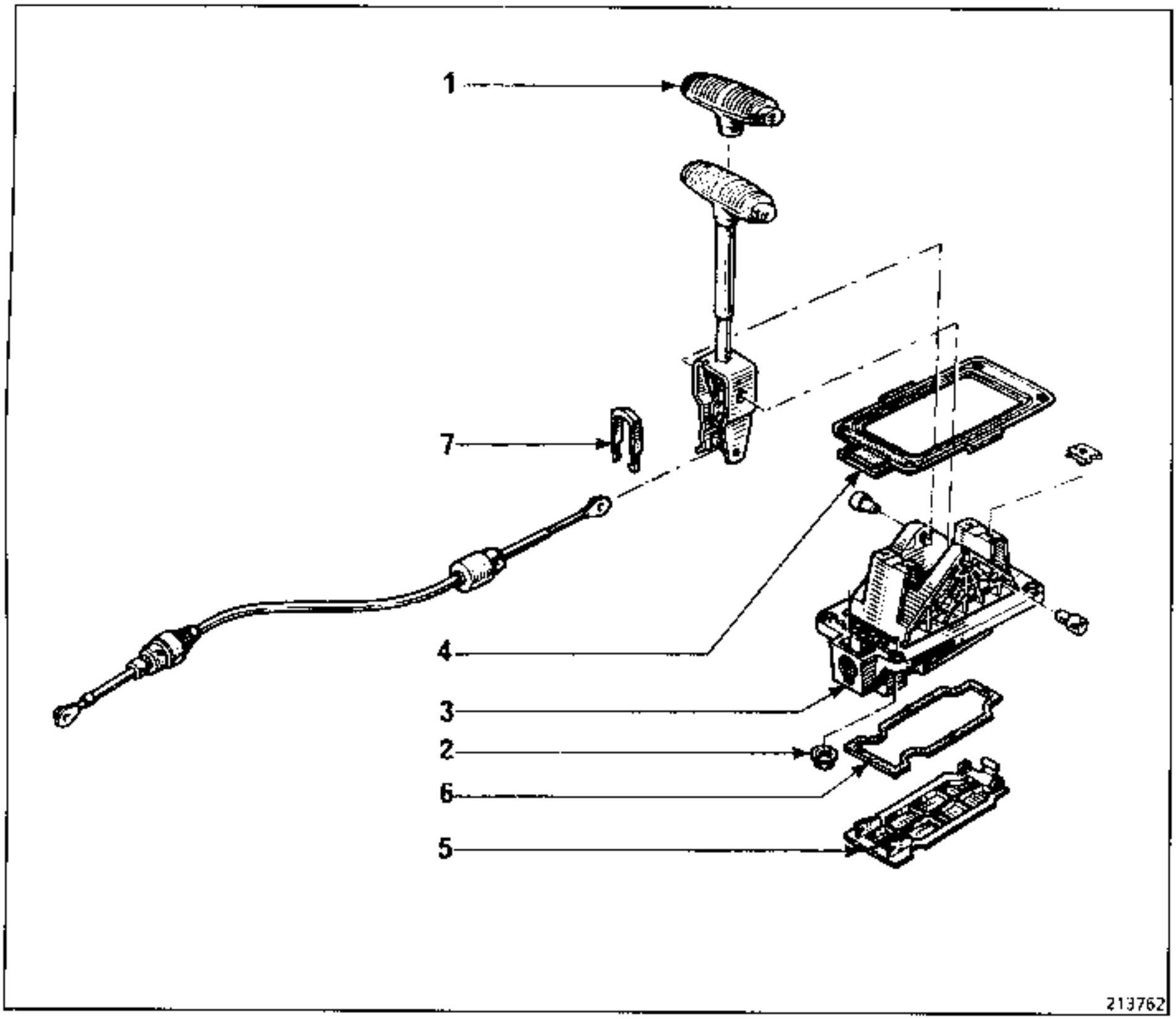
3 Control unit

4 Seal on control unit under floor panel

5 Lower flap

6 Seal

EXPLODED VIEW



1 Control lever handle

2 Nut securing control lever under floor panel

3 Control unit

4 Seal on control unit under floor panel

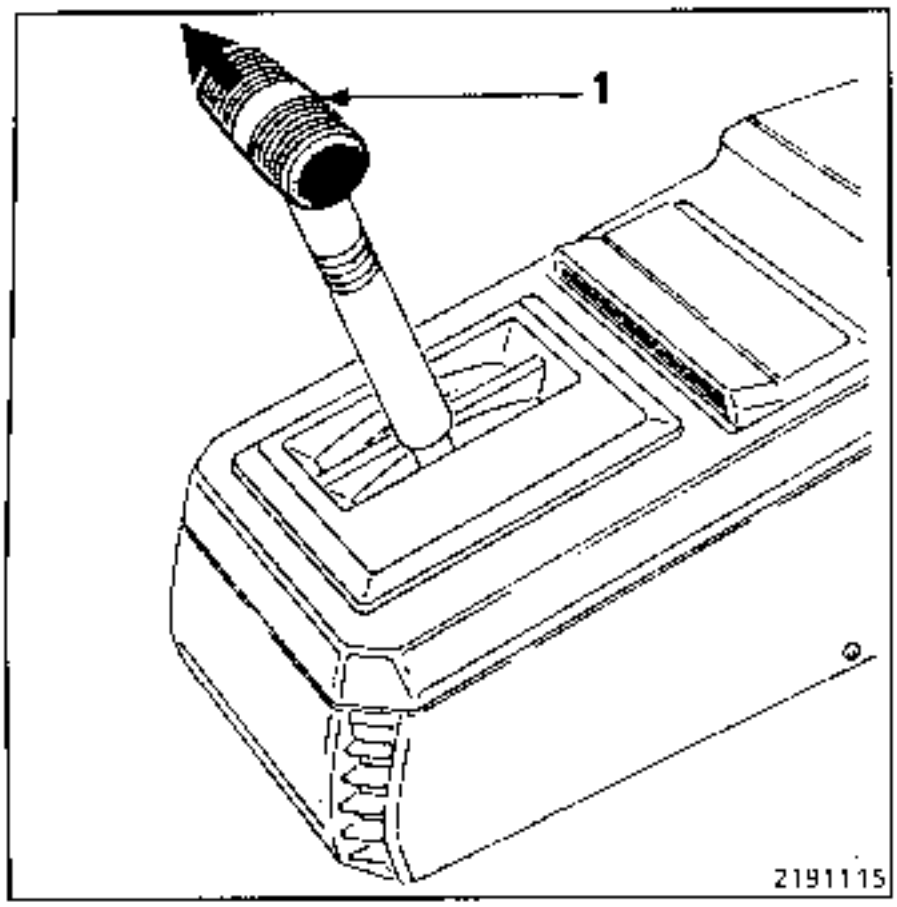
5 Lower flap

6 Seal

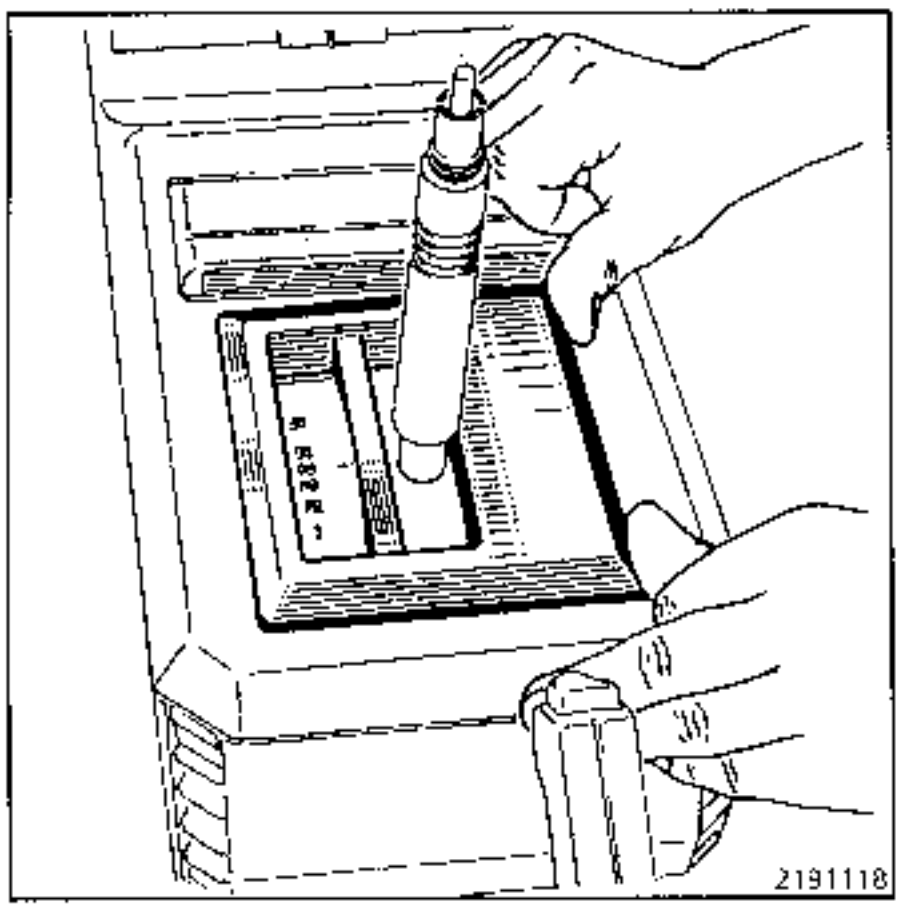
7 Locking key

REMOVING

Remove handle (1) from the control lever, moving it upwards.



Remove the console embellisher by pressing on the left-hand side and raise it to free the grips.

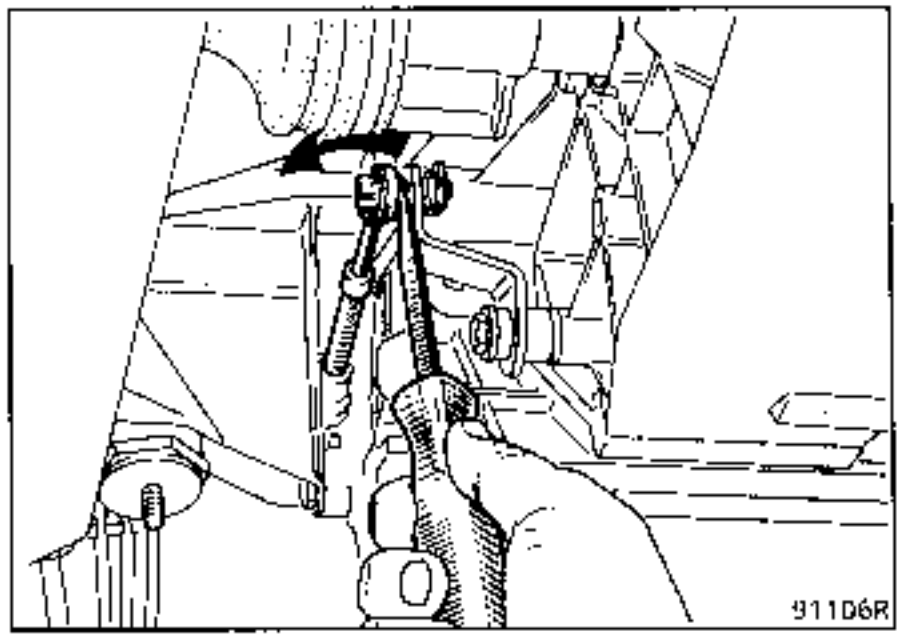


Remove the exhaust primary down pipe coupled to the intermediate pipe.

Remove the 4 nuts holding the control lever under the floor panel.

Disconnect the light from the repeater.

Unclip the control cable from the relay outer ball joint.



Lower the engine/gearbox cradle by 15 mm by unscrewing the two rear mountings.

Remove the right-hand mounting from the automatic transmission.

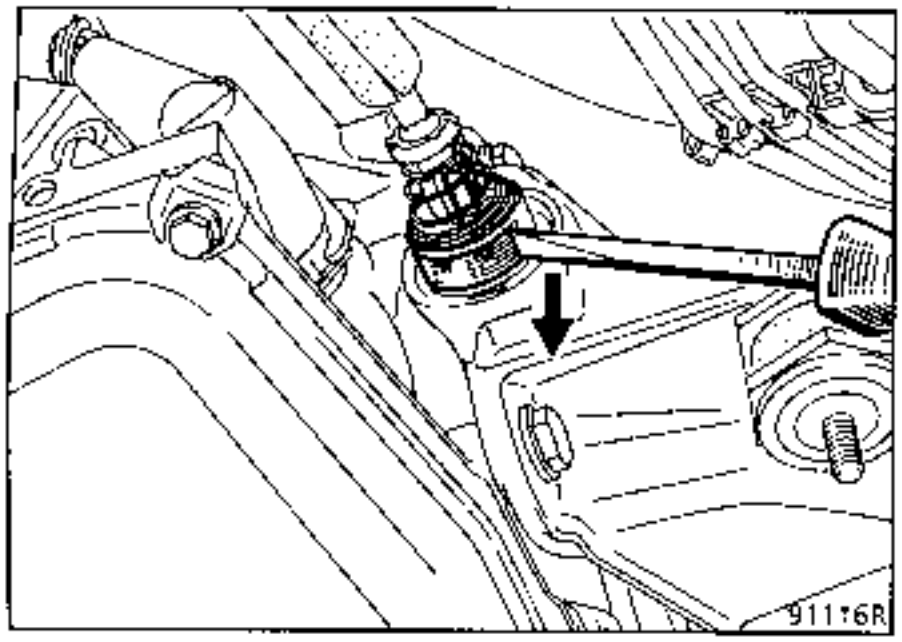
Free the complete control assembly (mounting, cable and lever).

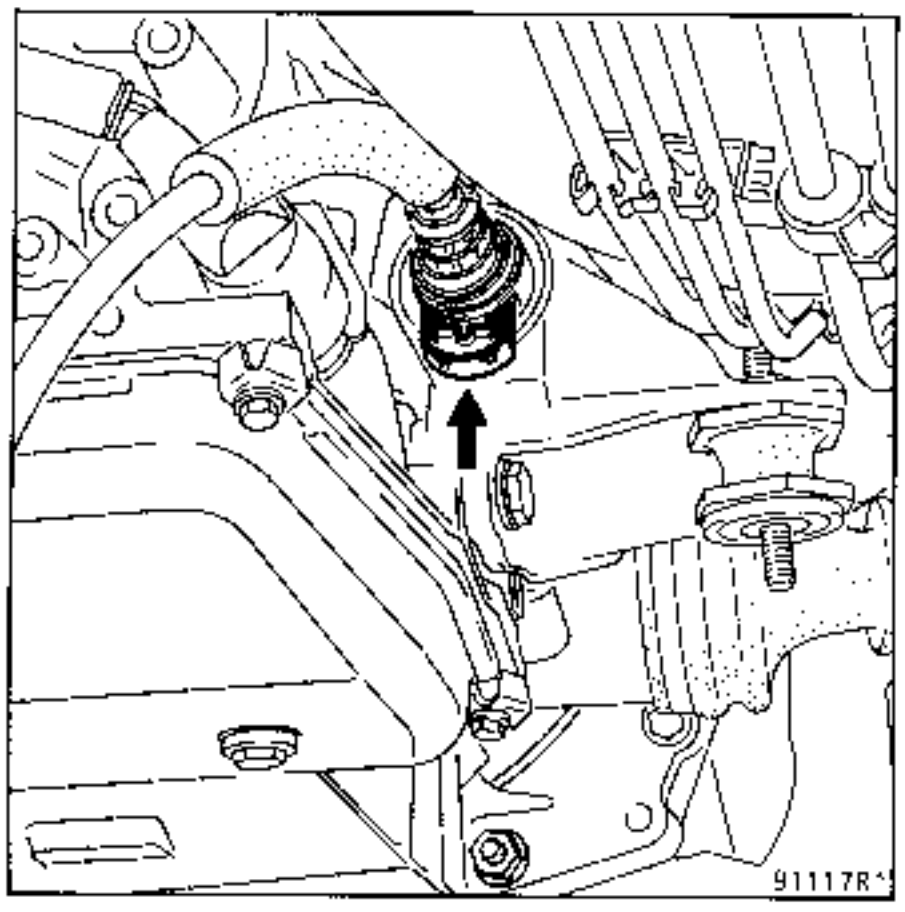
REFITTING - ADJUSTING

Fit in place the right-hand transmission mounting coupled to the control cable and lever.

Tighten the cradle rear mounting bolts.

Release the control cable setting and free it sufficiently to release the setting device.

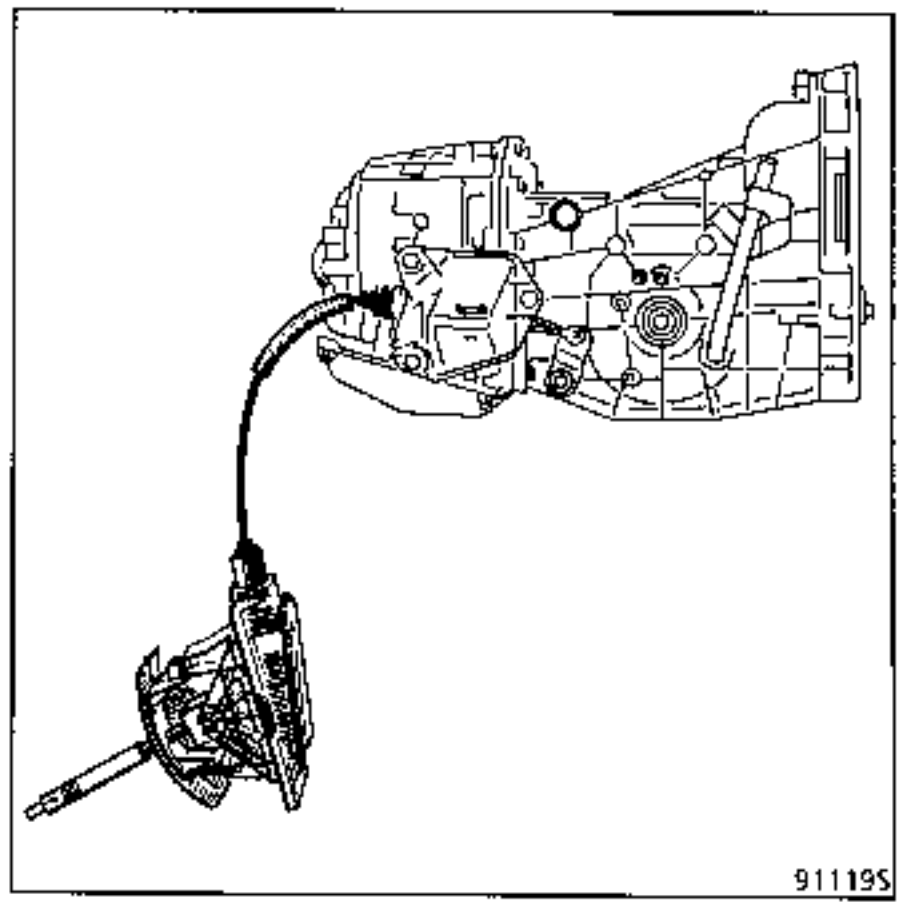


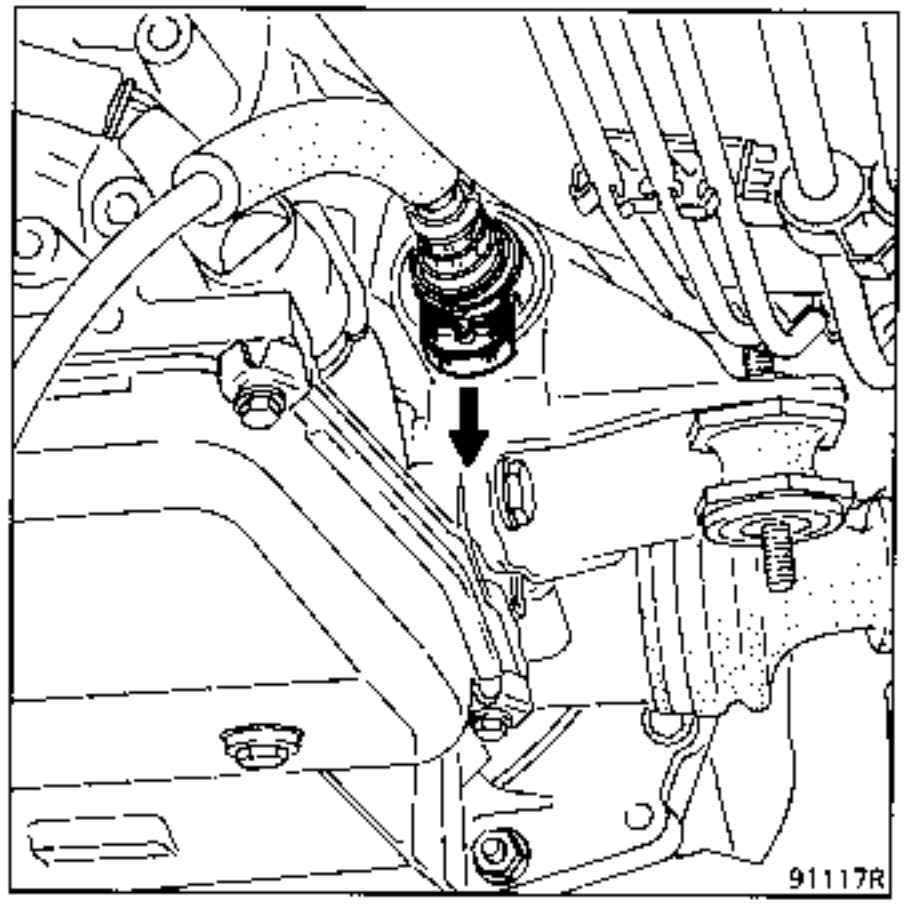


Place the control lever in (D) and the automatic transmission.

Clip the cable ball joint on to the swivel lever.

In this position, with the control assembly hanging under the vehicle, clip the adjusting latch in place.





Under the floor panel, engage the control unit equipped with its seal.

Connect the repeater light.

Screw the four mounting nuts under the body.

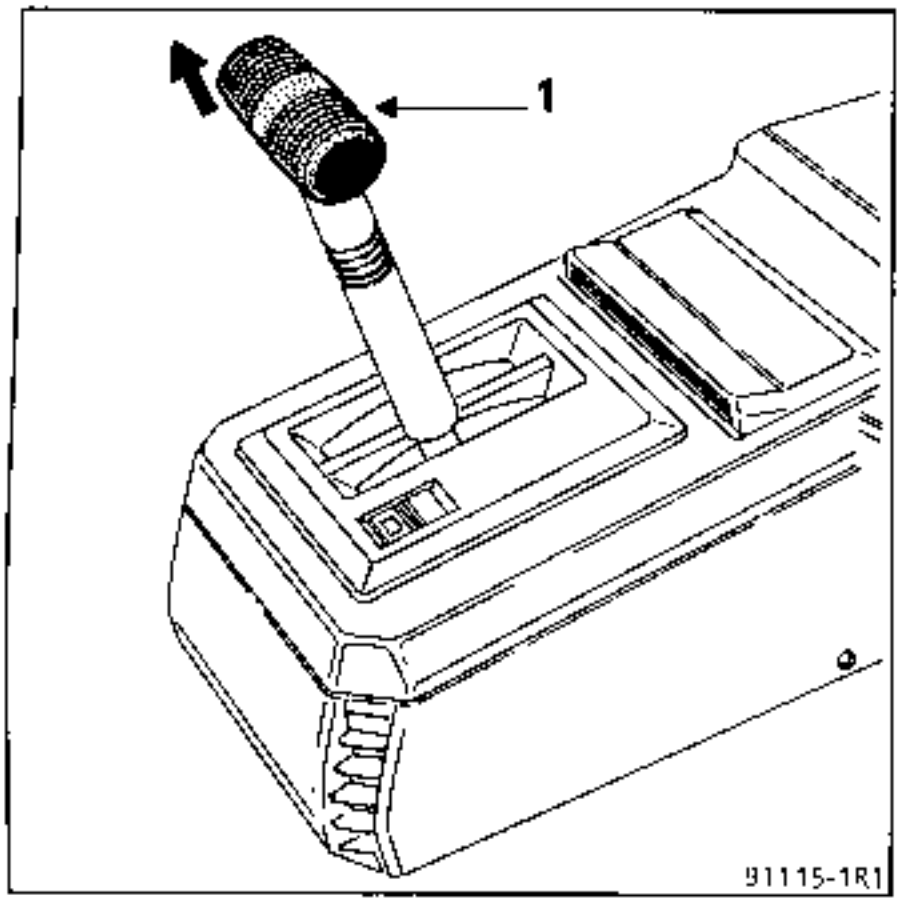
Refit the exhaust.

Clip on the console embellisher and control lever handle.

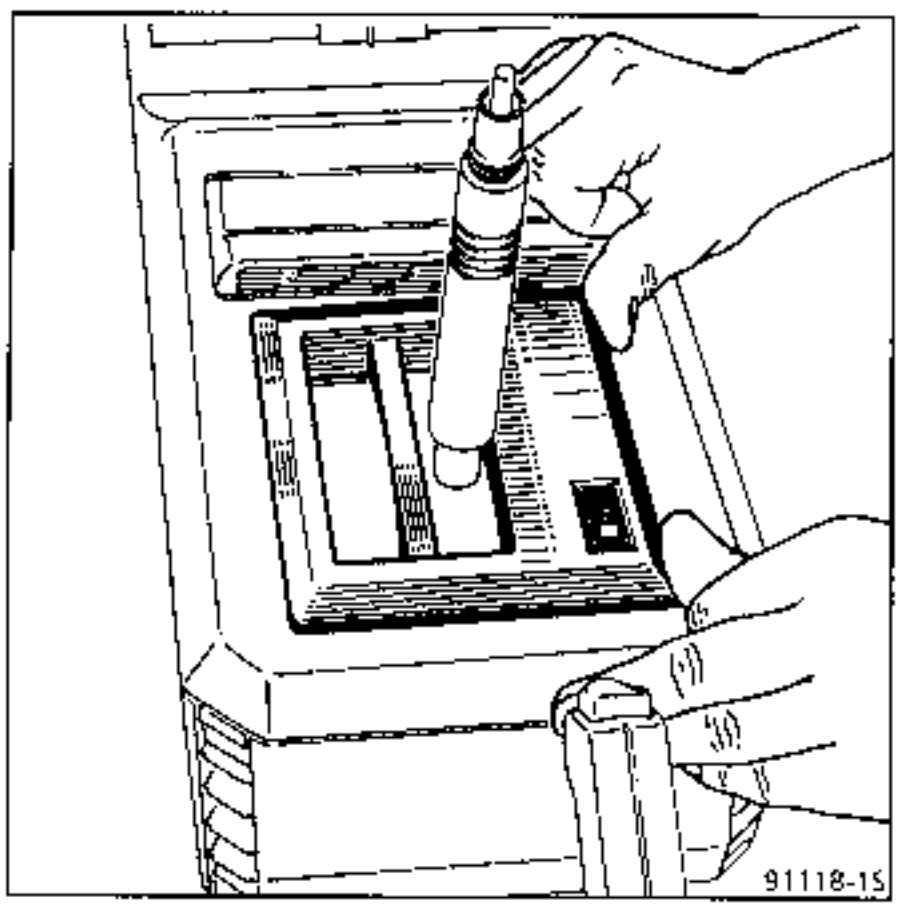
Check the controls operate correctly.

REMOVING

Remove handle (1) from the control lever by moving it upwards to free it.

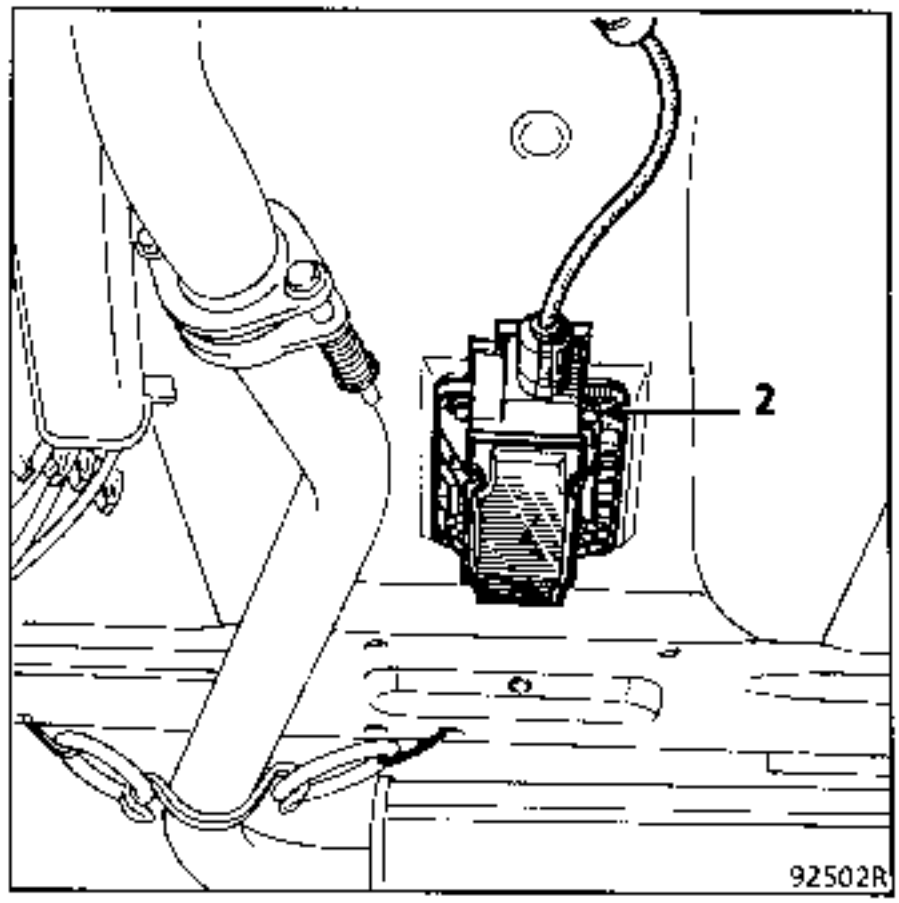


Remove the console embellisher pressing on the left-hand side and raise it to free the grips.



Remove the exhaust primary down pipe coupled to the intermediate pipe.

Remove the four nuts holding the control lever under the floor panel (2).



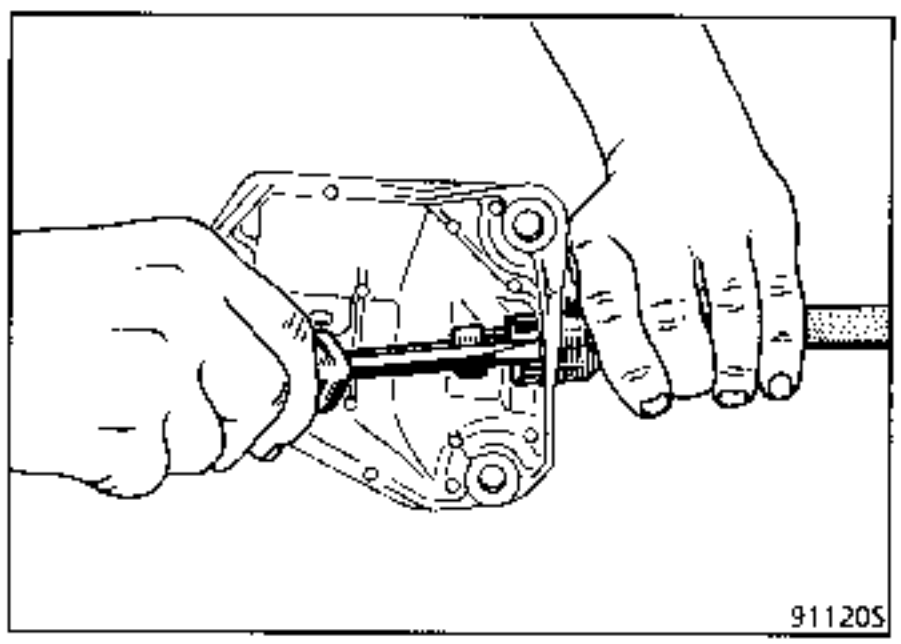
Disconnect the light from the repeater.

Unclip the control cable from the lever ball joint on the transmission.

Remove the right-hand mounting from the automatic transmission.

Free the complete control assembly (mounting, cable and lever).

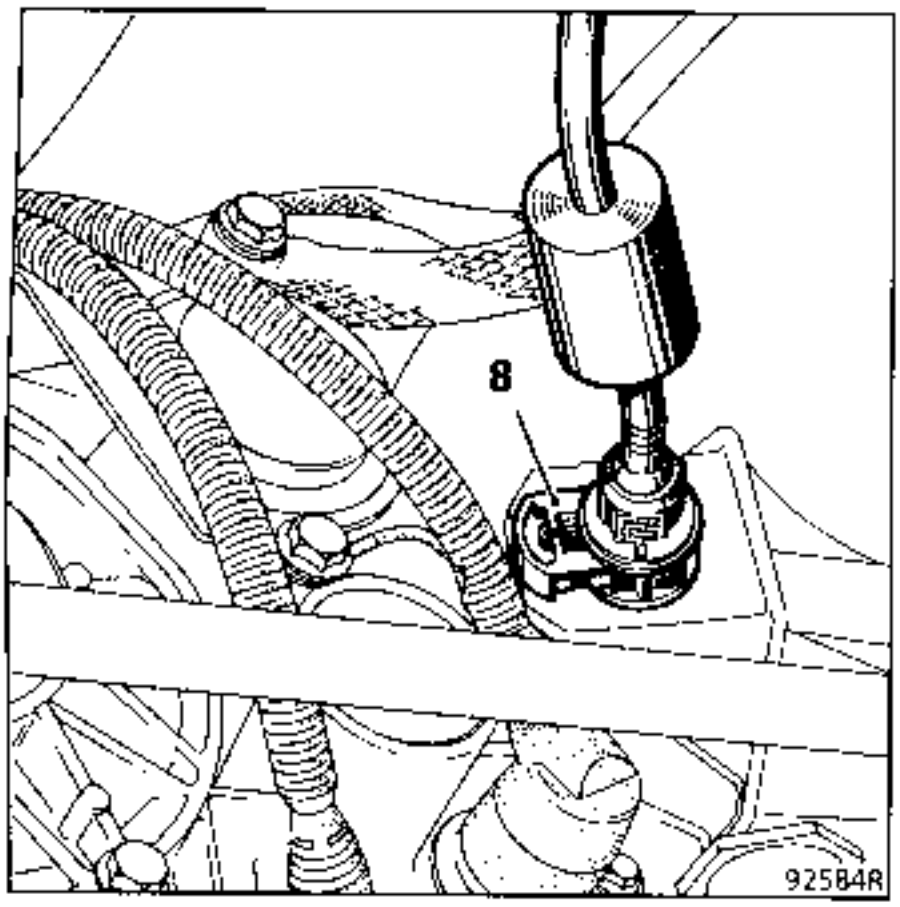
Separate the control from the right-hand transmission mounting.



REFITTING - ADJUSTING

Fit in place the right-hand transmission mounting coupled to the control cable.

Release the control cable setting and free it sufficiently to release the setting device.



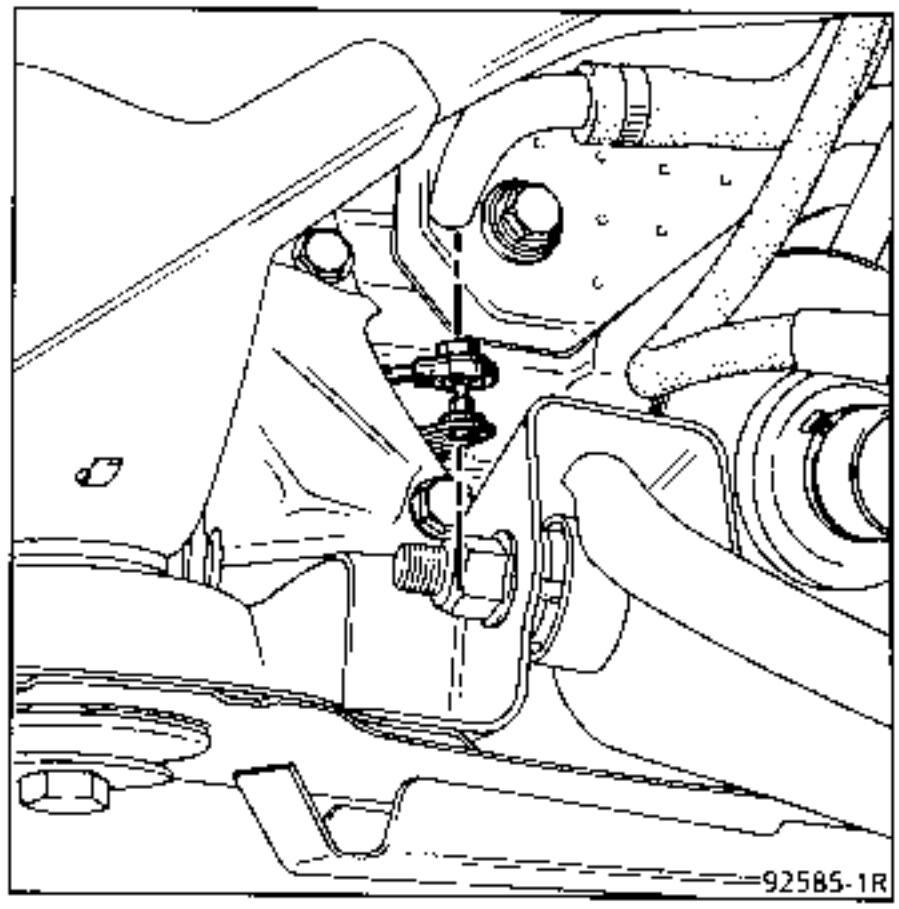
Under the floor engage the control unit equipped with its seal.

Connect the repeater light.

Screw up and tighten the four mounting nuts (2) under the body.

Clip on the console embellisher and control lever handle.

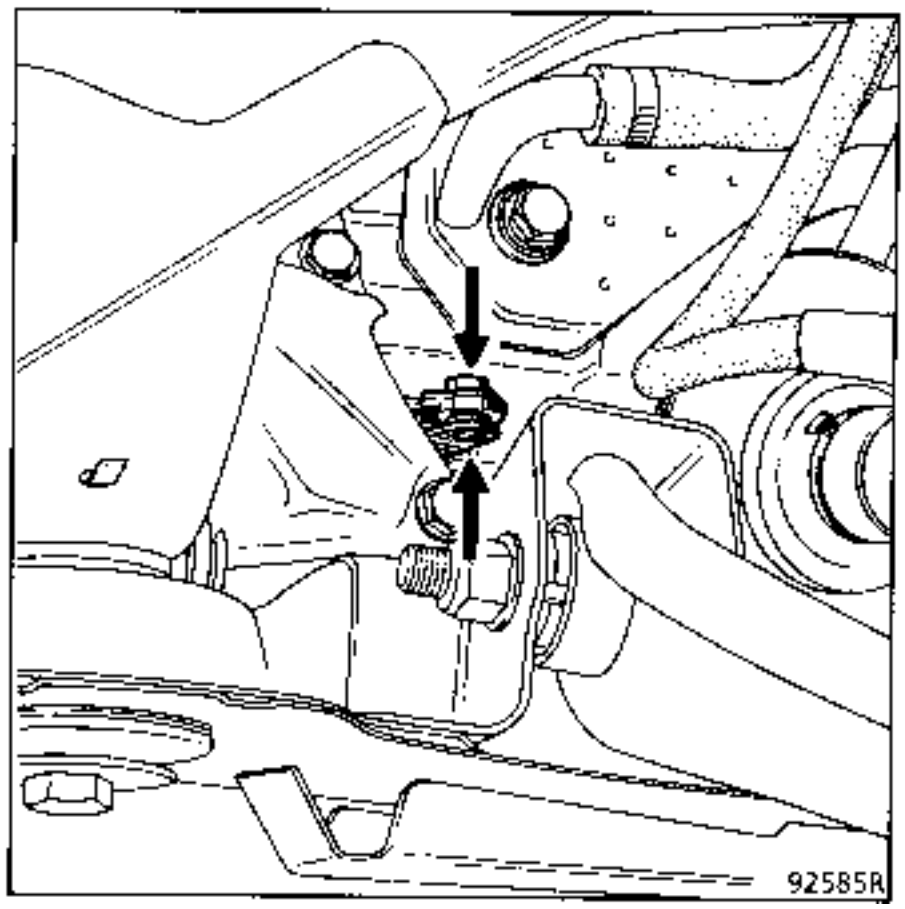
Place the control lever in 1st gear "hold" as well as the automatic transmission (gearbox lever as far as it will go on drive shaft side).

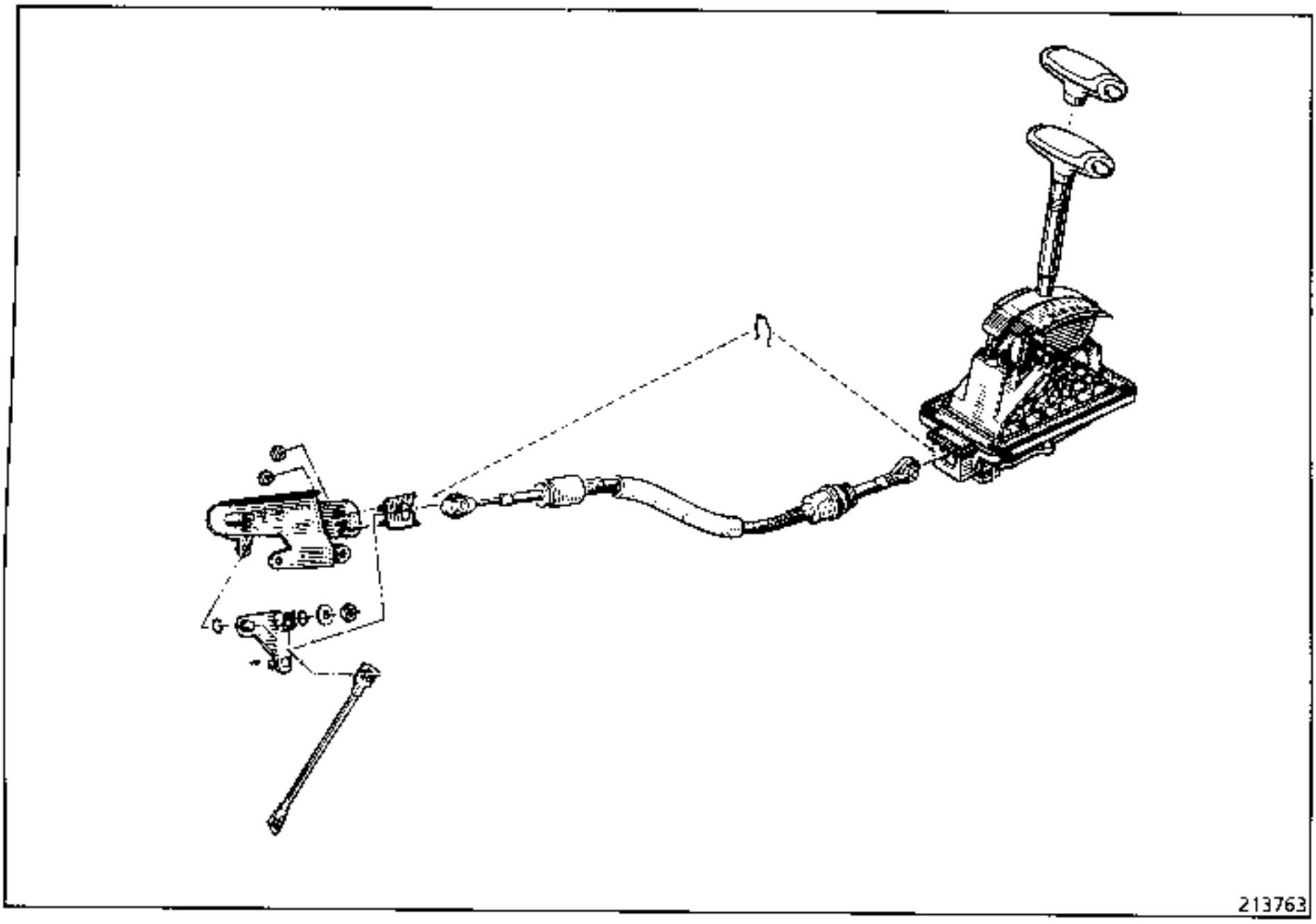


Align the cable ball joint with the ball joint on the gearbox lever, adjusting the position of the sheathing.

Lock the sheathing by pushing back catch (8).

Clip the control cable on to the gearbox lever using multi-socket pliers.



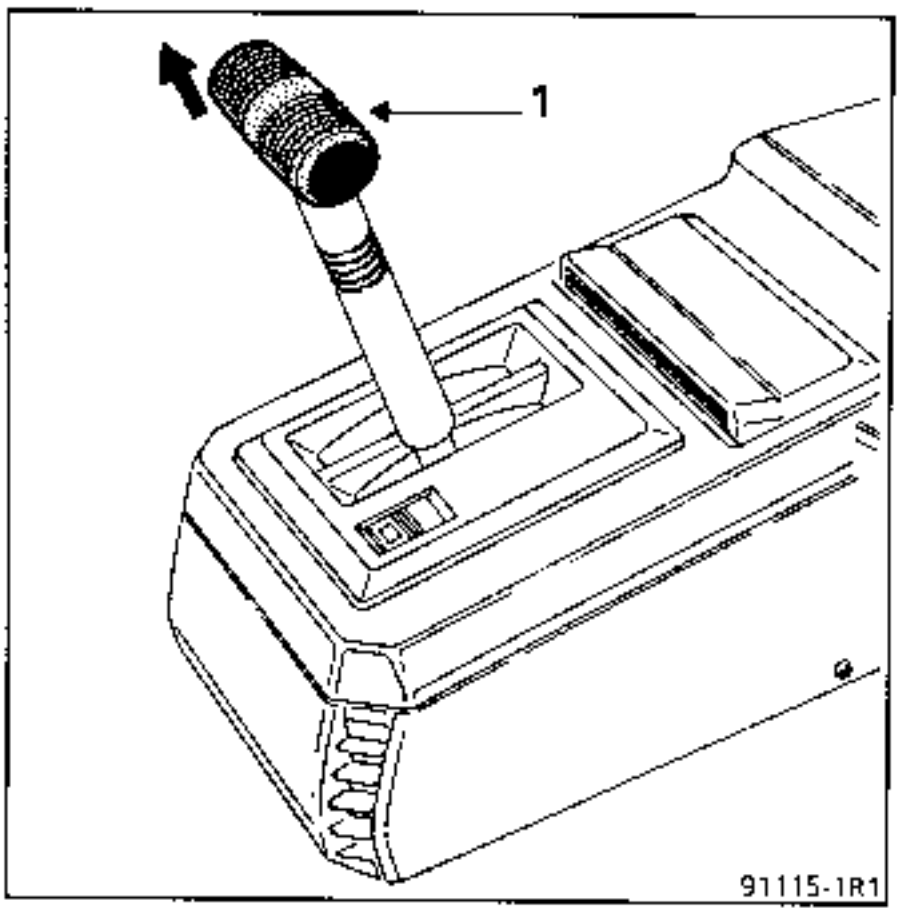


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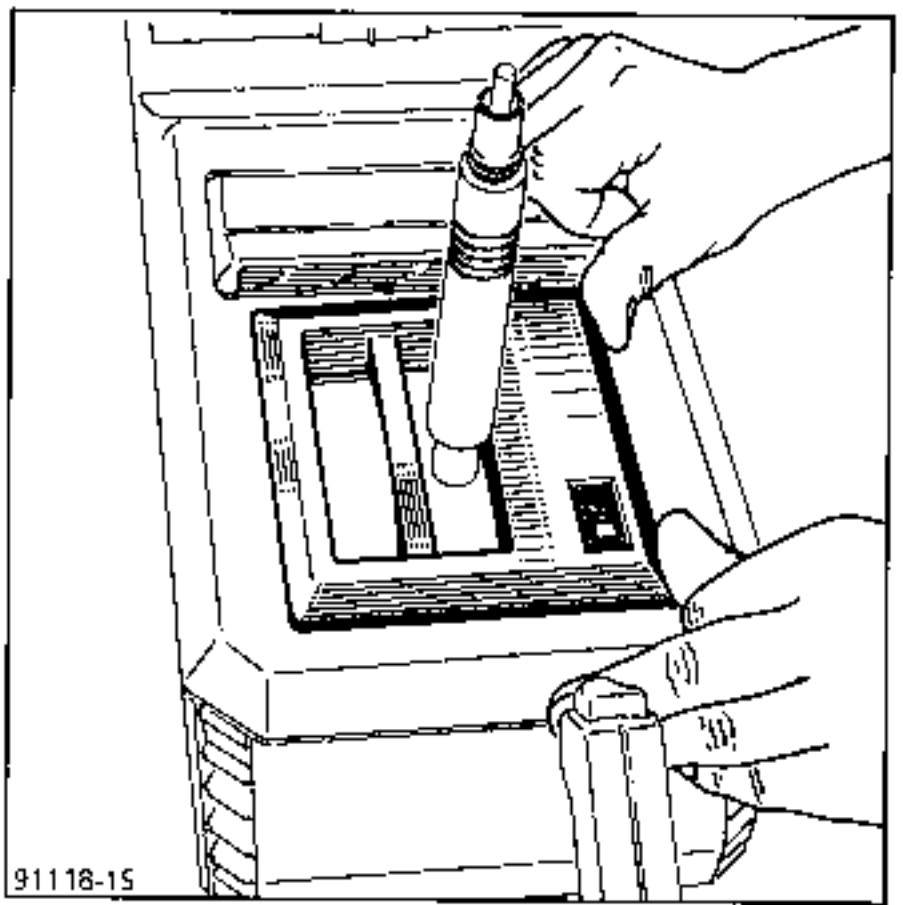
REMOVING

Passenger compartment side:

Remove the control lever handle (1) by moving it upwards to free it.



Remove the console embellisher pressing on the left-hand side and raise it to free the grips.

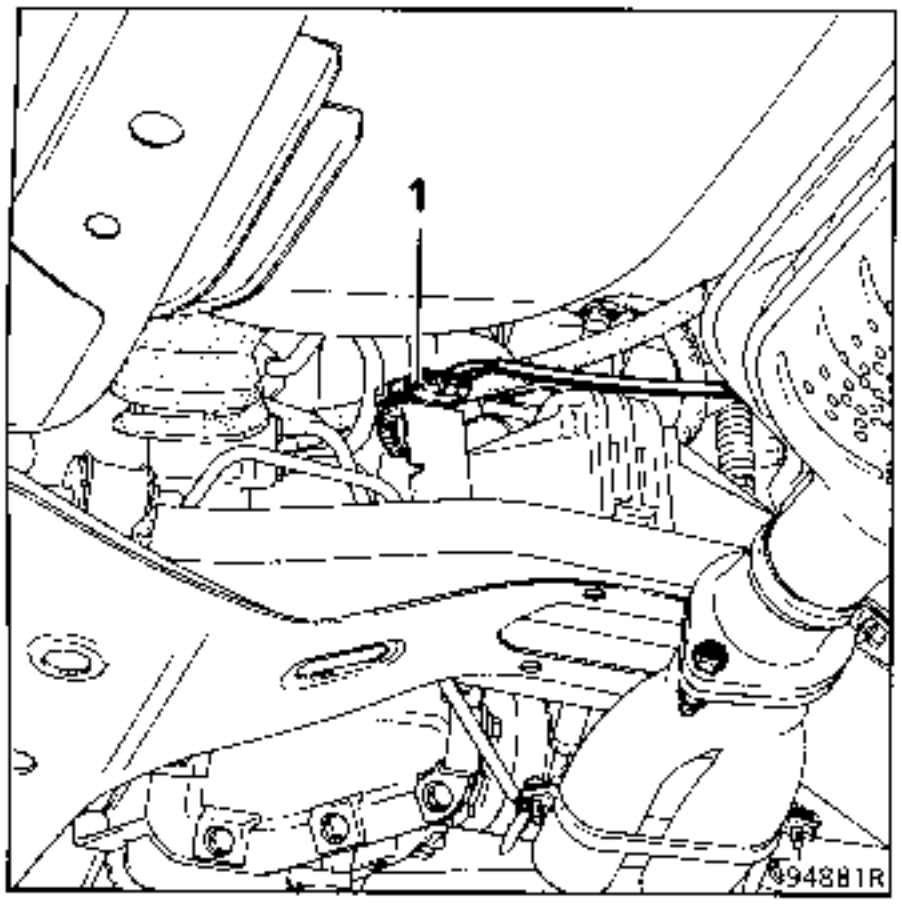


Disconnect the light from the repeater.

Under the vehicle :

Disconnect the oxygen sensor connector (1).

Remove the two bolts securing the flange. Save the seal to be used again.



Remove the protective cover (6).

Disconnect the ends of the cable.

Remove:

- the four retaining nuts on the control unit and take it out to move it downwards,
- the cable retaining clips.

REFITTING - ADJUSTING

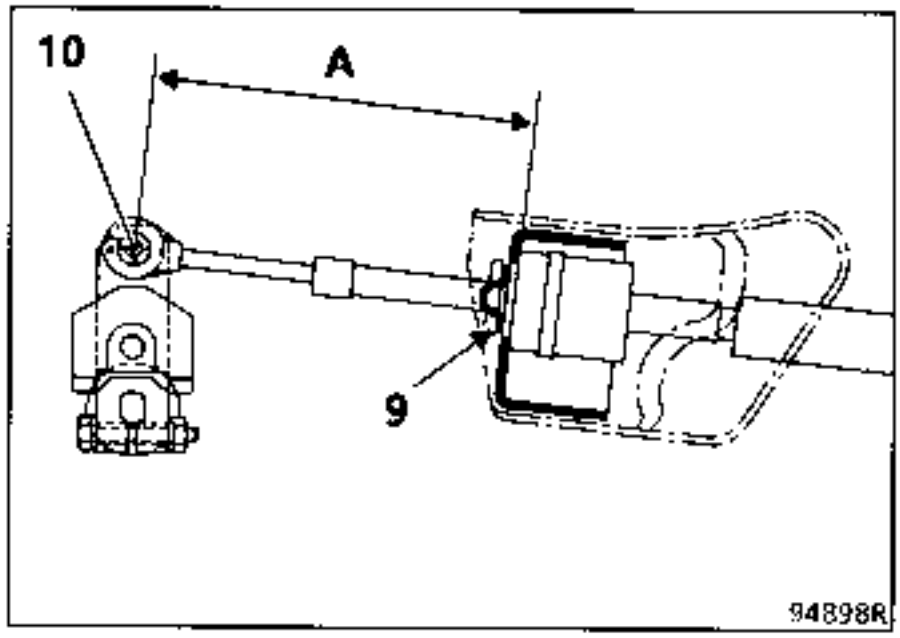
The automatic transmission must be in position (D).

Automatic transmission :

Before refitting the cable, check dimension (A) between surface where the cable makes contact with the sheath stop (9) and the locking ball joint (10).

$$A = 131 \text{ mm}$$

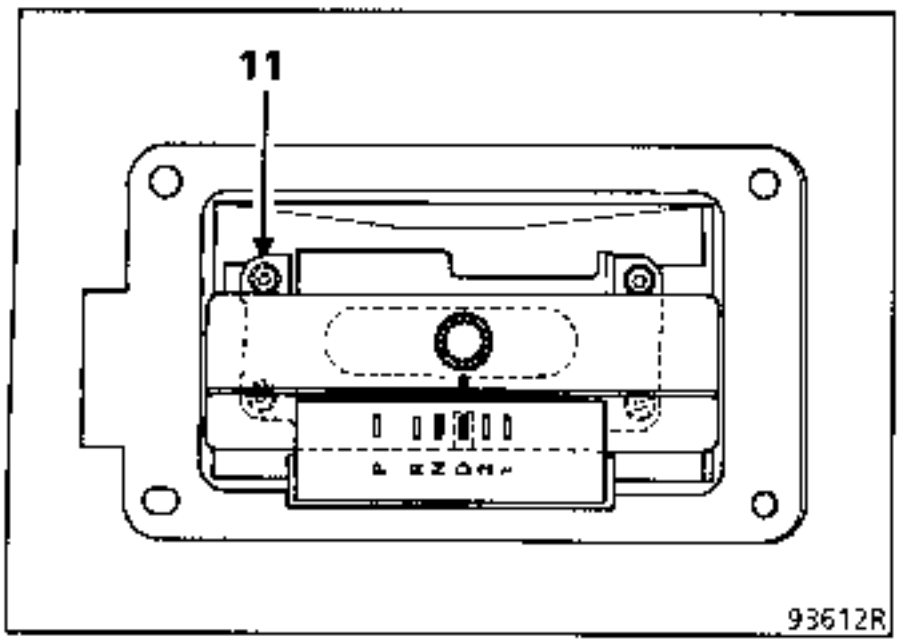
If necessary, slacken off screw (12) to obtain this dimension.



Control unit side (5) :

Place the selector in (**D**) (Drive) position.

Before tightening the four bolts (**11**) align the two marks on the surround and the repeater.



CHECKING THE CABLE

Release the sheath stop by moving it a quarter of a turn and make sure that the cable can slide easily.

FITTING

Fit the cable:

- to the automatic transmission with **D** still selected,
- on the control unit (with **D** still engaged) and turn the sheath stop a quarter of a turn to lock it.

Replace the control unit on the vehicle.

Remount the flange, using a new seal.

Reconnect the oxygen sensor connector.

Refit the console embellisher and the control lever handle.

Check the gear lever action, check that the ignition engages in position (**P**) and (**N**) and operation (**Park**).

If adjustment is incorrect, release the sheath stop by turning it a quarter of a turn and pull or push the cable, depending on the adjustment required.

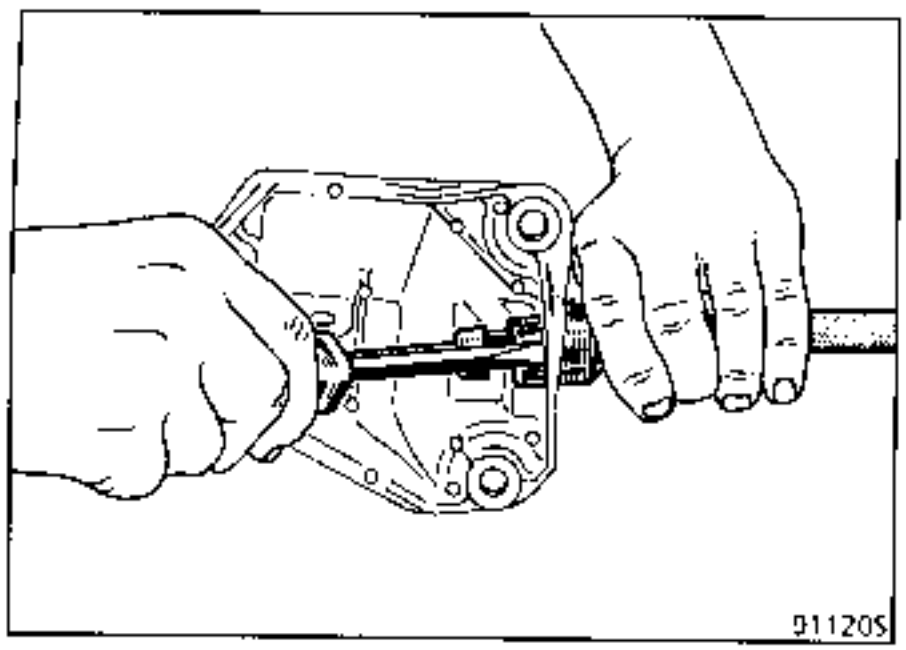
Do not forget to secure the sheath stop (**8**) again at the end of the operation.

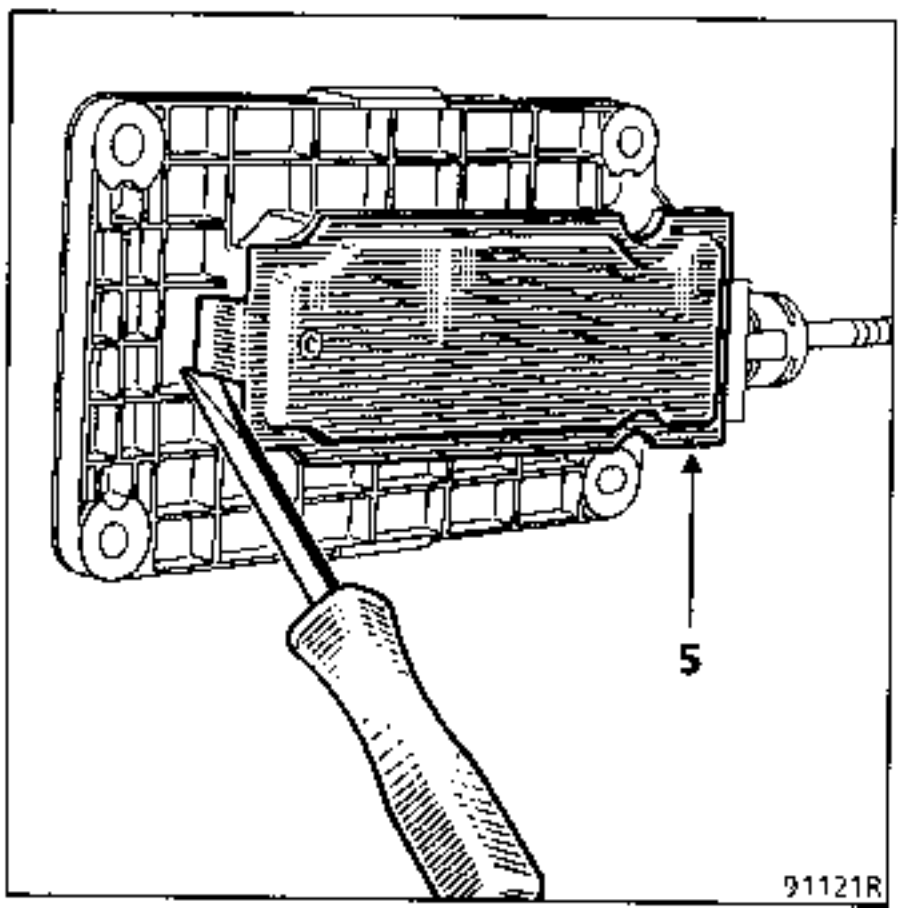
REPLACING

The control cable can only be removed when the control assembly has been removed (see section entitled "**Removing the control cable**").

Unclip the cable from the transmission right-hand mounting.

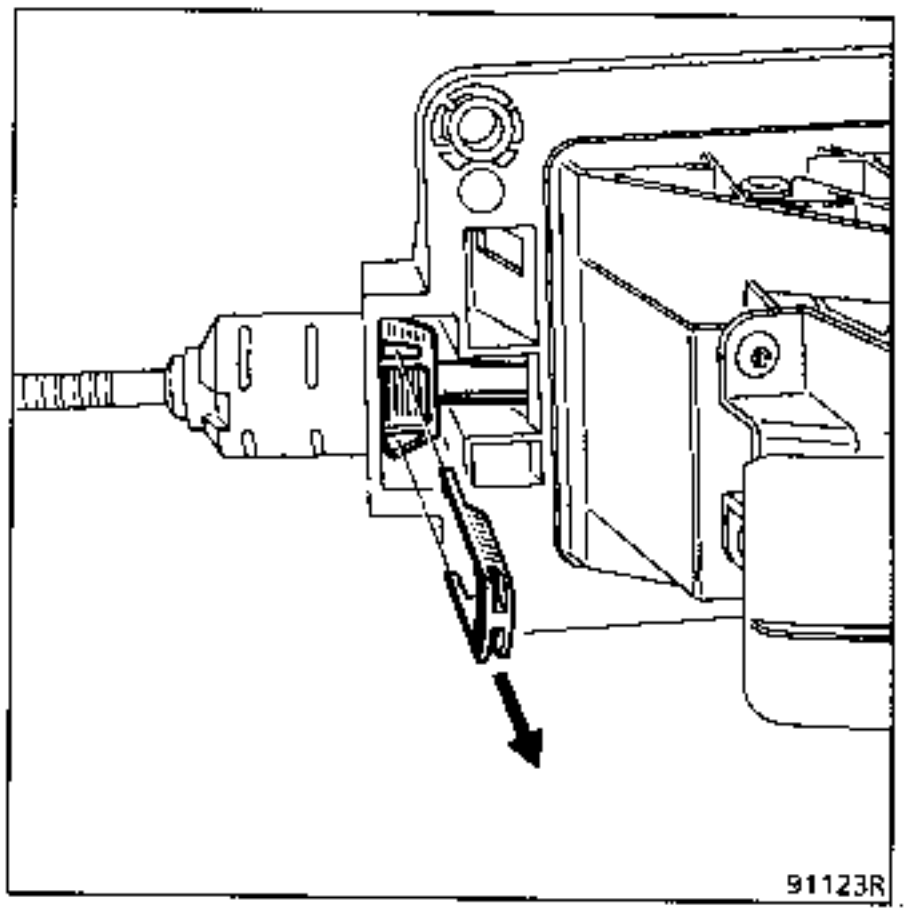
Open the lower flap (5) on the control unit using a screw driver.



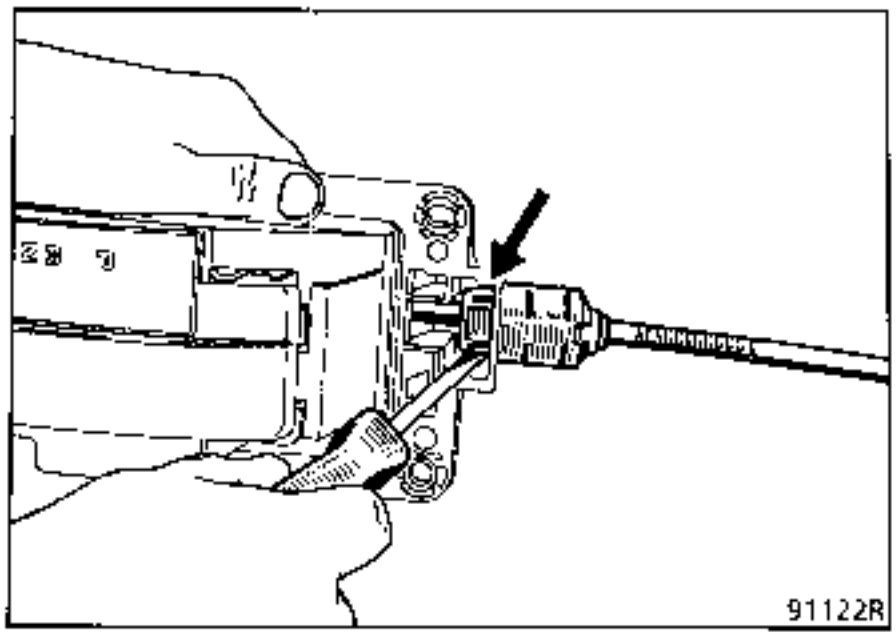


Unclip the ball joint from the base of the lever.

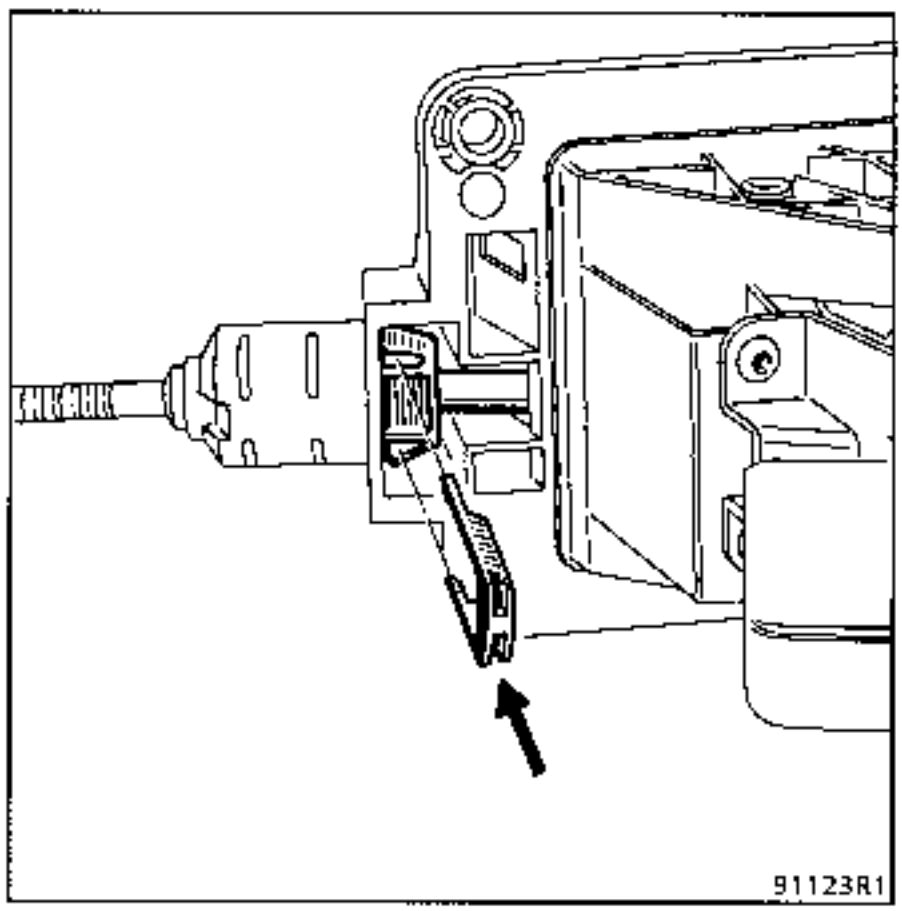
Remove the key locking the cable in the casing.



Release the cable by pressing on the two locking catches in the casing.



On reassembly, assemble the cable on the casing. (Ensure the key is placed in the correct direction.).



Clip the ball joint on the base of the lever.

Close the base of the casing using the seal and flap.

Clip the cable on to the transmission mounting.

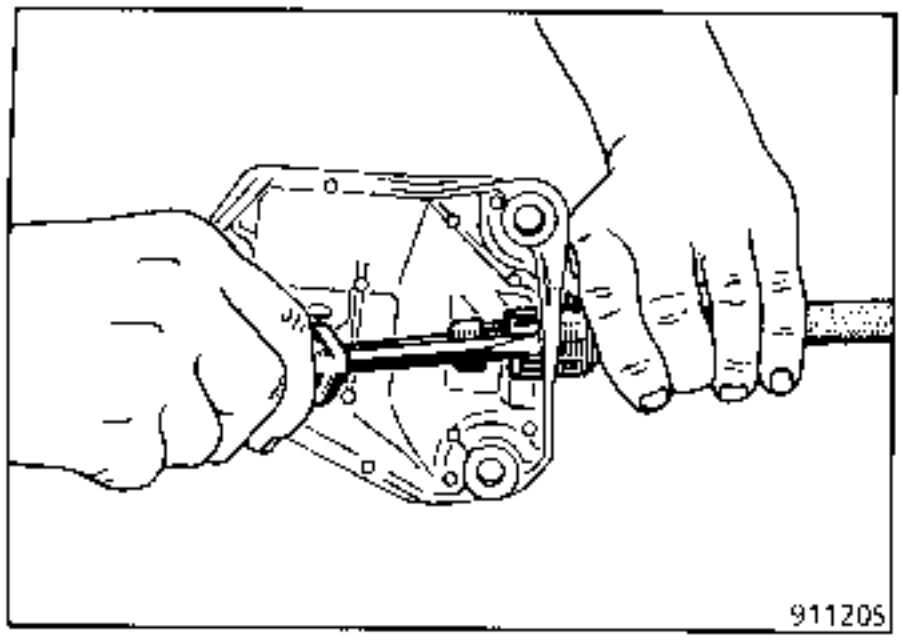
Proceed as in the section for "**Reassembling and adjusting the control assembly**".

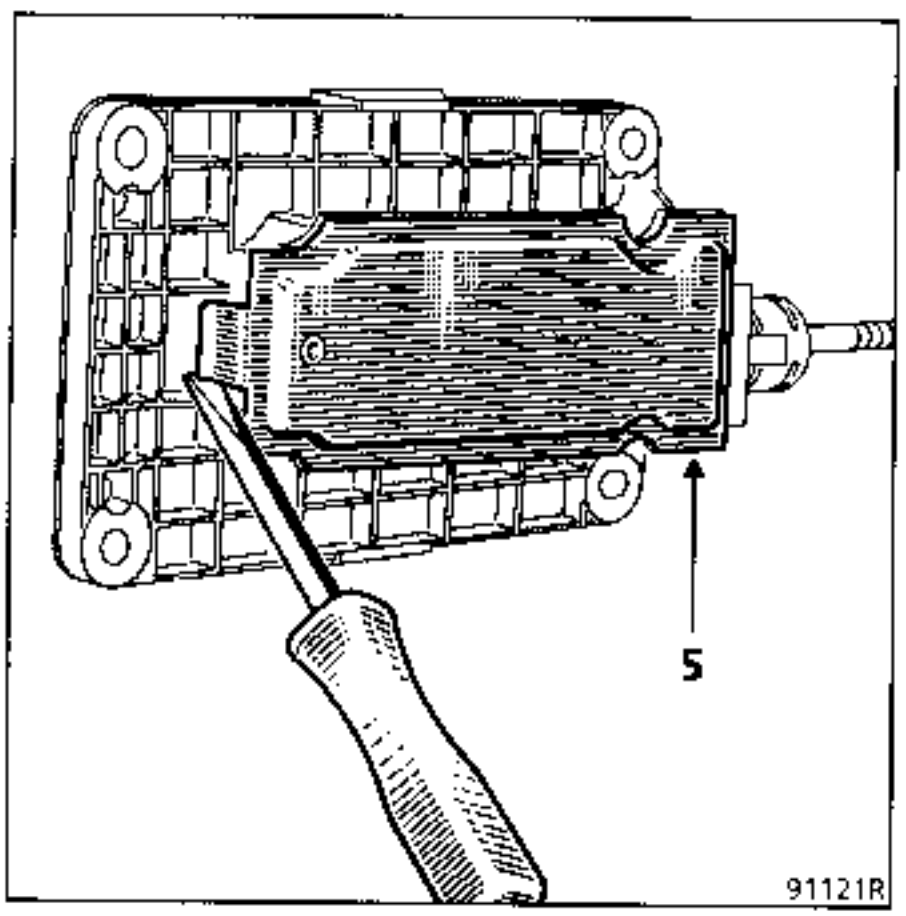
REPLACING

The control cable can only be removed when the control assembly has been removed (see section entitled "**Removing the control**").

Unclip the cable from the transmission right-hand mounting.

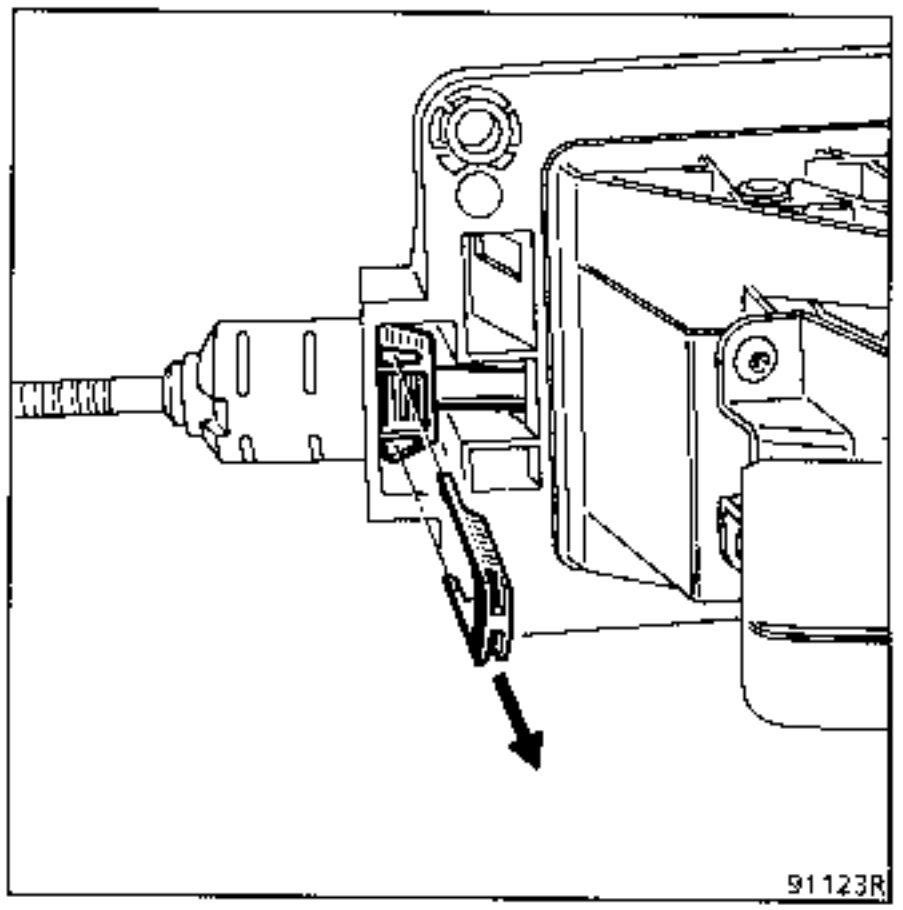
Open the lower flap (**5**) on the control casing using a screwdriver.



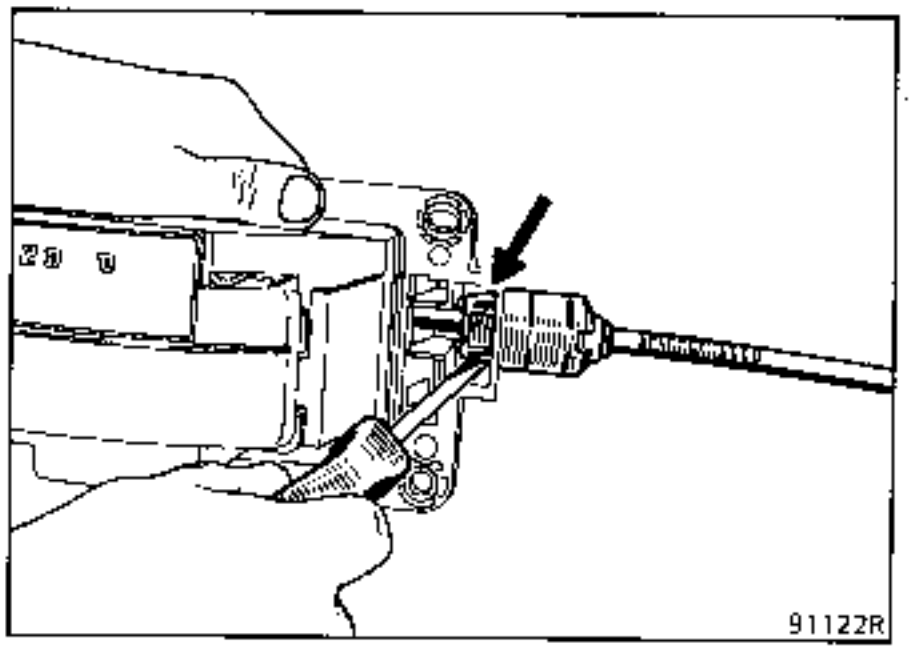


Unclip the ball joint from the base of the lever.

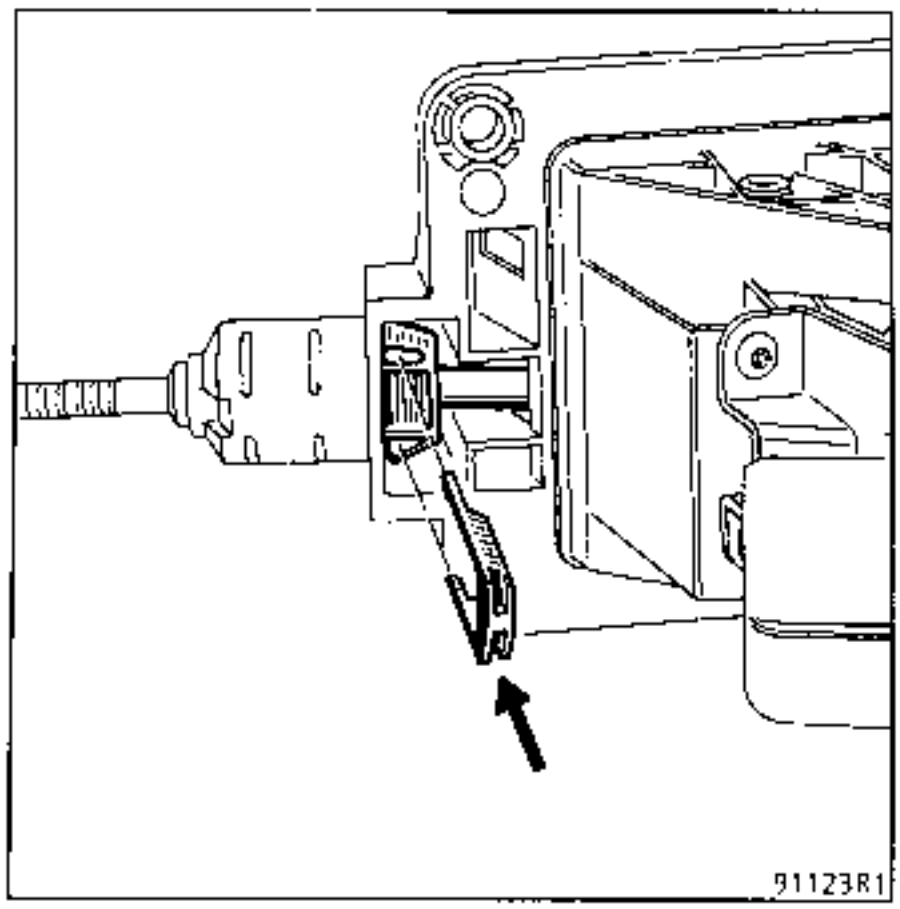
Remove the key locking the cable in the casing.



Free the cable by pressing on the two locking catches in the casing.



On reassembly, assemble the cable on the casing. (Place the key in the correct direction.)



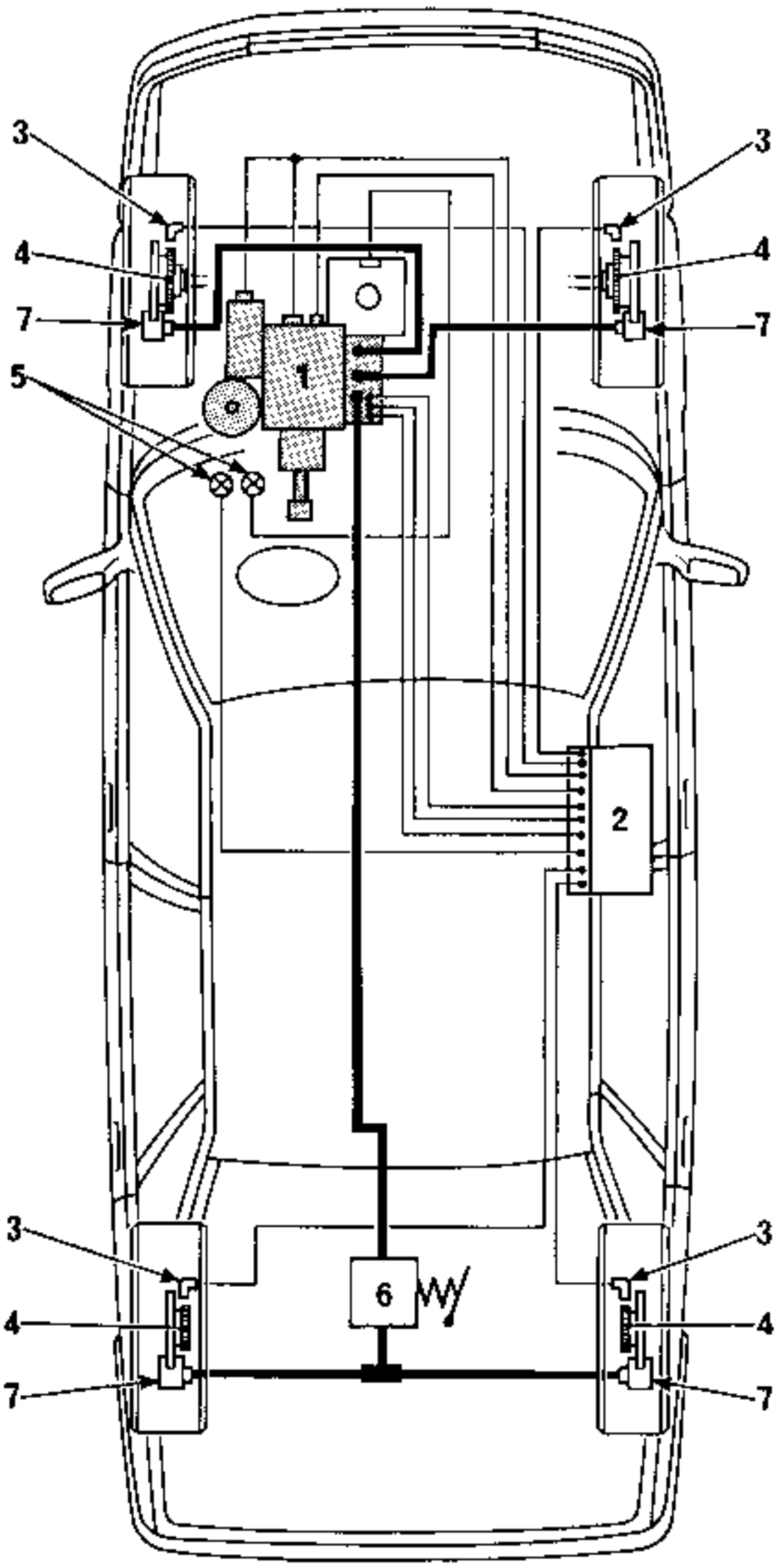
Clip the ball joint on to the base of the lever.

Close the bottom of the casing using the seal and flap.

Clip the cable on to the transmission mounting.

Proceed as in the section for "**Reassembling and adjusting the control assembly**".

LOCATION AND COMPOSITION



21A91342

LOCATION AND COMPOSITION

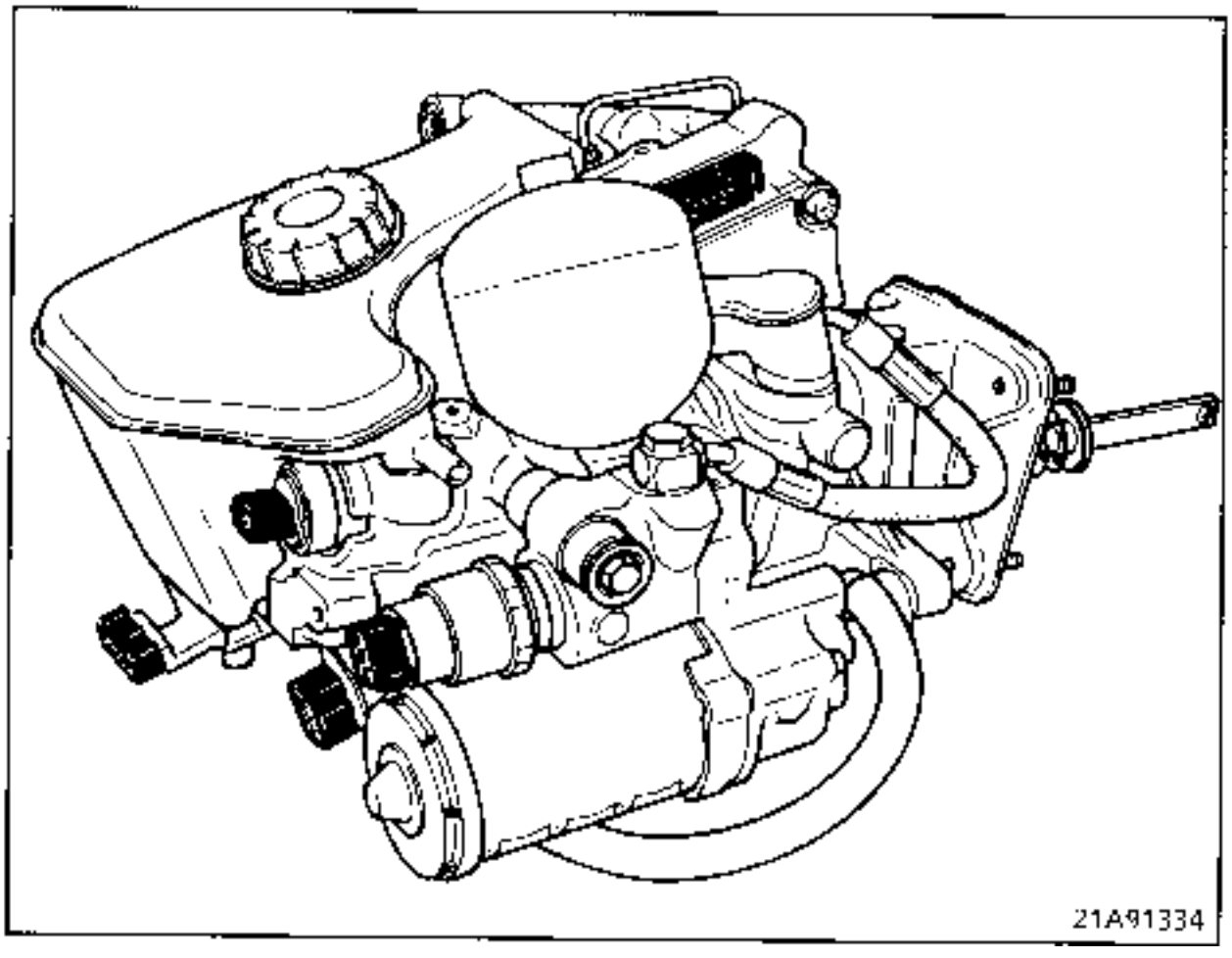
The ABS consists of:

- a hydraulic unit (1) comprising: a tandem master cylinder, a hydraulic unit for assisting braking and a regulating unit,
- a computer (2) comprising a self-test device,
- a rotational speed sensor (3) for each wheel,
- four sensor targets (4), press-fitted on the drive shafts at the front and on the wheel hubs at the rear,
- two control warning lights (5) on the instrument panel.

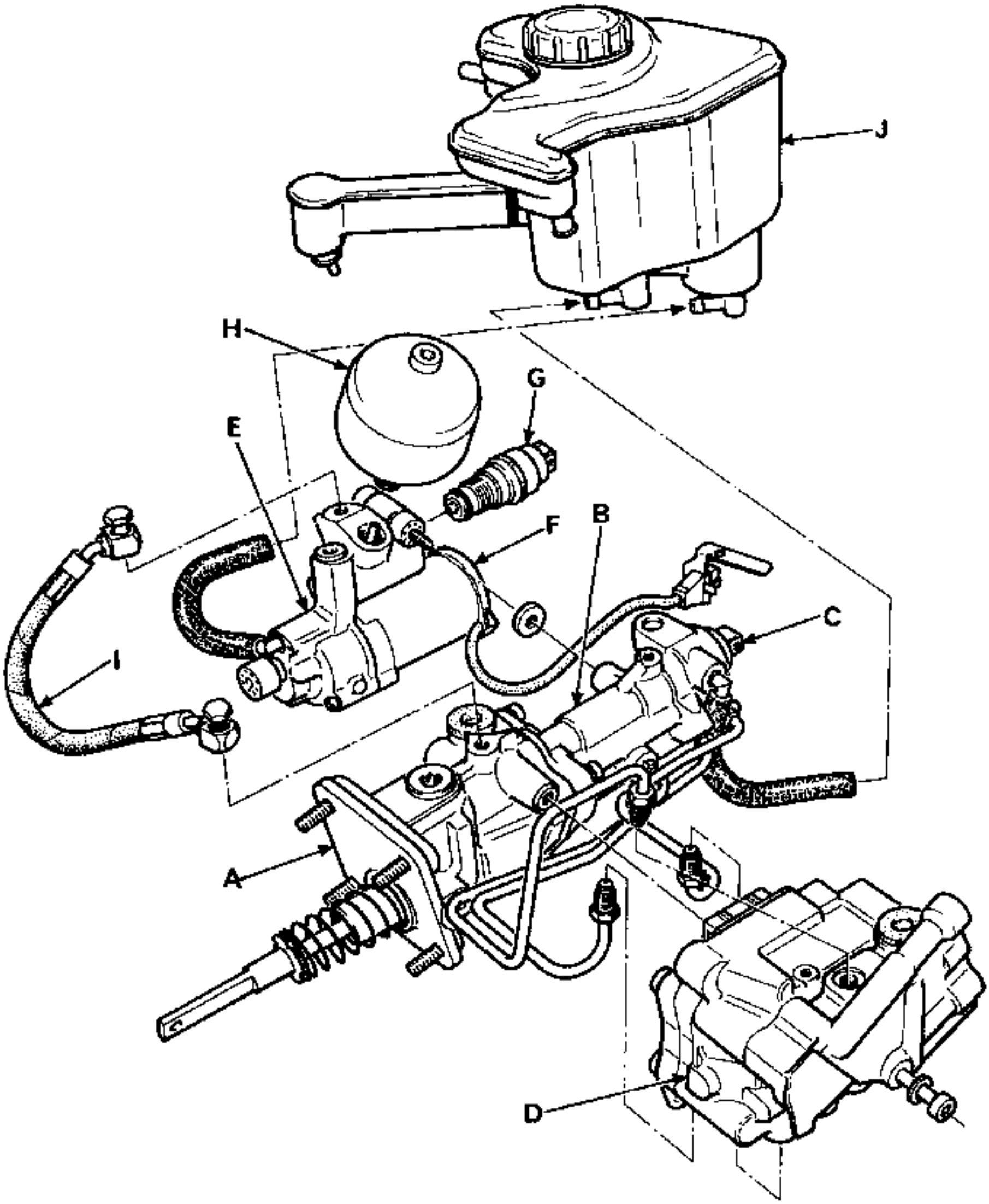
The remainder of the braking system consists of:

- a single braking compensator (6),
- a delay valve mounted on a bracket near the compensator on the feed circuit,
- four disc brakes (7).

HYDRAULIC UNIT (1)



LOCATION AND COMPOSITION



21A91419

LOCATION AND COMPOSITION

The hydraulic unit is of a modular design and is mounted in place of the brake servo/master cylinder assembly.

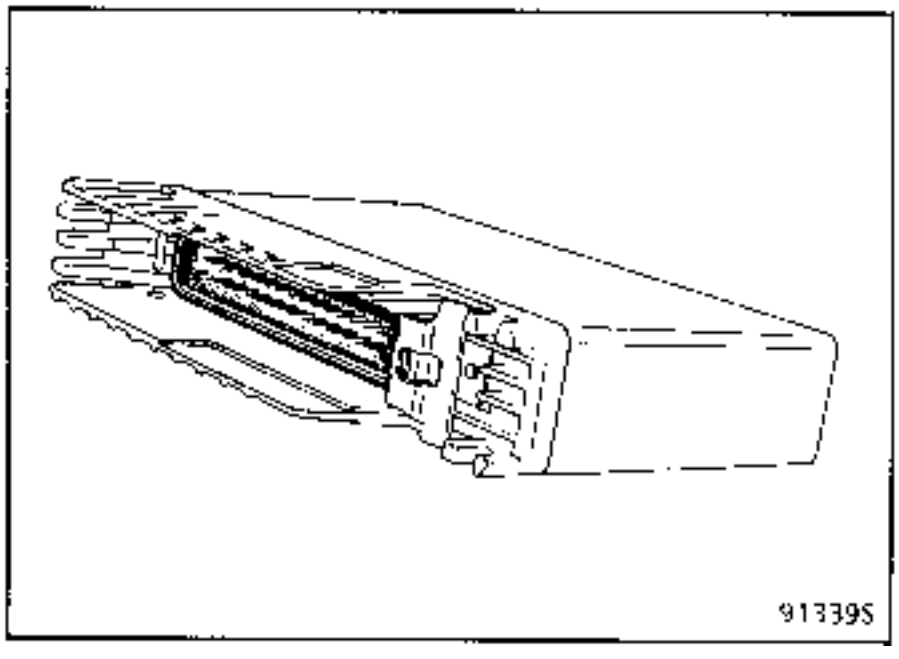
It comprises:

- the hydraulic amplifier (A) which assists braking on the rear wheels (dynamic circuit);
- tandem master cylinder (B) acting on each of the front wheels (static circuit);
- main solenoid valve (C);
- regulating unit (D) comprising three inlet solenoid valves and three outlet solenoid valves (one front right-hand circuit, one front left-hand circuit and one rear circuit), the role of which is to modulate the pressure when the wheels are on the verge of locking;
- feed unit (E) consisting of a high pressure electric pump (F), a pump control pressostat (G), pressure accumulator (H) and a high pressure hose (I),
- reservoir (J) with integrated nivocode which has a 10µ filter on the pump low pressure feed circuit.

This system operates without a vacuum servo assistance.

COMPUTER (2)

This is mounted under the front right-hand seat.

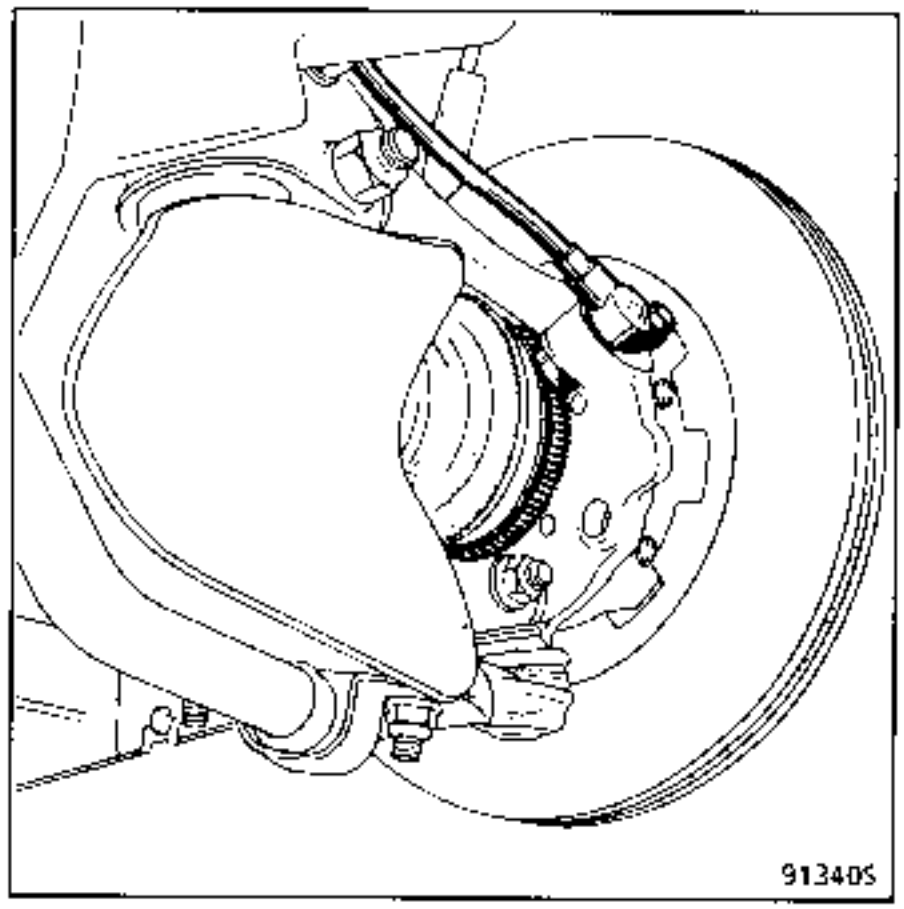


It analyses the data from the wheel sensors and controls the inlet and outlet solenoid valves according to this data.

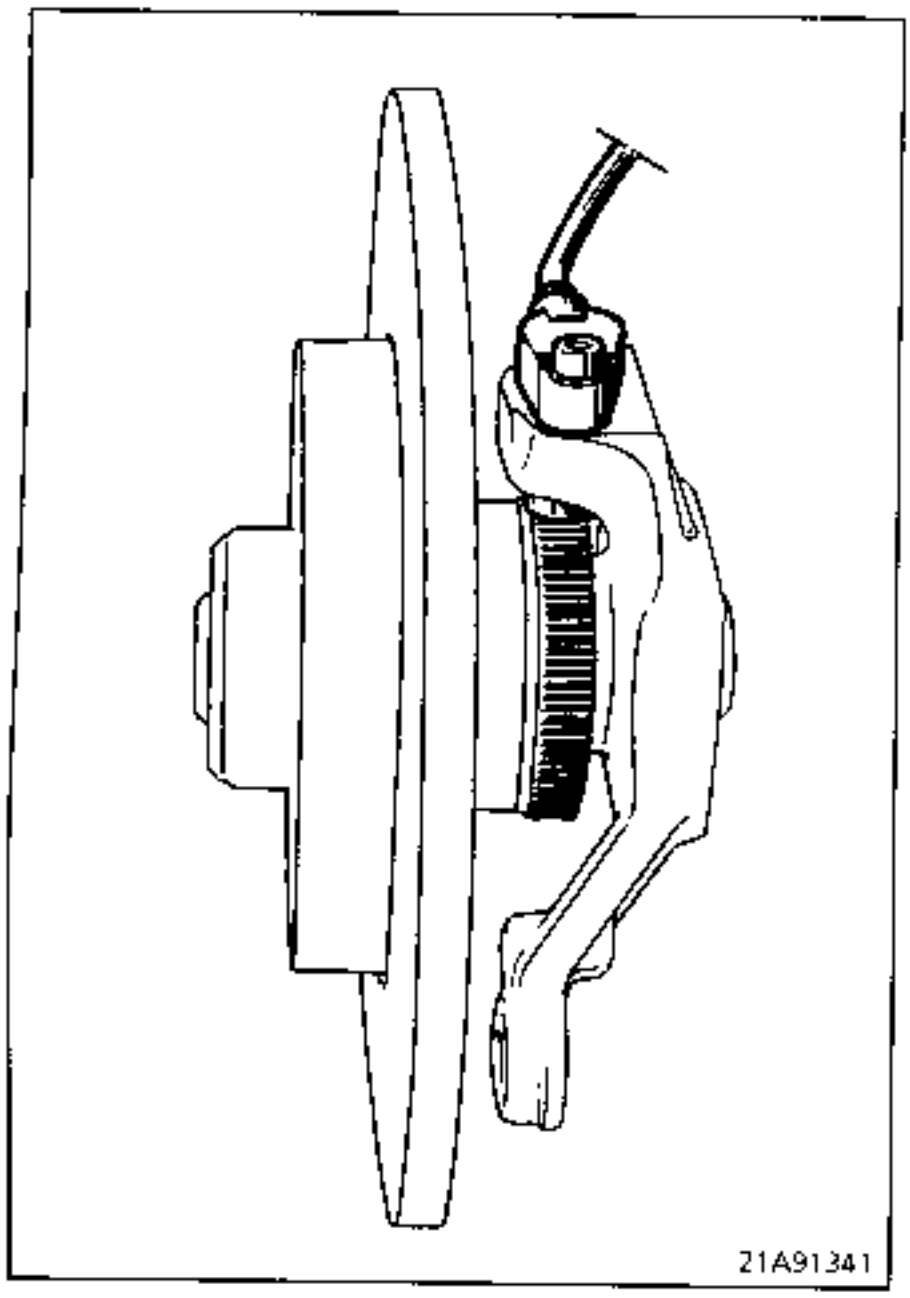
SPEED SENSORS (3) AND SENSOR TARGETS (4)

The speed sensors are mounted on the stub-axle carriers and receive data via the toothed sensor targets.

For the front wheels the targets are press-fitted on the drive shafts.

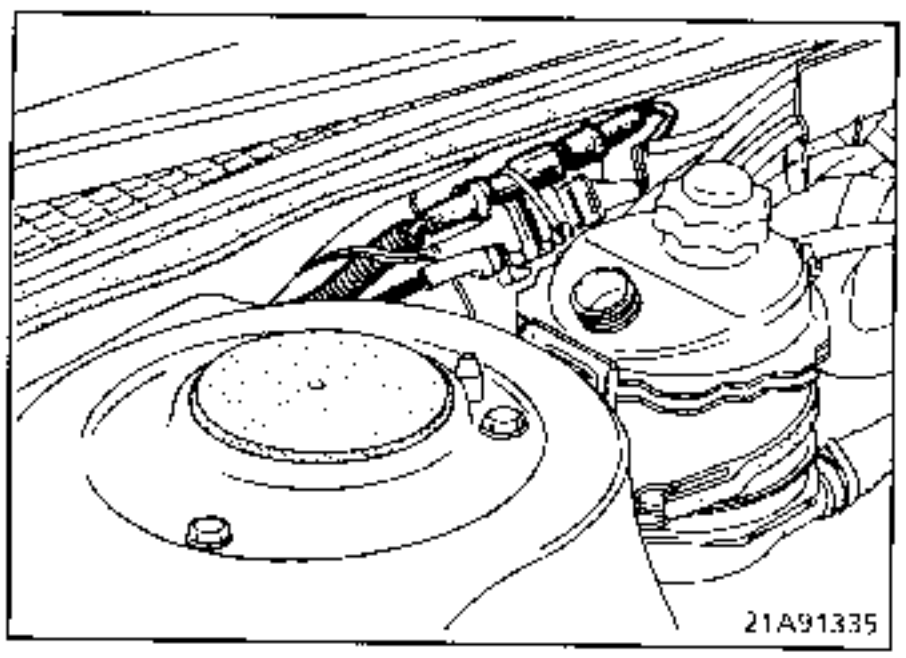


For the rear wheels, the targets are press-fitted on the hubs (cannot be dismantled).

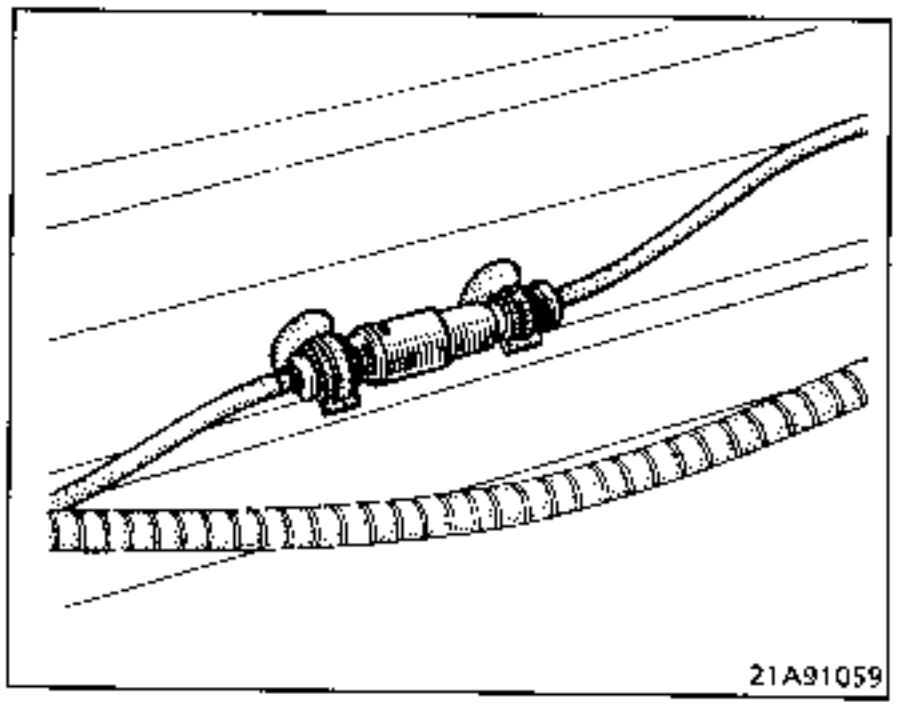


The speed sensors are connected to the computer wiring by means of connectors located:

- under the bonnet at the front;



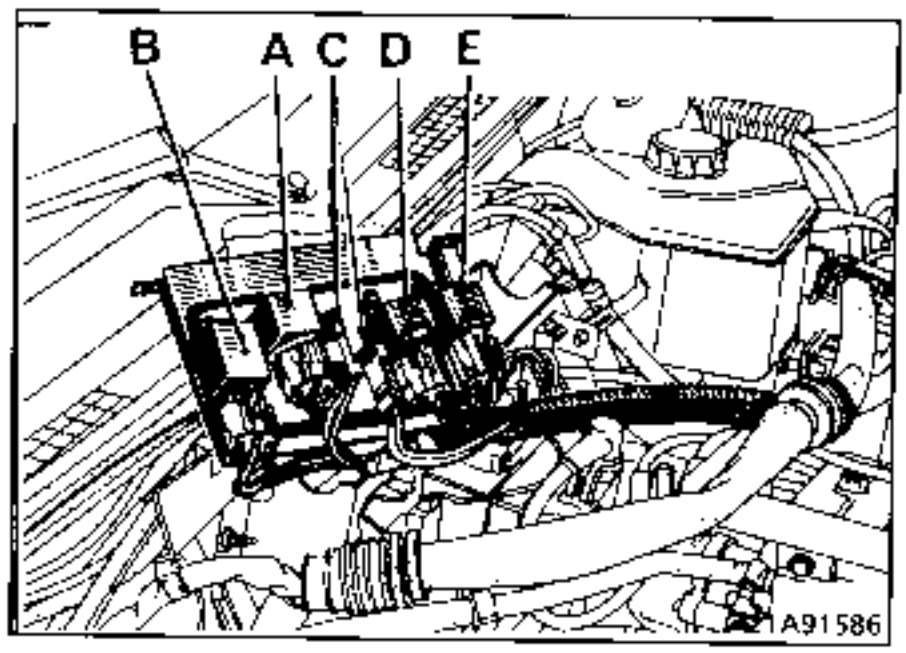
- under the rear axle fairing at the rear.



ABS DEVICE MAIN CONTROL RELAY (5)

The relay plate is in the central housing mounted in the centre of the bulkhead. It consists of:

- main relay (A),
- auxiliary relay (B),
- protective fuses (30 amps) (C),
- two protective diodes in a casing with a red base (D),
- pump relay (E).

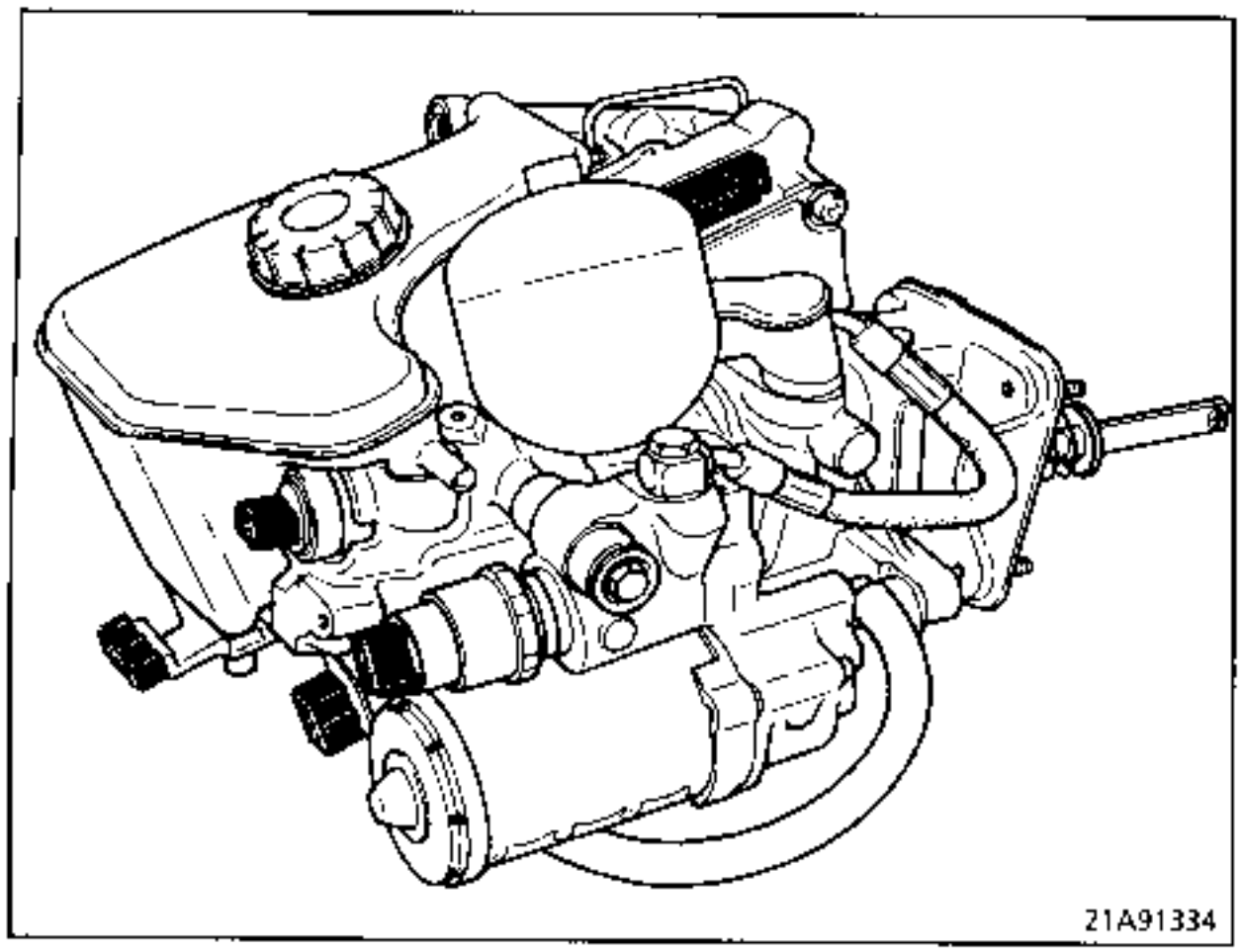


This casing bears two ABS symbols.



LOCATION AND COMPOSITION

The ABS hydraulic unit is based on a hydraulic braking amplifier with a separate feed. The conventional tandem master cylinder is replaced by a special master cylinder with a solenoid valve unit, so producing the ABS hydraulic unit.



The main components of this unit are :

- a hydraulic braking amplifier,
- a tandem master cylinder with a main solenoid valve and locating pin,
- a solenoid valve unit with six solenoid valves for modulating the braking pressure on the wheels,
- a feed unit with electric motor, pump, pressure accumulator, cut-off pressostat and discharge valve,
- a reservoir with a warning device.

The role of the hydraulic amplifier is to assist braking and control the circuit for the two rear wheels when they are moving.

The tandem master cylinder statically controls the two front wheel circuits and is re-supplied during the anti-lock regulation phase via the main solenoid valve.

The solenoid valve comprises six solenoid valves (three inlet valves and three outlet valves). The rest position corresponds to the position in which the inlet solenoid valves are open and the outlet valves closed.

LOCATION AND COMPOSITION

The pressure accumulator is at a constant pressure of between 140 and 180 bars. If the pressure in this accumulator drops to below 140 bars, the cut-off pressostat reacts and controls the activation of the pump until the pressure reaches 180 bars when it stops. A discharge valve restricts the pressure to 210 bars if the cut-off pressostat fails to operate.

The reservoir has a "level warning" device. If the brake fluid level drops, the device illuminates the warning light on the instrument panel. If the level drops again, the anti-lock braking system goes into defect mode and the (4) warning light will illuminate in turn. The reservoir also has a filtering device for feeding the pump. The filtering and warning light illuminating devices are inaccessible, being an integral part of the reservoir.

OPERATION

As soon as the vehicle's speed reaches 4 mph (7 km/h), the ABS self-tests and is ready to come into operation. Action on the brake pedal causes the amplifier regulation valve to open, on the one hand, and the tandem master cylinder to move, on the other. The pressure in the static circuits (at the front) and the dynamic circuit at the rear) increases in proportion to the force applied by the driver's foot to the brake pedal.

During braking, if the computer receives information from the sensor on one or more wheels that there is sharp deceleration and if it observes that the wheel or wheels is/are starting to lock, it will trigger the following sequence:

- closure of the brake fluid inlet solenoid valve for the hydraulic cylinders in question,
- opening of the brake fluid exhaust solenoid valve for the same cylinders.

If the wheels pick up speed again:

- the inlet solenoid valve on the cylinders in question will open again.

The process is repeated in this way until the vehicle stops.

In order to prevent the brake pedal moving down during this ABS regulation phase, the main solenoid valve connects the dynamic circuit with the static circuit producing a pumping effect at the brake pedal.

Moreover, it is to be noted that the rear axle is regulated by the "select low"system, i.e. the wheel having the lowest degree of adherence produces the same degree of regulation on the two rear wheels. Any incident likely to render the regulation device inoperative is signalled to the driver by the illumination of the warning light on the instrument panel.

In such a case, the vehicle behaves in one of the two following ways according to the type of incident detected by the computer:

- conventional braking without the ABS,
- braking in the defect mode; at this point the regulation on the front wheels and the energising of the main solenoid valve will be interrupted but the anti-lock braking system will continue to operate on the rear wheels.

If the pump no longer turns, the pressure in the accumulator will enable the system to brake twenty times. Then there will only be braking on the front wheels (static circuits controlled by the tandem master cylinder) in a similar situation to braking without the servo.

REMOVING - REFITTING THE CONSTITUENT COMPONENTS

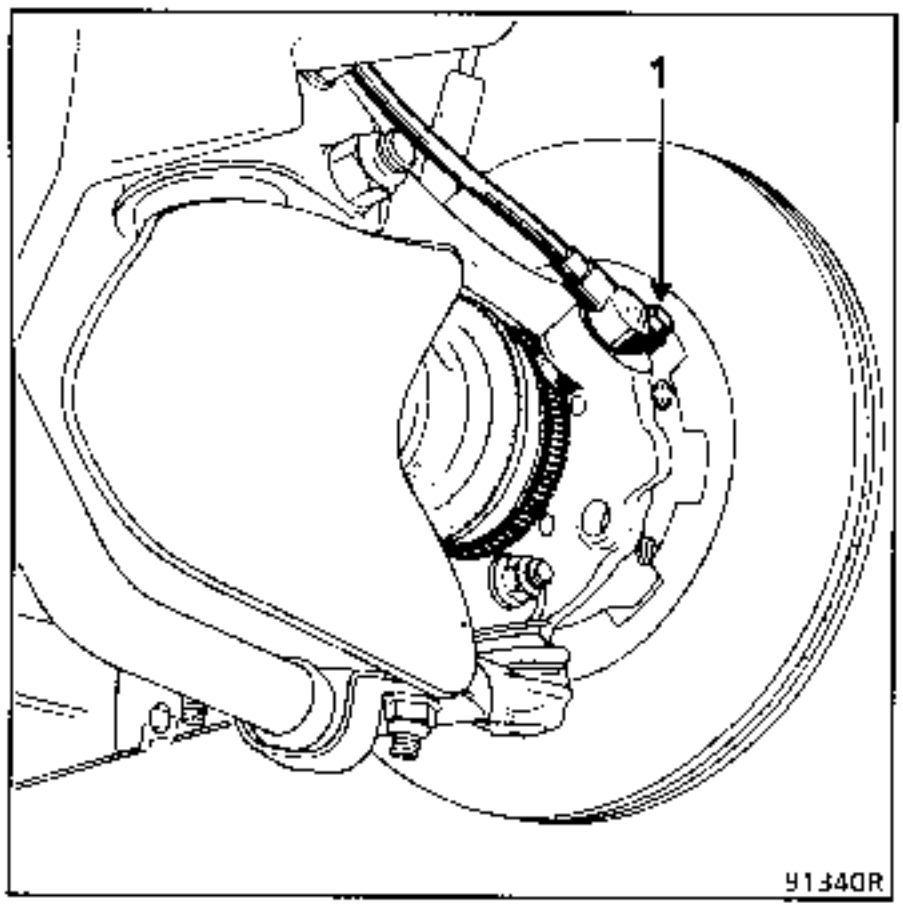
I - FRONT WHEEL SENSOR

TIGHTENING TORQUES (in daN.m)	
Sensor mounting bolt	0.8

DEPOSE

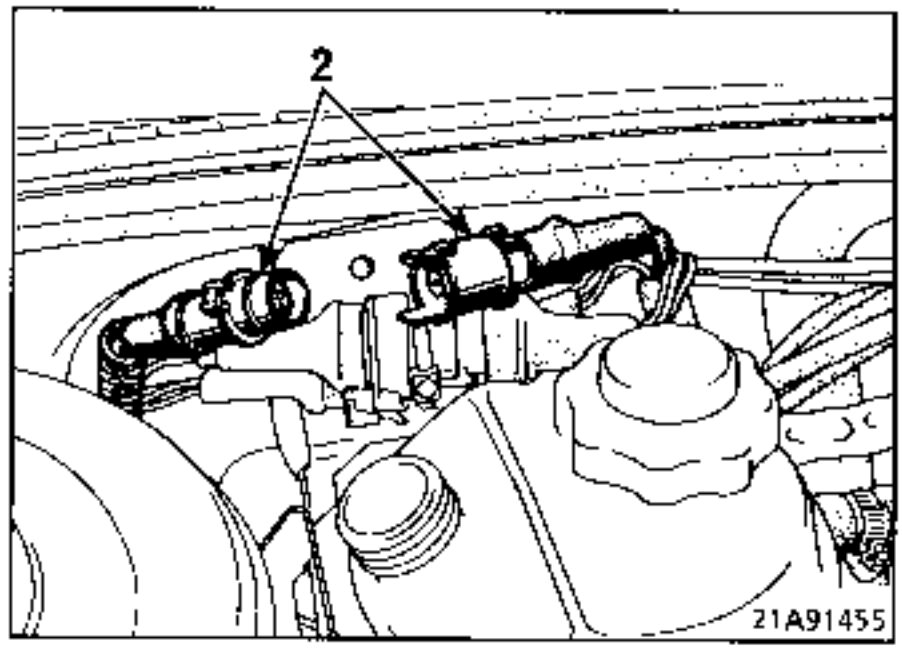
Remove:

- bolt securing the sensor (1);
- the sensor.



Unfasten the lead from its supports.

Disconnect the sensor from its connector (2) under the bonnet near the top of the shock absorber turrets.



Remove the assembly.

REFITTING

Fit in place the sensor, after first smearing it with multi-function grease, Part No. 77 01 422 308 then reconnect it.

NOTE: To avoid risks of failure, ensure that the connector is correctly connected.

II - FRONT WHEEL SENSOR TARGET

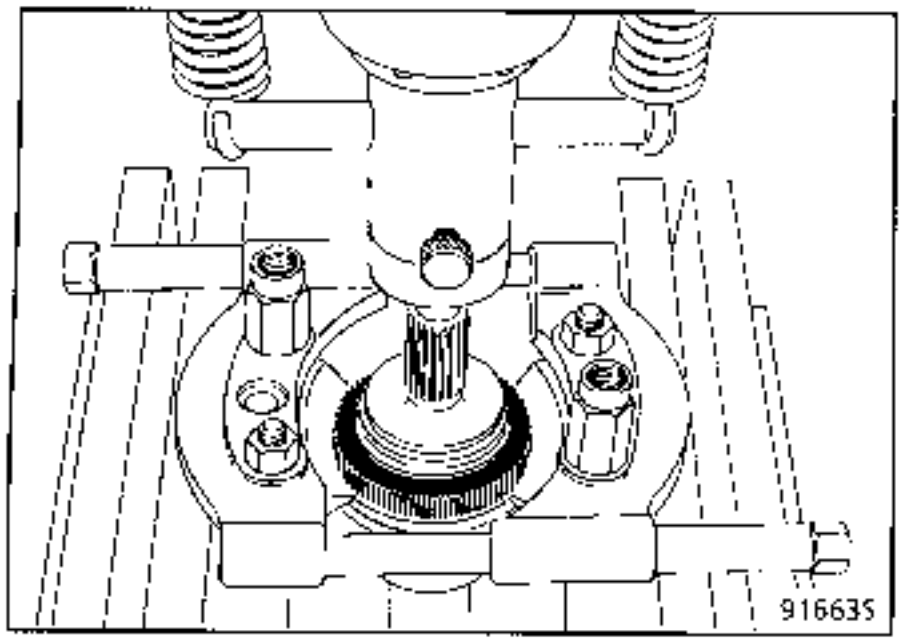
TIGHTENING TORQUES (in daN.m)		
Wheel bolts	4 bolts	9
	5 bolts	10
Drive shaft nut		25

As the sensor target is press-fitted on the drive shaft, this operation is performed after removal of the drive shaft.

REMOVING - REFITTING THE CONSTITUENT COMPONENTS

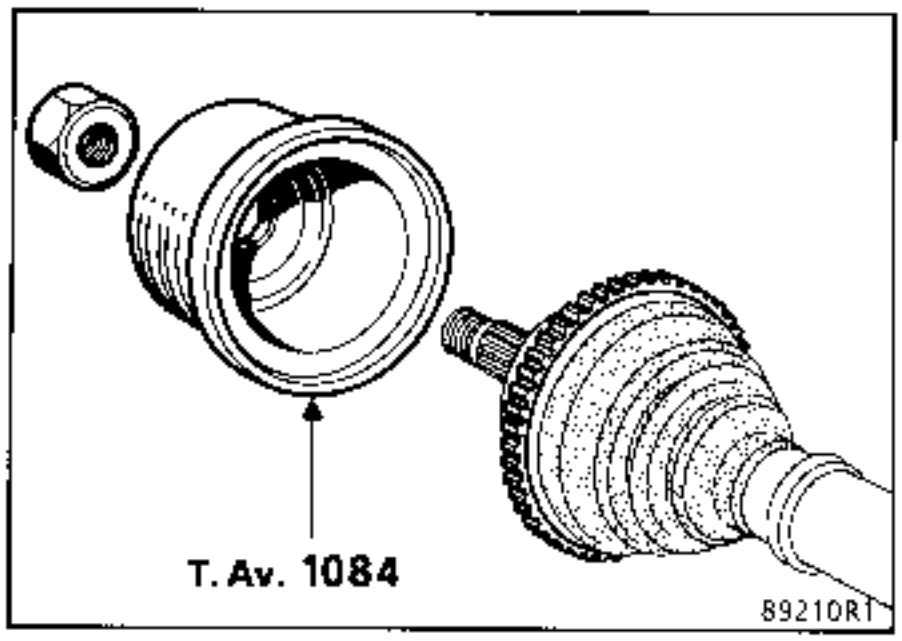
REMOVING

Take out the sensor target on the press, using a **FACOM U53G** type extractor.



REFITTING

Smear the sensor target with **LOCTITE SCELBLOC** and refit it, using tool **T.Av. 1084** and re-using the old drive shaft nut.



NOTE: In future, the Parts Department will only supply in service exchange machined drive shaft not equipped with the anti-lock braking sensor targets. The sensor targets must therefore be retained in order to be realigned on the drive shafts. The sensor targets alone, however, are available from the Parts Department.

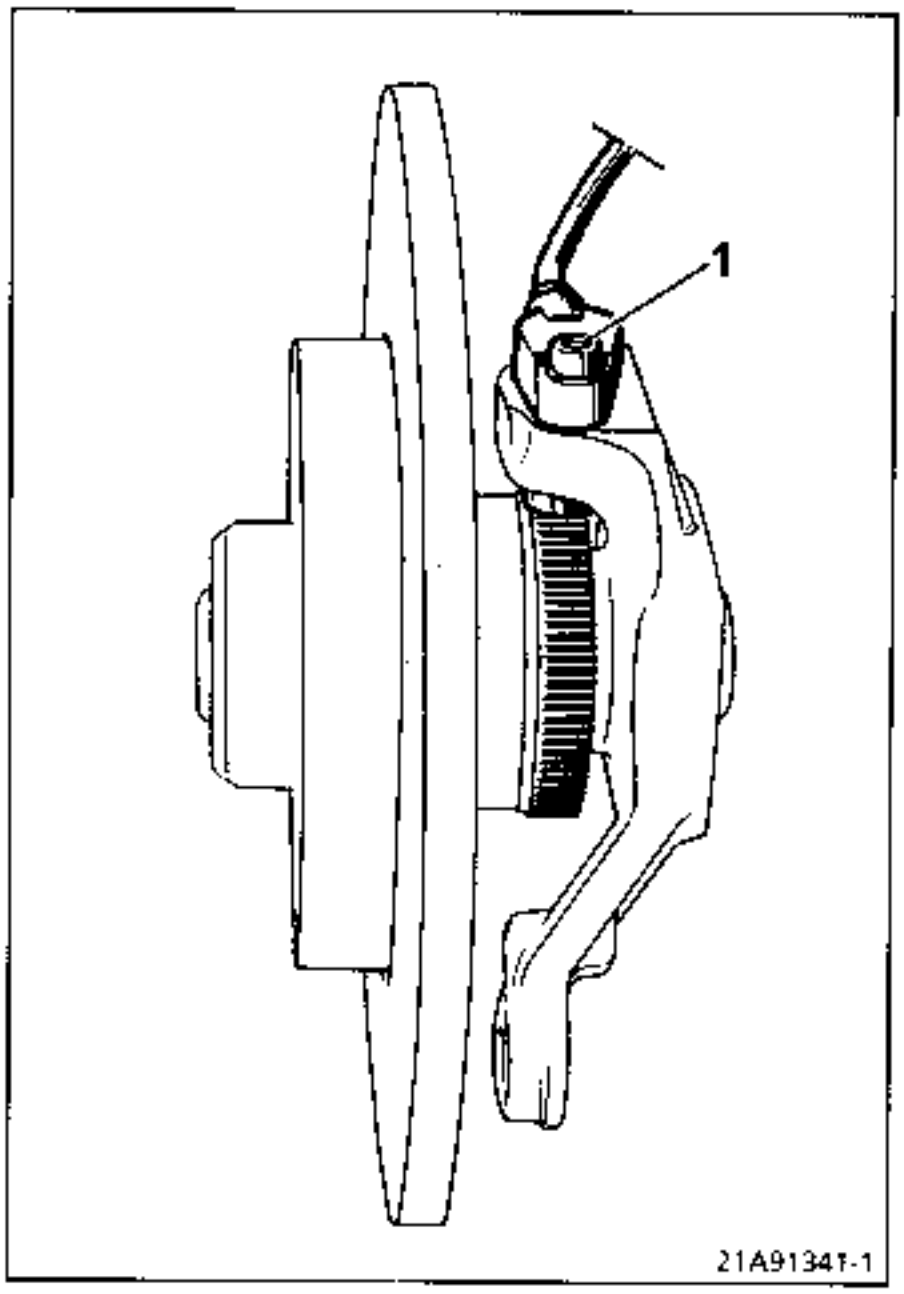
III - REAR WHEEL SENSOR

TIGHTENING TORQUES (in daN.m)		
Wheel bolts	4 bolts	9
	5 bolts	10
Sensor mounting bolt		0.8

REMOVING

Remove:

- the wheel,
- **bolt (1)** securing the sensor,
- the sensor and its mounting.

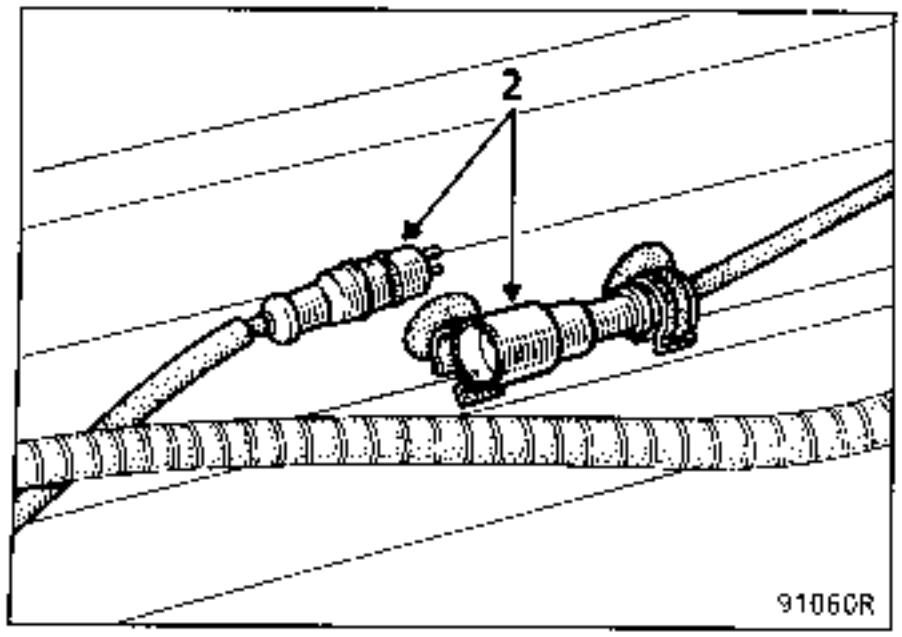


Unclip the lead from its mounting.

Disconnect the sensor from its connector **(2)** under the vehicle, after first removing the rear axle fairing.

Remove the assembly.

REMOVING - REFITTING THE CONSTITUENT COMPONENTS



REFITTING

Fit in place the sensor, after first coating it with multi-function grease, Part No. **77 01 422 308**, and then reconnect it.

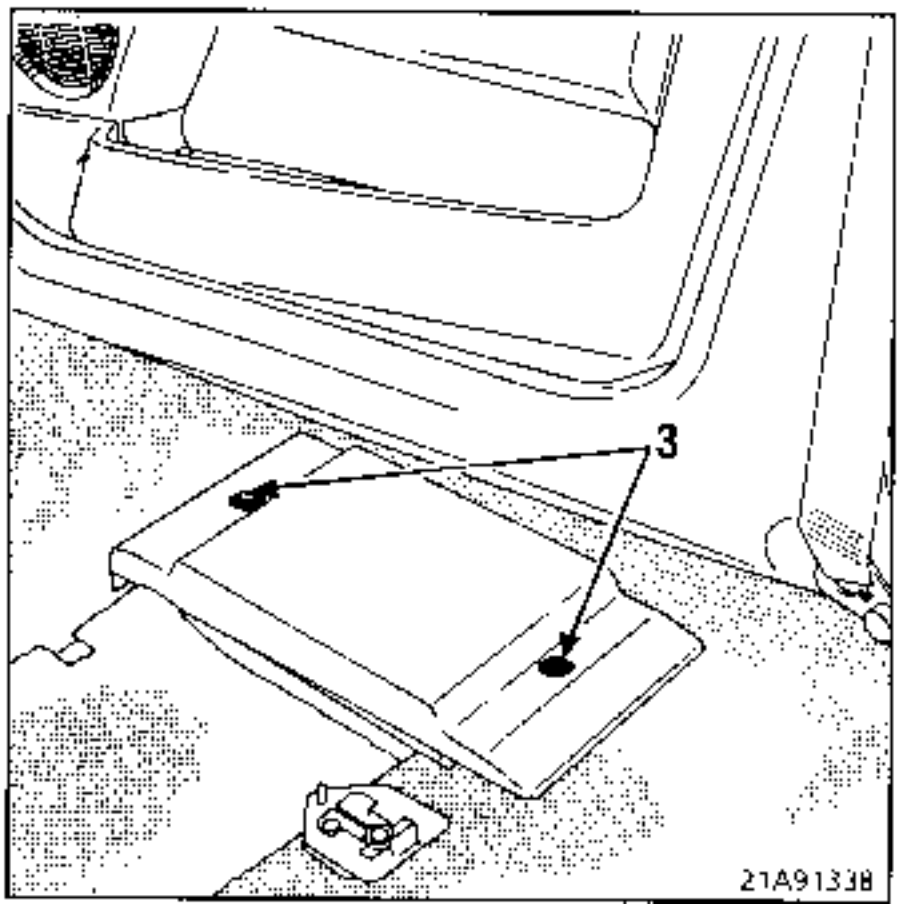
NOTE: To avoid risks of failure, ensure that the connector is correctly connected.

IV - COMPUTER

This is under the front right-hand seat.

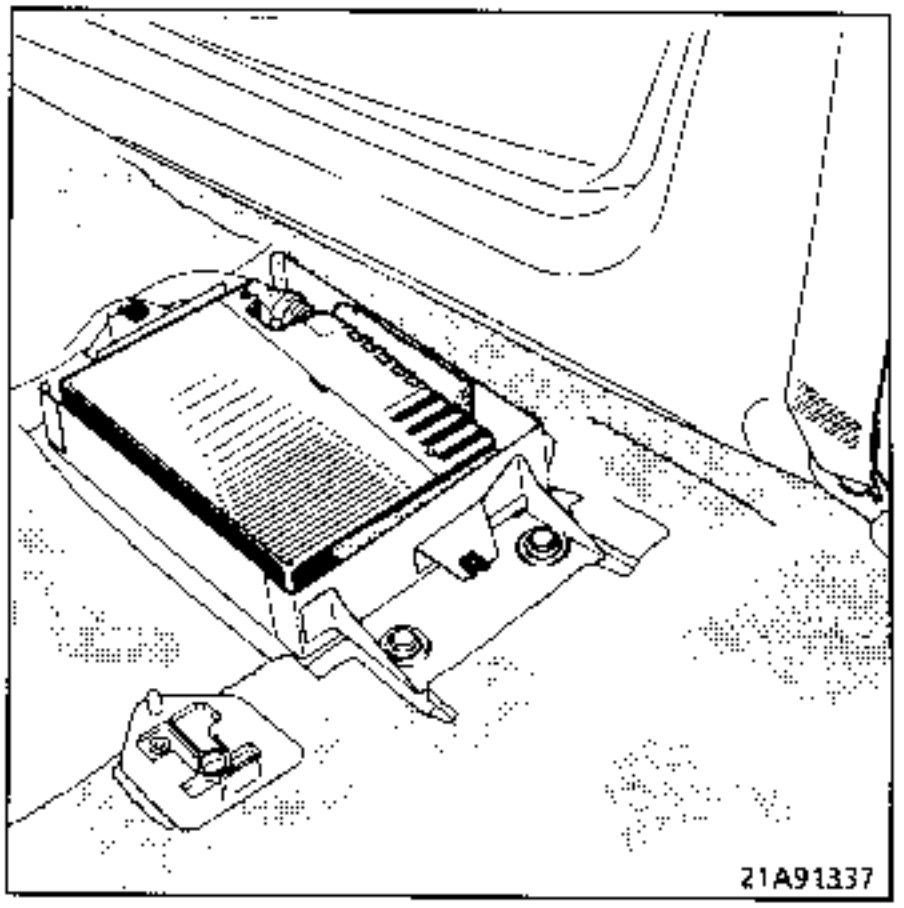
REMOVING

Remove:
- the two bolts (3),



- the protective cover,

- the computer from its housing then disconnect it.



REFITTING

Refit the computer in place, ensuring that the **35-way connector** is properly connected.

V - HYDRAULIC UNIT

TIGHTENING TORQUES (in daN.m)	▽
Bolts for mounting on bulkhead	2
Hose union bolts	1.3

REMOVING

Disconnect the battery.

Pump the brake pedal approximately 20 times (until it becomes hard) to make the pressure drop.

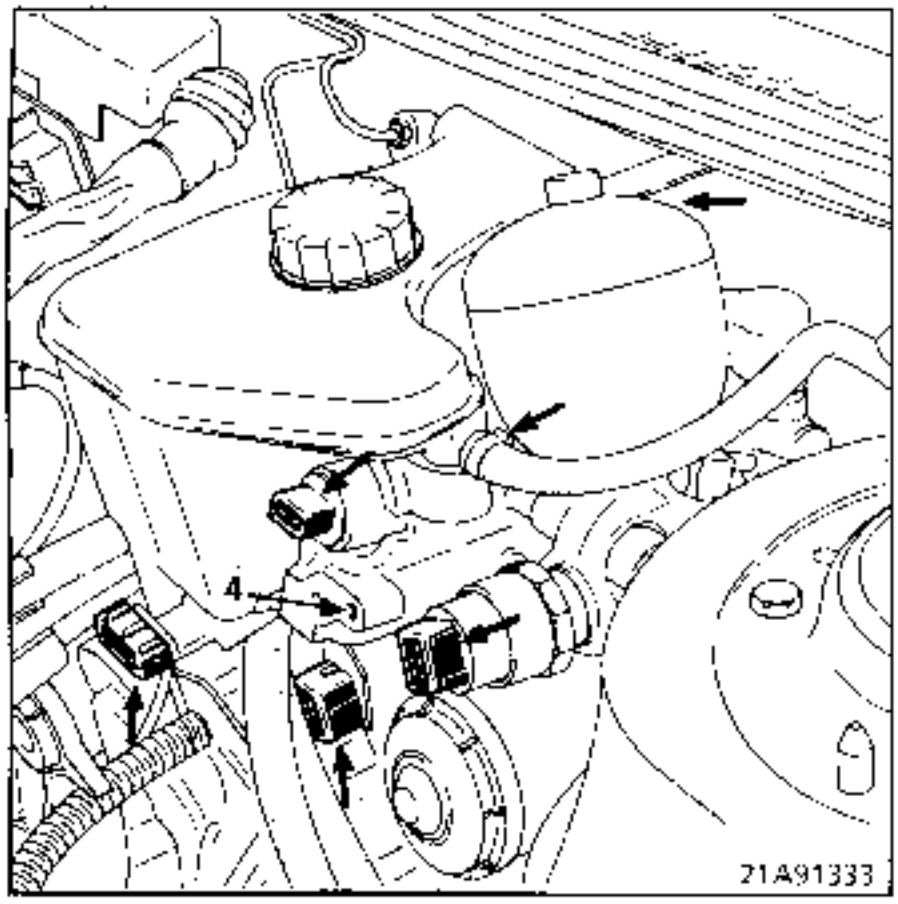
Empty the reservoir using a syringe.

Unclip the fastening of the power assisted steering fluid chamber and free the chamber by moving it downwards.

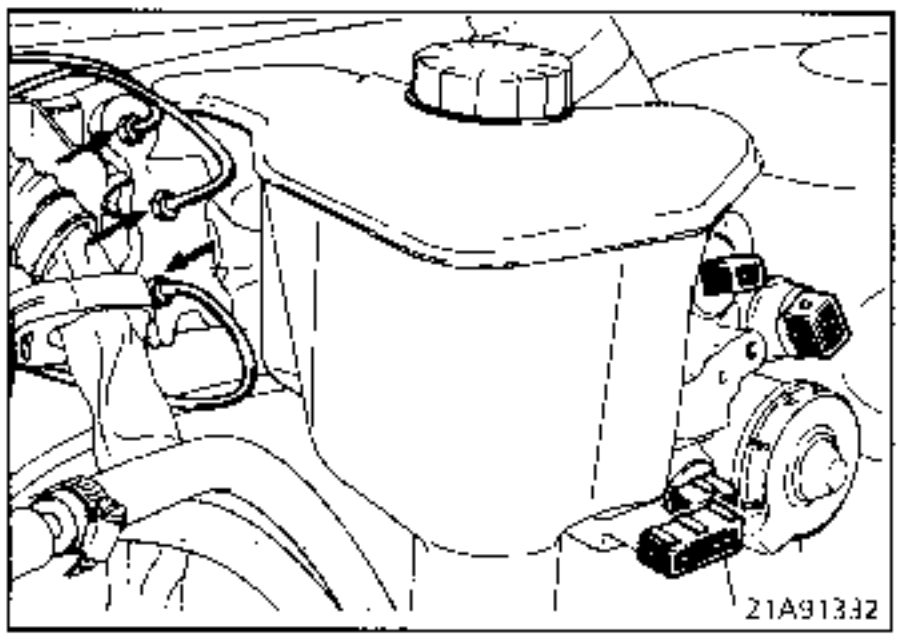
REMOVING - REFITTING THE CONSTITUENT COMPONENTS

Remove:

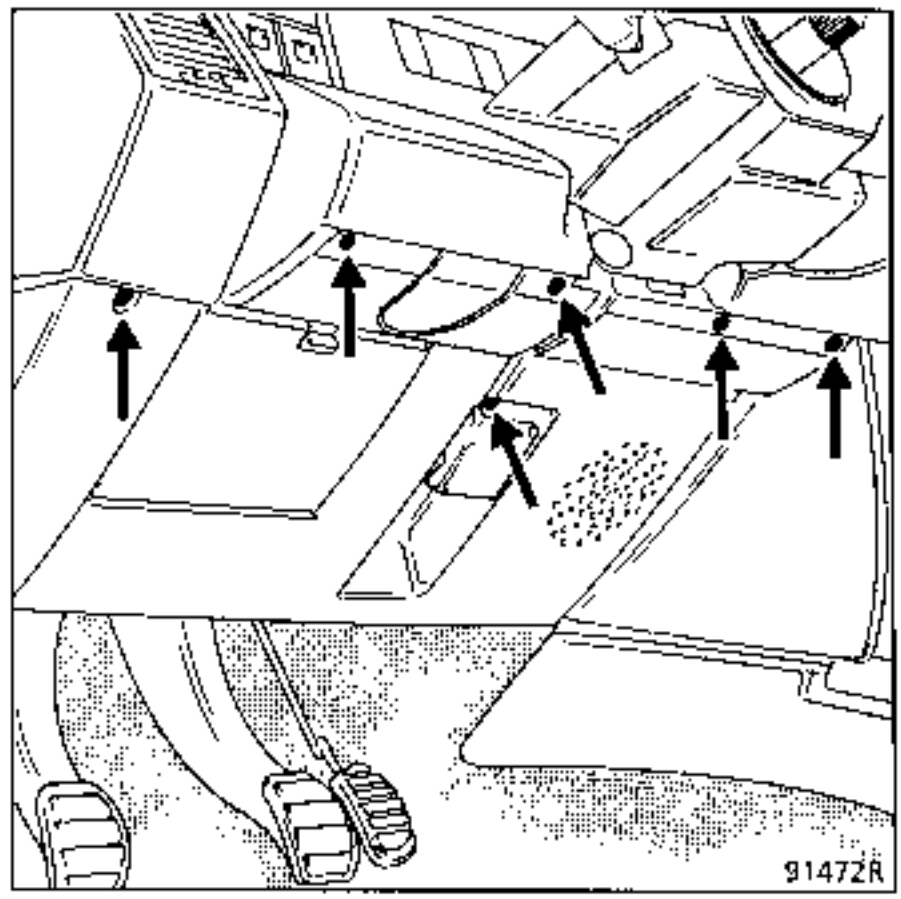
- the plastic mounting from the PAS fluid chamber;
- the five electrical connectors;
- the earth lead and wiring mounting lug at (4);



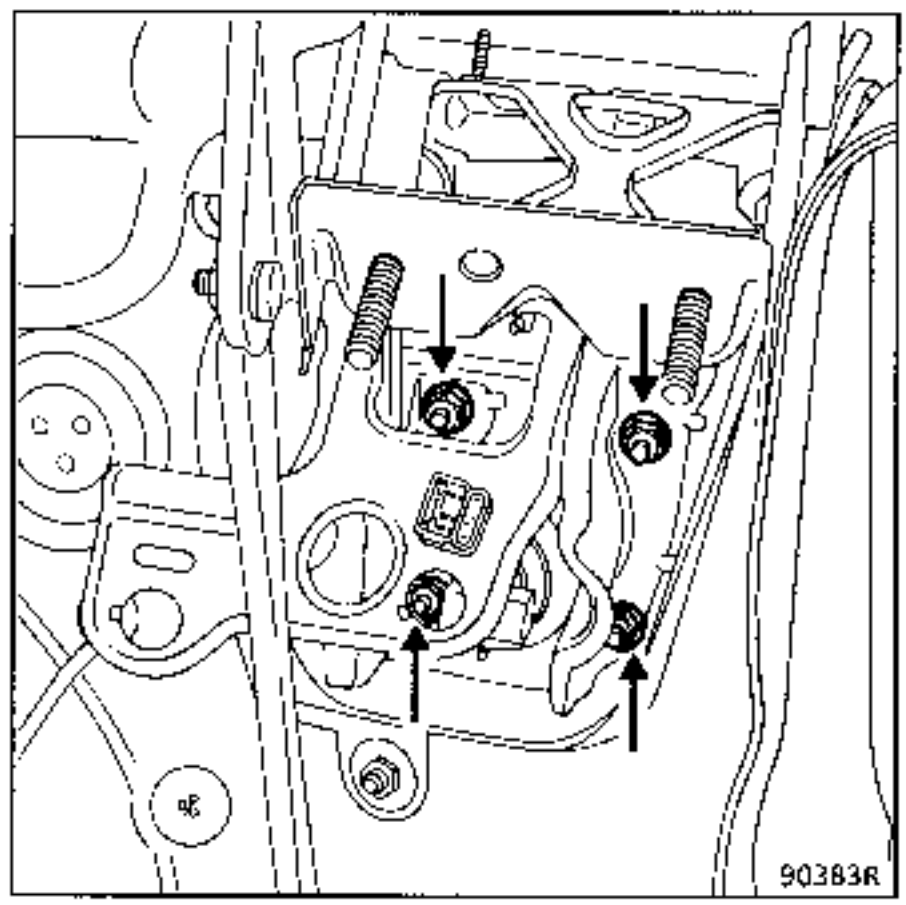
- the clutch master cylinder feed hose;
- the rigid outlet pipes;



- the cover under the steering wheel (remember to remove the bolt under the steering column adjustment lever);



- the clevis pin connecting the brake pedal to the pushrod;
- the nuts holding the hydraulic unit on the bulkhead;



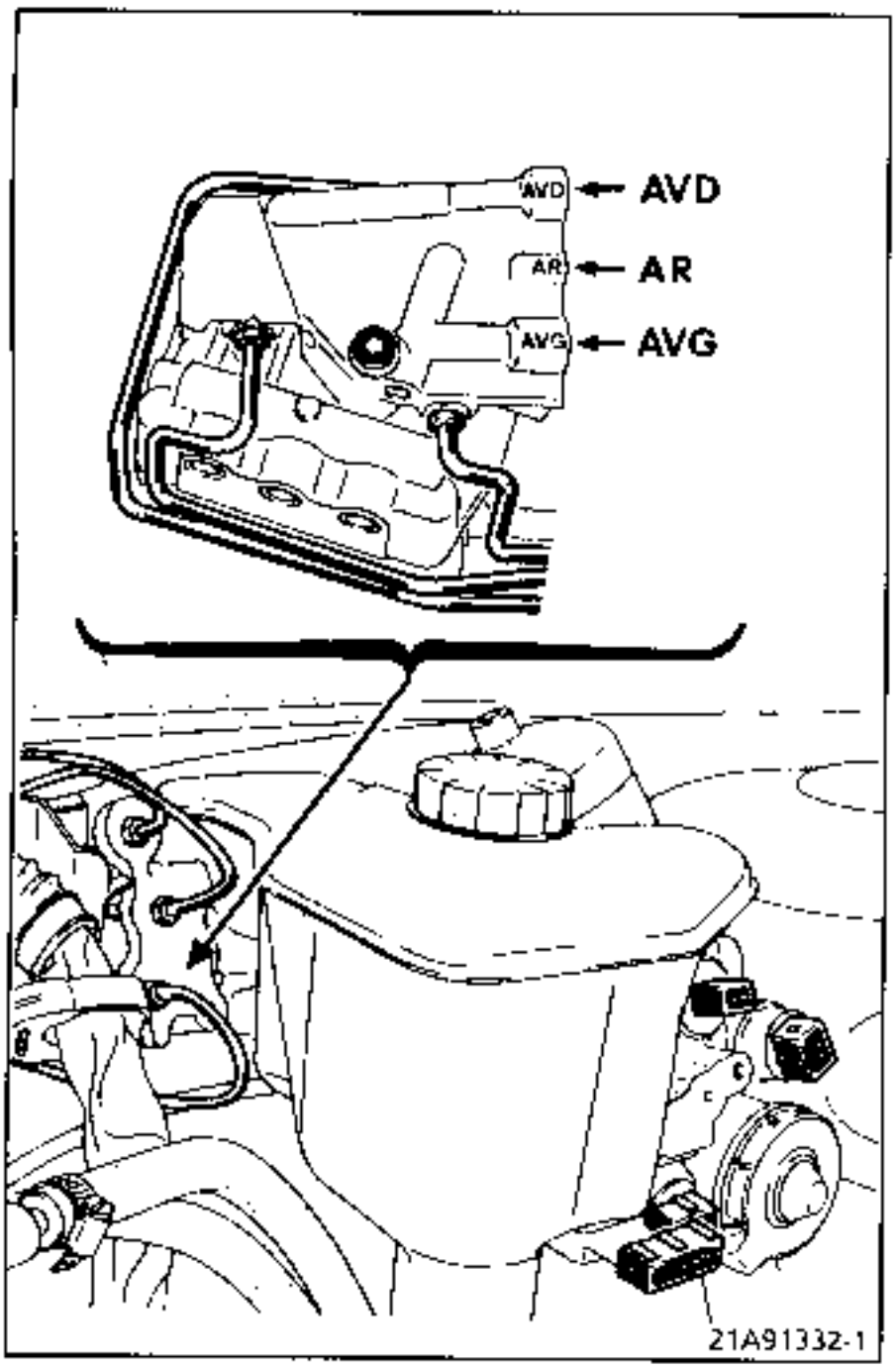
- the hydraulic unit, retrieving the bulkhead connection seal.

REMOVING - REFITTING THE CONSTITUENT COMPONENTS

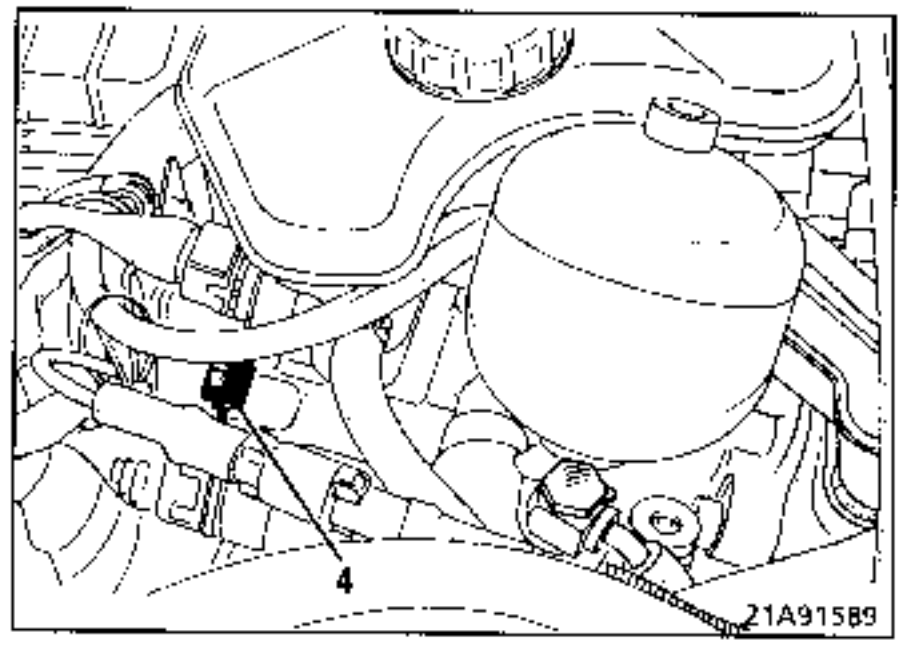
REFITTING

Fit in place:

- the hydraulic unit with its connection seal;
- the four mounting nuts on the bulkhead;
- the brake pedal clevis pin;
- the cover under the steering wheel;



- the rigid outlet pipes, ensuring the take-offs are facing the correct direction;
- the clutch mater cylinder feed hose;
- the electrical connectors;
- the mounting lug and earth lead at (4);



- the power assisted steering fluid chamber.

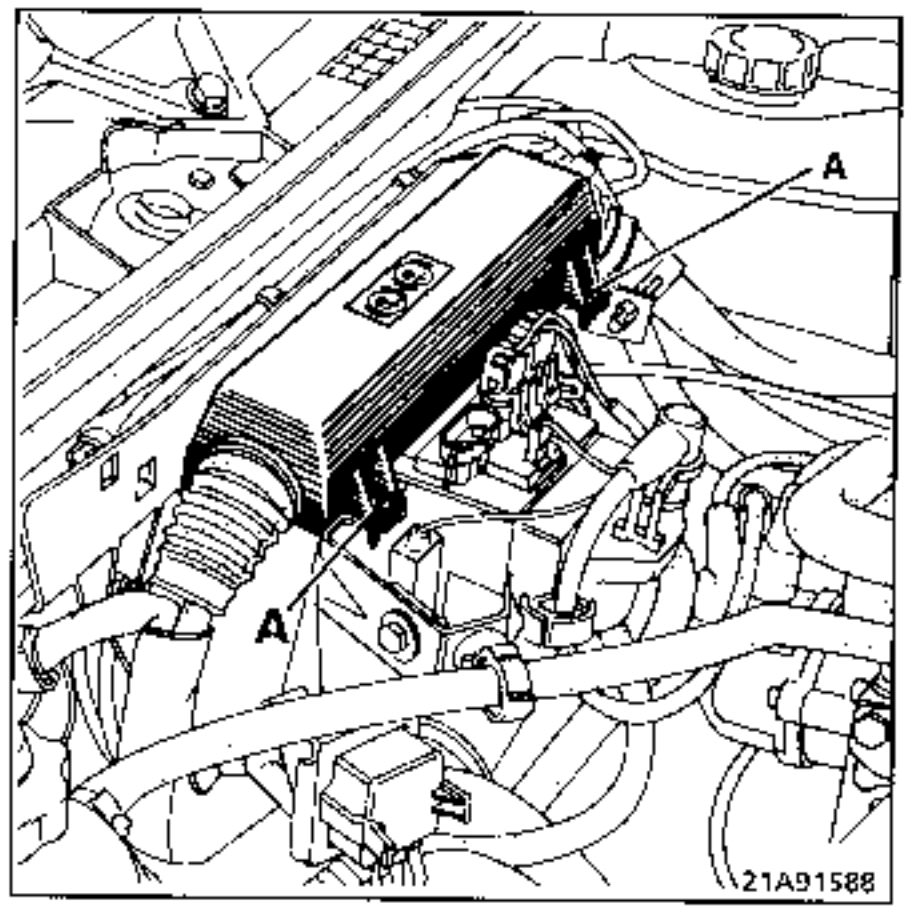
Fill the brake circuit with brake fluid and bleed the system (see the relevant paragraph).

VI - RELAY PLATE

REMOVING

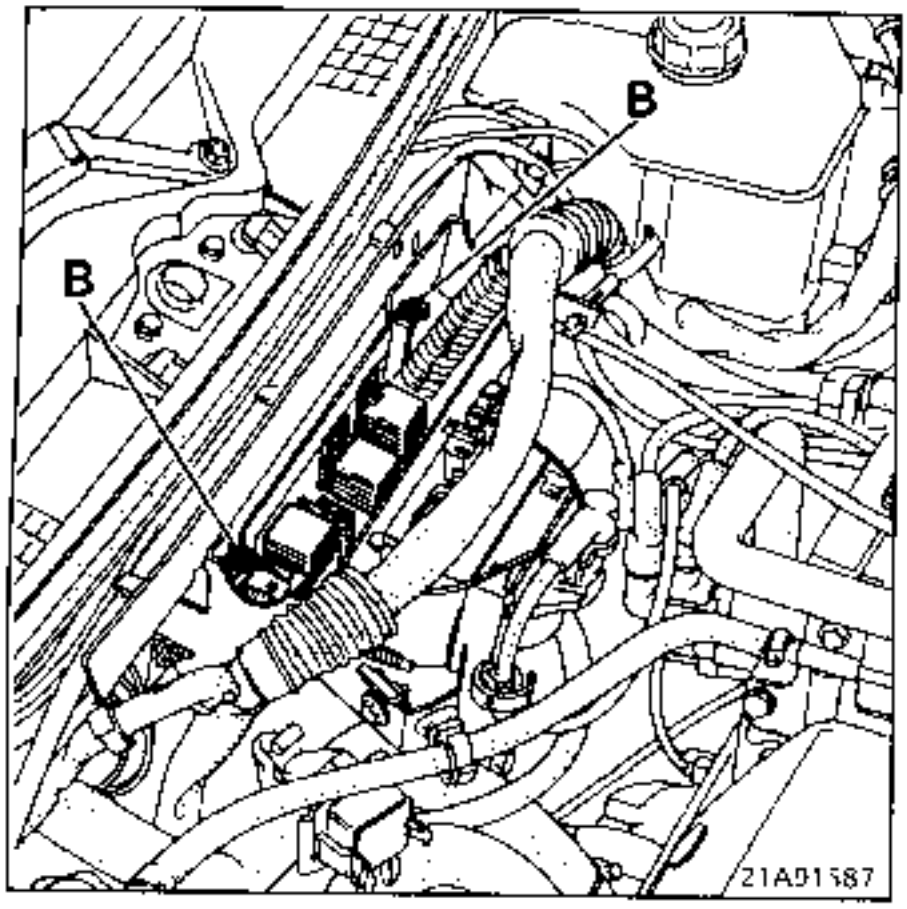
Remove:

- the two bolts (A),
- the cover,



REMOVING - REFITTING THE CONSTITUENT COMPONENTS

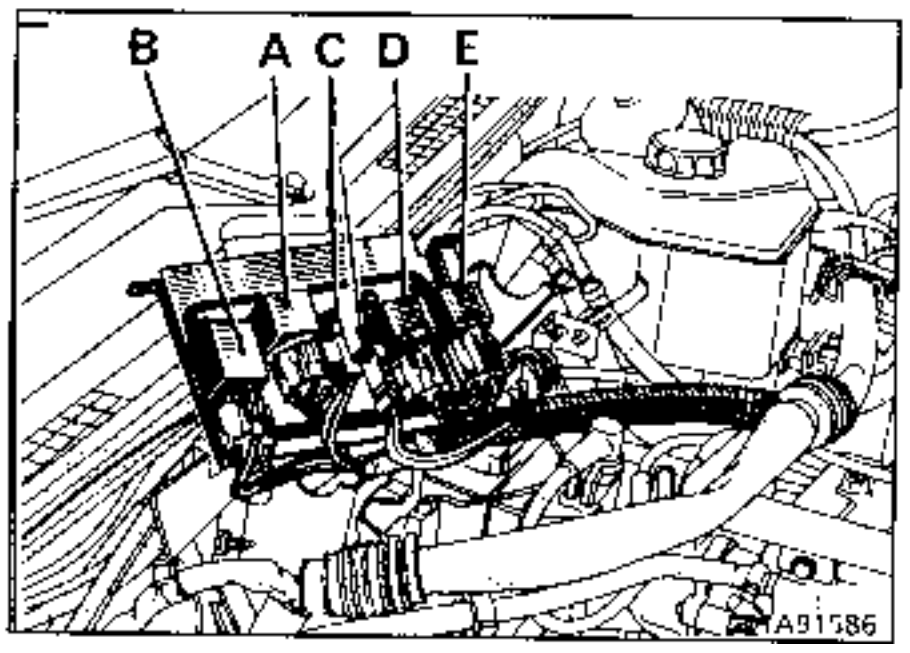
- The two bolts (B).



Move the wiring loom away and take out the relay plate.

The plate comprises:

- main relay (A);
- auxiliary relay (B);



- the two protective fuses (**30 amps**) (C),
- the two protective diodes in a casing with a red base (D),
- pump relay (E).

REFITTING

Proceed in the reverse order to removal, ensuring that the various components are properly connected.

REPLACING THE VARIOUS COMPONENTS OF THE HYDRAULIC UNIT

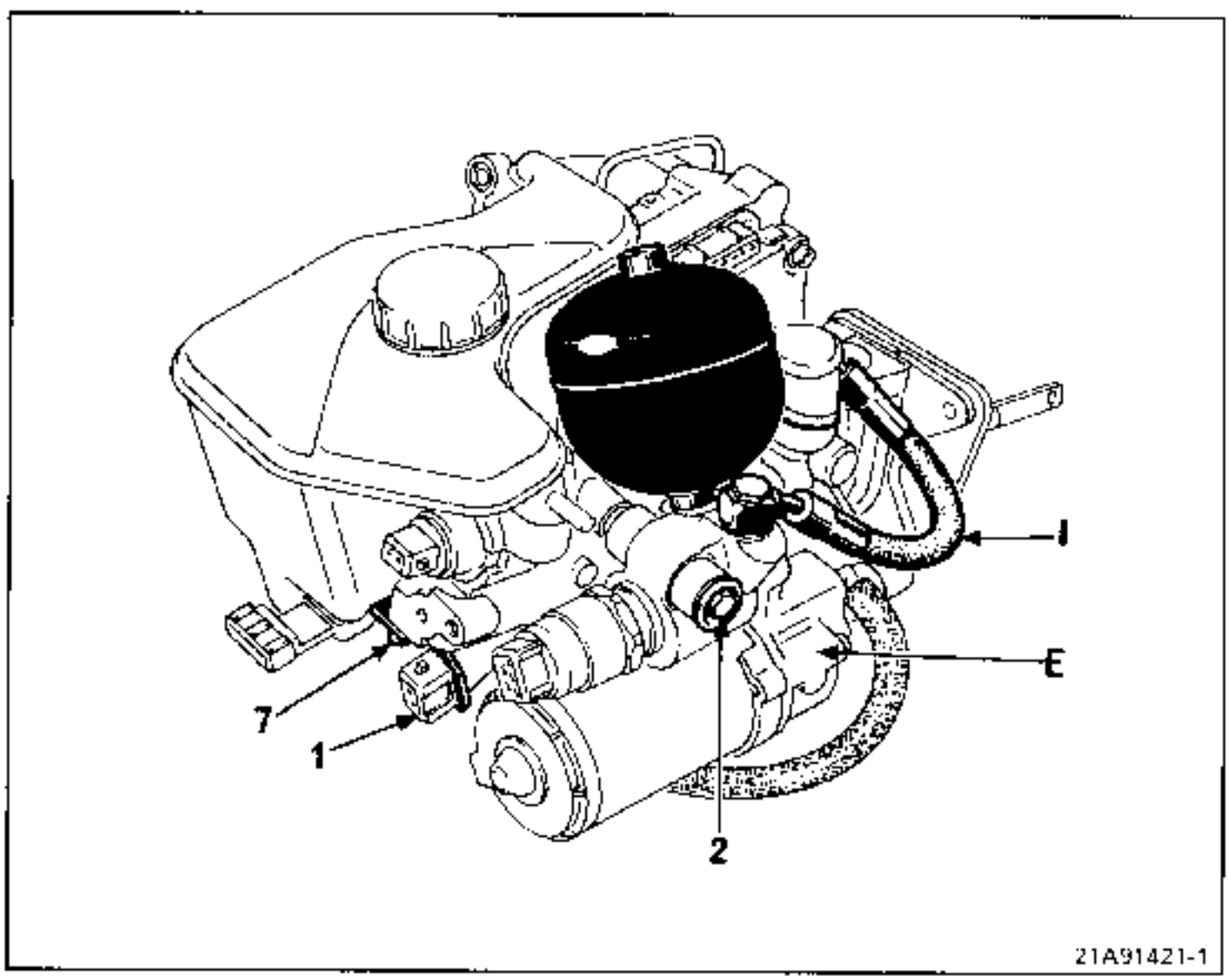
All these operations are performed when the hydraulic unit has been removed.

I - REPLACING THE MASTER CYLINDER - AMPLIFIER ASSEMBLY

REMOVING

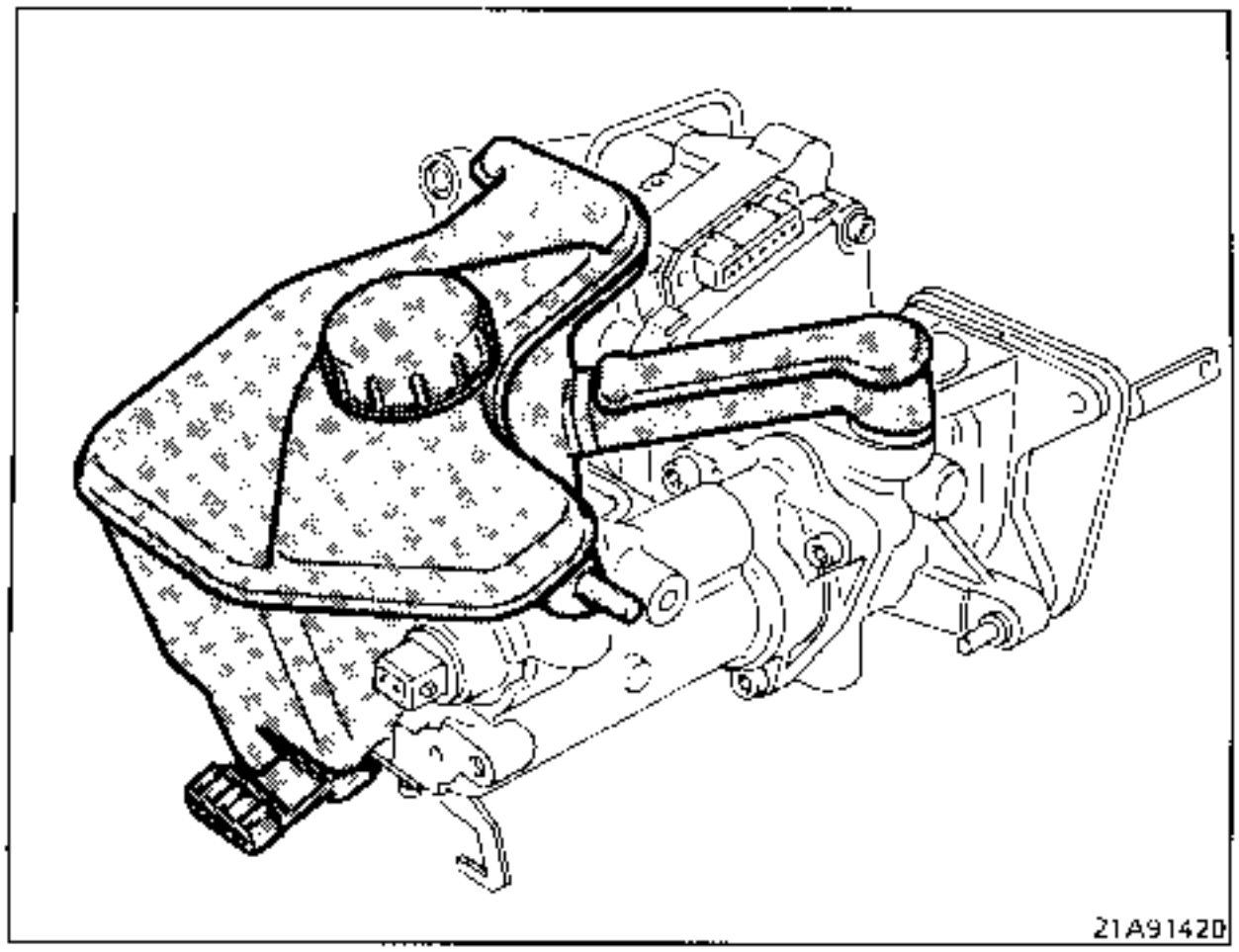
Remove:

- the low pressure feed hose in the reservoir;
- the high pressure hose (I)(plug the take-offs);
- hydraulic connector (1);
- bolt (2) securing the pump;
- the feed unit assembly (E);

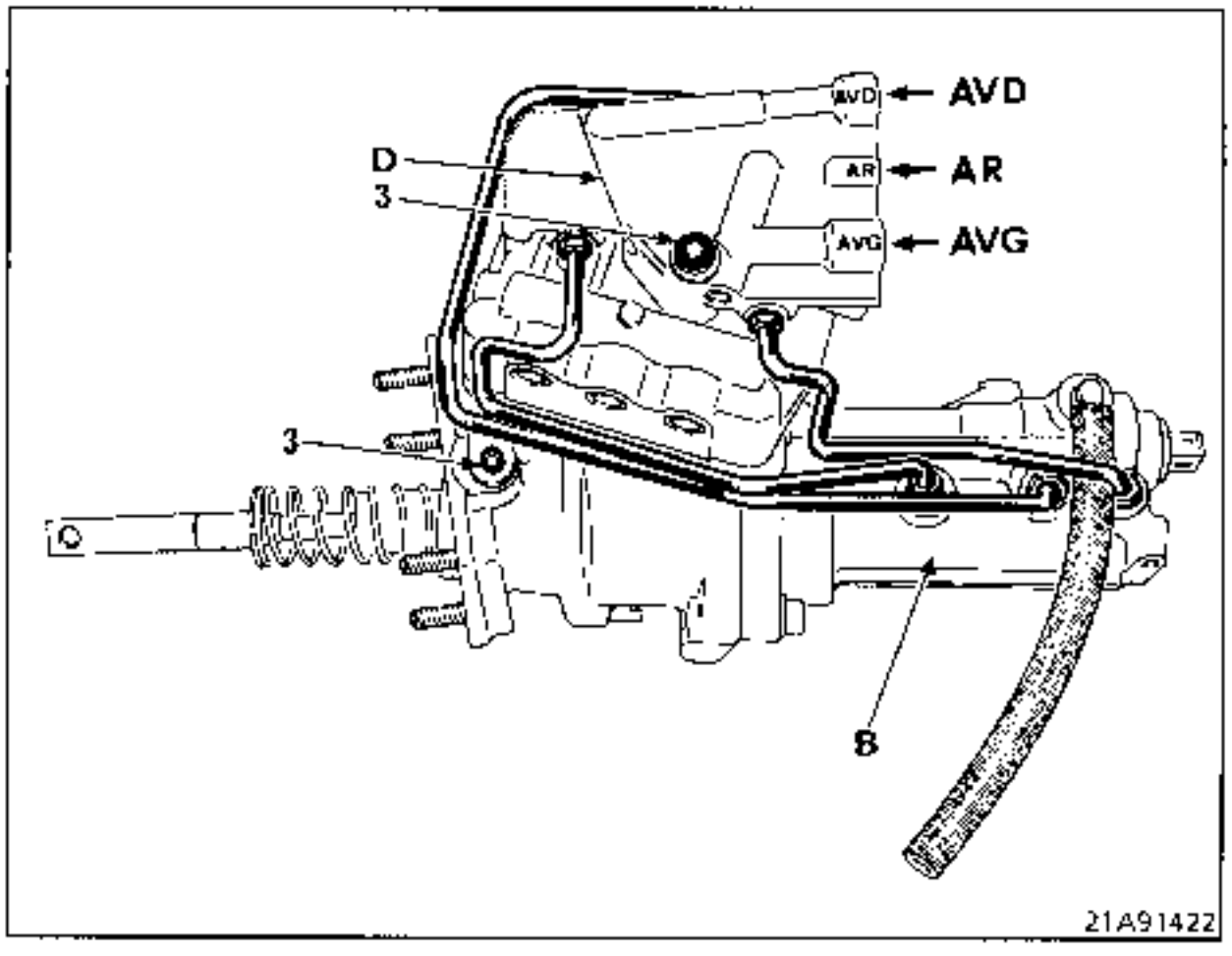


- the master cylinder low pressure hose;
- the reservoir, unclipping it from its anchorages after removing mounting lug (7).

REPLACING THE VARIOUS COMPONENTS OF THE HYDRAULIC UNIT



- Remove the rigid pipes connecting the master cylinder (B) and regulating unit (D). (Plug the take-offs.)
- Remove the two mounting bolts (3) from the regulating unit.



- Remove the regulating unit.

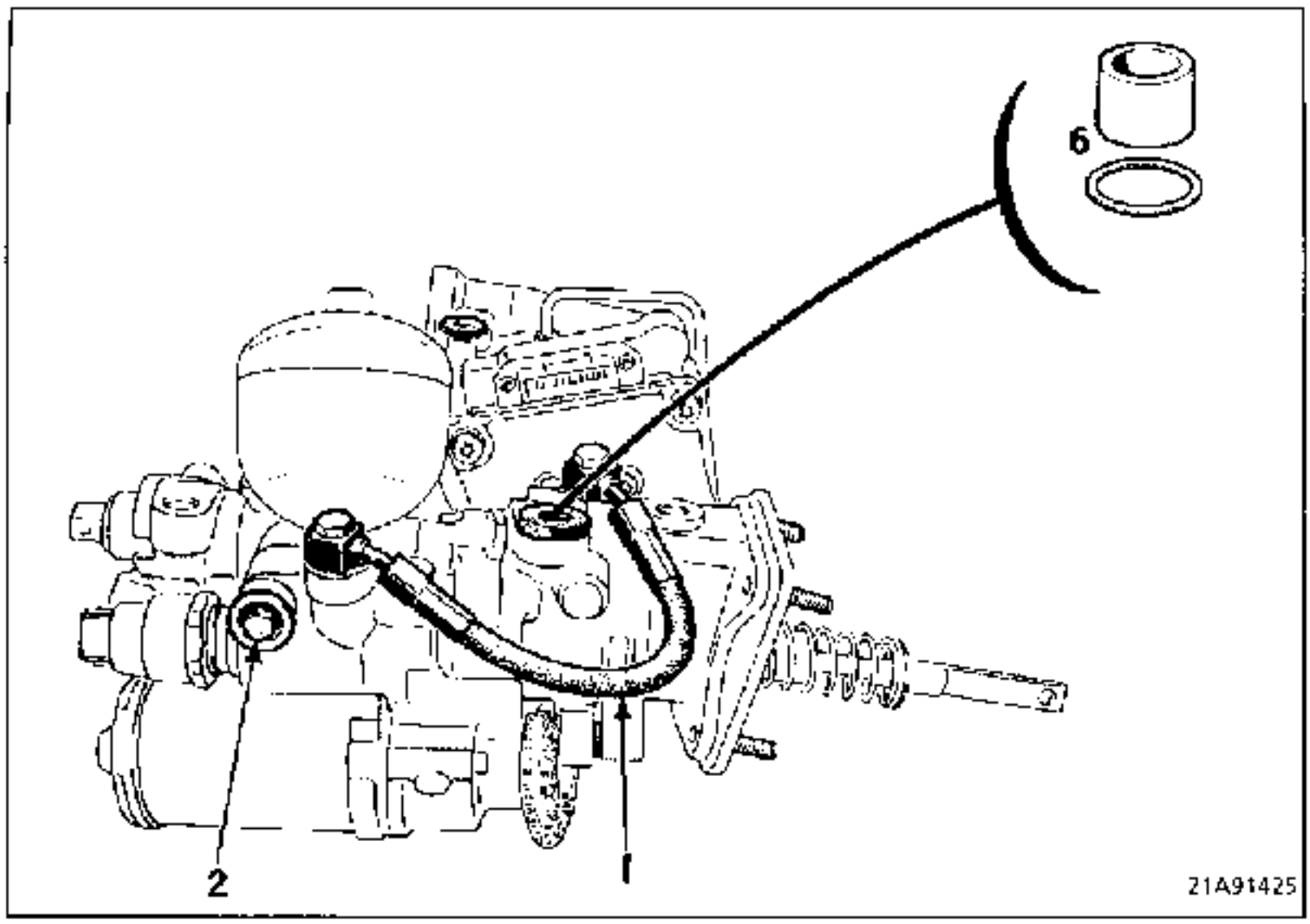
AVD = FRONT RIGHT
AR = REAR
AVG = FRONT LEFT

REPLACING THE VARIOUS COMPONENTS OF THE HYDRAULIC UNIT

REFITTING

Fit in place:

- the low pressure hose on the master cylinder;
- the regulating unit and its rigid connection pipes (coat the mounting bolts with LOCTITE FRENETANCH);
- the feed unit (bolt (2) should first be smeared with LOCTITE FRENETANCH), making sure that the silent-bloc bushes are in good condition, otherwise replace them;



- high pressure hose (1) with new O-ring seals;
- the reservoir - make sure that the anchorage cups are in good condition - remember to fit the small spacer and a new O-ring seal in take-off (6);
- the reservoir mounting lug (smear the bolt with LOCTITE FRENETANCH),
- the hydraulic pump and master cylinder low pressure hoses on the reservoir.

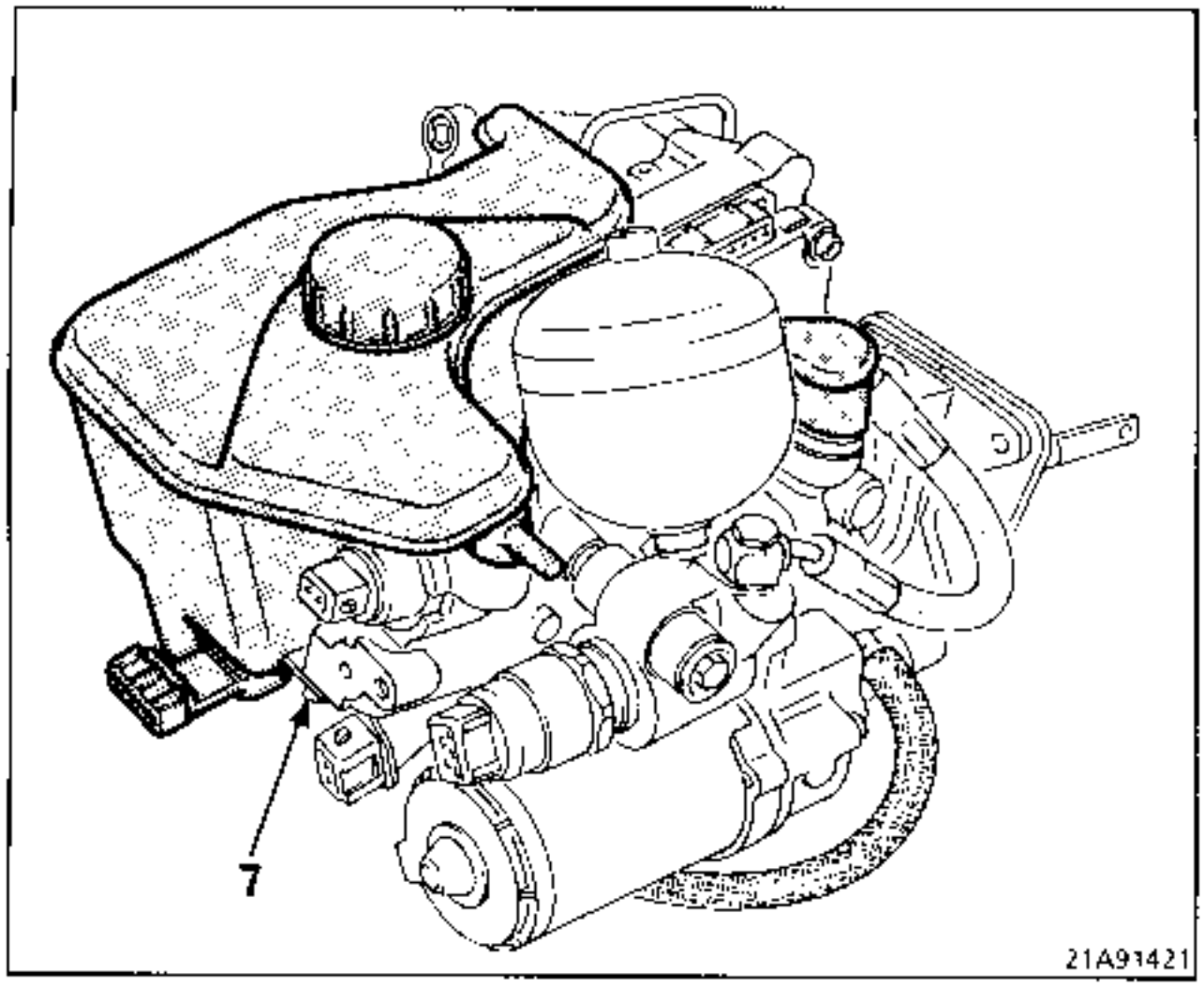
REPLACING THE VARIOUS COMPONENTS OF THE HYDRAULIC UNIT

II - REPLACING THE REGULATING UNIT

REMOVING

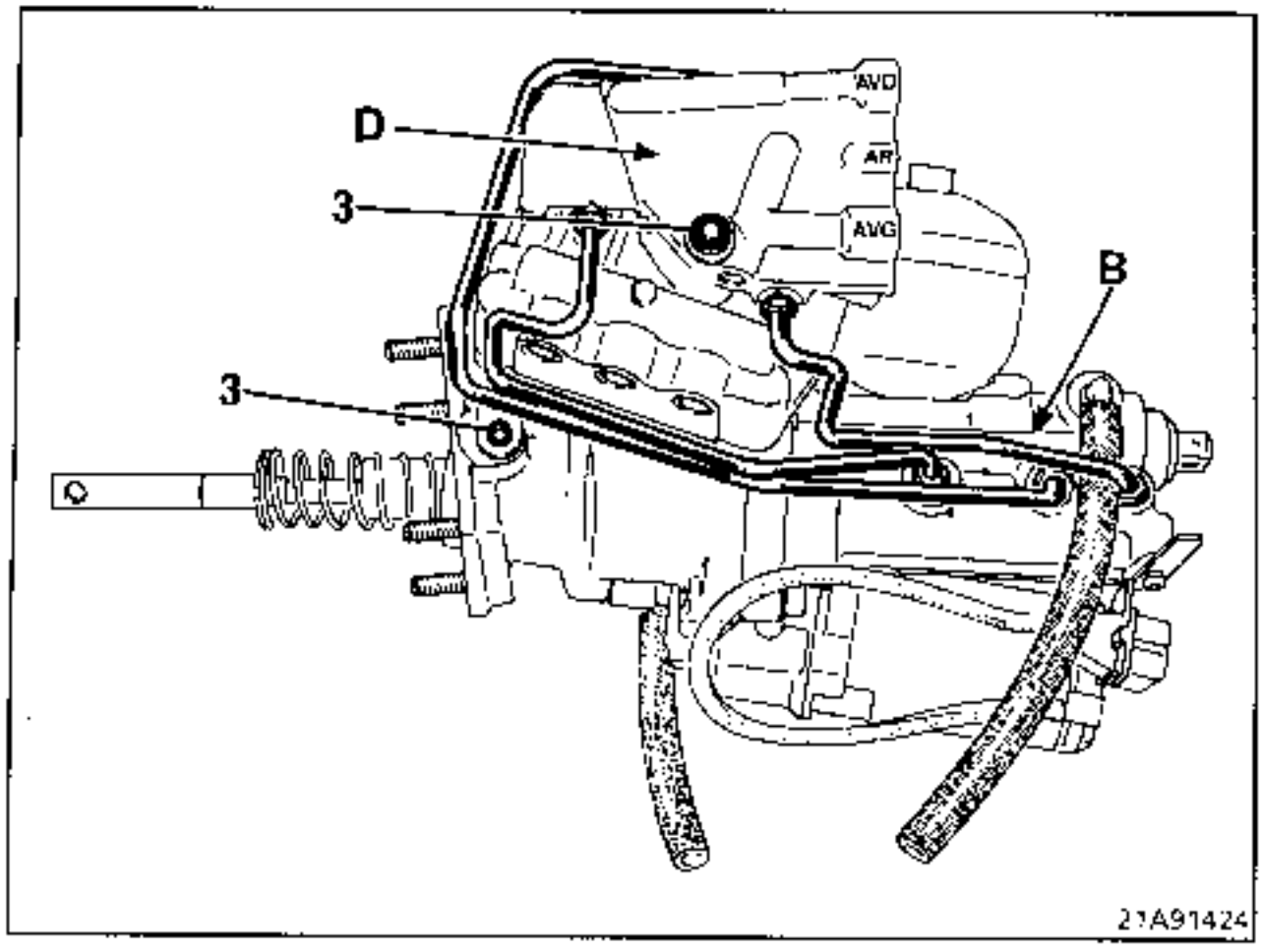
Remove:

- mounting lug (7) from the reservoir;



- the reservoir, unclipping it from its anchorages, after first disconnecting the two low pressure hoses;
- the rigid pipes connecting master cylinder (B) to regulating unit (D) (plug the take-offs);
- the two bolts (3) securing the regulating unit,
- the regulating unit.

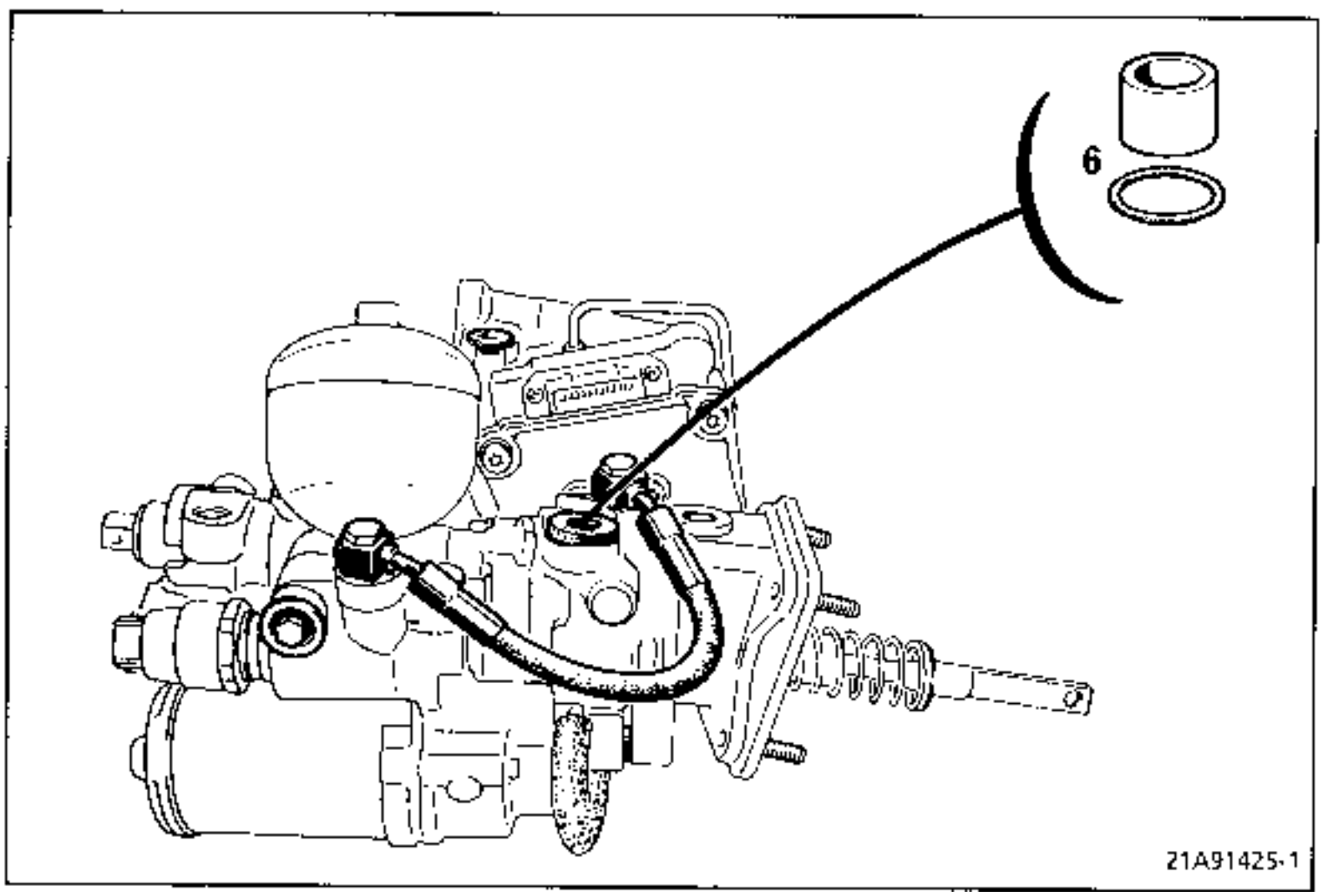
REPLACING THE VARIOUS COMPONENTS OF THE HYDRAULIC UNIT



REFITTING

Fit in place:

- the regulating unit and its rigid connection pipes. (Smear the mounting bolts with **LOCTITE FRENETANCH.**)



REPLACING THE VARIOUS COMPONENTS OF THE HYDRAULIC UNIT

- Fit the reservoir, making sure that the anchorage cups are in good condition. **Remember to fit the small spacer and a new O-ring seal in the take-off (6).**

- Fit mounting lug (7) for the reservoir. (Smear the bolt with **LOCTITE FRENETANCH.**)

- Fit the hydraulic pump and master cylinder low pressure hoses on the reservoir.

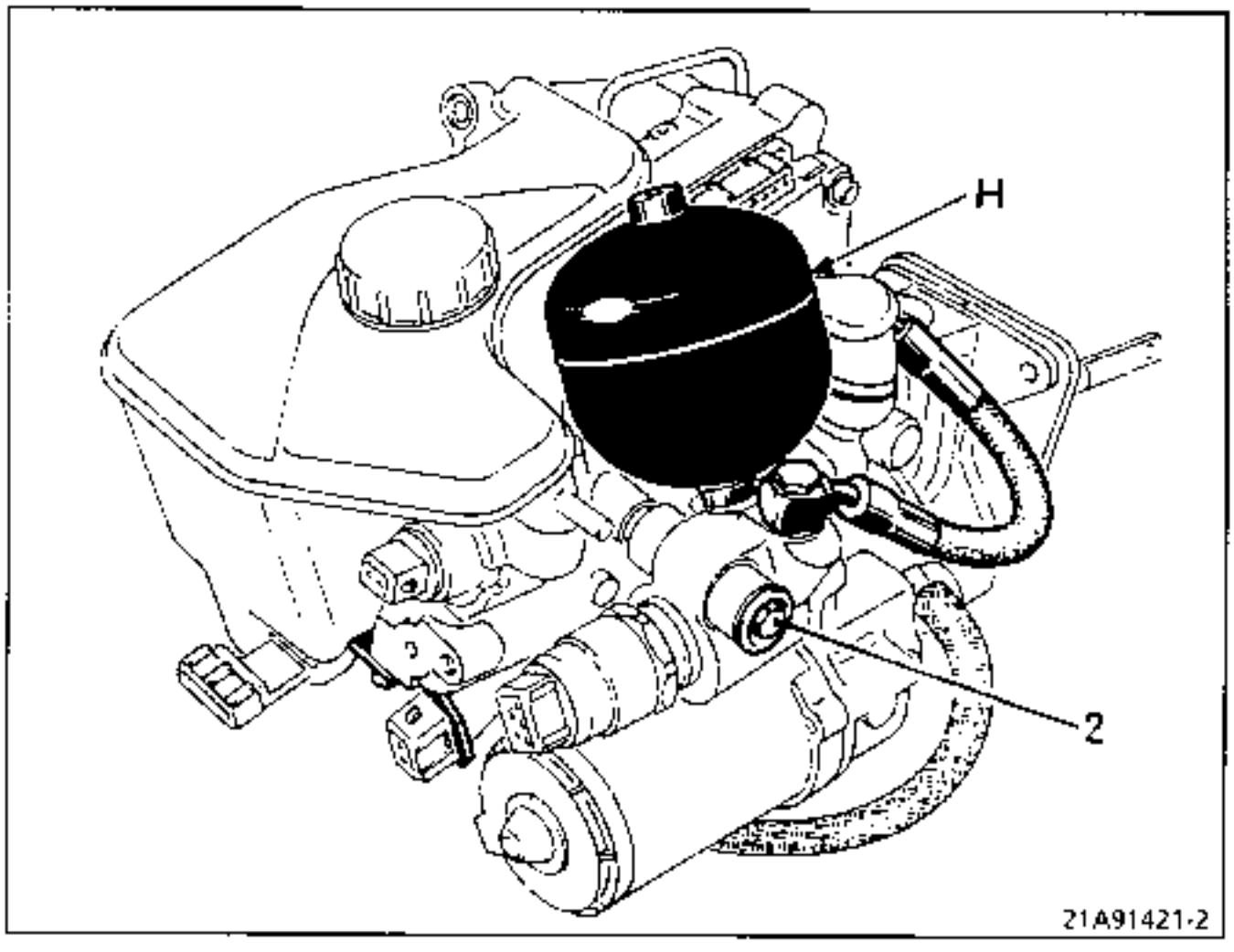
III - REPLACING THE FEED UNIT

This operation may be performed in situ; for this purpose and in order to facilitate the removal of bolt (2) from the pump, the four nuts securing the hydraulic unit to the bulkhead must be unscrewed completely.

REMOVING

Remove:

- accumulator (H);

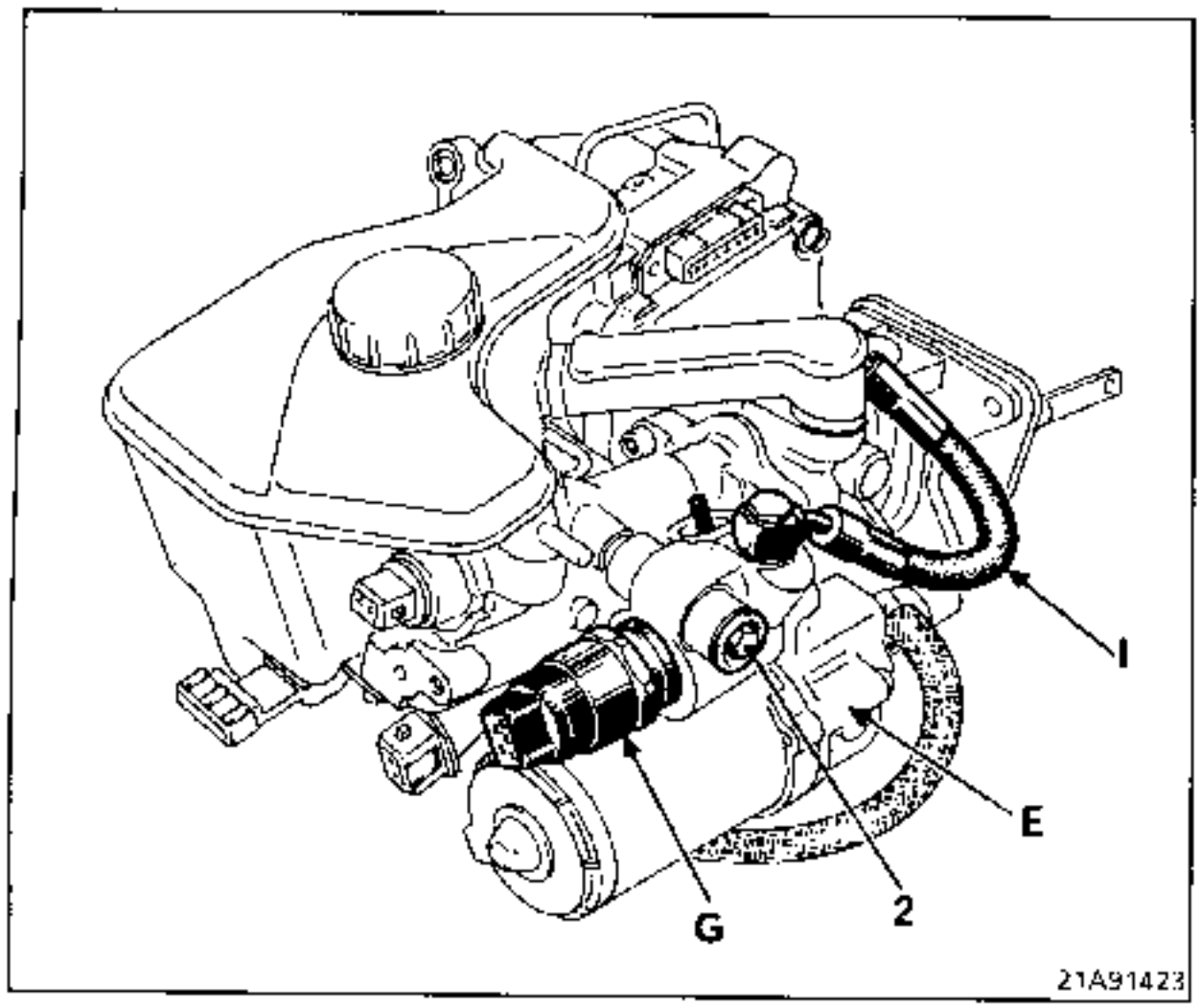


- pressostat (G);

- high pressure hose (I) (plug the take-offs);

- bolt (2) securing the pump.

REPLACING THE VARIOUS COMPONENTS OF THE HYDRAULIC UNIT



- Remove feed unit (E), disconnecting the feed hose between the pump and reservoir.

REPOSE

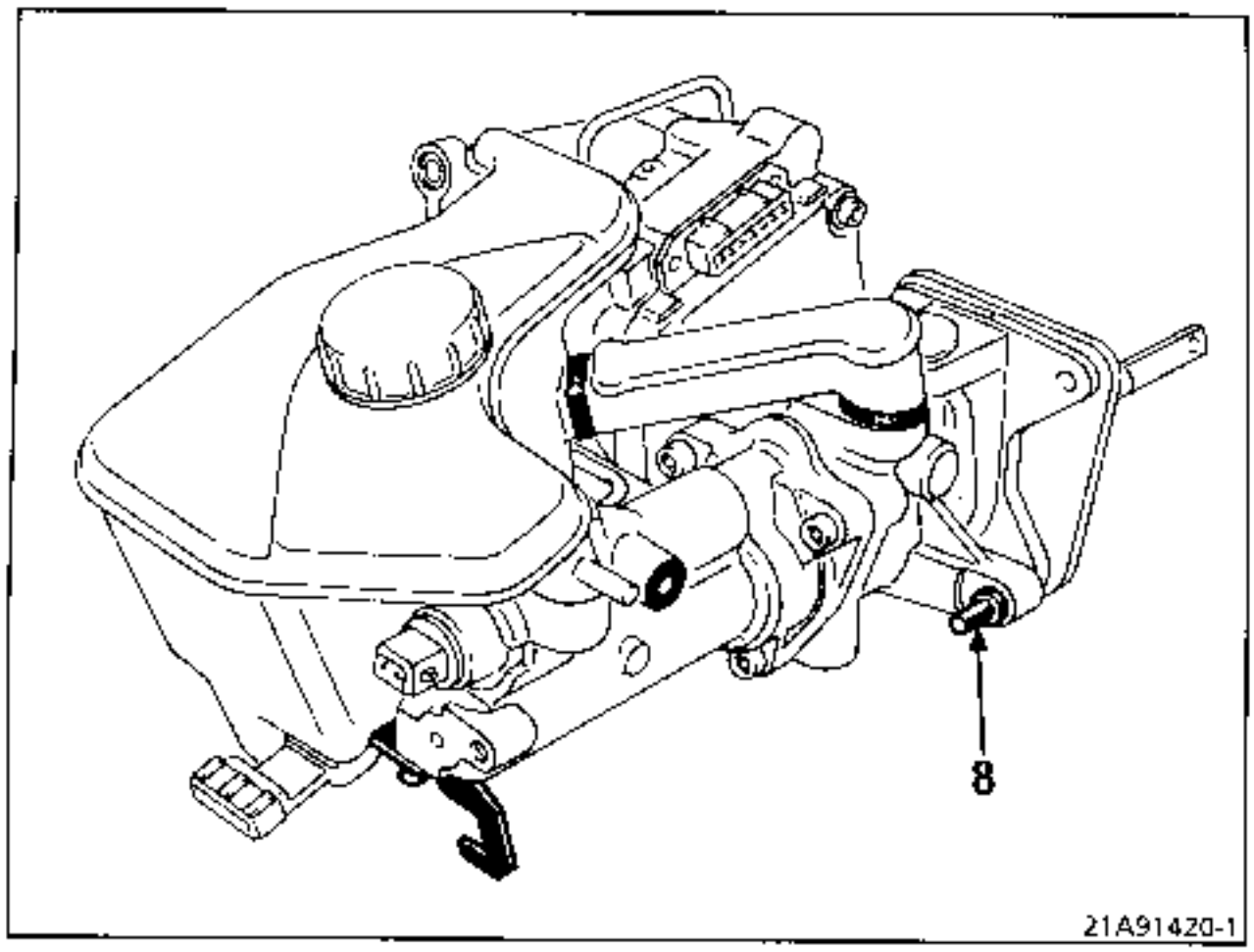
Ensure that the following are in good condition:

- locating pin (8) on the amplifier body,
- the feed unit silent-bloc bushes.

If any part is defective, it must be replaced.

REPLACING THE VARIOUS COMPONENTS OF THE HYDRAULIC UNIT

Fit in place:



- the feed unit (smear bolt (2) with **LOCTITE FRENETANCH**);
- the low pressure hose in the reservoir take-off;
- high pressure hose (I) equipped with new O-ring seals;
- pressostat (G) with a new seal;
- accumulator (H) with a new seal.

IV - REPLACING THE RESERVOIR

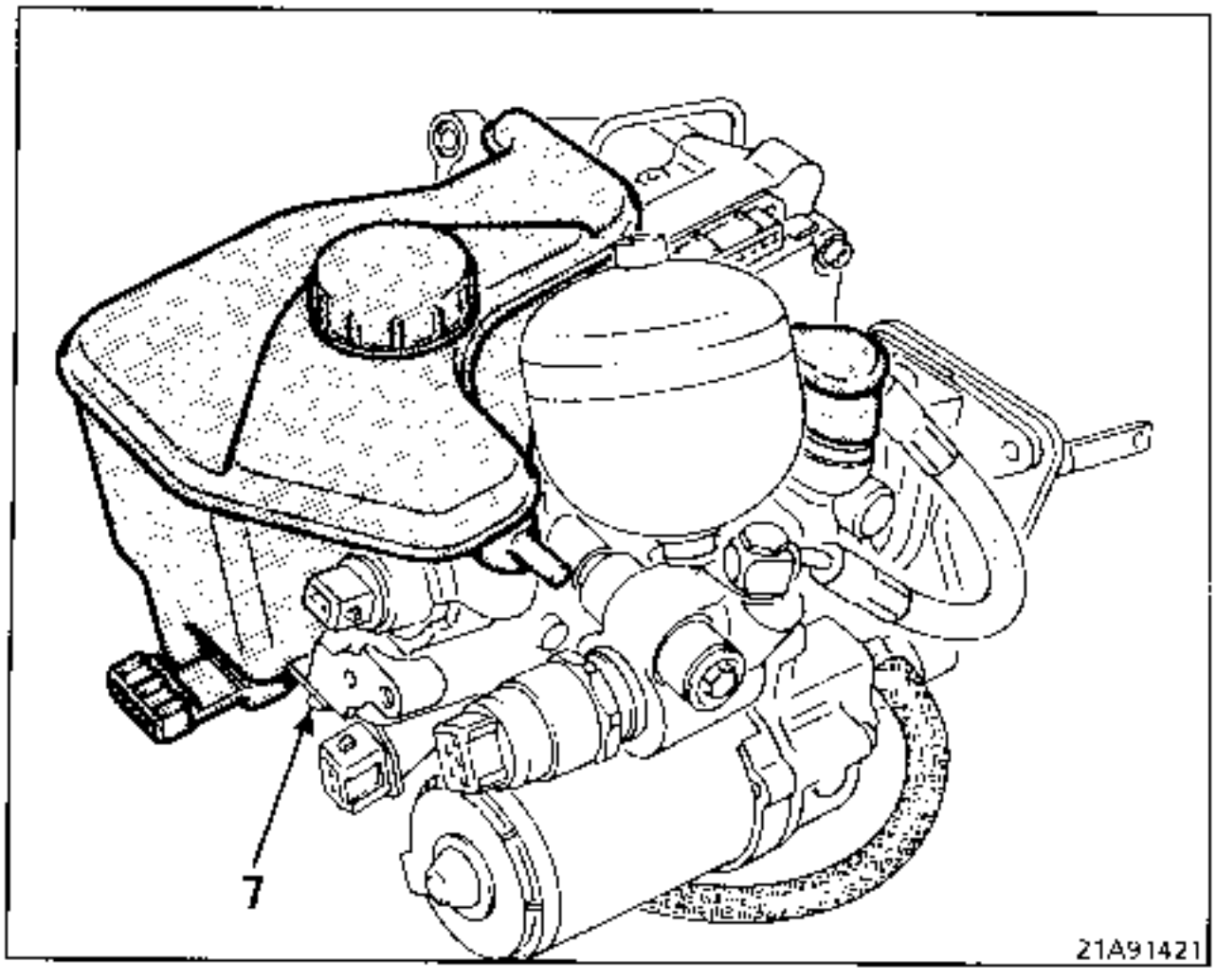
This operation can be performed in situ.

REMOVING

Remove :

- reservoir mounting lug (7),
- the reservoir, by unclipping it from its anchorages after disconnecting the two low pressure hoses.

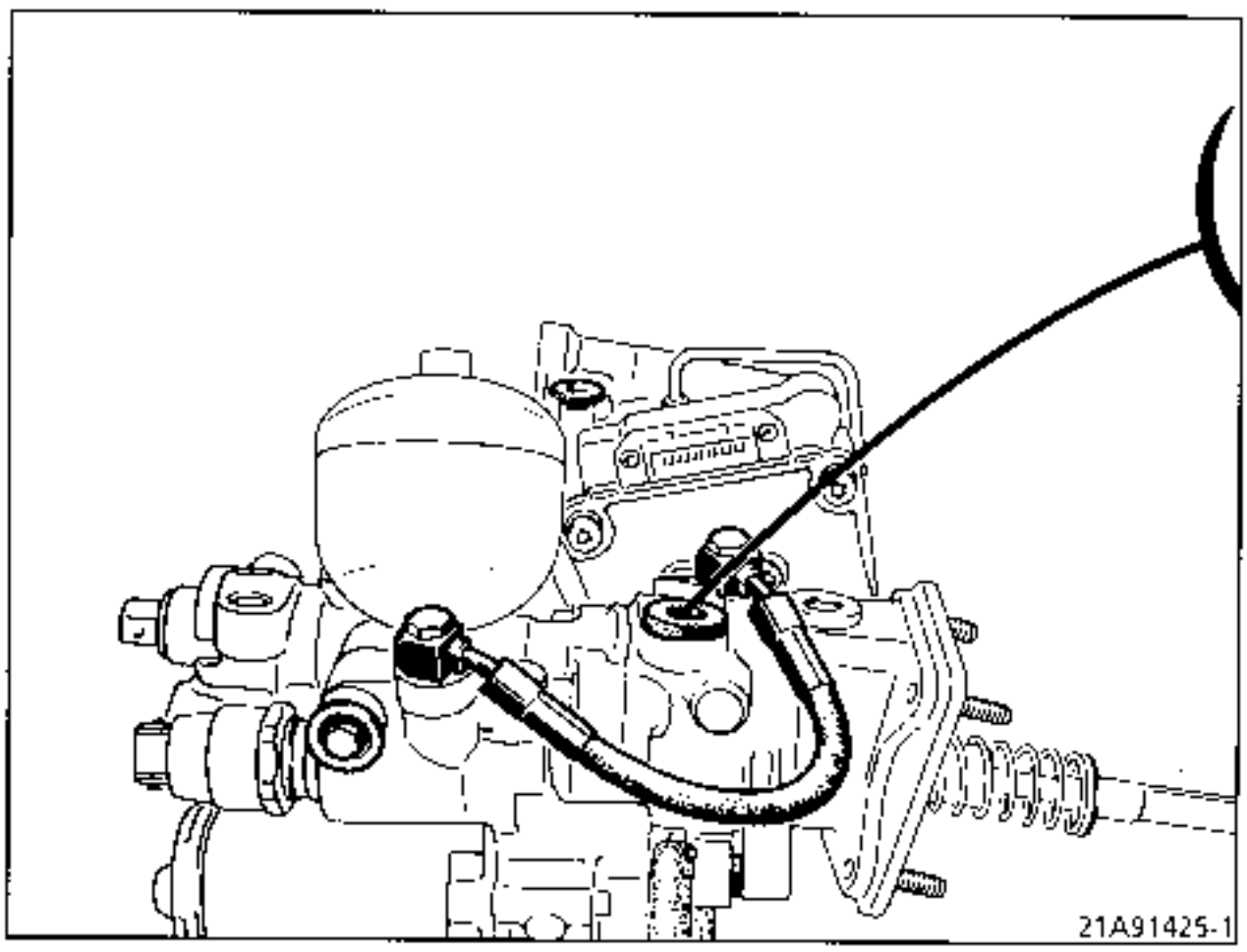
REPLACING THE VARIOUS COMPONENTS OF THE HYDRAULIC UNIT



REFITTING

Fit in place:

- the reservoir, making sure that the anchorage cups are in good condition. **Remember to fit the small spacer and a new O-ring seal in take-off (6).**



- Fit the reservoir mounting lug (7). (Smear the bolt with **LOCTITE FRENETANCH.**)

- Fit the hydraulic pump and master cylinder low pressure hoses on the reservoir.

REMOVING - REFITTING - CHECKING THE ACCUMULATOR

ESSENTIAL SPECIAL TOOLING		
Mot.	445	Strap wrench
Fre.	1085	Braking system pressure testing kit

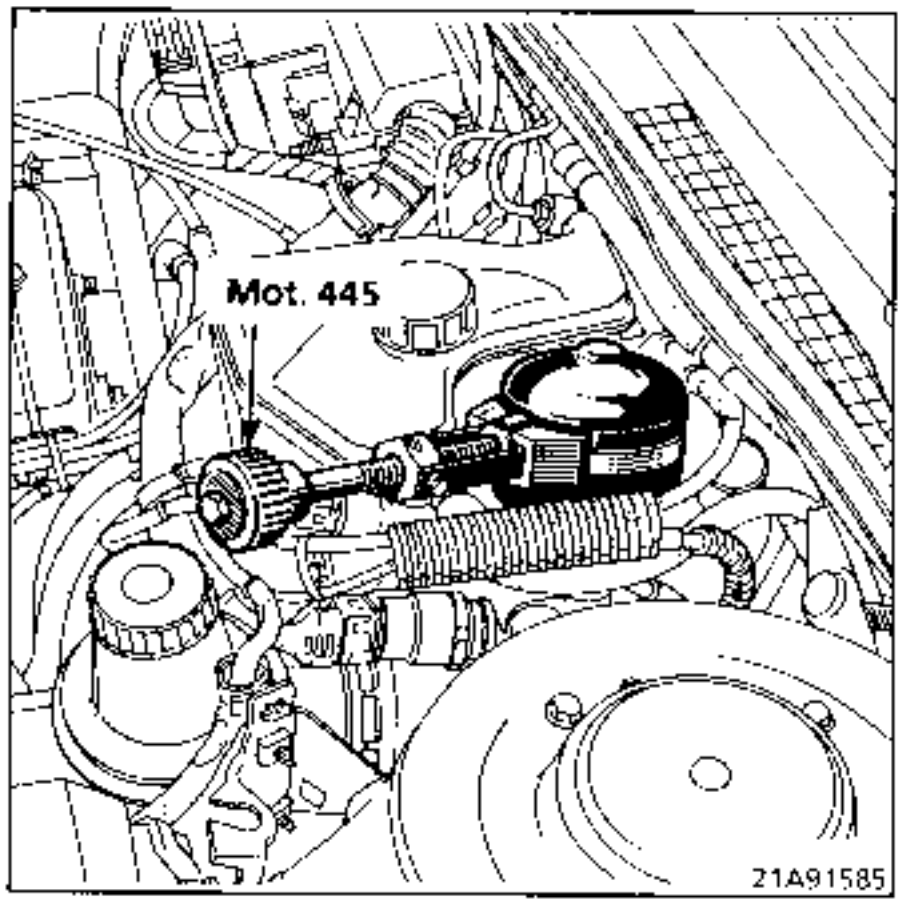
NOTE: The ABS operating pressure is between **140** and **180 bars**. Therefore, before working on the accumulator, it **must** be emptied by allowing the pressure to drop after depressing the brake pedal **20 times** (until it becomes hard). Do not switch on the ignition as activating the hydraulic pump causes the accumulator to fill.

REFITTING

Accumulator empty.

Ignition switched off.

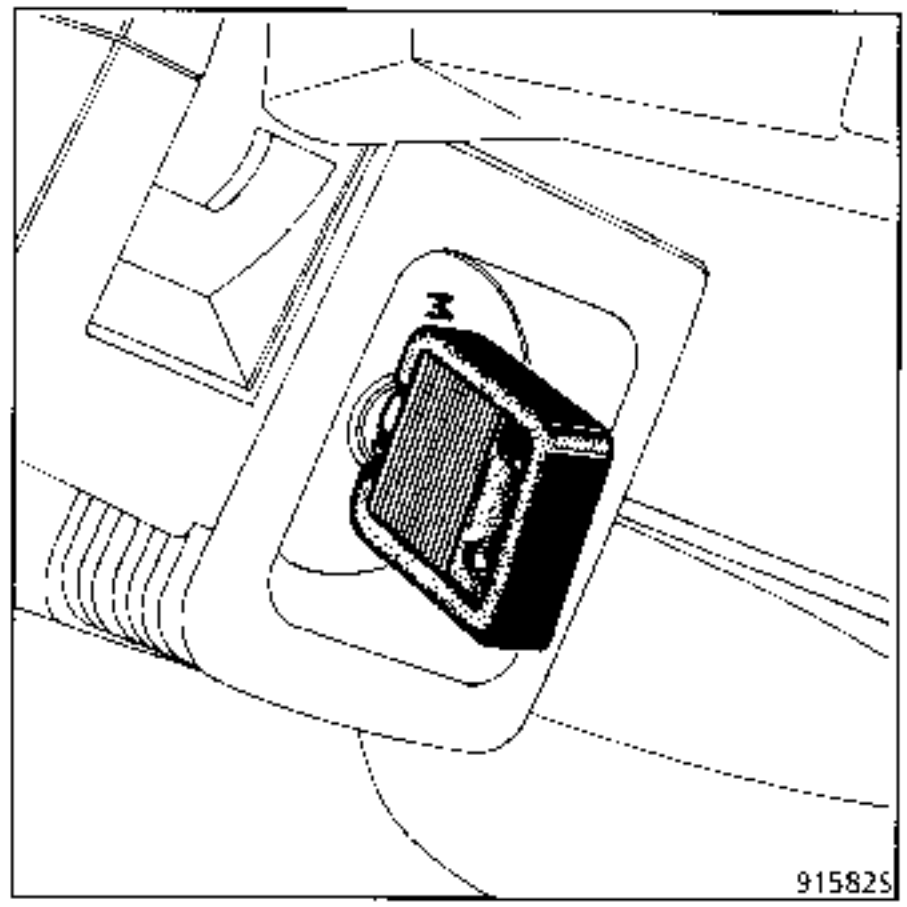
Remove the accumulator using a **Mot. 445** wrench.



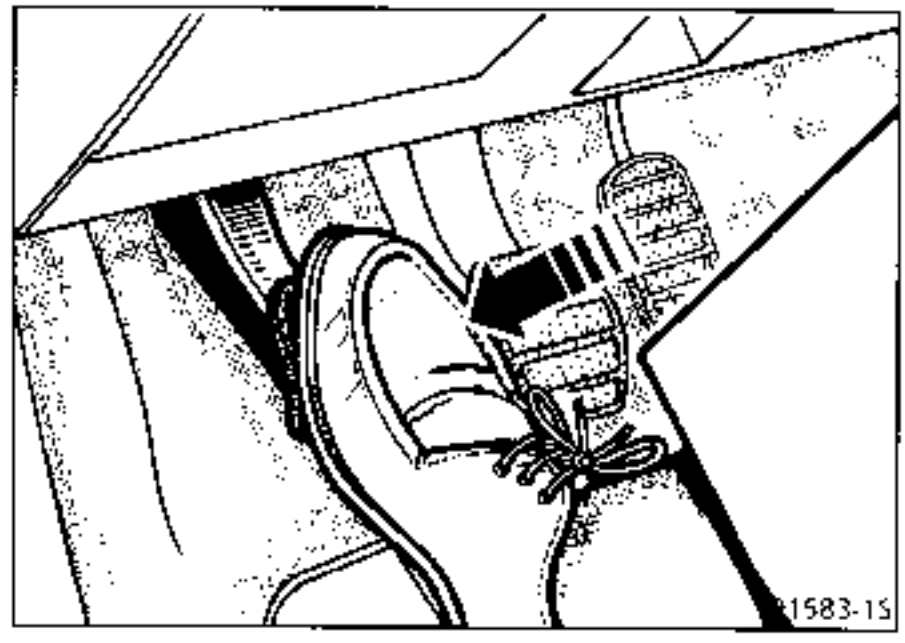
REFITTING

Fit in place the accumulator with a new O-ring seal and tighten it.

Switch on the ignition.



Wait for the pump to stop then press the brake pedal several times.



Wait for the pump to stop again.

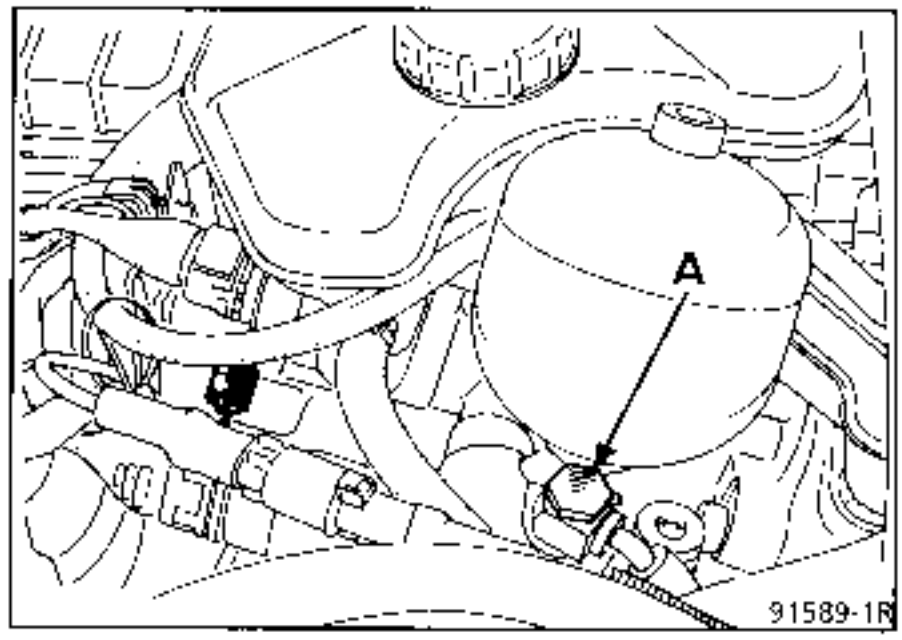
If necessary, top up the fluid level in the chamber. (See the relevant paragraph.)

REMOVING - REFITTING - CHECKING THE ACCUMULATOR

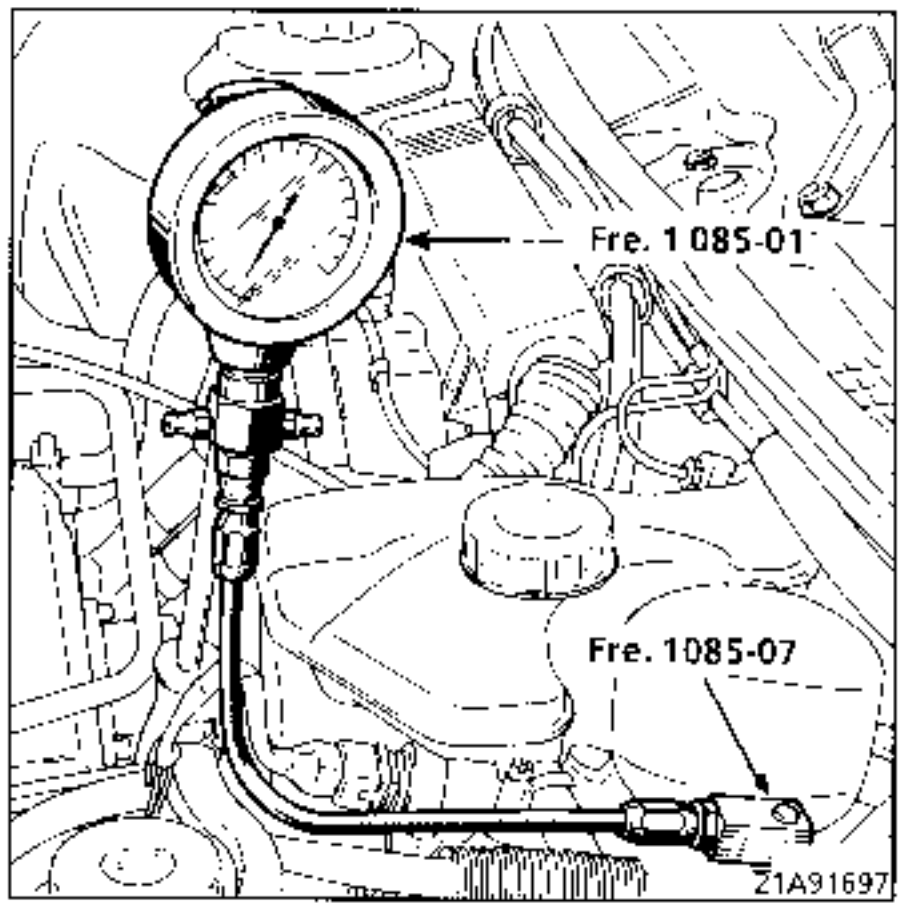
CHECKING

Accumulator empty (see **NOTE on previous page).**

Remove **bolt (A)** from the hose take-off.

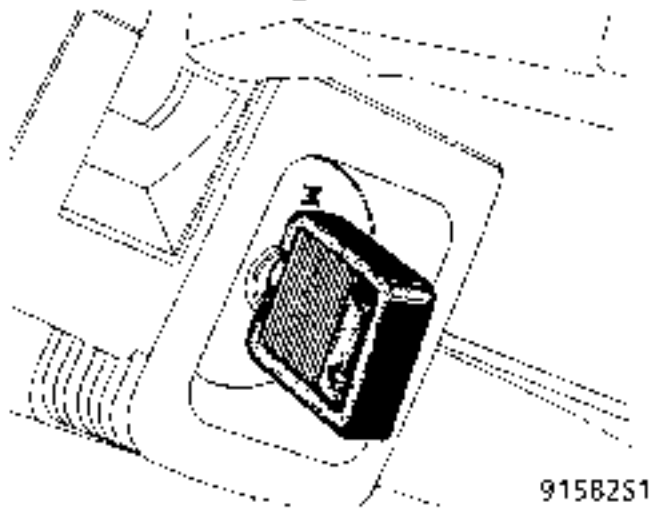
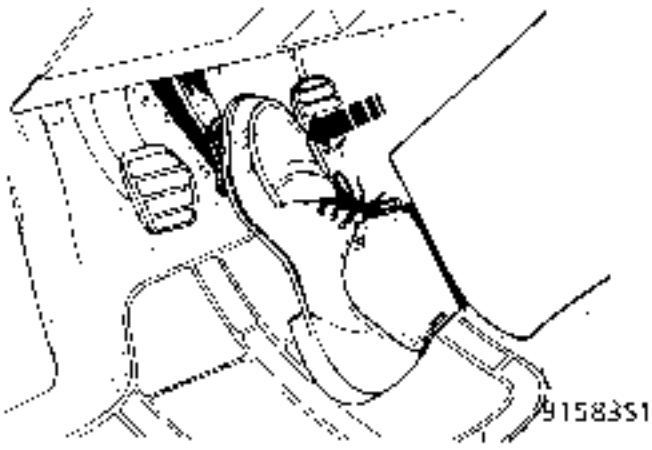
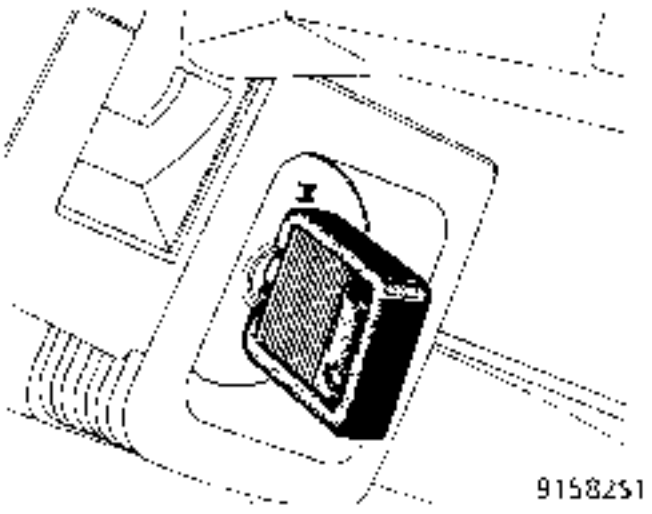


Fit in place tool **Fre. 1085-01** and end piece **Fre. 1085-07**.

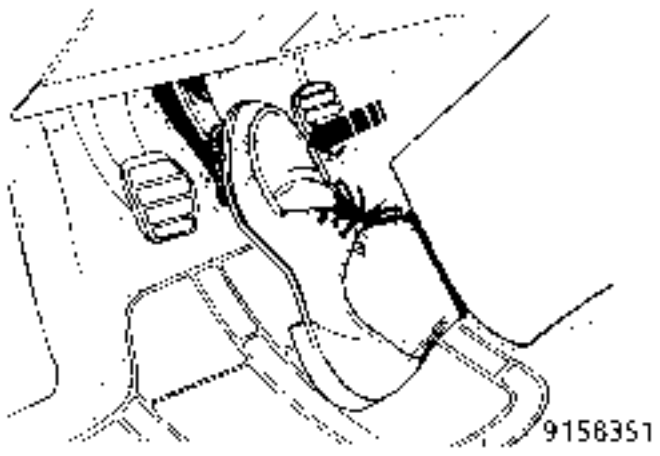
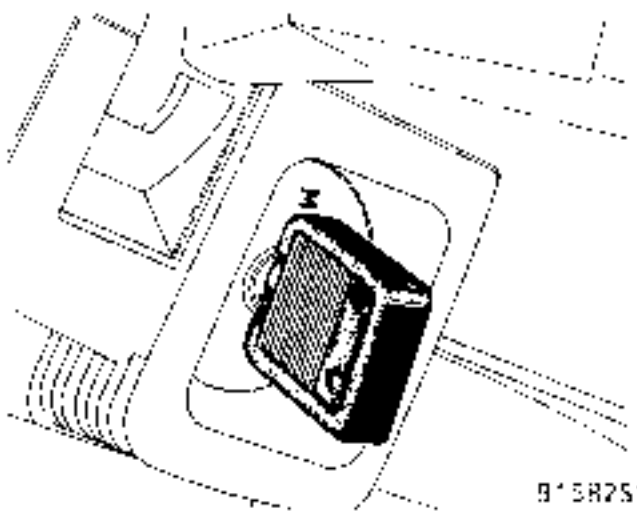
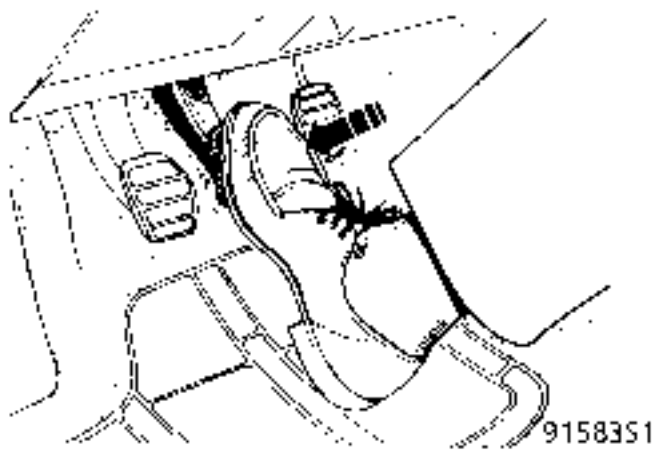


Proceed with the check (see the paragraph on **"Checking the accumulator and pressostat"**).

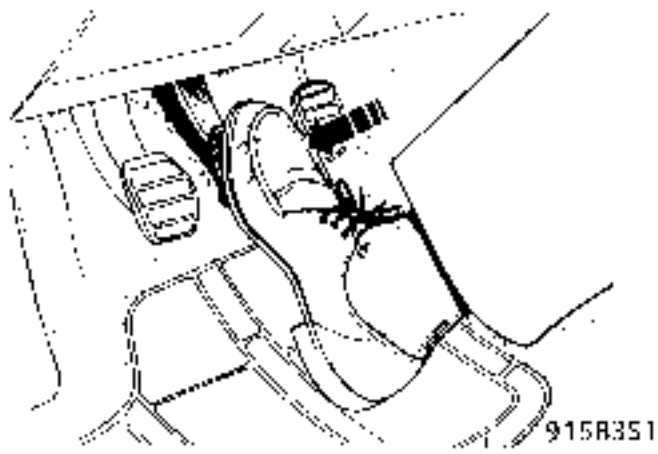
REMOVING - REFITTING - CHECKING THE ACCUMULATOR AND PRESSOSTAT

Tests	Correct values	Additional checks
1 - Accumulator test - **System not pressurised.** - Switch on the ignition.  9158ZS1	Pressure increases to between **40** and **90 bars**.	If value incorrect, replace accumulator.
2 - Length of time taken for accumulator to fill - Switch off ignition. - Activate brake pedal **20** times (until it becomes hard).  9158ZS1 - Switch on the ignition.  9158ZS1 - Measure time taken for accumulator to fill.	Time taken for accumulator to fill should be **60 seconds maximum**.	Check: pump operation, condition of high pressure hose and its take-offs, - condition of filter in reservoir.

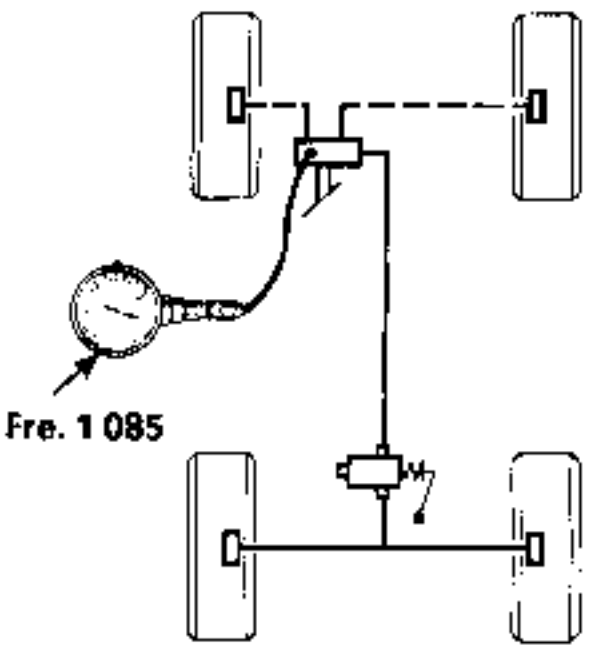
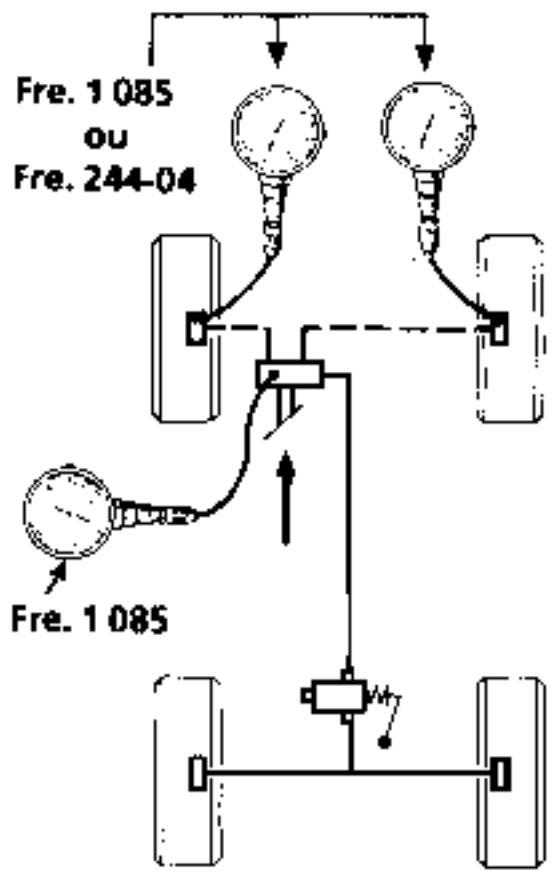
REMOVING - REFITTING - CHECKING THE ACCUMULATOR AND PRESSOSTAT

Tests	Correct values	Additional checks
3 - Pressostat operation - Switch off ignition. - Activate brake pedal **20** times (until it becomes hard).  9158351 - Switch on ignition.  9158251 - Check pressure when pump stops.	The pressure should be between 174 and **188 bars** when pump stops.	Replace pressostat if values incorrect.
- Activate brake pedal.  9158351 - Check pressure at which pump cuts in again.	The pressure should be between **130** and **150 bars**.	

REMOVING - REFITTING - CHECKING THE ACCUMULATOR AND PRESSOSTAT

Tests	Correct values	Additional checks
4 - Pressostat warning function - Disconnect motor feed. Activate brake pedal.  - Check point at which warning lights illuminate.	Warning lights (1)(2) + (4) should illuminate at a pressure of between **100** and **110 bars**.	If values incorrect, replace pressostat.

CHECKING FOR LEAKS

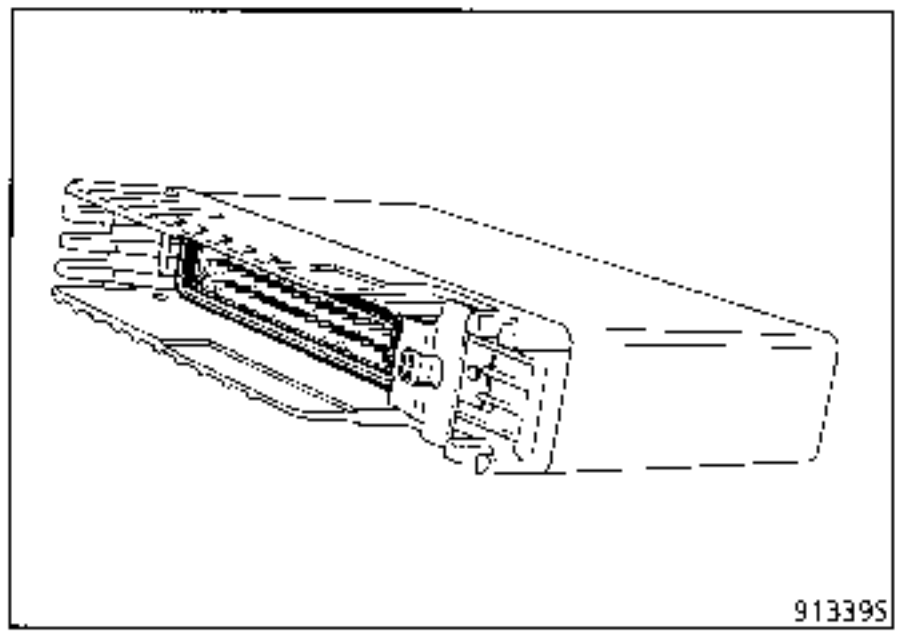
Checks	Correct values	Additional checks
1 - Accumulator test  **Fre. 1 085** 91563-4R1 - Accumulator full. - Brake in rest position.	Pressure loss should be less than **10 bars** in **5** minutes.	- Check absence of external leaks. - Replace amplifier/master cylinder assembly.
2 - Circuit test - Connect two pressure gauges **Fre. 1085** or **Fre. 244-03** to front wheels.  **Fre. 1 085 ou Fre. 244-04** **Fre. 1 085** 91563-4R - Accumulator full. - Adjust pressure on front wheels to **100 bars** with pedal clamp.	Pressure loss should be less than: - at pump: **10 bars** in **5 minutes**, - at callipers: **5 bars** in **5 minutes**.	- Check there are no external leaks. - Replace amplifier/master cylinder assembly.

IF **WARNING** LIGHTS ILLUMINATE

The control warning light(s) illuminate(s) when an incident has been detected.

Several components in the anti-lock braking system are equipped with incident sensing means.

1 - The computer

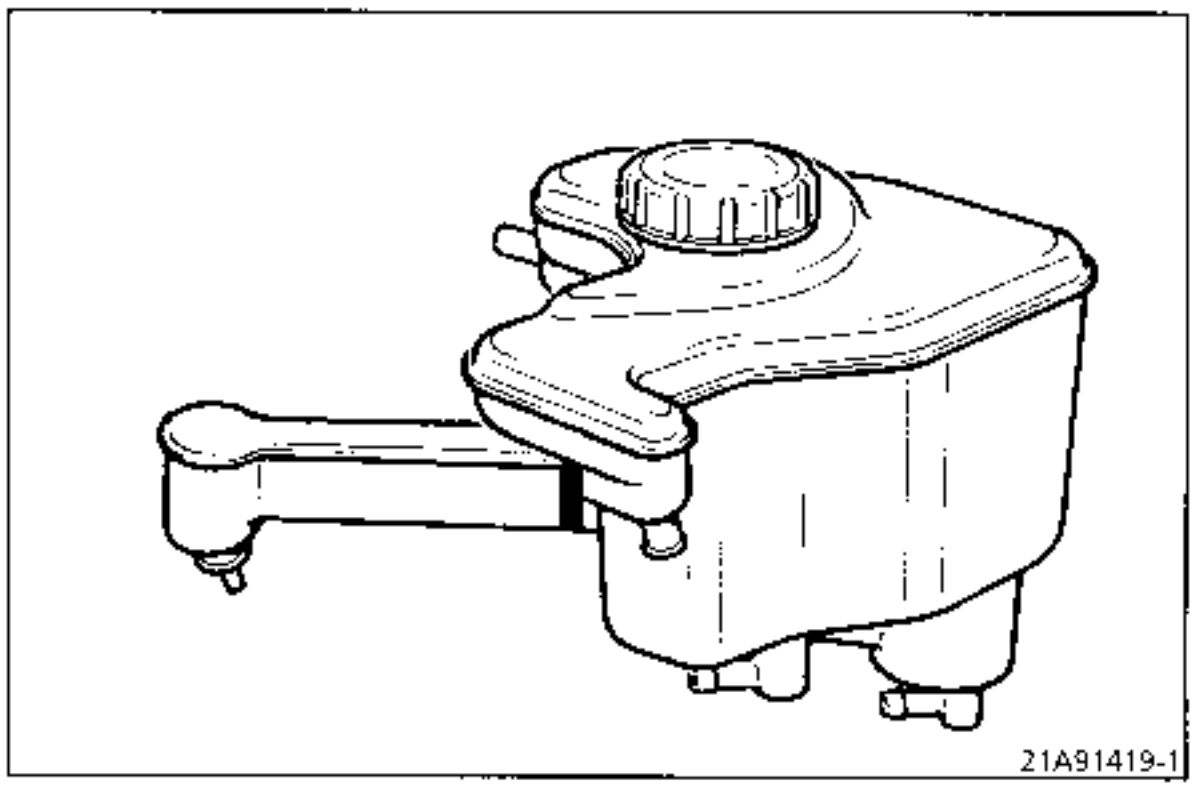


It continuously tests all its peripheral units; if it detects a problem, it instructs warning light (4) to illuminate.

2 - The brake fluid reservoir

The reservoir has a double warning device with two thresholds :

First **threshold** : If the brake fluid level drops, the "**level warning**" device illuminates the warning light (1)(P) .



Second threshold : If the level drops still further, the device illuminates the second warning **light**, i.e. (1)(P) + (4)

IF WARNING LIGHT ILLUMINATES

3 - Cut-off pressostat



2*A9*419-2

The pressostat has a dual function:

a) **Service function**

- **140 bars** : activates pump.
- **180 bars** : stops pump.

b) **Warning function**

- **105 bars** : Activation of "defect" mode: anti-lock braking retained only for rear wheels.
- **130 bars** : Warning device and downgraded move deactivated.

Only the warning functions illuminate the warning lights.

1st case : ignition on with pressure between **105** and **180 bars**: pump activated and warning light (4) illuminates during activation phase.

2nd case : ignition on with pressure lower than **105 bars** : pump activated and warning lights (1)(2) + (4) illuminate until pressure reaches **130 bars**.

4 - Phase during which warning lights are fed during starting

a) **Accumulator empty**

NOTE 1: The hydraulic accumulator operates at a pressure between **140** and **180 bars**, internal sealing is performed solely by machining tolerances. Therefore, after the vehicle has not been used for a long time, the accumulator discharges and the illumination of the test warning lights is modified.

Pressure less than 105 bars.

Ignition switched on: Pump activated and warning lights (1)(2) + (4) illuminates until pressure reaches **130 bars** (see **NOTE 1**).

Starting : Warning light (4) illuminates again.

NOTE 2 : The computer is cut off during the starting phase to prevent a defective signal being detected owing to the drop in battery voltage resulting in the warning light illuminating again. To meet these requirements an auxiliary relay is used.

Engine running: Warning light (4) remains illuminated during test cycle.

IF WARNING LIGHT ILLUMINATES

b) Accumulator full

Ignition switched on : Warning light (4) illuminates during activation phase.

Starting: Warning light (4) comes on again (see **NOTE 2**).

Engine running: Warning light (4) stays on during test cycle.

5 - Warning lights illuminate following an incident when travelling or when starting

a) Warning light (4) illuminates.

Depending on the type of incident detected by the computer, the vehicle:

- either has conventional braking, without ABS,
- or has anti-lock braking system in the "defect" mode (regulation only on rear wheels).

b) Warning light (1)(2) illuminates.

Apart from meaning that the handbrake has not been fully released, the illumination of this warning light alone indicates a drop in the fluid level in the brake fluid reservoir.

c) Warning lights (1)(2) + (3) illuminate

A brake fluid leakage causes warning light (1)(2), to illuminate; if the fluid level continues to drop, warning light (4) illuminates in turn and the system goes into "defect" mode (pressure regulation only on rear wheels).

If the pump stops operating, warning lights (1)(2) + (3) will illuminate simultaneously when the pressure drops to below 105 bars. The system then goes into defect mode (pressure regulation only on rear wheels).

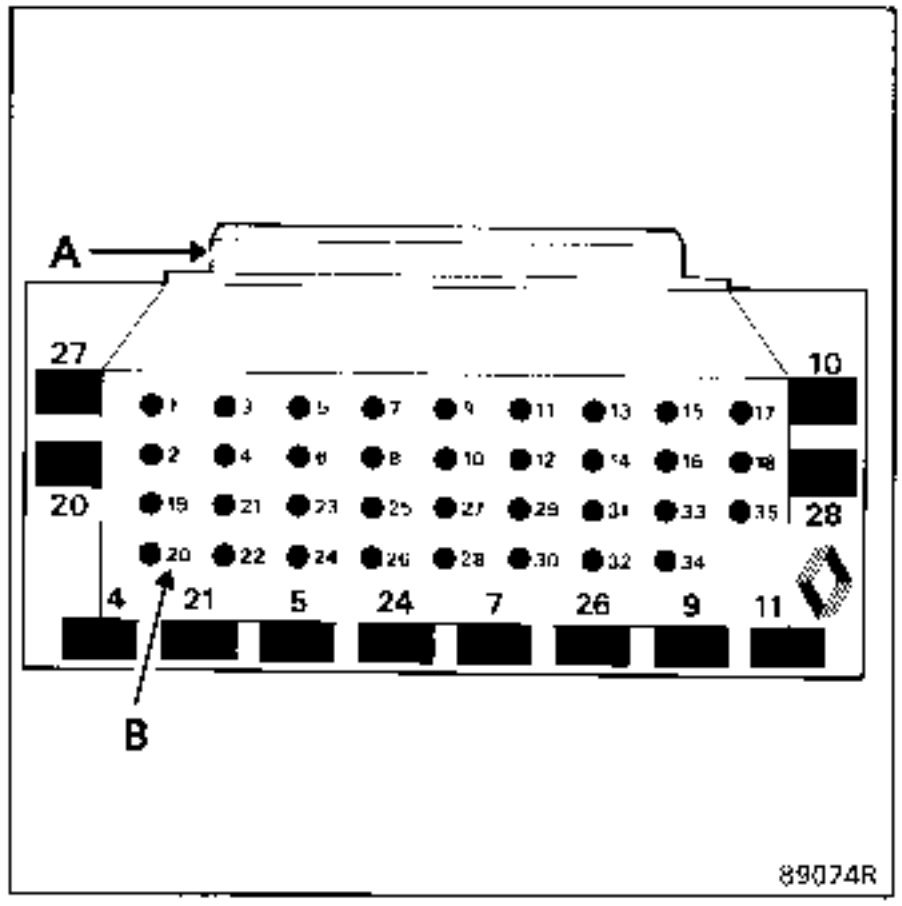
DIAGNOSIS

ESSENTIAL SPECIAL TOOLING	
M.S. 1048	Bornier for testing wiring using XR 25 or multimeter

This consists of a base with **35 contact points** identical to that for the anti-lock braking system computer and integral with a printed circuit equipped with electrical contact points numbered from (1) to (35).

Each number corresponds to an electrical connection on the vehicle wiring and is indicated on the operating diagram.

By rapid access and preventing errors in matching reference marks, it enables all the electrical connectors arriving at the anti-lock braking system main connector to be checked.

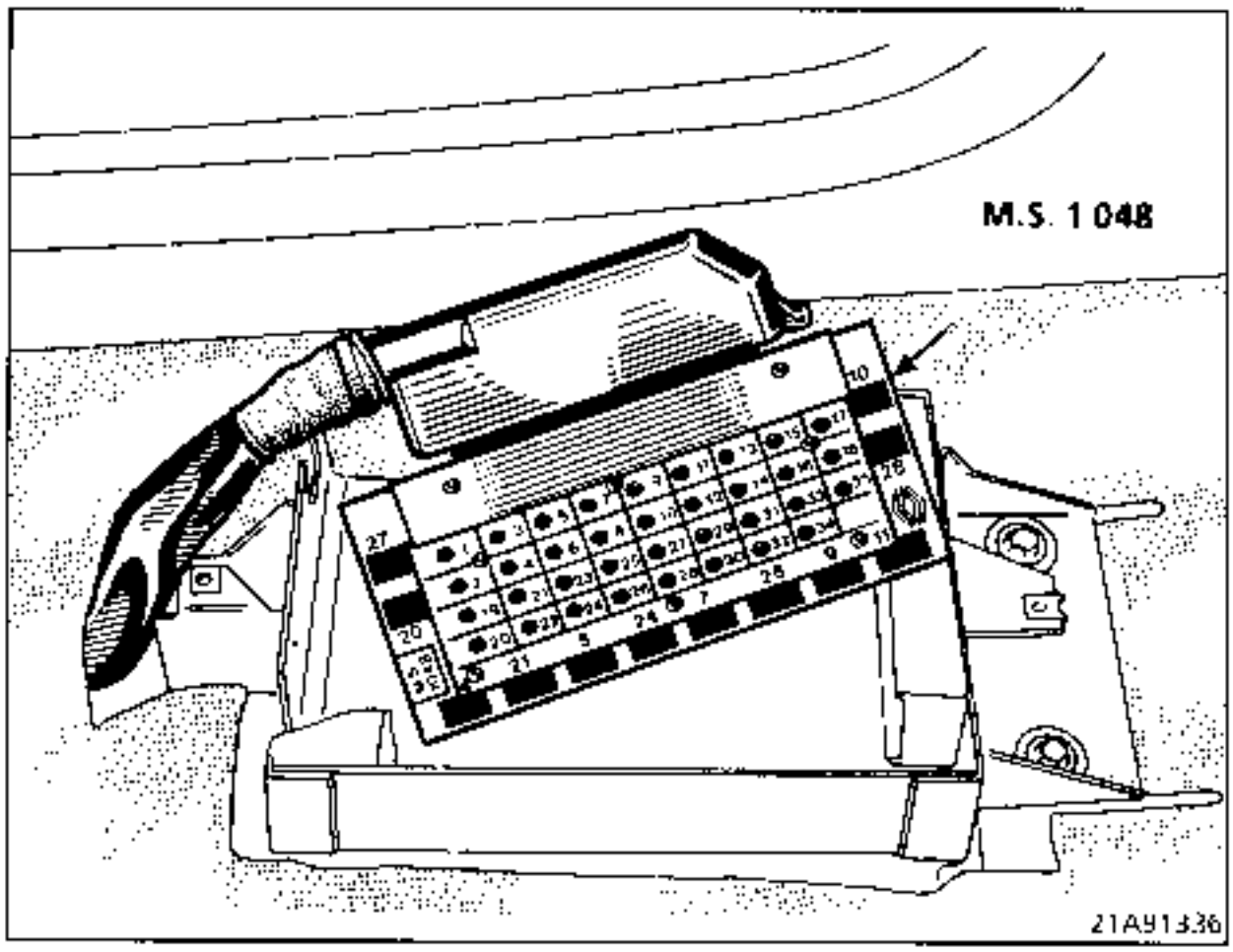


A Vehicle wiring harness.
B Contact points for probe tips
Checking points

DIAGNOSIS

Connection on vehicle

Ignition off : Disconnect the anti-lock braking system computer from its base and connect the bornier in its place.



Checking method principle

Place the probe tip of the XR25 or multimeter in contact with the numbers indicated on the bornier and corresponding to the letters **DIAG A** → **B** --- **C** to **Y** on the test tables, paying attention to the conditions given in the left-hand column of these tables on pages **38-34** to **38-38**.

Test apparatus which may be used

- **XR25** : Measurement of continuity using the buzzer
  Measurement of voltage using the voltmeter

- **Multimeter** : Resistance measurement
  Voltage measurement

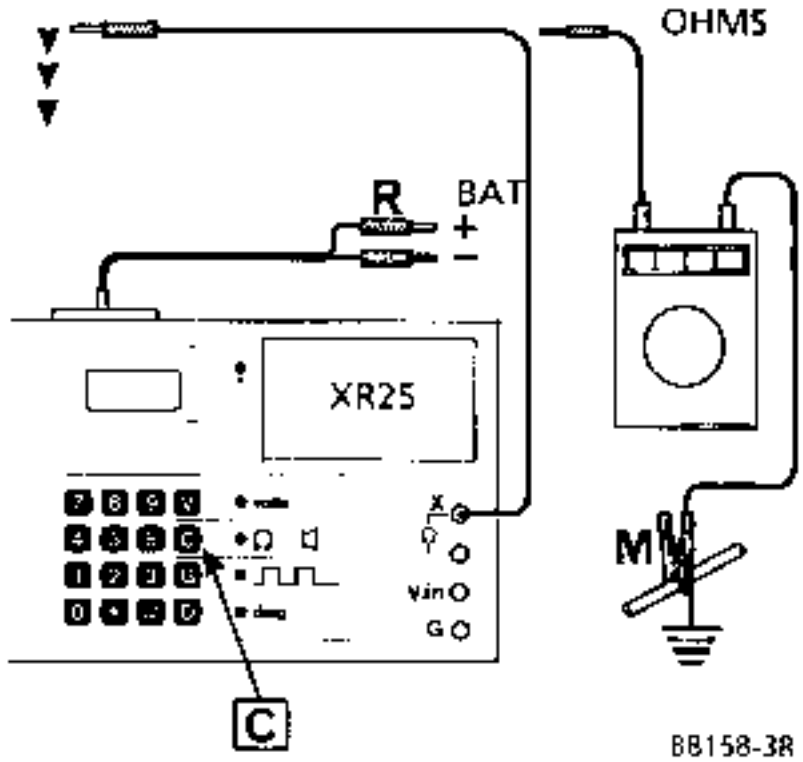
DIAGNOSIS

CHECKING CONTINUITY

MEASURING CONDITIONS	DIAG	TEST APPARATUS		BOR-NIER NO.
		XR 25	OHMMETER	
VEHICLE IGNITION OFF	A	*	0 to 0.5 Ω	1
	B	*	0 to 0.5 Ω	3
	C	*	0 to 0.5 Ω	11
	D	*	0 to 0.5 Ω	20
	E	*	50 to 100	8
Key: *	F	*	5 to 7 Ω	15
	G	*	5 to 7 Ω	17
THE BUZZER BUZZES	H	*	5 to 7 Ω	35
	I	*	3 to 5 Ω	33
BUZZER DOES NOT BUZZ	J	*	3 to 5 Ω	34
	K	*	3 to 5 Ω	16
	L	*	2 to 5 Ω	18
	M	*	> 20 kΩ	4
	N	*	> 20 kΩ	5
	O	*	> 20 kΩ	6
	P	*	> 20 kΩ	7
	Q	*	> 20 kΩ	9
	R	*	> 20 kΩ	10

CONNECTIONS

XR 25 MULTIMETERS

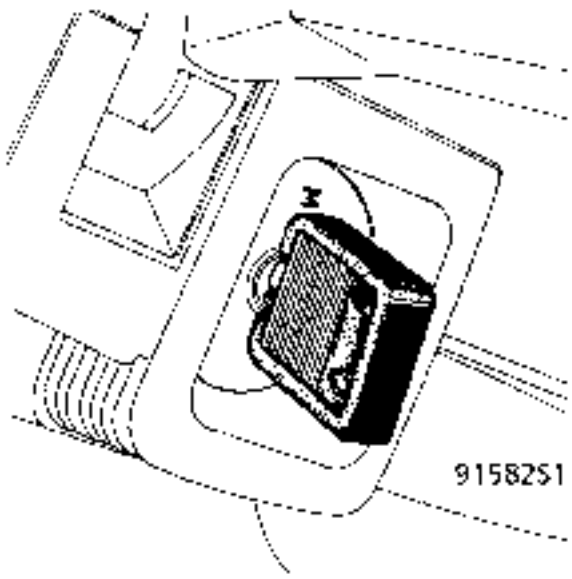
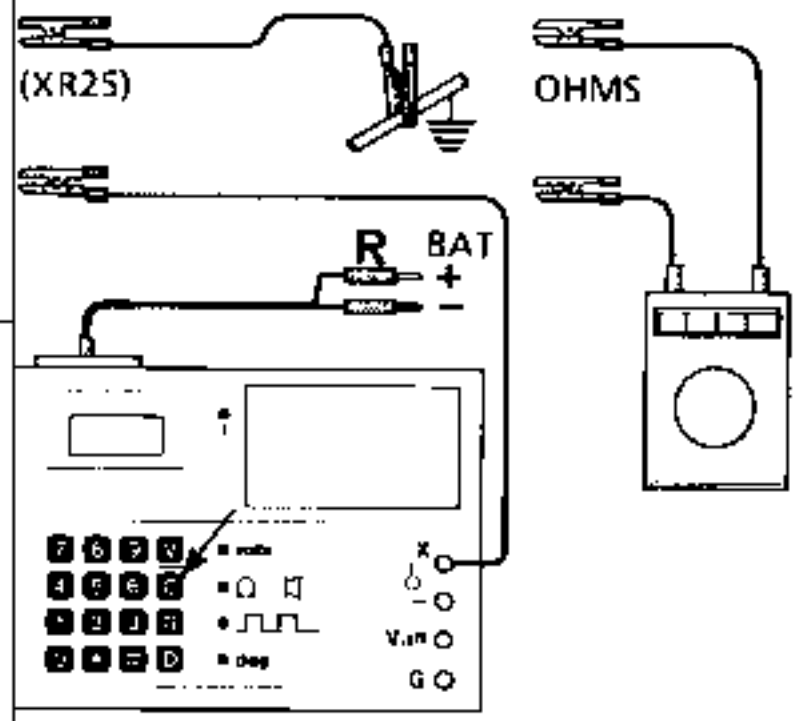


C – Key pressed
R = Red connected to battery
M = Crocodile clip connected to brake pipe

DIAGNOSIS

CIRCUIT CHECK : Switch B of NIVOCODE 207 and 105 bar switch of PRESSOSTAT 434 .

Key: BUZZER BUZZES

MEASURING CONDITIONS	TEST APPARATUS		BOR-NIER NO.	CONNECTIONS	
	XR 25	OHMMETER		XR 25	MULTIMETERS
- Ignition on.  9158251	BUZZER BUZZES	0 to 0.5 Ω	9 10	 (XR25) R BAT + − OHMS 88158-8S	
- System pressurised (**180 bars**). - Fluid level correct.		⊗		Key C pressed : **R** : red terminal connected to battery −	

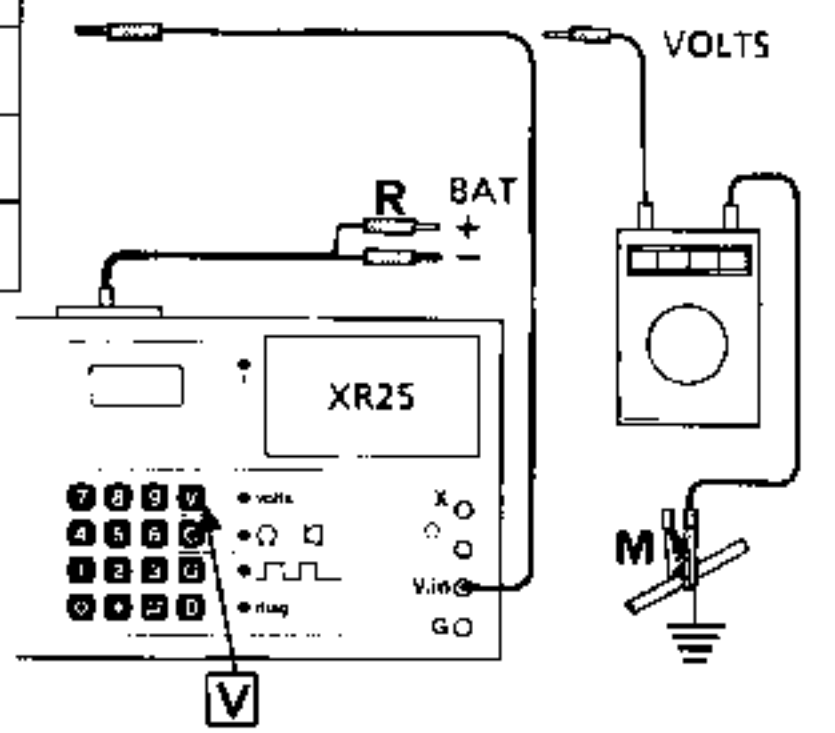
⊗ If incorrect: check continuity between terminal (9) of computer, terminal (1) of connector A, terminal (2) of connector A, terminal (3) of connector D (**105 bar** switch pressostat), terminal (5) of connector D and terminal (10) of computer.

DIAGNOSIS

CHECKING VOLTAGE

MEASURING CONDITIONS	DIAG	XR 25 / MULTIMETER	N°
IGNITION ON	S	> 10 V	2
Ignition on	T	> 10 V	3
Shunt 2 and 8	U	> 10 V	20
	V	0.5 V to 1.5 V	27

CONNECTIONS
XR25 MULTIMETER



V = Key pressed

R = Red terminal connected to battery +

M = Crocodile clip connected to brake line

88158-4R

DIAGNOSIS

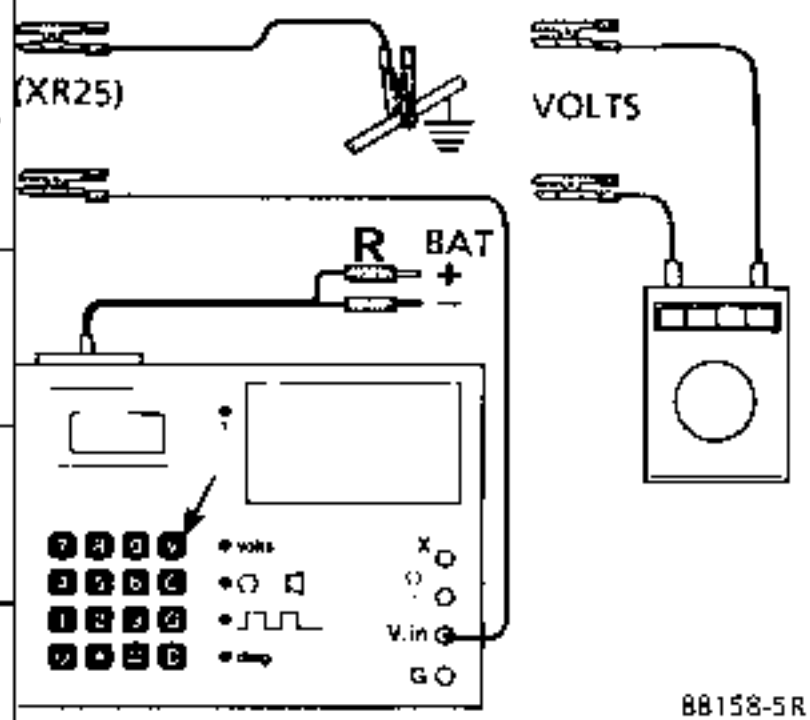
WHEEL SENSOR TEST

Measuring the voltage:

* Turn the wheel in snatches and watch the voltmeter.

Key : Multimeter on alternating current.

MEASURING CONDITIONS	XR 25 / MULTIMETER		N°	CONNECTIONS XR25 / MULTIMETER
TURN* FRONT LEFT-HAND WHEEL	Y1	V ⩾ 0.1 V ⎓ R — 0.6 to 1.6 kΩ	5 23	
TURN* FRONT RIGHT-HAND WHEEL	Y2	V ⩾ 0.1 V ⎓ R — 0.6 to 1.6 kΩ	7 25	
TURN* REAR LEFT-HAND WHEEL	Y3	V ⩾ 0.1 V ⎓ R — 0.6 to 1.6 kΩ	6 24	
TURN* REAR RIGHT-HAND WHEEL	Y4	V ⩾ 0.1 V ⎓ R 0.6 to 1.6 kΩ	4 22	

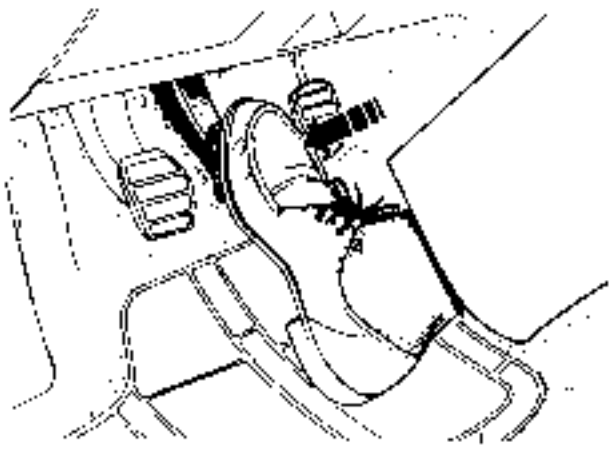
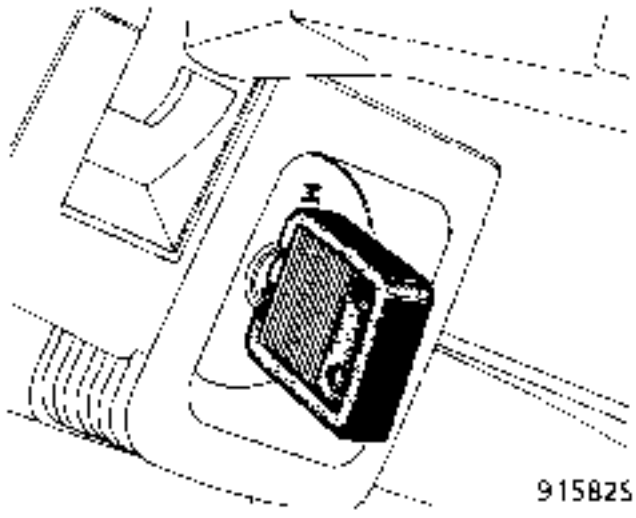


88158-5R

Key V pressed
R = Red terminal connected to battery +

DIAGNOSIS

HYDRAULIC FEED UNIT TEST (MOTOR)

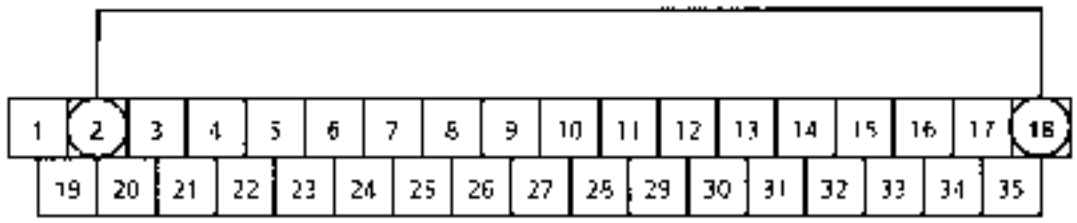
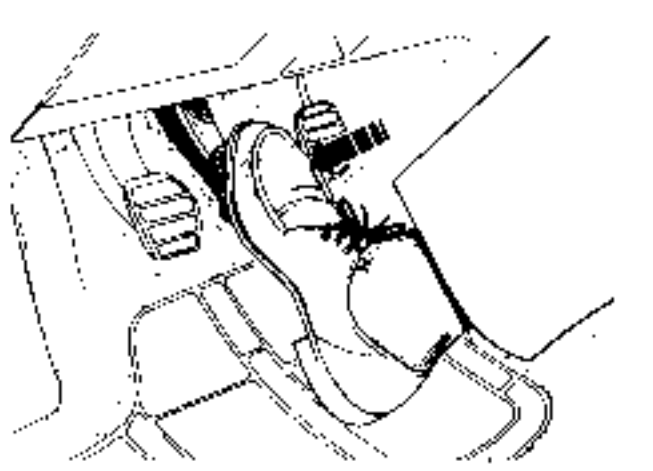
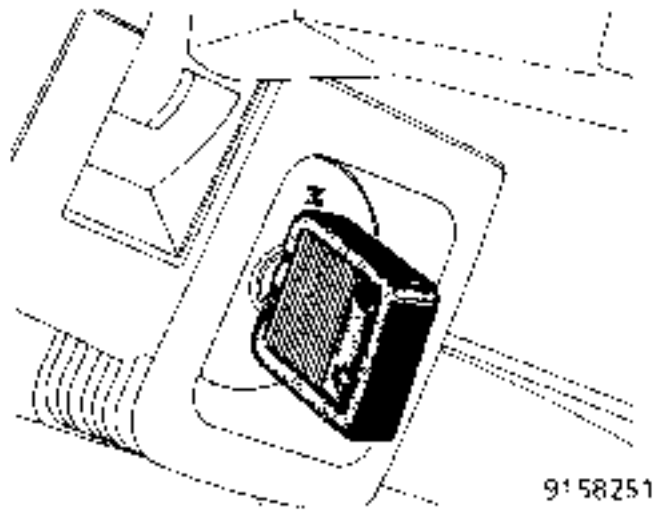
MEASURING CONDITIONS	CORRECT VALUES	ADDITIONAL CHECKS
- Ignition off. - Depress* brake pedal **20 times**.  9158251 - Switch on ignition.  9158251	Pump motor should turn.	- Motor feed voltage (**10 volts**). - Fuse **30A**. - Pump motor relay **301**. - Connector **C**. - Wiring. * This enables the **140 - 180 bars** switch of pressostat **434** to close, as a result of which relay **301** is fed and motor **186** operates up to the **180** bars threshold.

DIAGNOSIS

CHECKING THE OPERATION OF THE MAIN SOLENOID VALVE

- Switch on the ignition **until** the pump stops, then switch off the ignition.

NOTE : Use tongues, Part No.: 77 01 997 033, to shunt the computer connectors.

TEST	MEASURING CONDITIONS	CORRECT VALUE
1	- Ignition off. Shunt terminals **(2)** and **(18)**.  - Depress brake pedal (medium force).  9158351 - Switch on ignition.  9158251	Pedal returns abruptly and hardens.

DIAGNOSIS

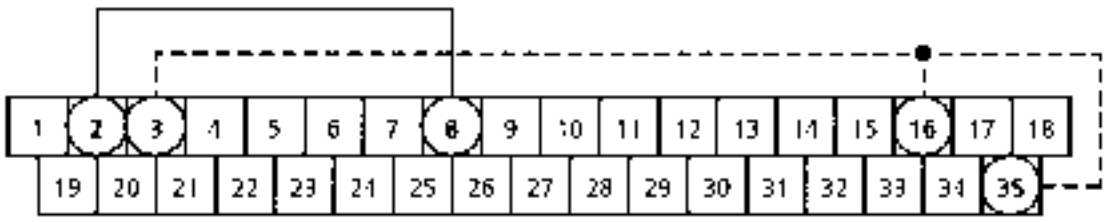
CHECKING THE OPERATION OF THE ROADWHEEL SOLENOID VALVES

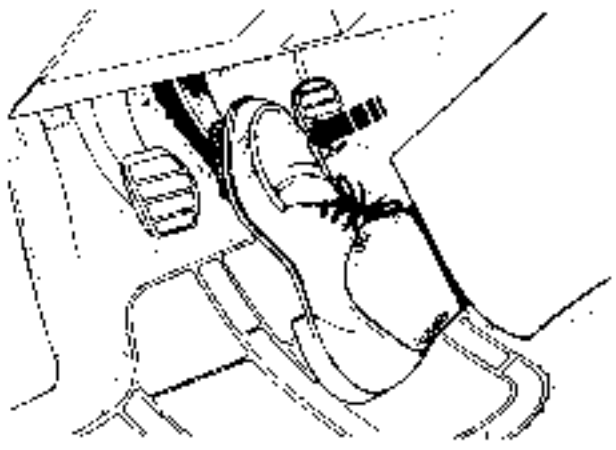
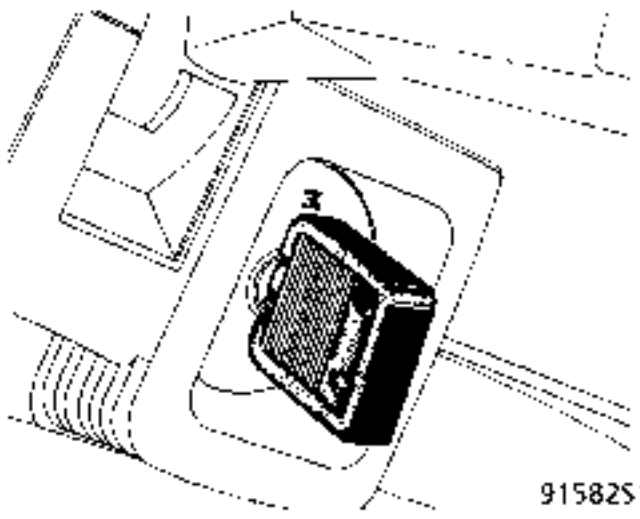
With the vehicle on a two-post lift, check that the wheels turn freely.

- Switch on the ignition until pump stops, then switch off ignition.

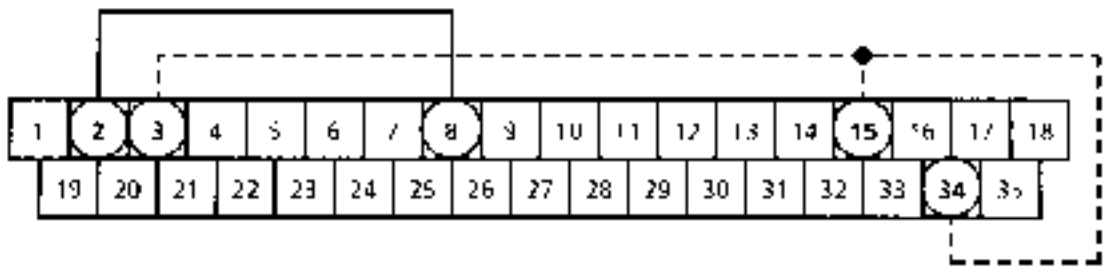
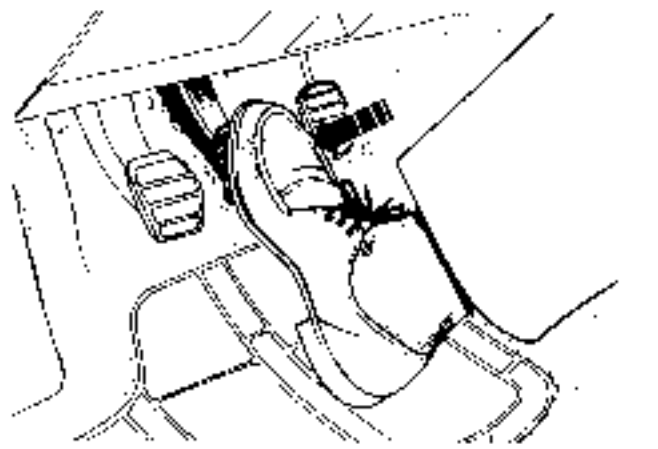
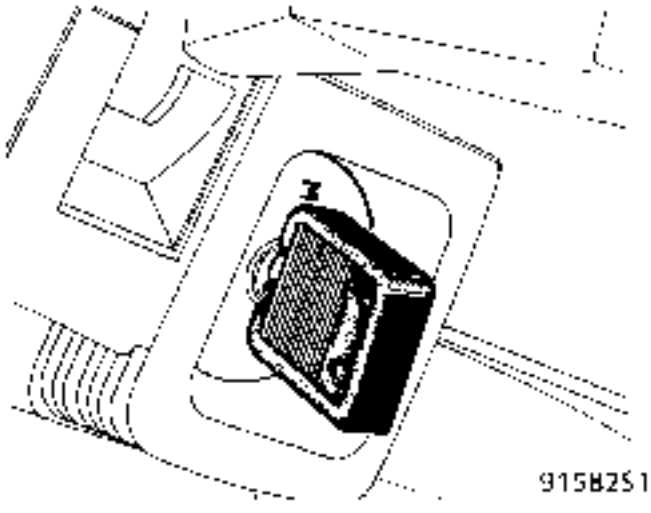
NOTE: Do not energise solenoid valves for longer than 60 seconds; for shunting in computer connector, use tongues, Part No.: 77 01 997 033.

<table>
<tr><th>TEST</th><th>MEASURING CONDITIONS</th><th>CORRECT VALUE</th></tr>
<tr><td>1

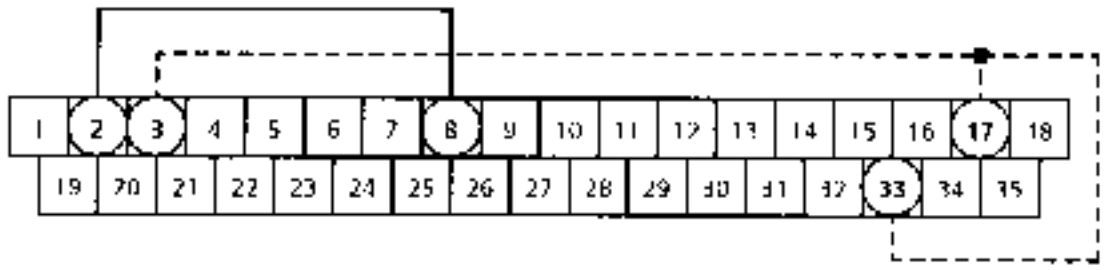
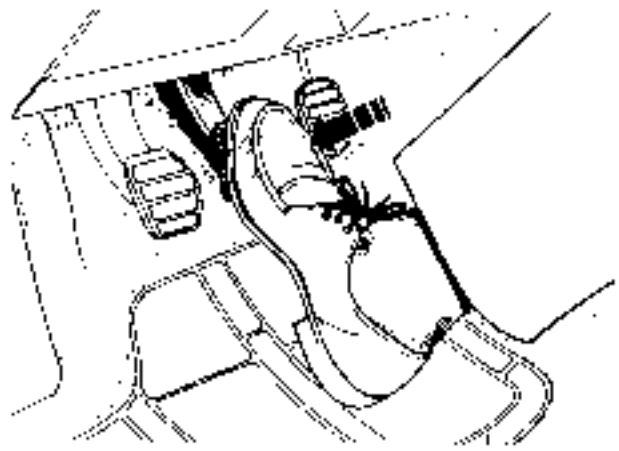
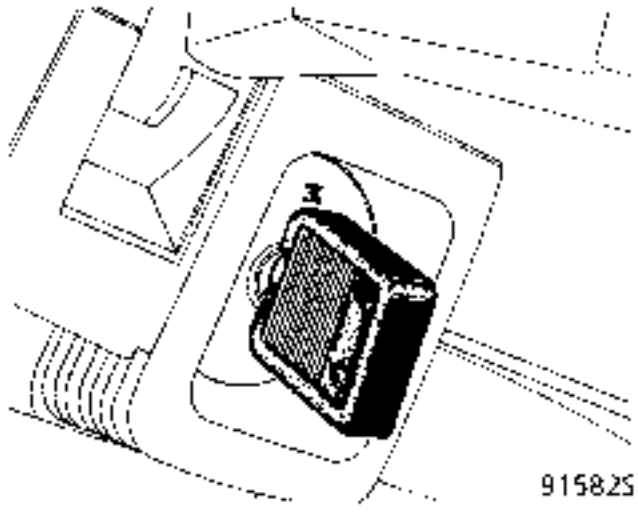
Front left-hand wheel</td><td>- Ignition off, terminals (2) and (8) shunted :
Shunt terminals (3), (16) and (35).
 

- Depress brake pedal (wheel locks).
 
9158351
- Switch on ignition.
 
9158251</td><td>Wheel turns freely.</td></tr>
</table>

DIAGNOSIS

TEST	MEASURING CONDITIONS	CORRECT VALUE
2 Front right-hand wheel	- Ignition off, terminals (2) and (8) shunted : Shunt terminals (3), (15) and (34).  - Press brake pedal (wheel locks).  9158351 - Switch on ignition.  9158251	Wheel turns freely.

DIAGNOSIS

TEST	MEASURING CONDITIONS	CORRECT VALUE
3 Rear wheels	- Ignition off, terminals (2) and (8) shunted : Shunt terminals (3), (17) and (33).  - Depress brake pedal (wheels lock).  9158351 - Switch on ignition.  9158251	Wheels turn freely.

DIAGNOSIS

COMPONENTS TESTED		DIAGNOSIS	
CHASSIS EARTH	A	Wiring terminal (1) to chassis earth (M19)	
Main relay 428	B	Wiring terminal (3) to terminal (30) of main relay terminal (87a) of main relay to earth (M18)	
HYDRAULIC EARTH	C	Wiring terminal (11) to terminal (7) of connector E, to earth (M18)	
Main relay: rest switch to hydraulic unit earth	D	Wiring terminal (20) to terminal (30) of main relay terminal (87a) of main relay to earth (M18)	
Main relay: coil	E	Wiring terminal (8) to terminal (86) of main relay terminal (85) of main relay to chassis earth (M19)	Main relay coil cut
Front RH wheel inlet solenoid valve	F	Wiring terminal (15) to terminal (6) connector E to earth (M18)	Coil cut
Rear wheel inlet solenoid valve	G	Wiring terminal (17) to terminal (3) connector E to earth (M18)	Coil cut
Front LH wheel inlet solenoid valve	H	Wiring terminal (35) to terminal (1) connector E to earth (M18)	Coil cut
Rear wheel outlet solenoid valve	I	Wiring terminal (33) to terminal (4) connector E to earth (M18)	Coil cut
Front LH wheel outlet solenoid valve	J	Wiring terminal (16) to terminal (2) connector E to earth (M18)	Coil cut
Front RH wheel outlet solenoid valve	K	Wiring terminal (34) to terminal (5) connector E to earth (M18)	Coil cut
Main solenoid valve	L	Wiring terminal (18) to terminal (1) connector B terminal (2) connector B to earth (M18)	Coil cut
Rear RH wheel sensor insulation	M	Check insulation on sensor and wiring	
Front LH wheel sensor insulation	N	Check insulation on sensor and wiring	
Rear LH wheel sensor insulation	O	Check insulation on sensor and wiring	
Front RH wheel sensor insulation	P	Check insulation on sensor and wiring	

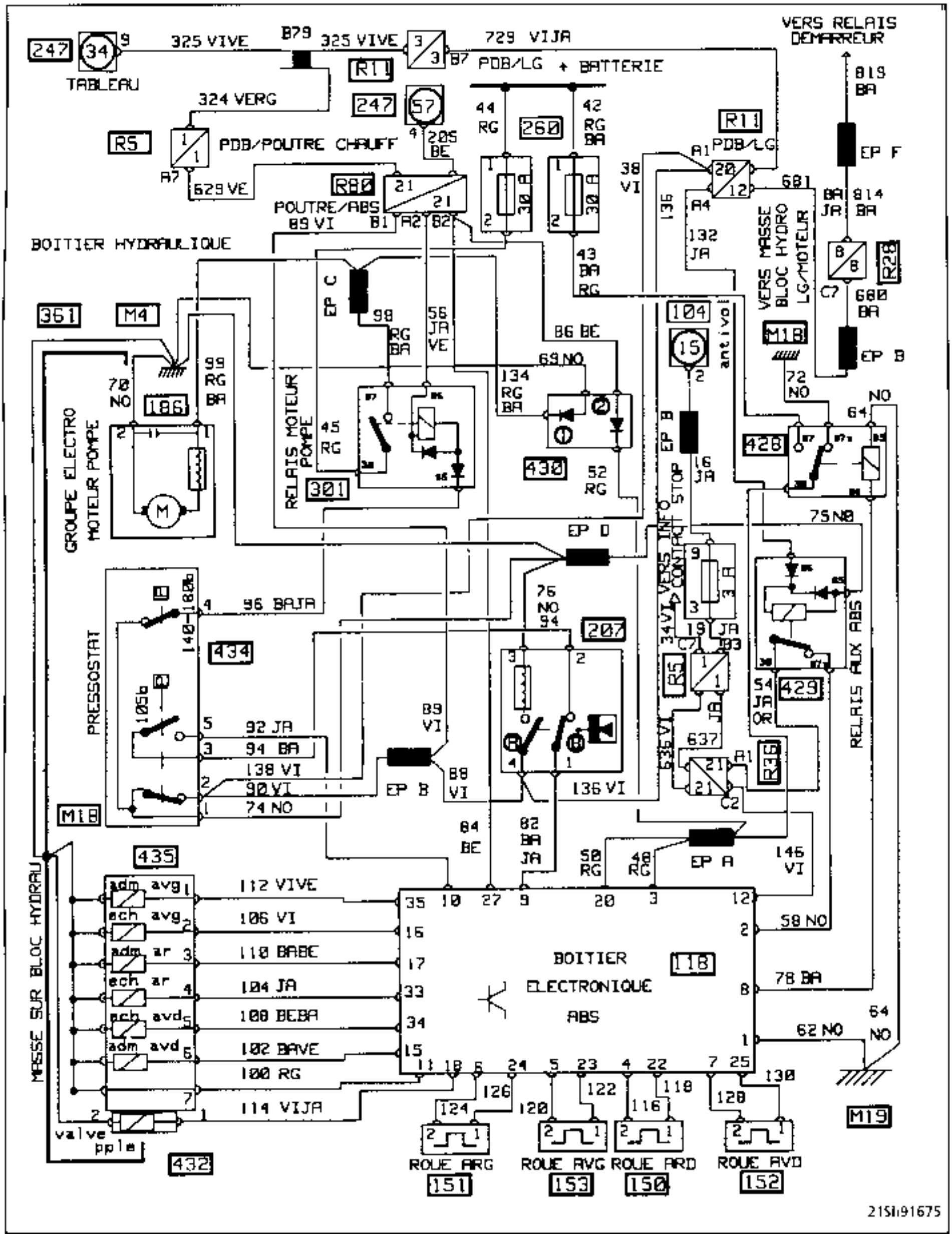
DIAGNOSIS

COMPONENTS TESTED		DIAGNOSIS
Circuit : level switch Pressure switch (check insulation)	Q R	Check insulation in relation to earth connection: terminal (9) to terminal (1) connector A → terminal (2) connector A → terminal (3) connector D → terminal (5) connector D and terminal (10)
Auxiliary relay 429 (battery feed)	S	Wiring terminal (2) to terminal (87a) of auxiliary relay terminal (30) of auxiliary relay to 3A fuse
Main relay 428 (operating switch)	T U	Battery voltage 30A fuse to terminal (87) of main relay: terminal (27) main relay to terminal (2)
Diode 2	V	Check ABS warning light - terminal (27) connection to bulb Faulty diode **Note :** Test B should be good
Wheel sensor signal	Y1 Y2 Y3 Y4	If the voltage does not exceed 0.1 volts when the wheel corresponding to the measuring points is turned (abruptly): Check the condition of the connectors/play in wheel hubs

KEY TO OPERATING DIAGRAM ON PAGE 38-45:

TABLEAU = INSTRUMENT PANEL
PDB/POUTRE CHAUFF = DASH/HEATER
POUTRE-ABS = DASH/BULKHEAD/ABS
PDB/LG = DASH/LH SIDE MEMBER
BATTERIE = BATTERY
VERS RELAY DEMARREUR = TO STARTER RELAY
VERS MASSE BLOC HYDRO LG MOTEUR = TO HYDR. UNIT EARTH LH SIDE MEMBER/ENGINE
ANTIVOL = ANTI-THEFT
VERS INFO CONTACT STOP = TO STOP LIGHT SWITCH DATA
RELAY AUX ABS = ABS AUX. RELAY
BOITIER HYDRAULIQUE = HYDRAULIC UNIT
GROUPE ELECTRO MOTEUR POMPE = PUMP ELECTRIC MOTOR ASSEMBLY
RELAIS MOTEUR POMPE = PUMP MOTOR RELAY
MASSE SUR BLOC HYDRAU = EARTH ON HYDRAULIC UNIT
BOITIER ELECTRONIQUE ABS = ABS COMPUTER
VALVE PPLE = MAIN VALVE
ADM. - INLET ECH. = OUTLET ROUE = WHEEL
AVG = FRONT LEFT AVD = FRONT RIGHT ARG = REAR LEFT ARD = REAR RIGHT AR = REAR

OPERATING DIAGRAM



21Si91675

KEY TO WIRING DIAGRAM

34 : Brake fluid level warning light

57 : ABS voltage

104 : Anti-theft switch

118 : ABS computer

150 : Rear right hand wheel sensor

151 : Rear left-hand wheel sensor

152 : Front right-hand wheel sensor

153 : Front left-hand wheel sensor

186 : ABS electric pump assembly

207 : Nivocode sensor

247 : Instrument panel

260 : ABS fuse (30 amps)

301 : ABS pump motor relay

361 : ABS hydraulic assembly

428 : ABS main relay

429 : ABS auxiliary relay

430 : ABS diode casing

432 : Main valve

434 : ABS cut-off pressostat

435 : ABS solenoid valve unit

M4 : Bodywork earth

M18 : ABS earth

M19 : ABS electronic earth

R5 : Junction block: dashboard to heater bulkhead

R11 : Dashboard to left-hand side member

R28 : Junction block: engine to right-hand side member

R36 : Junction block: ABS to dashboard

R80 : Junction block: heater bulkhead to ABS

Special points:

Renault 21, L48 5RYL and B48 RY vehicles with permanent 4-wheel drive and Teves ABS are equipped with a fault finding system incorporated in the computer.

The incident codes are displayed by the ABS warning light on the instrument panel flashing.

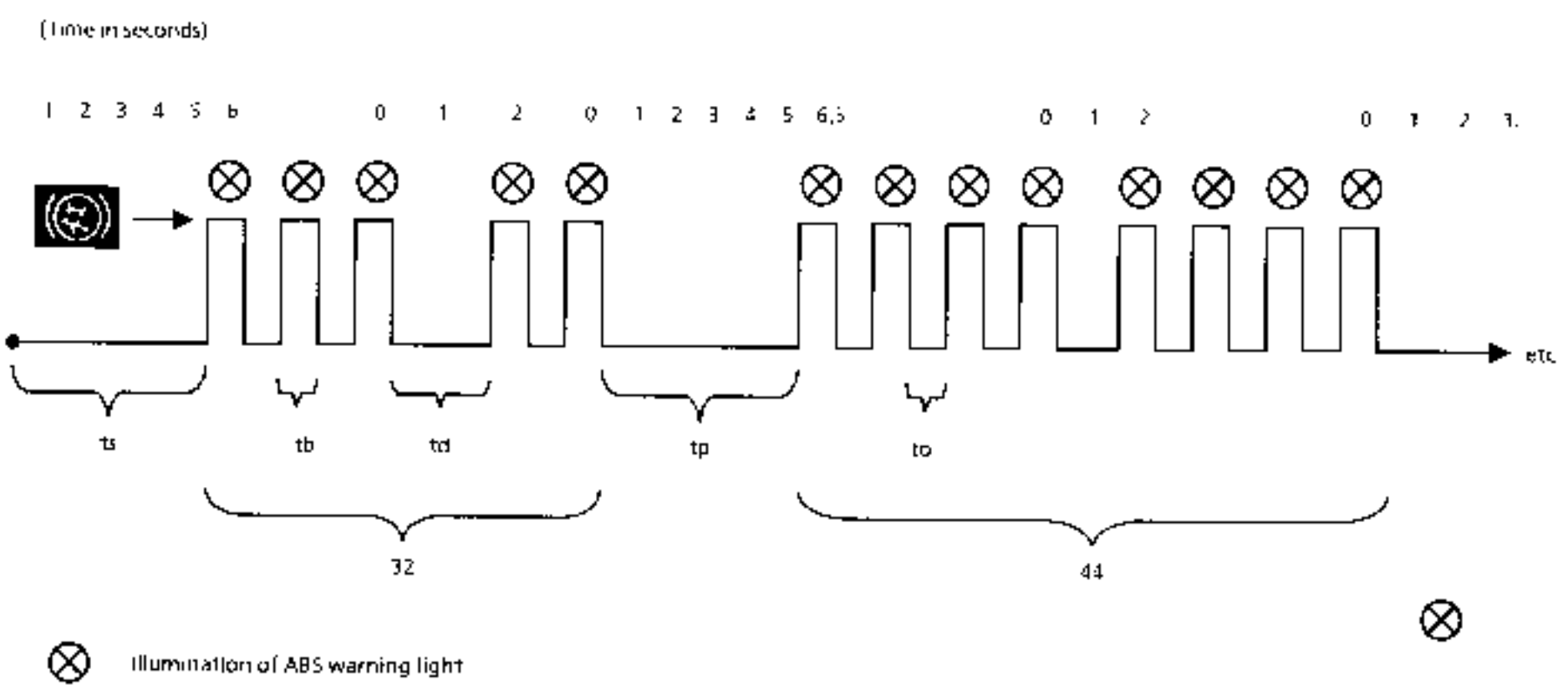
To start this light flashing, a shunt must be produced between tracks **2** and **11** of the diagnostic socket **225**, then switch on the ignition; if incidents have been stored, the flashing sequence will start **6 seconds** later.

DIAGNOSIS

GENERAL

The codes consist of two figures: tens and units (for example: **32** and **44**).

Identifying codes warning lights flashing.



Lights flash for:

ts 6.0 seconds : Start time after ignition switched on.
tb 0.5 seconds : Duration of pulses (warning light illuminates) .
td 2.0 seconds : Interval between tens and units.
tp 6.5 seconds : Pause between codes.
to 0.5 seconds : Interval between two flashes .

The monitoring system detects incidents and intermittent defects either during the normal operation of the ABS system or during a reading and fault finding procedure. This information is then stored and saved in a memory which **is not erased when the electrical supply is interrupted** (see following pages).

DIAGNOSIS

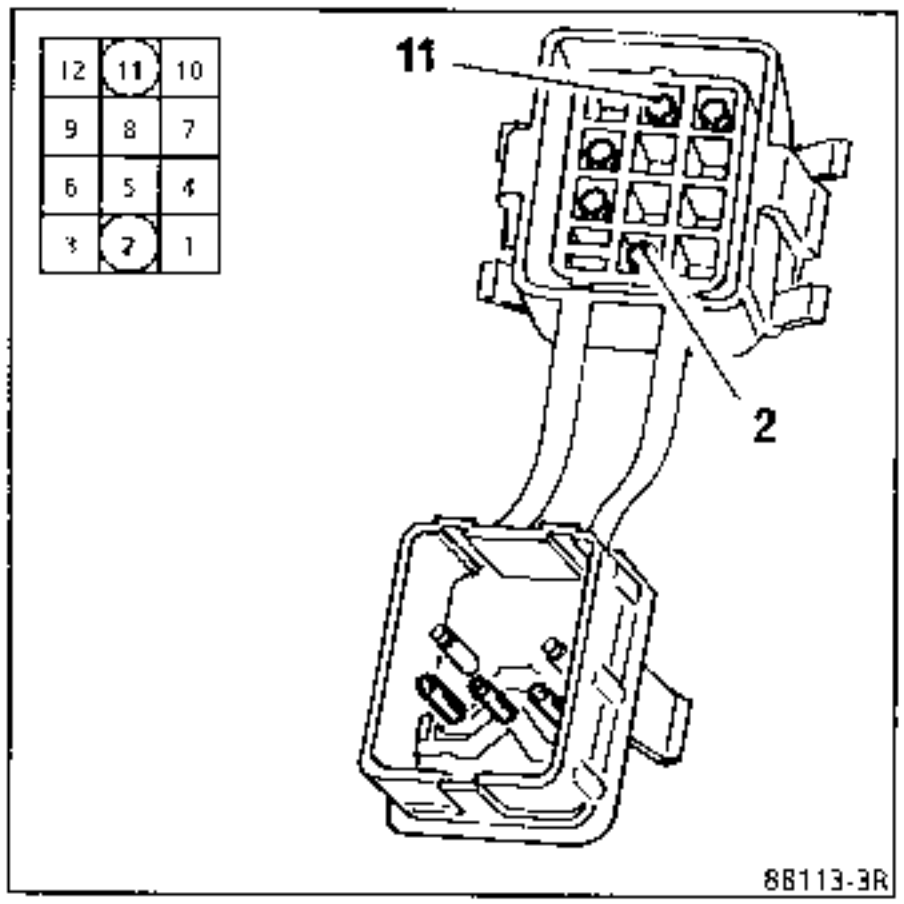
CODE READING PROCEDURE

1 - Have a pen and paper available.

2 - Vehicle stopped, ignition off.

3 - Make a shunt with the two "PACKARD"  terminals and a lead approx. 8 cm. in length.

4 - On diagnostic socket 225, connect tracks 2 and 11 with this shunt shunt (this earths track 11).



5 - **Switch on the ignition** and watch warning light (11) .

6 - **After 6 seconds**, the flashing sequence for the first code starts.

Watch warning light (11) flash, count the pulses and write down the 2-figure number obtained. Each time there is a **6.5 second** pause between the codes flashing to enable you to note down the number.

After each pause, warning light (11) indicates the following code number and so on until all the codes stored have been read, which is signalled by the warning light (11) staying extinguished.

7 - To conclude the reading procedure, disconnect the shunt from diagnostic socket 225 and switch off the ignition.

8 - Compare the codes noted with the reference list below and perform the additional checks and any repairs indicated.

DIAGNOSIS

ATTENTION

If the codes have not all been noted down correctly, the reading procedure may be repeated. Nevertheless, avoid travelling with the vehicle at more than 18 mph (30 km/h) between two reading procedures so as not to erase the data stored in the computer.

EXCEPTIONS TO THE NORMAL READING PROCEDURE

1 - If warning light  illuminates for 1.7 seconds and then goes out permanently after the reading procedure has started, no incident/defect has been recorded in the memory and the system is operating correctly.

2 - If a high priority solenoid valve incident occurs during the reading procedure, the monitor is made aware of this incident and stops after displaying the first code (if this was a code indicating a solenoid valve incident, this data will be overwritten by the new solenoid valve incident code). If a solenoid valve incident occurs later during the continuous code sequence, the monitor stops but only when it has finished displaying the current code. In both cases, the solenoid valve incident which has occurred must be remedied and it is recommended that the complete reading procedure be repeated from the beginning.

3 - If the car is driven during the fault-finding reading procedure, the monitor stops as soon as the vehicle speed exceeds 5 mph (8 km/h) or if three wheels have rotated at more than 5 mph (8 km/h). This may lead to incorrect interpretation of the codes interrupted during the reading procedure.

ERASING THE COMPUTER MEMORY

The ABS system monitor has an automatic memory cancelling function. Erasure is triggered in two stages as follows:

1 - The reading procedure must reach its conclusion in the normal manner, i.e. all the codes stored have been displayed. To prepare the computer for erasure, a normal reading procedure merely has to be triggered.

2 - Then remove the shunt from the diagnostic socket, switch on the ignition and drive the vehicle at a speed above 19 mph (30 km/h). This will erase all the information stored and the car will return to normal ABS operating mode.

DIAGNOSIS

LIST OF INCIDENT CODES : High priority incidents

CODE (1)	COMPONENT	INCIDENT	REPAIR (2)
11	Harness.	Electrical interference.	Check harness correctly fitted. Replace computer.
12	Computer.	Faulty.	
21	Main solenoid valve.	Harness solenoid valve or power transistor in computer incident.	Check solenoid valve indicated, its harness and connector terminals (cut, shorting). If correct, change computer.
22	Front left-hand inlet solenoid valve.		
23	Front left-hand outlet solenoid valve.		
24	Front right-hand outlet solenoid valve.		
25	Front right-hand outlet solenoid valve.		
26	Rear inlet solenoid valve.		
27	Rear outlet solenoid valve.		
31	Front left-hand sensor	Winding or sensor cable cut, connector open.	Check sensor indicated, its harness and connector (open circuit or shorting). If correct, change computer.
32	Front right-hand sensor		
33	Rear right-hand sensor		
34	Rear left-hand sensor		
35	Front left-hand sensor.	Sensor winding or cable circuit open or intermittent shorting. Air gap between sensor and target not to specification. Sensor incident detected by continuity test (open circuit or shorting) of wheel speed at speeds above 25 mph (40 km/h).	Check sensor indicated, its harness and connector. Check sensor/target air gap at several points on the sensor target. Check sensor earth lead, computer earthing, hub vibration and sensor mounting.
36	Front right-hand sensor.		
37	Rear right-hand sensor.		
38	Rear left-hand sensor.		

DIAGNOSIS

LIST OF INCIDENT CODES : High priority incidents (continued)

CODE (1)	ELEMENT	INCIDENT	REPARATION (2)
41 42 43 44	Front left-hand sensor. Front right-hand sensor. Rear right-hand sensor. Rear left-hand sensor.	No sensor signal, sensor/target air gap too large. This fault is detected by comparing the wheel speeds.	Check that sensor target is fitted and check air gap.
51 52 53 54	Front left-hand outlet solenoid valve. Front right-hand outlet solenoid valve. Rear outlet solenoid valve. (Identical to 53).	Drop in pressure and wheels reacting at speeds greater than 25 mph (40 km/h). Defect resulting from incorrect hydraulic operation of valve.	Check sensor leads corresponding to solenoid valve and computer earth.
55 56 57 58	Front left-hand sensor. Front right-hand sensor. Rear right-hand sensor. Rear left-hand sensor.	Sensor signal absent long time (long-term monitoring of duration of test).	Check position of sensor target fitted and air gap (sensor detached).
61	Nivocode sensor. Pressostat.	Earth shorting on leakage current between battery positive terminal and cut-off pressostat (434) or (207).	Check nivocode sensor, pressostat and their harness.
65	Longitudinal acceleration sensor.	Circuit open or shorting.	Check sensor, its harness, connector and mounting.

DIAGNOSIS

LIST OF INCIDENT CODES : Low priority incidents

CODE (1)	COMPONENT	INCIDENT	REPAIR (2)
71 72 73 74	Front left-hand sensor Front right-hand sensor Rear right-hand sensor Rear left-hand sensor	Drop in pressure and wheels reacting at speeds of less than 25 mph (40 km/h). Long-term detection of electrical interference.	Check earth lead of sensor indicated, computer earth and solenoid valve corresponding to sensor.
75 76 77 78	Front left-hand sensor Front right-hand sensor Rear right-hand sensor Rear left-hand sensor	Hub vibrating, excessive play or air gap too small. Sensor incident detected by checking speed continuity of wheel at speeds less than 25 mph (40 km/h).	Check earth lead of sensor indicated, computer earth hub vibrations, sensor mounting, its air gap and harness.

1 - If warning light  remains permanently illuminated without indicating an incident code, it is likely that the computer is faulty. Check first of all the electrical supply, if this is correct, replace the computer.

2 - If the recommended repairs are not successful, replace the computer.

COMMENT:

Codes 71 and 78 indicate low priority incidents which only cause temporary and/or partial malfunctions. It is possible that the driver is not even aware of these incidents but they are nevertheless stored in the computer memory.

DIAGNOSIS

WARNING LIGHT  indication

WITHOUT PRODUCING AN INCIDENT CODE

The on-board fault finding system can only check incidents or errors producing an electrical signal. Processing of the error code is triggered by the input of the fault finding triggering process and is displayed by warning light  .

In order to avoid incorrect fault finding results, all the components concerned must operate correctly.

Cases when the lighting-up of the warning light does not correspond to an error code are listed below :

1 - ALARM COMMUTATOR TEST CYCLE

When the ignition has been switched on warning light  illuminates for approximately **1.7 seconds**, then flashes for approximately **1 second** to check the connection to the level and pressure alarm commutators.

In this case, warning light  continues to flash, this connection to the commutators has been interrupted or is shorting with the vehicle earth.

2 - INCORRECT ASSEMBLY

If the computer is not fitted correctly to the main connector (or if the connection is faulty), the main relay stays on the normally closed contact while the ignition is switched on.

In this case, warning light  illuminates permanently via the normally closed contact of main relay **428**.

3 - COMPUTER INCIDENTS

3.1 Incident detected by internal time check

Some hardware errors cause the computer to be deactivated after an internally set time period has elapsed. Warning light  illuminates simultaneously.

As this action cuts off the main computer feed, it can neither record nor output the error codes.

3.2 Short circuit when fault finding trigger instruction input

If the fault finding trigger input is earthed (shunt tracks **2** to **11**) via the diagnostic socket, the computer switches to reading the error codes stored when the ignition is switched on and if one or more error code(s) has (have) been stored in the memory. If the vehicle accelerates and reaches a speed of **5** mph (8 km/h) whilst there is still a short circuit on the trigger input earth, the computer is deactivated and warning light  illuminates.

DIAGNOSIS

3.3 Warning light connection defects

3.3.1 Warning light illuminates if there is a short circuit on its earth lead, without however, impeding the operation of the anti-lock braking system. The computer cannot detect this short circuit.

3.3.2 Warning light feed circuit faulty

If there is a defect on the feed circuit inside the computer, the warning light will either be illuminated or permanently extinguished depending on the type of internal defect.

3.4 Warning light incorrectly activated (without incident detected)

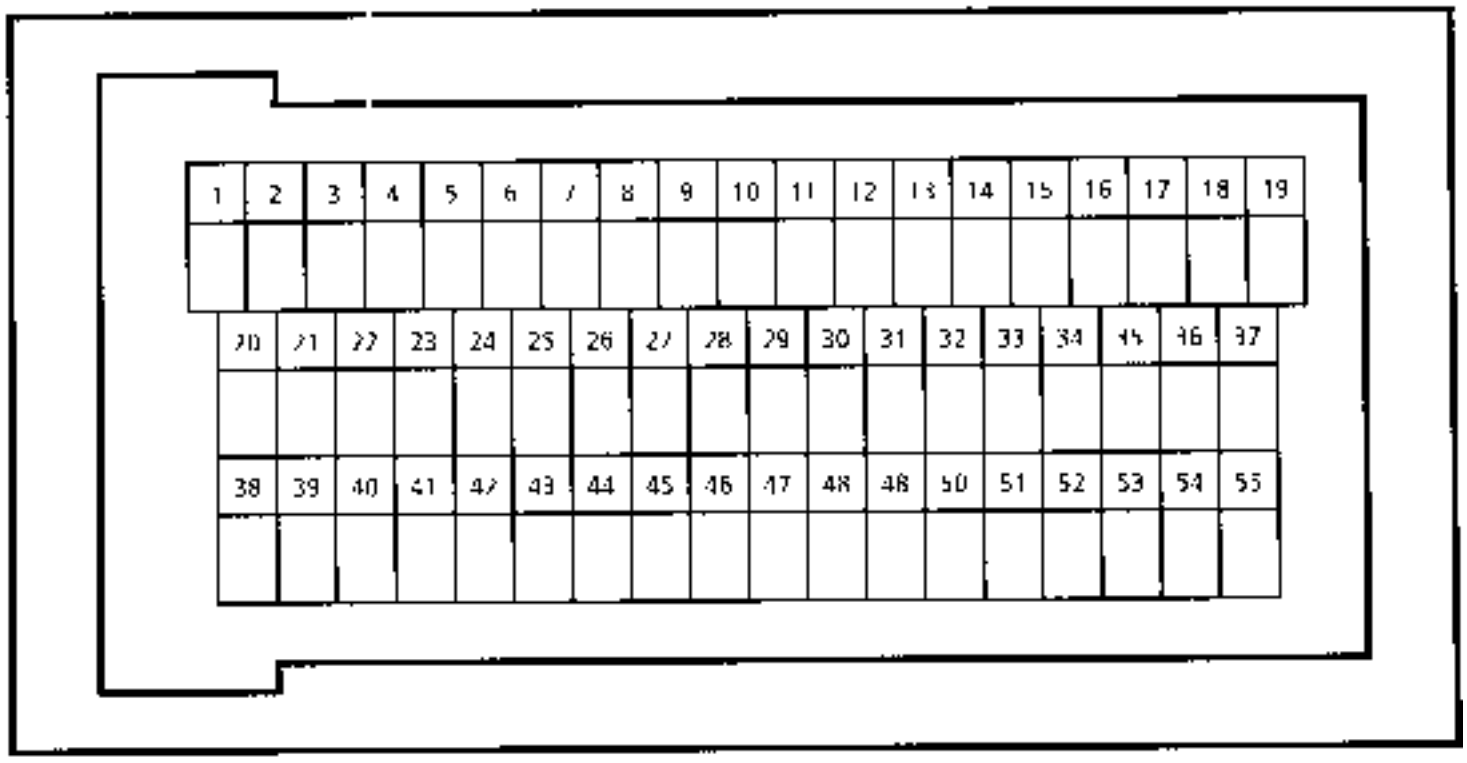
3.4.1 If there are intermittent transitory interruptions on the contacts or feed wires of warning light , it may flash erratically.

3.4.2 If warning light bulb is burnt out or damaged in any way, it is impossible for the data contained in the computer to be displayed.

ELECTRICAL TESTS TO BE PERFORMED ACCORDING TO DIAGNOSTIC CODE

Connector (118)

The tests are performed at the terminal end (the drawings shows the harness end).



1 - SWITCHES OPEN

Connector (118)

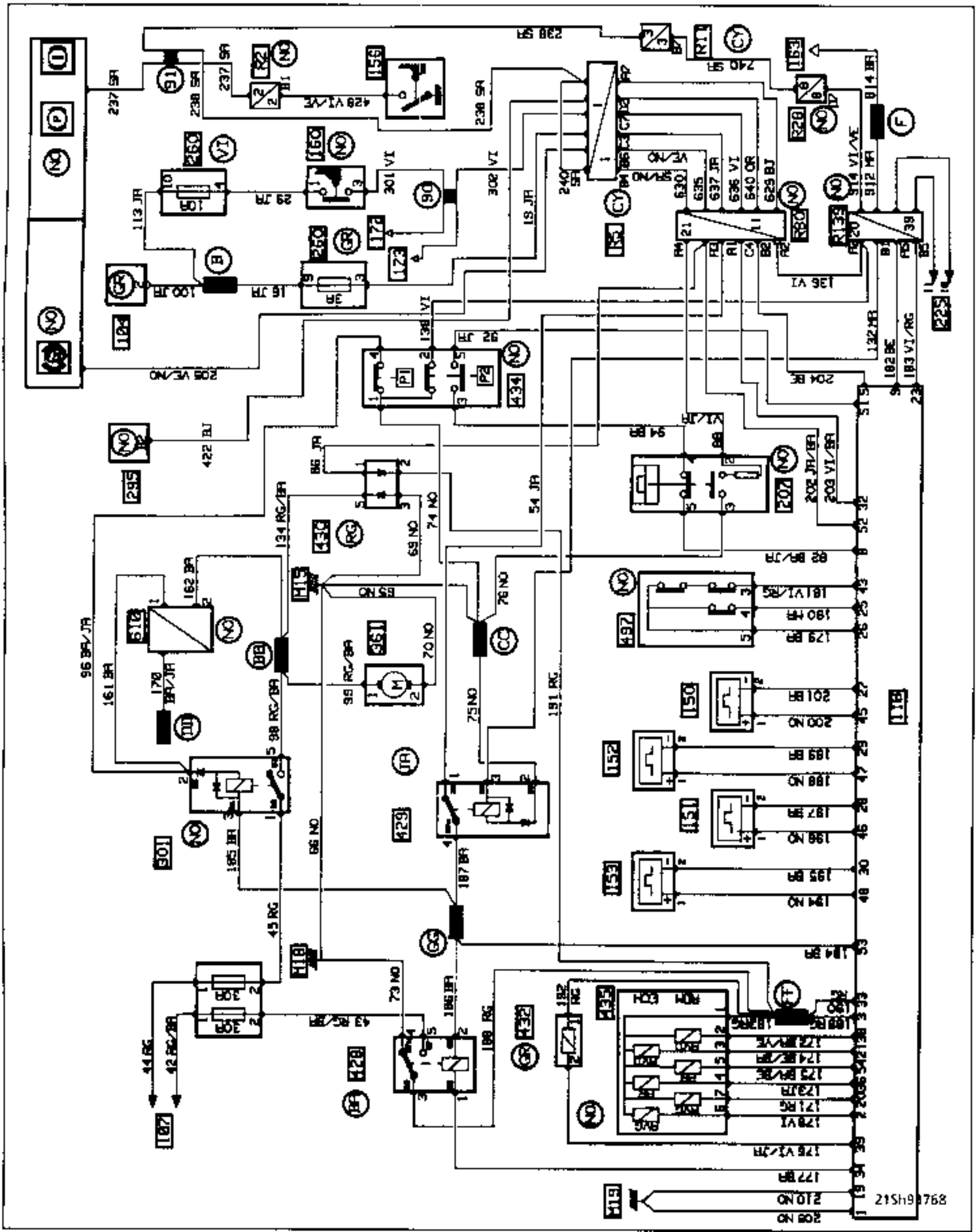
TESTS	TERMINALS (118)		VALUES	CODE NUMBER		
EARTH	1	⏚	0 to 1 Ω			
EARTH	19	⏚	0 to 1 Ω			
Rear RH sensor (150)	27	45	800 to 1400 Ω	33	37	57
Rear LH sensor (151)	28	46	800 to 1400 Ω	34	38	58
Front RH sensor (152)	29	47	800 to 1400 Ω	32	36	56
Front LH sensor (153)	30	48	800 to 1400 Ω	31	35	55
Relay coil (428)	34	53	50 to 100 Ω			
Harness	3	33	0 to 1 Ω			
Relay normally closed contact (428)	3	⏚	0 to 1 Ω			
Main solenoid valve (432)	3	39	2 to 6 Ω	21		
Front LH solenoid valve	3	2	3 to 5 Ω (outlet)	23		
Front LH solenoid valve	3	20	5 to 7 Ω (inlet)	22		
Rear solenoid valve	3	36	3 to 5 Ω (outlet)	26		
Rear solenoid valve	3	54	5 to 7 Ω (inlet)	27		
Front RH solenoid valve	3	21	3 to 5 Ω (outlet)	25		
Front RH solenoid valve	3	38	5 to 7 Ω (inlet)	24		
Accelerator sensor (497)	26 26	43 25	0 to 1 Ω **Note : Vehicle** 0 to 1 Ω must be horizontal	65		
Pressostat circuit (434)	8	51	0 to 1 Ω : With pressure present	61		
and minimum level (207)	8	51	⩾ 20 kv : When pressure absent			

DIAGNOSIS

2 - SWITCHES CLOSED

TESTS	TERMINALS (118)	VALUES
Diode circuit (430)	52 3	0.5 to 1V ABS warning light should be illuminated
Brake circuit (610) (switch)	32 32	0 v brake raised 12 v brake depressed
Dog clutch warning light circuit (295)	5 and ⏚	Position of dog clutch switch C 1 Raised → Read 12 volts 2 Depressed → If dog clutch warning light permanently illuminated: read 0 V 2 Depressed → If dog clutch warning light flashes: variable voltage to illuminate warning light C permanently. Place vehicle in first or reverse (press vehicle gently if necessary): read 0 V.

WIRING DIAGRAM



KEY TO WIRING DIAGRAM

104 : Ignition switch

107 : Battery

118 : ABS computer

150 : Rear right-hand wheel sensor

151 : Rear left-hand wheel sensor

152 : Front right-hand wheel sensor

153 : Front left-hand wheel sensor

156 : Handbrake switch

160 : Stop light switch

163 : Starter (data)

172 : Rear right-hand stop

173 : Rear left-hand stop

207 : Low brake fluid level

225 : Diagnostic socket

247 : Instrument panel

260 : Fuse box

295 : Dog clutch control warning light unit

301 : ABS electric pump assembly relay

361 : ABS hydraulic assembly

428 : ABS main relay

429 : ABS auxiliary relay

430 : Diode unit

432 : Main solenoid valve

434 : Cut-off pressostat

435 : Solenoid valve unit

497 : 4 x 4 ABS acceleration sensor

610 : ABS diagnostic switch

Junctions

R2 : Dashboard/rear left-hand

R5 : Dashboard/heater bulkhead

R11 : Dashboard/left-hand side member

R28 : Engine/left-hand side member

R80 : Heater bulkhead, ABS

R139 : Engine/ABS

Earth

M15 : Heater bulkhead earth

M18 : ABS earth

M19 : ABS electronic earth

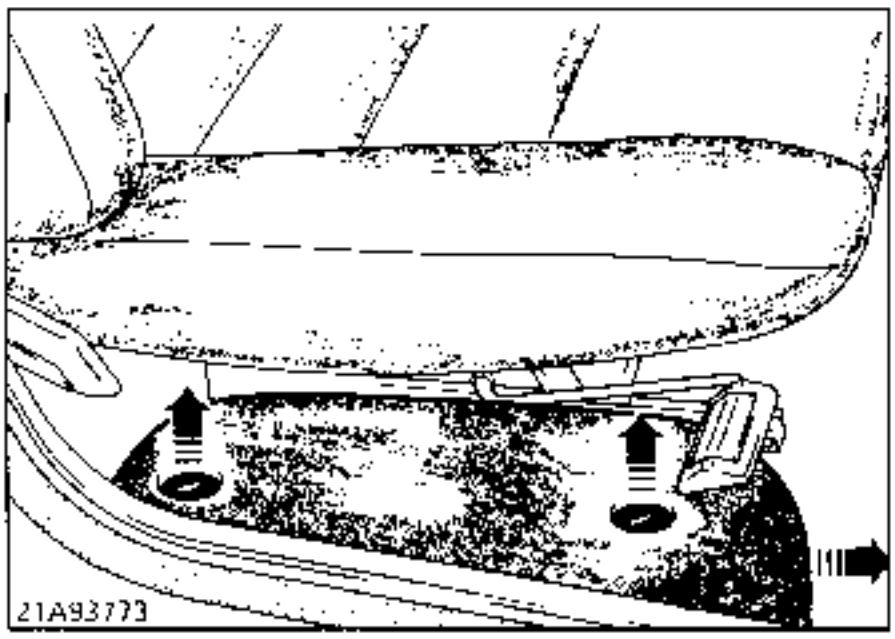
CONSTITUENT COMPONENTS (specific to 4 x 4)

1) 55-track computer :

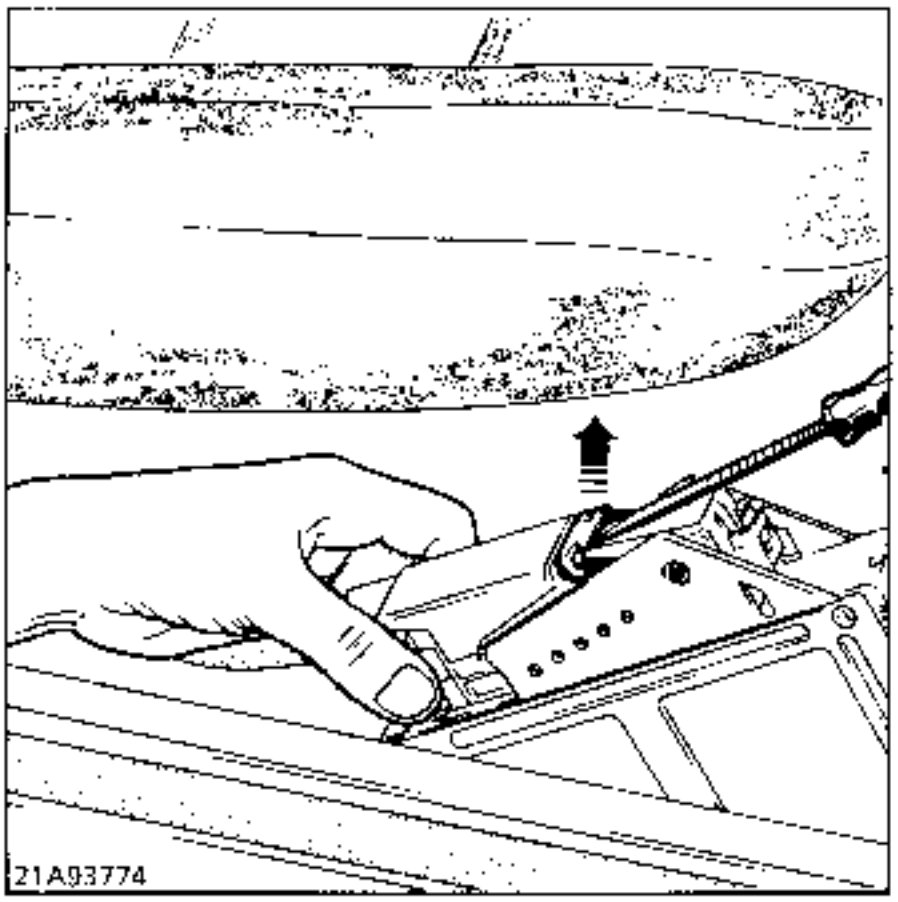
It is located under the front RH seat.

REMOVING

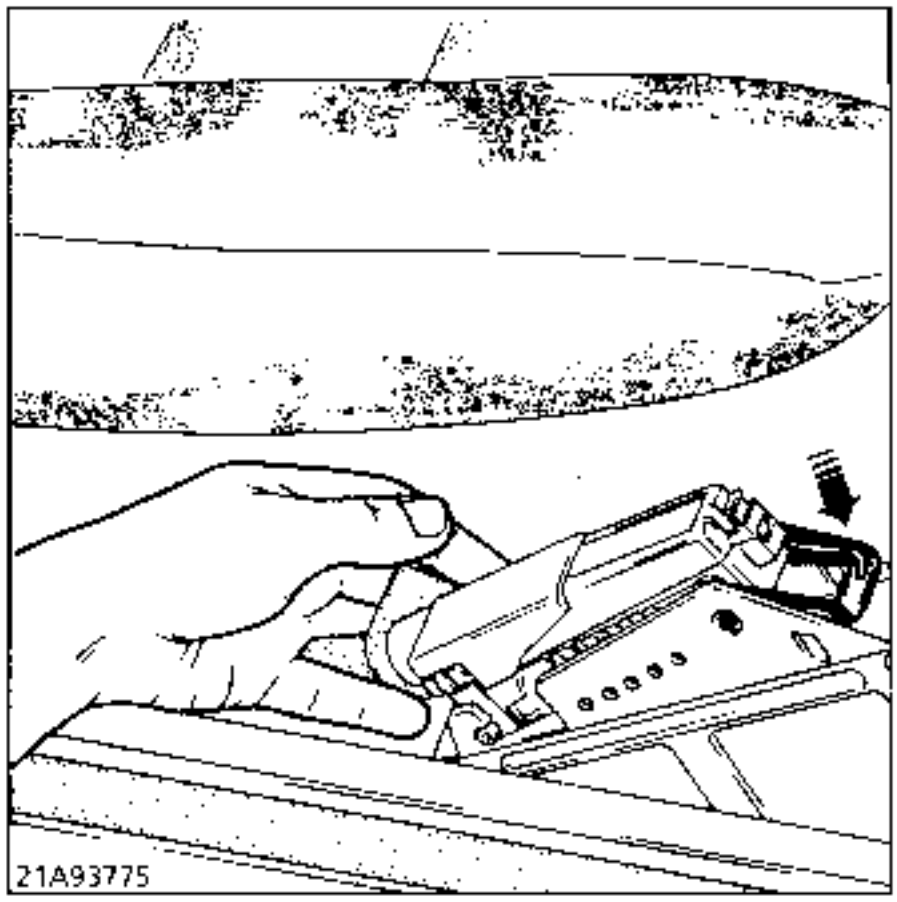
Unclip the protective cover by pulling it upwards then release it by moving it towards the front of the vehicle.



Release the computer and raise the catch with a screwdriver.

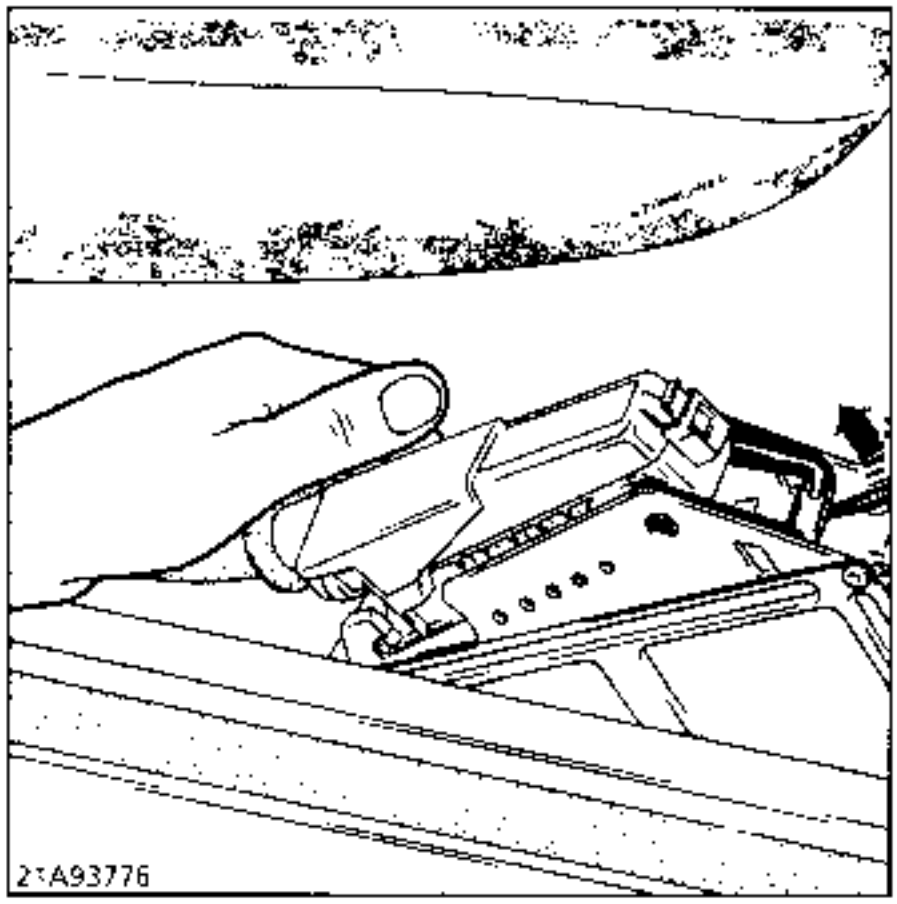


Turn the catch and press.



Remove the computer.

REFITTING
Position the connector, lift the catch with a screwdriver and turn it completely



Fit the computer and protective cover in place.

2) Longitudinal acceleration sensor
It is located under the radio or radio compartment in the centre console.

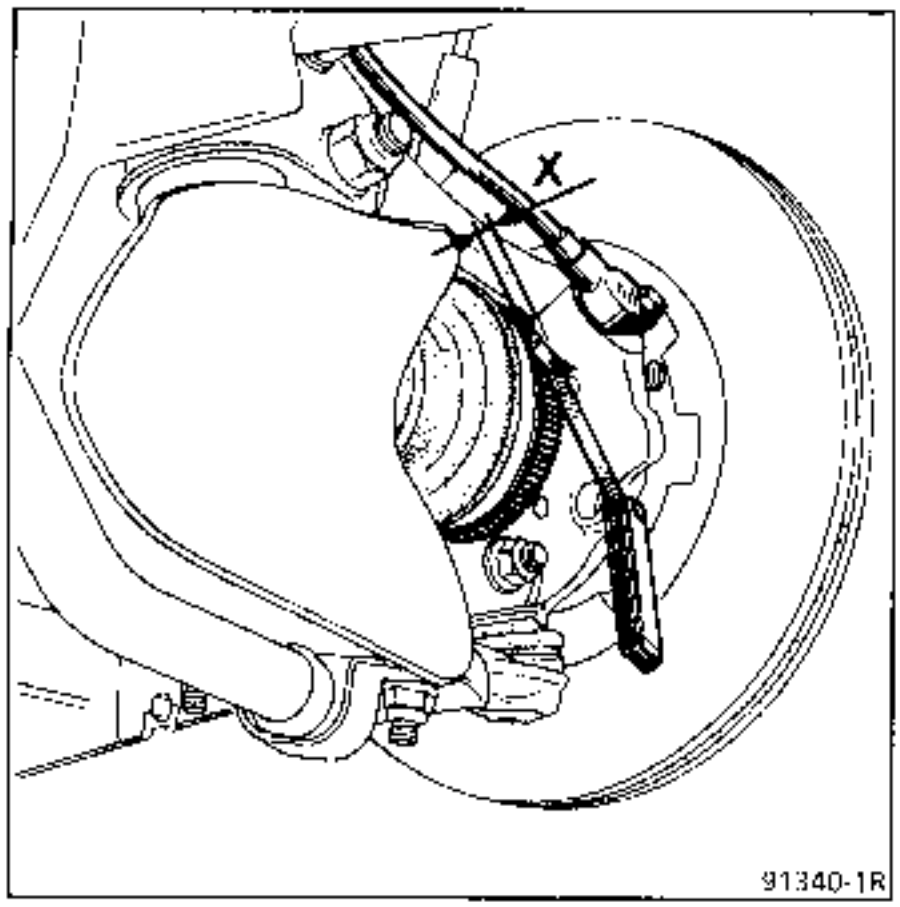
ATTENTION : It must be mounted facing the correct direction (→ facing front of vehicle).

ADDITIONAL CHECKS

I - CHECKING THE SENSOR AIR GAP

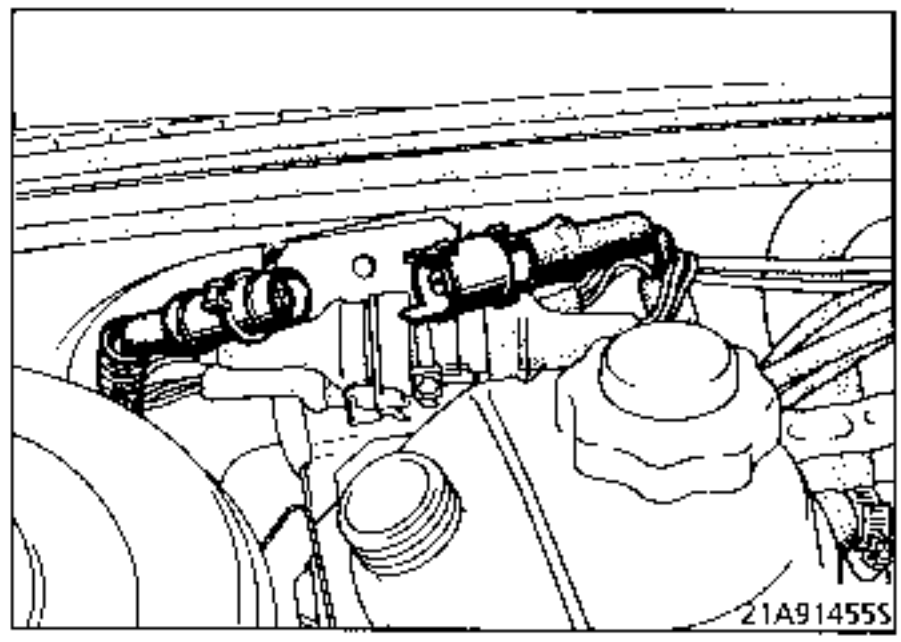
Target / sensor air gap

X = 0.6 mm

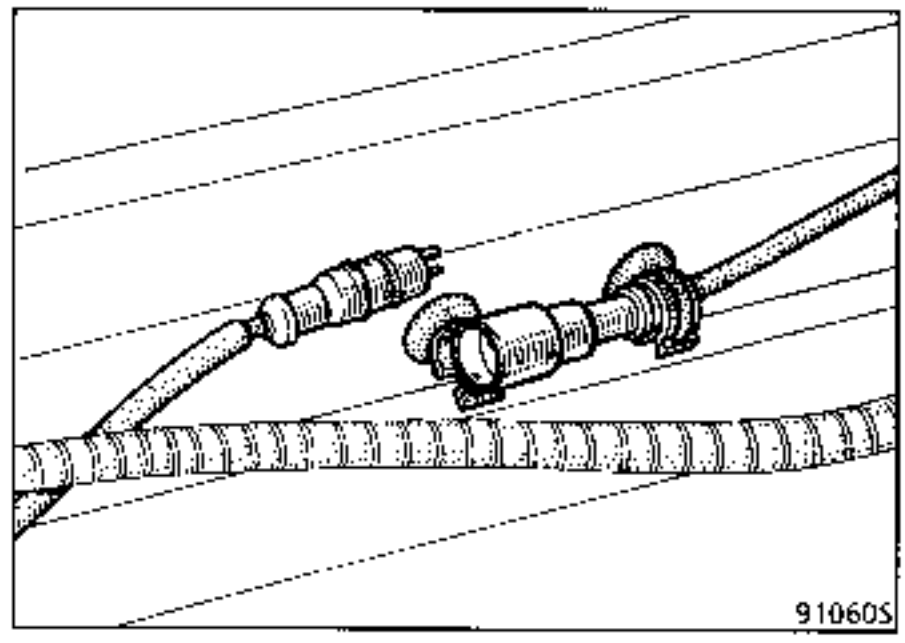


II - CHECKING THE WHEEL SENSOR CONNECTORS

Front connectors



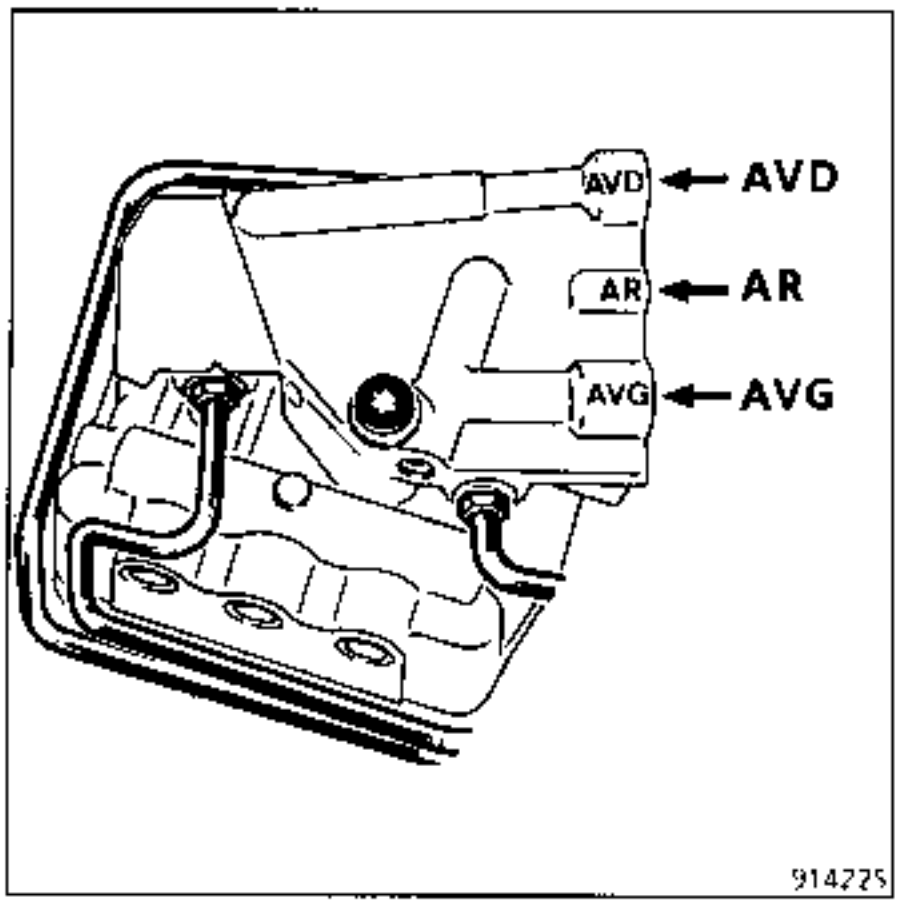
Rear connectors



If the ABS warning light illuminates intermittently, check first of all the wheel sensor connectors and clean them with **NETELEC, Part No. 77 01 408 464**.

ADDITIONAL CHECKS

III - REFERENCE MARKS ON HYDRAULIC UNIT HOSES



V - HYDRAULIC UNIT CONNECTOR PINS

"Nivocode" connector (A)

1 : ABS computer track **9**

2 : Cut-off pressostat **track 3**

3 : Cut-off pressostat track 1, chassis earth and terminal **85** of auxiliary relay

4 : Cut-off pressostat track **2** and illumination of warning light ①②

5 : Not used

"Main solenoid valve" connector (B)

1 : ABS computer track **18**

2 : Hydraulic assembly earth

"Pump motor" connector (C)

1 : Pump relay terminal **87**

2 : Chassis earth

"Cut-off pressostat" connector (D)

1 : Nivocode track **3**, chassis earth and auxiliary relay terminal **85**

2 : Nivocode track **4** and illumination of warning light ①②

3 : Nivocode track **2**

4 : Pump relay terminal **85**

5 : ABS computer track **10**

"Solenoid valve unit" connector (E)

1 : ABS computer track **35**

2 : ABS computer track **16**

3 : ABS computer track **17**

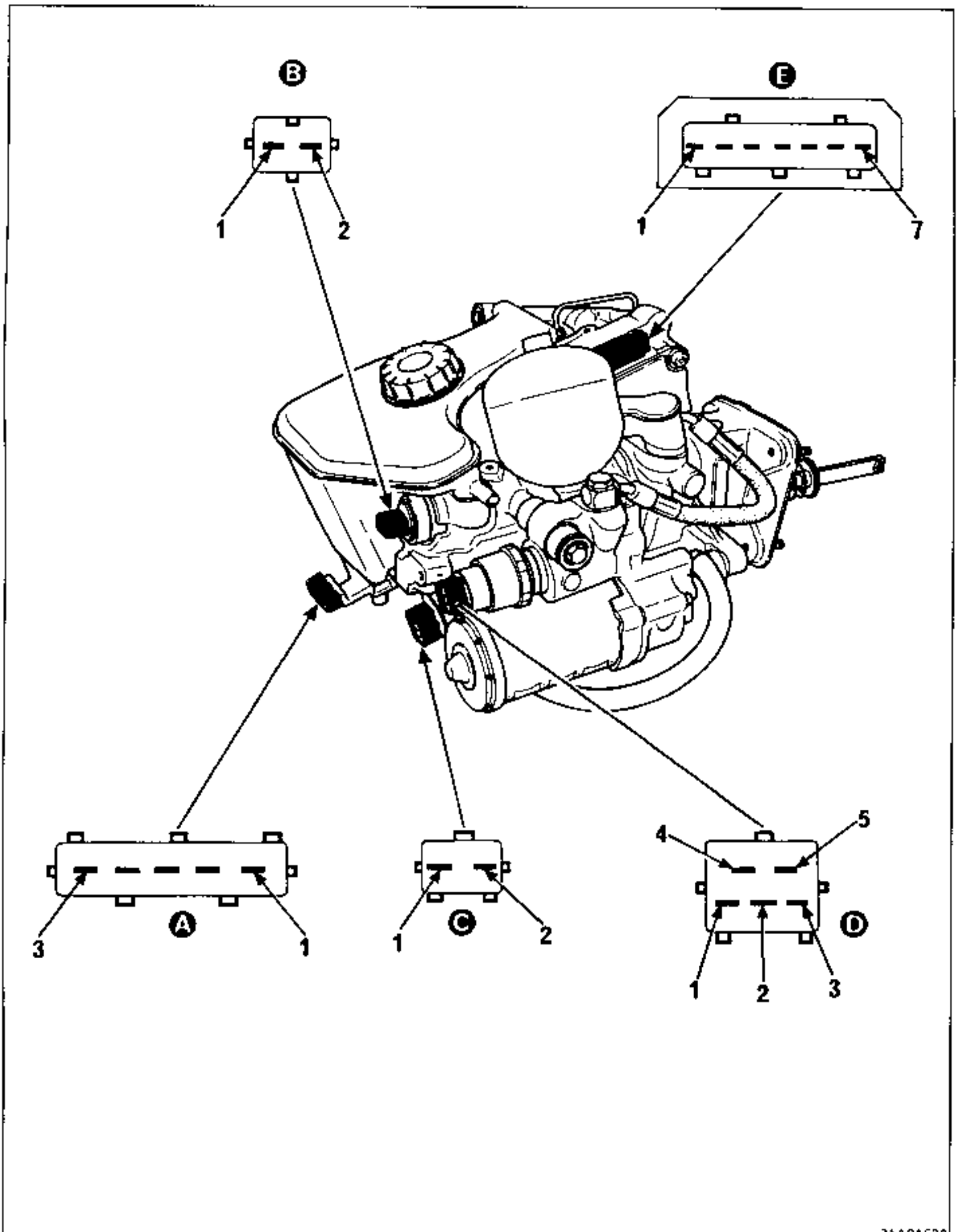
4 : ABS computer track **33**

5 : ABS computer track **34**

6 : ABS computer track **15**

7 : ABS computer track **11**

ADDITIONAL CHECKS



21A91620

ADDITIONAL CHECKS

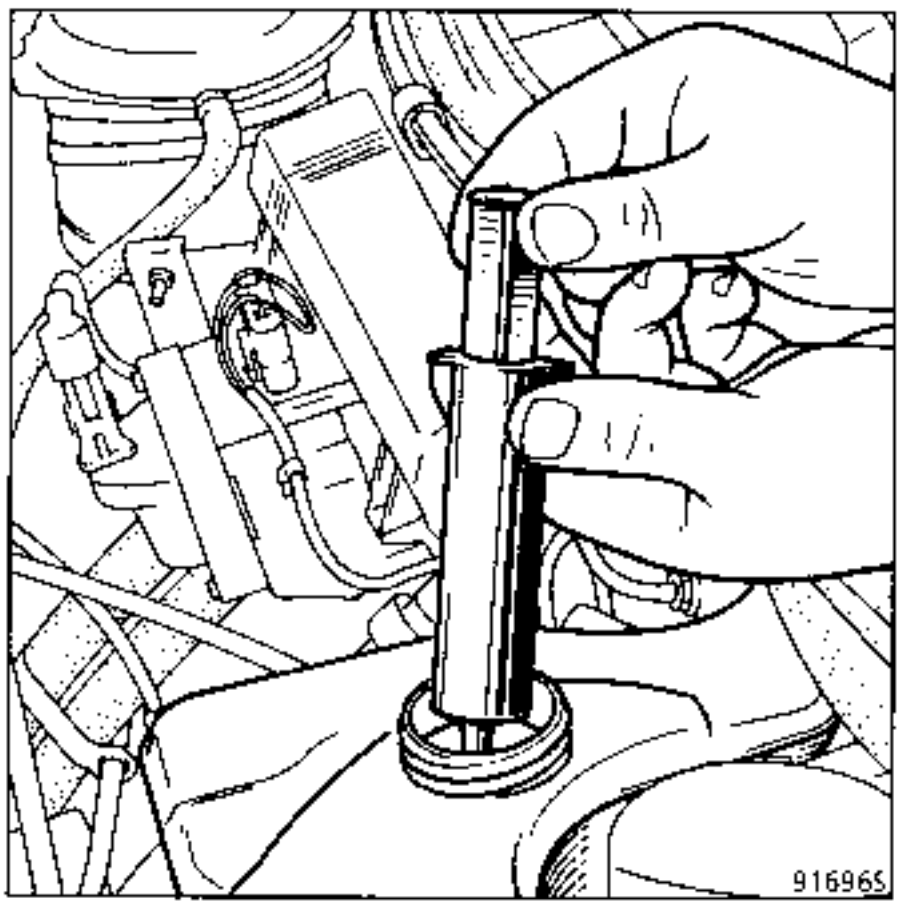
VI - OPERATION OF DOUBLE WARNING DEVICE INCORPORATED IN THE BRAKE FLUID RESERVOIR

NOTE: The double warning device is incorporated in the reservoir, if it does not operate, replace the entire reservoir.

CHECKING

Switch on the ignition.

Drain the reservoir using a clean syringe until the fluid is below the **MIN** mark.



- (1)(2) warning light illuminates.

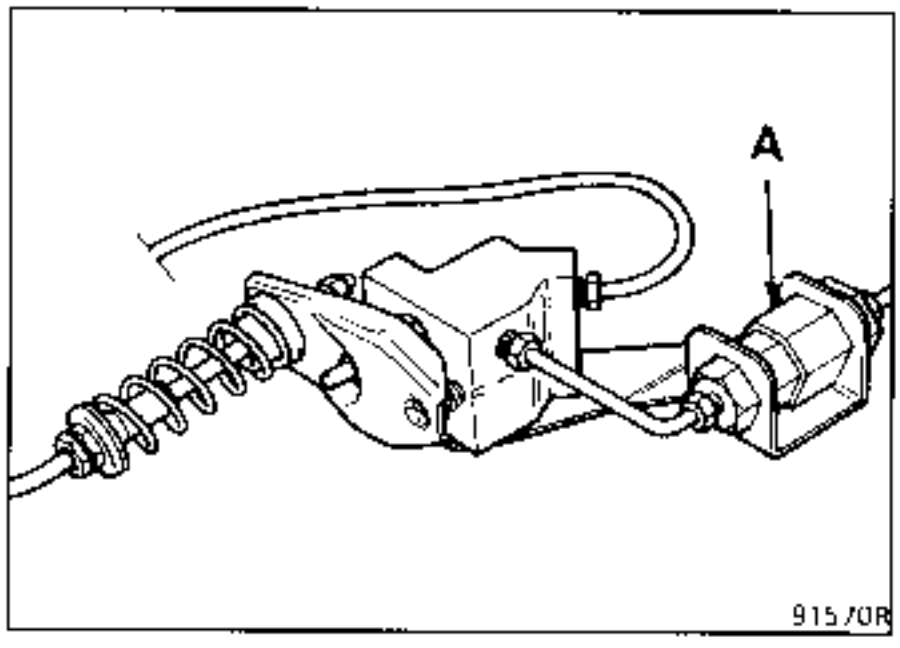
Continue to remove the fluid.

- (4) illuminates in turn.

If there is a defect: one or other of the warning lights fails to illuminate, check the wiring (see paragraph IV). If the wiring is good, replace the reservoir.

SPECIAL POINT CONCERNING BRAKE COMPENSATOR

Vehicles fitted with the Teves ABS have a delay valve (A) near the compensator, on a mounting lug.

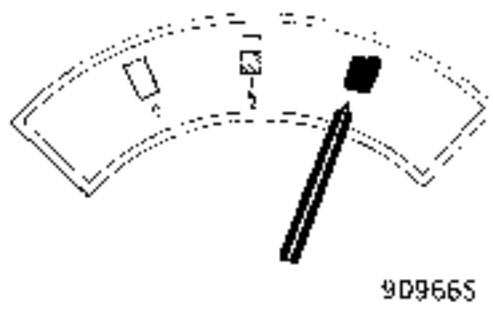


This valve enables the increase in pressure on the rear axle to be slightly offset.

The method for removing the compensator-delay valve assembly is identical to the method described in section 37.

BRAKE COMPENSATOR SETTING VALUES

Vehicles are equipped with a delay valve and single compensator which is dependent on the load. They are checked and adjusted with the vehicle unladen, fuel tank full and driver on board.

Vehicle type		Amount of fuel in tank	Test pressure (Bar)	
			Front	Rear
B48W	L48W	 909665	100 →	38 +0 -9
B488	L488			
B483	L483			
L48L	L485			
B48K	L48K			
B48Y	L48Y			
B48Q	L48Q			
B487	L487			
B48P	L48P			
B48R	L48R		100 →	39 +0 -8
B48Y	L48Y			
K483	K48K		100 →	43 +0 -9
K487	K488			
K48W				
K48R			100 →	39 +0 -9

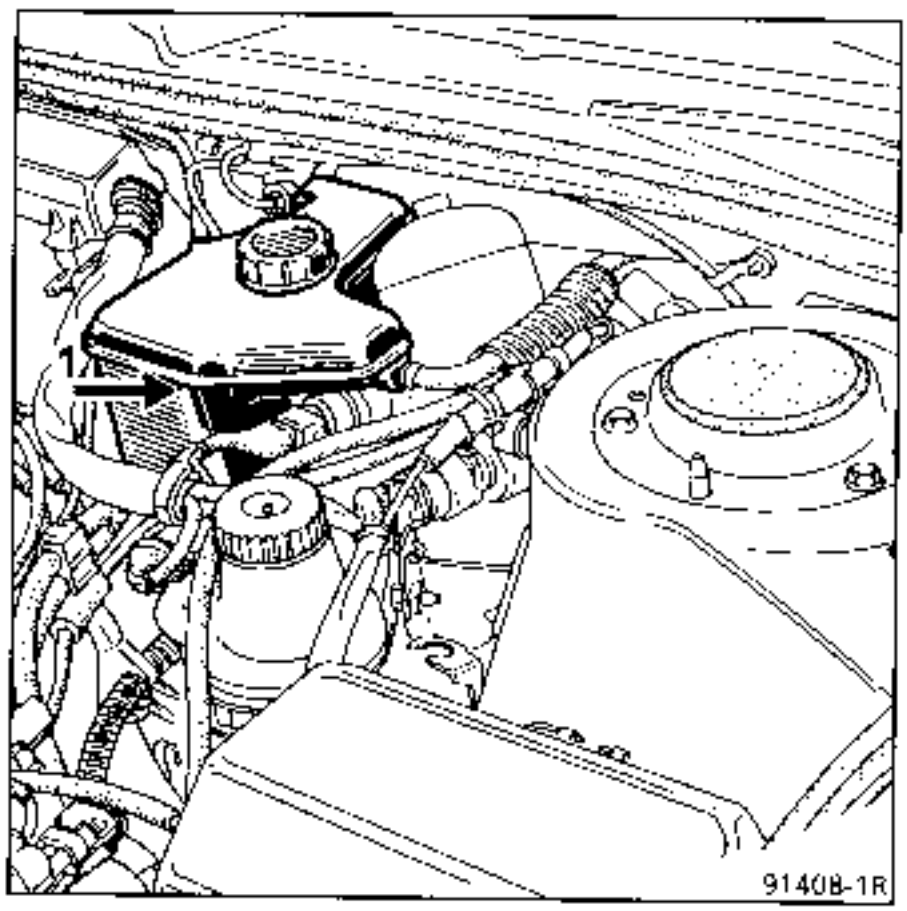
CHECKING THE LEVEL - BLEEDING

I CHECKING THE LEVEL

The brake fluid level is checked with the ignition switched on. When the fluid is at the MAX level it means that the accumulator is full.

Switch on the ignition and wait for the pump to stop.

If necessary, top up the brake fluid level to the MAX mark (1) (vehicle with new brake pads).



NOTE: The brake fluid reservoir capacity is designed to compensate the liquid from the accumulator when it has been emptied.

II BLEEDING

ESSENTIAL SPECIAL TOOLING	
M.S. 815	Bleeding apparatus

The ABS consists of two types of quite distinct circuits:

- static circuit for the front wheels controlled by a tandem master cylinder;
- dynamic circuit for the rear wheels controlled by the hydraulic amplifier.

Precaution to be taken before operating on the bleed screws.

NEVER open the rear wheel cylinders when the brake pedal is depressed and the accumulator full.

The accumulator, which controls the dynamic circuit of the rear brakes, **is loaded at 180 bars. It MUST be emptied by allowing the pressure to drop by pumping the brake pedal 20 times** (until it becomes hard), before undertaking any work on the system.

- **Do not switch on the ignition as starting the hydraulic pump will cause the accumulator to fill.**

1) Bleeding the front static circuit

- Accumulator empty
- Ignition switched off

Fill the reservoir and fit in place the container from tool **MS. 815**.

Connect two lines of tool **MS. 815** to the bleed screws on the two front hydraulic cylinders.

Connect the apparatus to a compressed air supply point (5 bars minimum).

Open:

- the supply;
- the compressed air valve;
- the bleed screw on the front right-hand wheel and wait approximately 20 seconds for the liquid to drain out;

CHECKING THE LEVEL - BLEEDING

Open:

- the bleed screw on the front left-hand wheel and wait approximately 20 seconds for the liquid to drain out.

- Take no account of air bubbles in the bleed apparatus hoses.

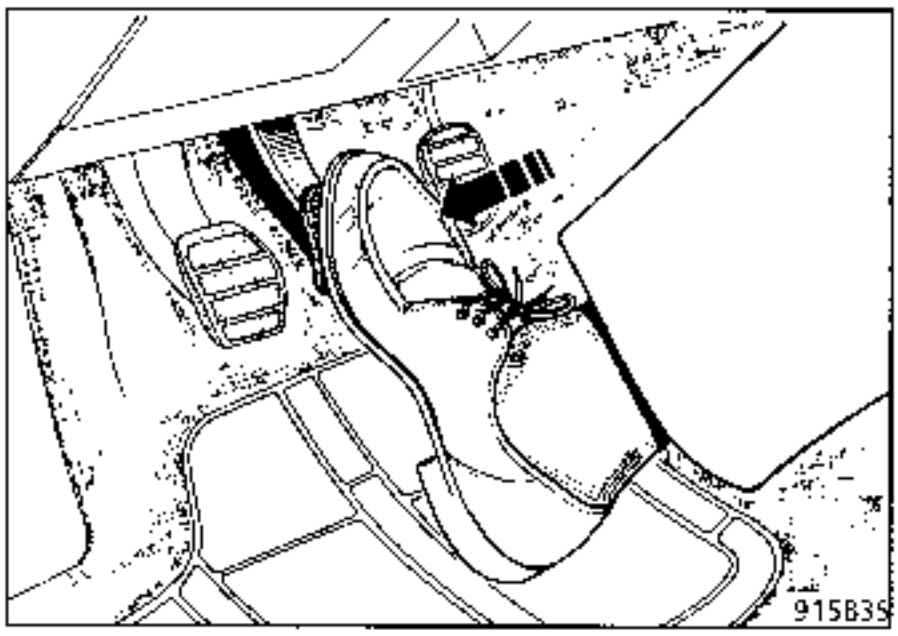
2) Bleeding the rear dynamic circuit:

- accumulator empty
- ignition switched off

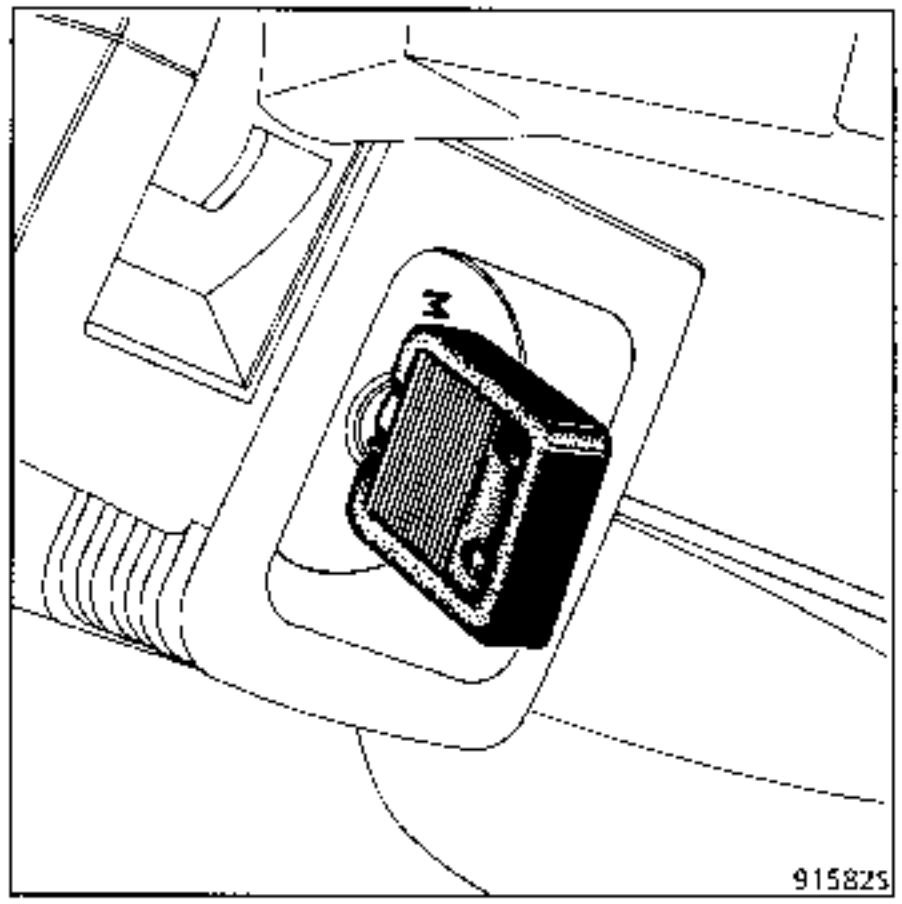
Place a hose connected to a container on the rear right-hand wheel.

Open the bleed screw.

Press down lightly on the brake pedal.



Switch on the ignition.



NOTE : Starting the hydraulic pump causes the brake fluid to flow.

Wait for a continuous stream of liquid to flow out without any bubbles then release the pedal.

Tighten the bleed screw and switch off the ignition.

Proceed in the same way on the other side.

Switch on the ignition and wait for the pump to stop.

If necessary, top up the brake fluid level to the MAX mark (1) (vehicle with new pads).

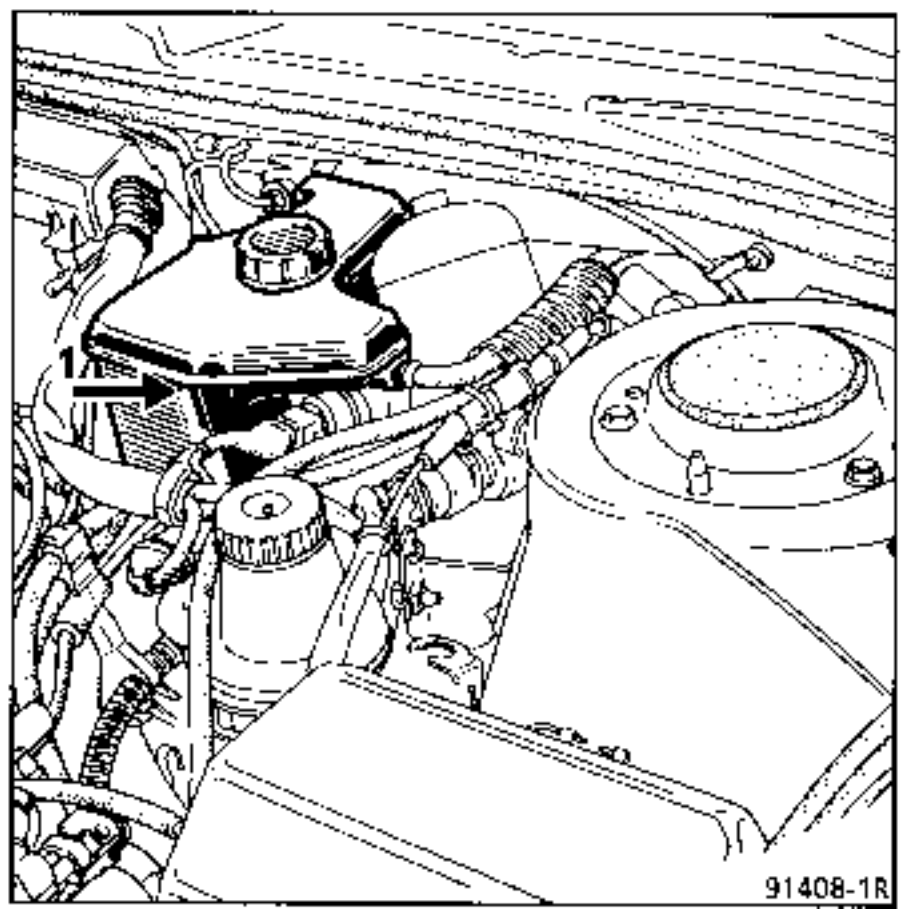


DIAGRAM SHOWING CONNECTIONS FOR BLEEDING OPERATION

I FRONT CIRCUIT

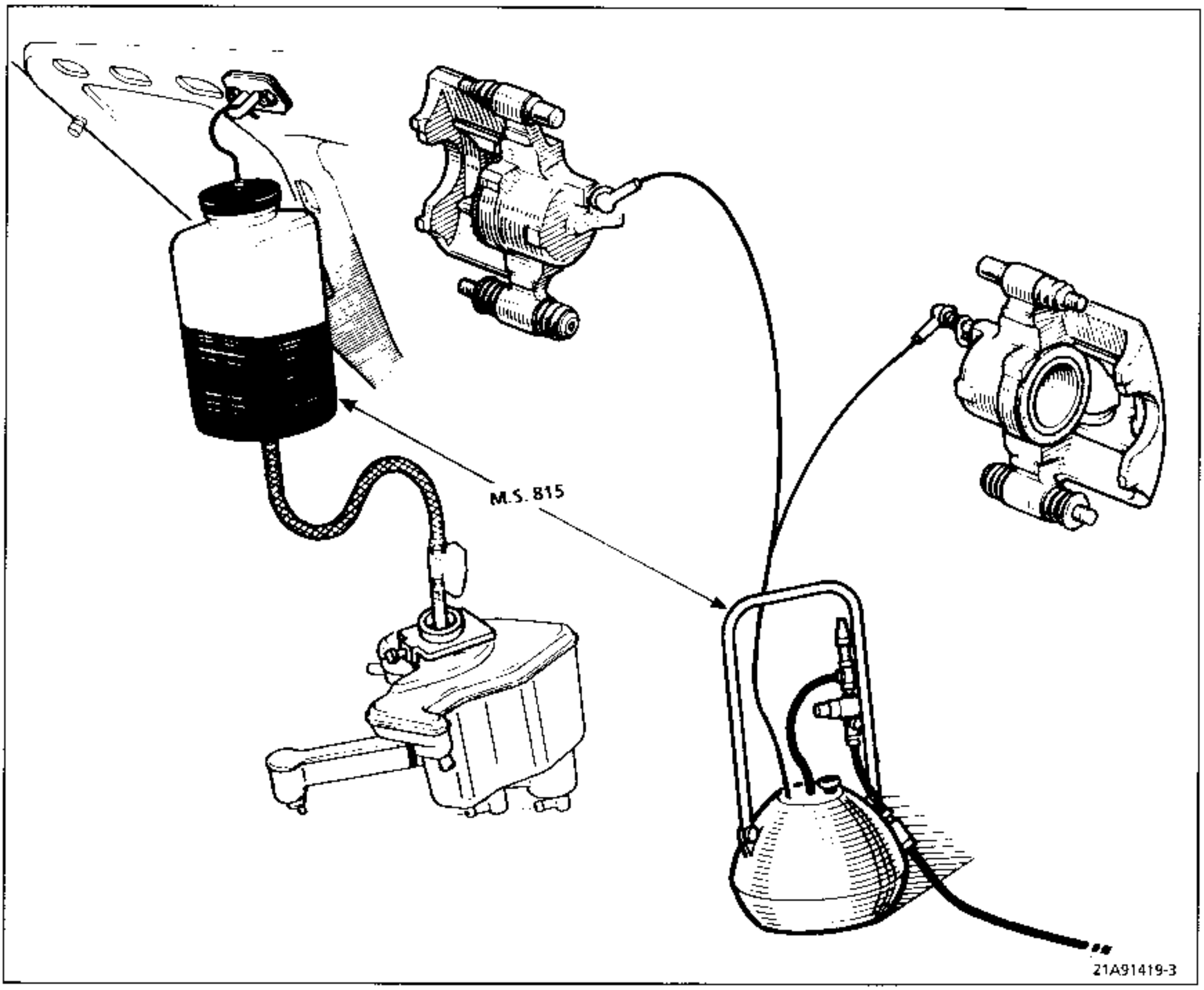
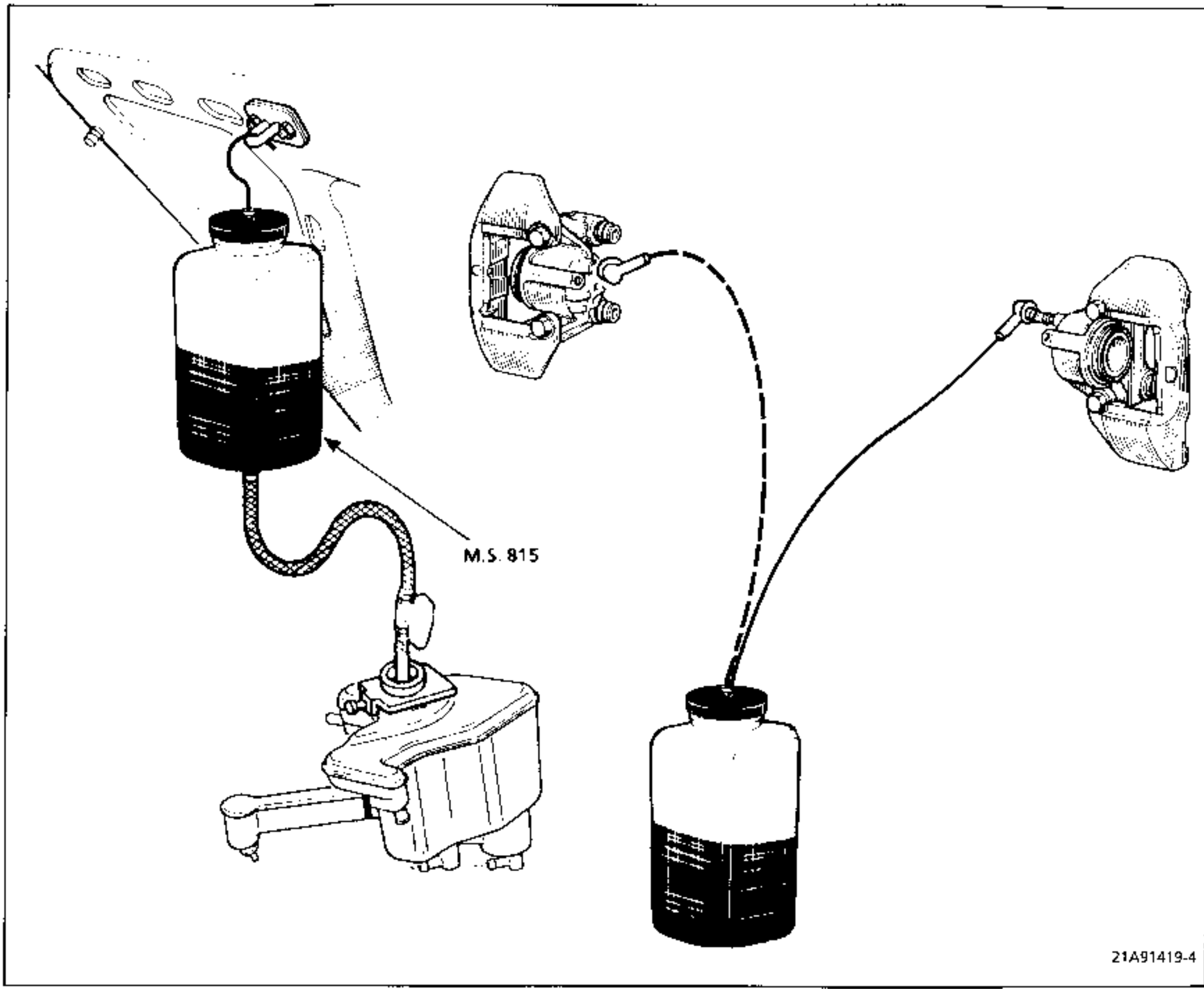
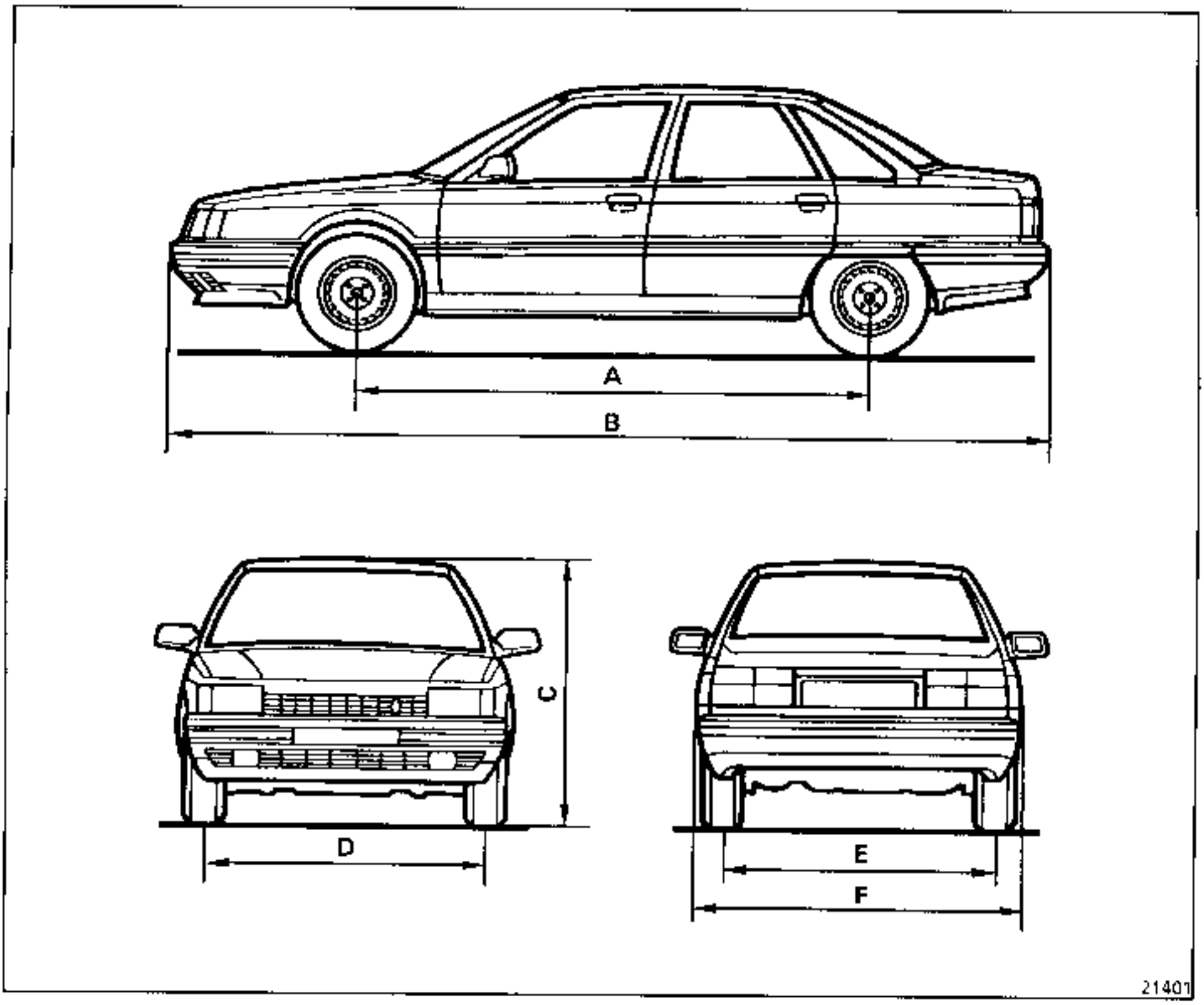


DIAGRAM SHOWING CONNECTIONS FOR BLEEDING OPERATION

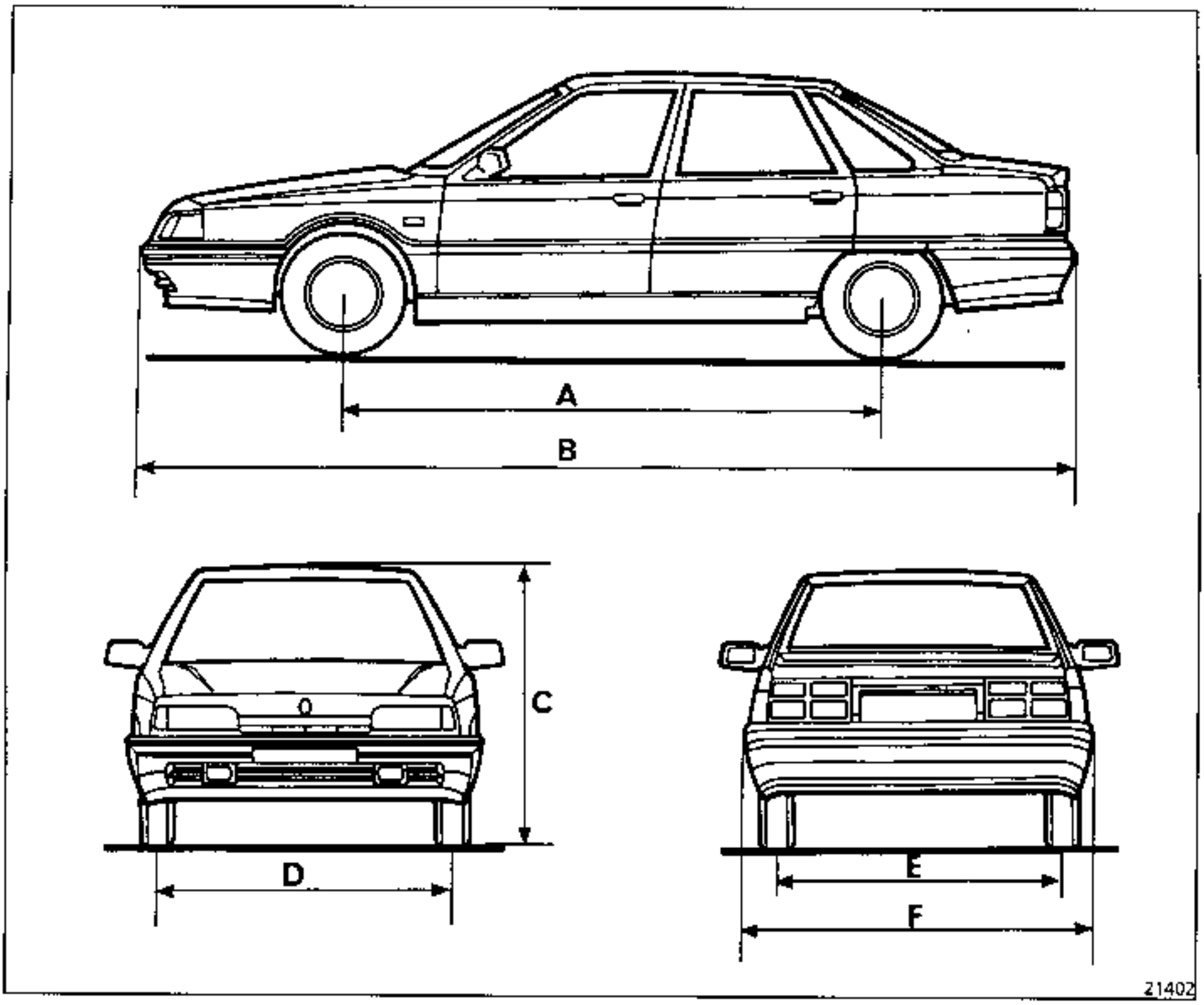
II REAR CIRCUIT





REFERENCE	IN-LINE ENGINE						TRANSVERSE ENGINE			
	RX	TI	GTX TXE	2 litres turbo	TD GTD	Turbo D Turbo DX	TL - TS	GTS	RS	TSE
A	2600						2659			
B	4465		4462	4498	4462		4462		4465	4462
C	1414			1385	1414		1414			
D	1454			1450		1454	1429			
E	1406			1402	1406		1402			
F	1715			1706	1715		1706		1715	

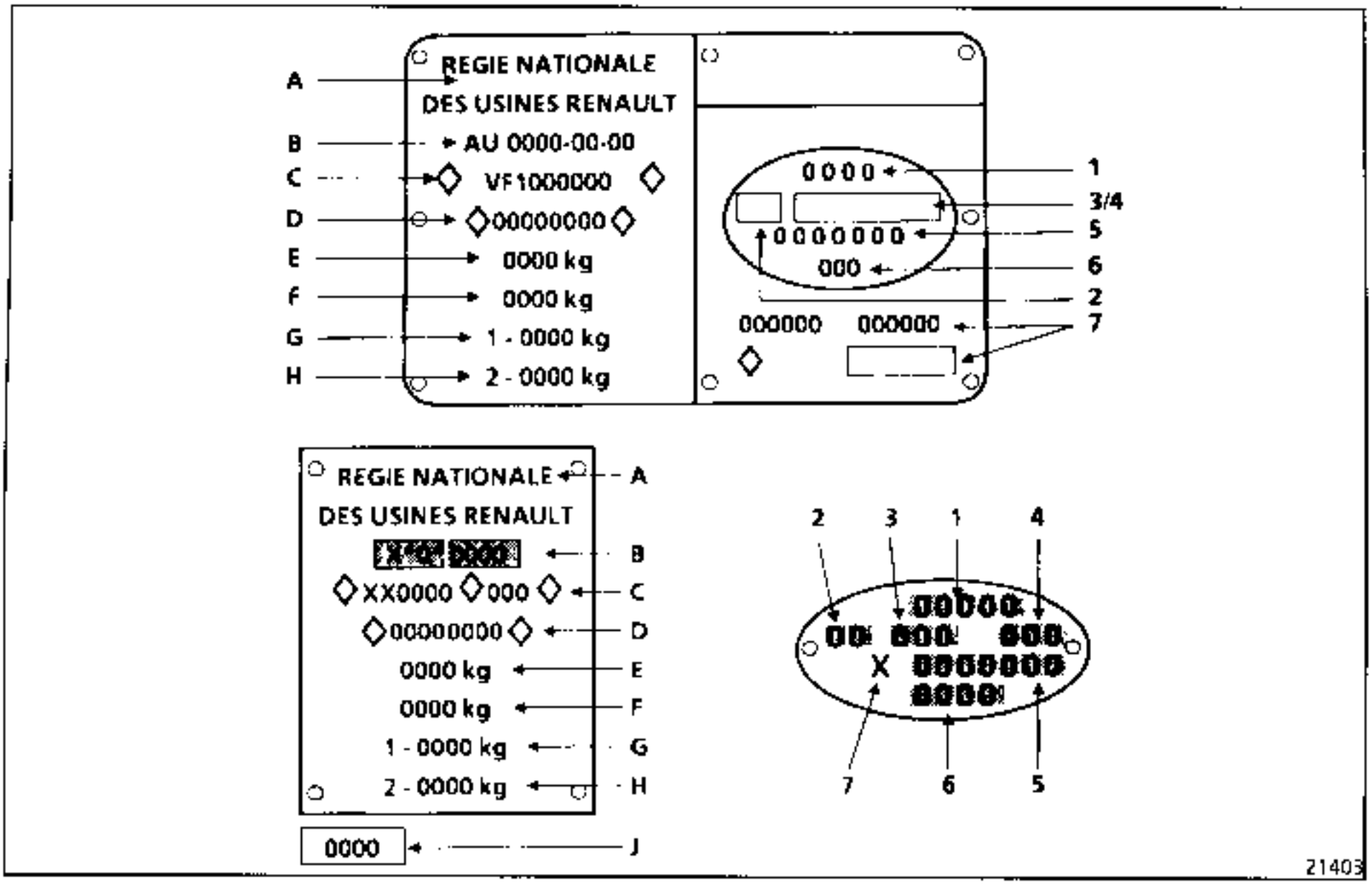
Dimensions are given in millimetres.



REFERENCE	IN-LINE ENGINE					TRANSVERSE ENGINE			
	GTX TXE	TXI	2 litres turbo	TD GTD	Turbo D Turbo DX	TL - TS	GTS	TSE	SD - GSD
A	2600					2659			
B	4528		4510	4528		4528			
C	1415		1385	1415	1400	1415			
D	1454		1445	1454		1435			
E	1400 (1403 with ABS)		1396	1400 (1408 with ABS)		1400 (1403 with ABS)			1400 (1408 ABS)
F	1726		1722	1726		1726			

Dimensions are given in millimetres.

The vehicle is identified by the means of two plates which may be on the same mounting.



- At A : The manufacturer's name.
- At B : The EEC reception number
- At C : The vehicle type mines preceded by the world wide identification code for the manufacturer (example VF1 corresponds to Renault France).
- At D : The chassis number.
- At E : The gross vehicle weight.
- At F : The gross train weight.
- At G : The maximum permissible front axle loading.
- At H : The maximum permissible rear axle loading.
- At J* : The model year (optional, three possible locations, see above).
- At 1 : The vehicle type.
- At 2 : Special features of the vehicle.
- At 3 and 4 : The equipment and option numbers.
- At 5 : A letter designating the manufacturing factory followed by the fabrication number
- At 6 : The original paint reference.
- At 7 : The additional marking.

*Note : In certain export markets some of these items may not be shown. The plate described above is the most comprehensive version.

ALLOCATION OF EQUIPMENT NUMBERS

Good roads		Poor roads	Special equipment
Steering			
LHD	RHD	LHD	LHD
100 series	600 series	200 series	500 series

SPECIAL TOOLING REQUIRED	
Cha. 280-02	Trolley jack pad
Cha. 408-02	Trolley jack adaptor socket

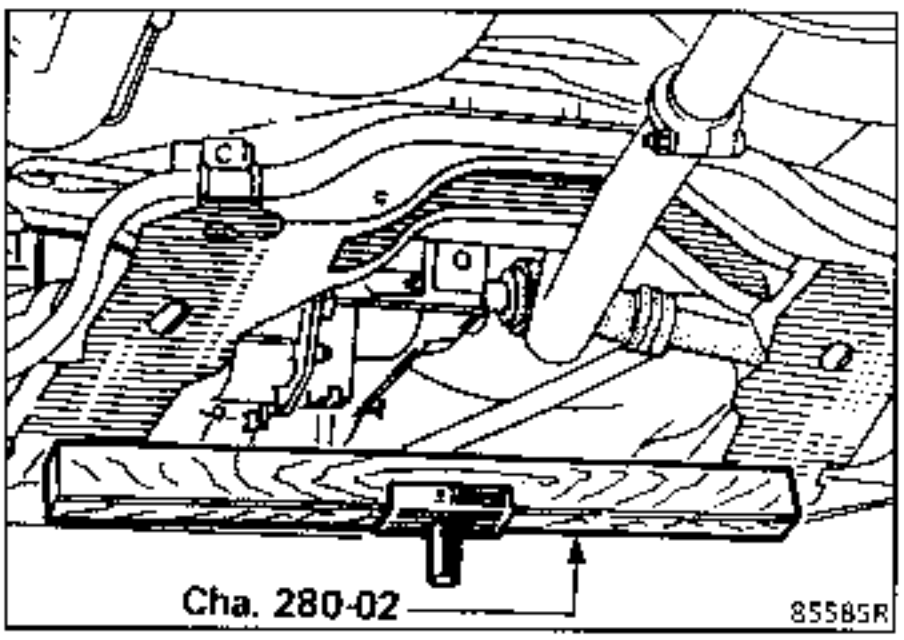
The vehicle may not be lifted by taking the load under the front suspension arms.
Depending on the type of trolley jack, use one of the sockets **Cha. 408-02** to fit the pad **Cha. 280-02.**

LIFTING WITH A TROLLEY JACK FROM THE FRONT

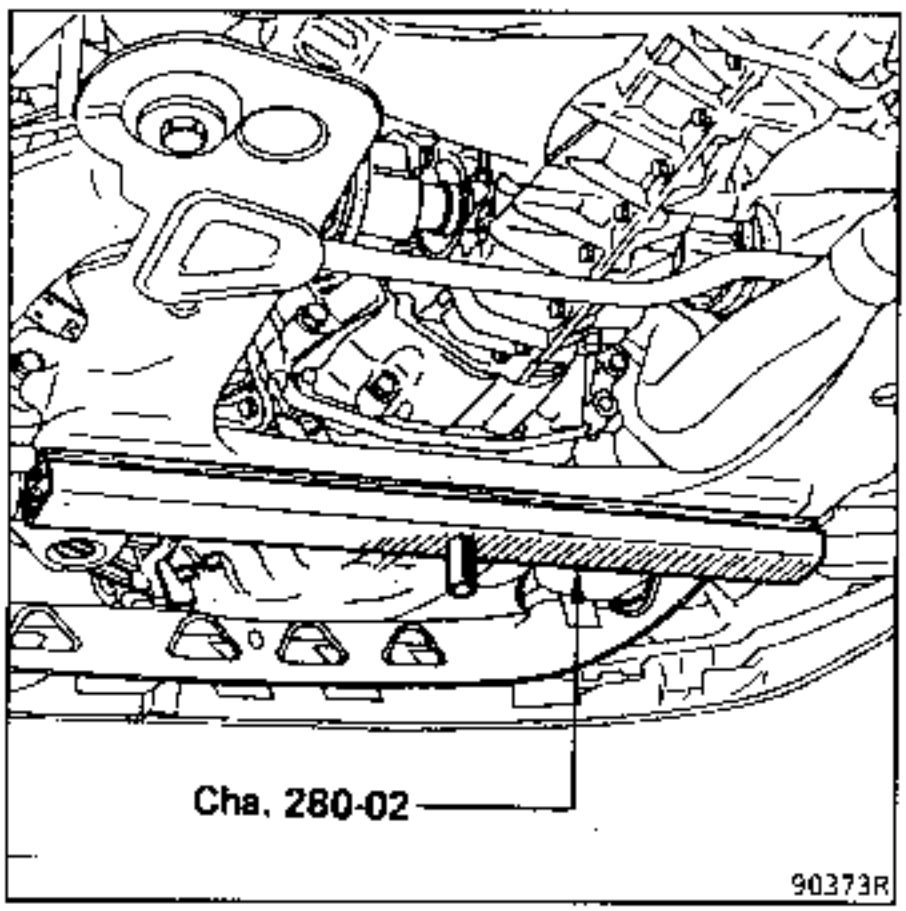
Apply the handbrake or chock the rear wheels.

Use pad **Cha. 280-02.**
Take the load under the front sub-frame.
Ensure that the pad is not in contact with the gearbox or the exhaust downpipe.

Transverse engine

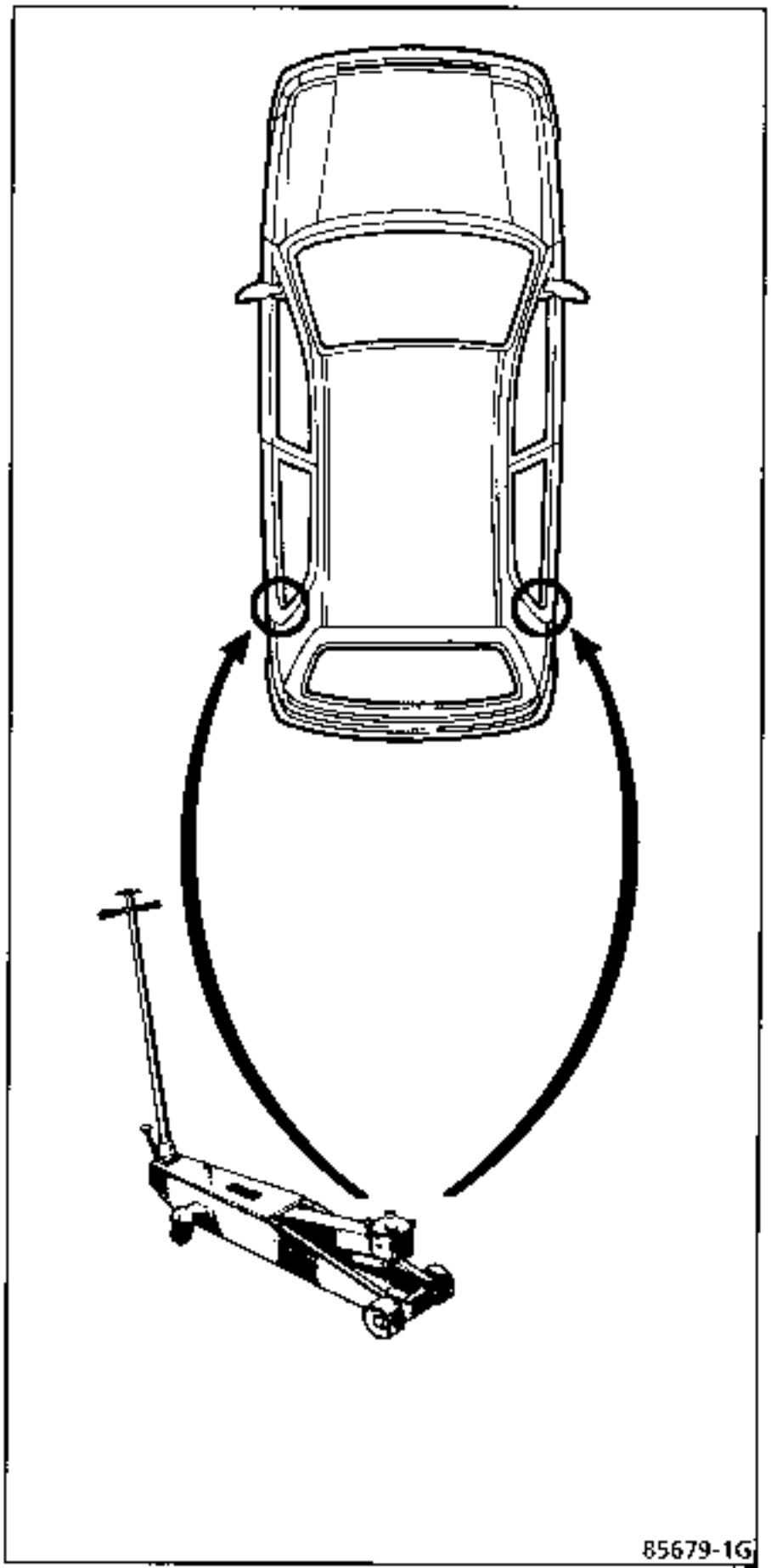


In-line engine



LIFTING WITH A TROLLEY JACK FROM THE REAR

The vehicle MAY NOT be lifted by taking the weight under the rear axle assembly. Lift each wheel separately, taking the load on the vehicle jacking points.

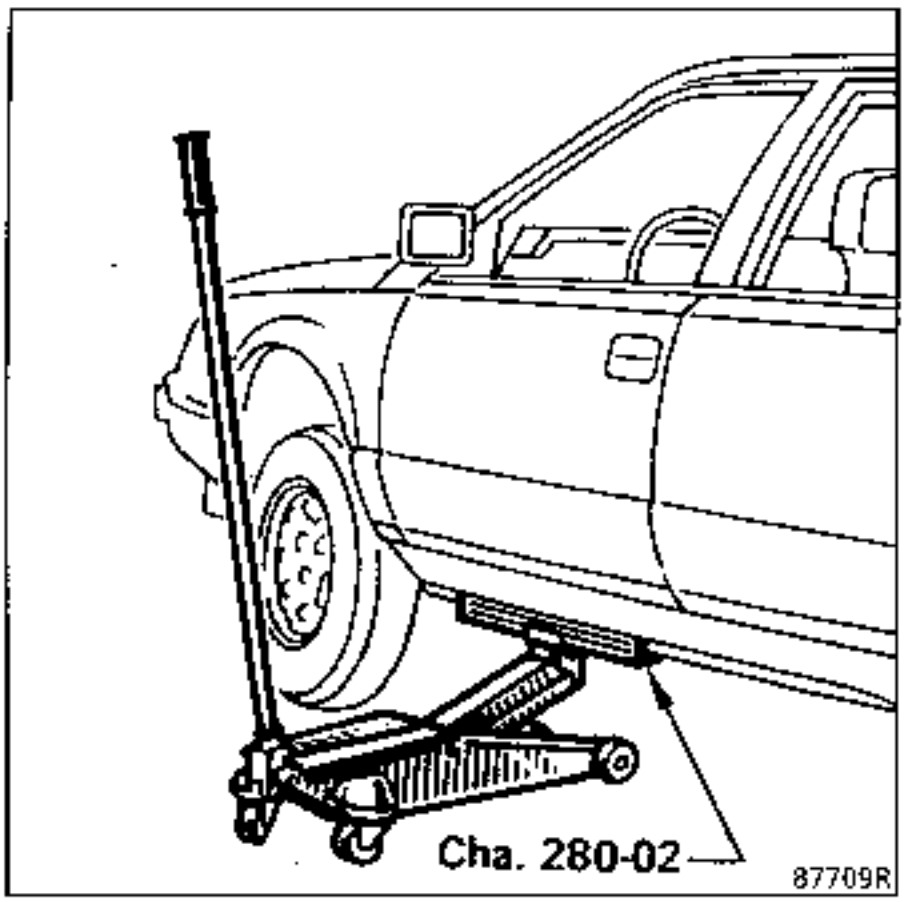


LIFTING WITH A TROLLEY JACK FROM THE SIDE

Use pad **Cha. 280-02.**

Take the load under the sill, under the front door.

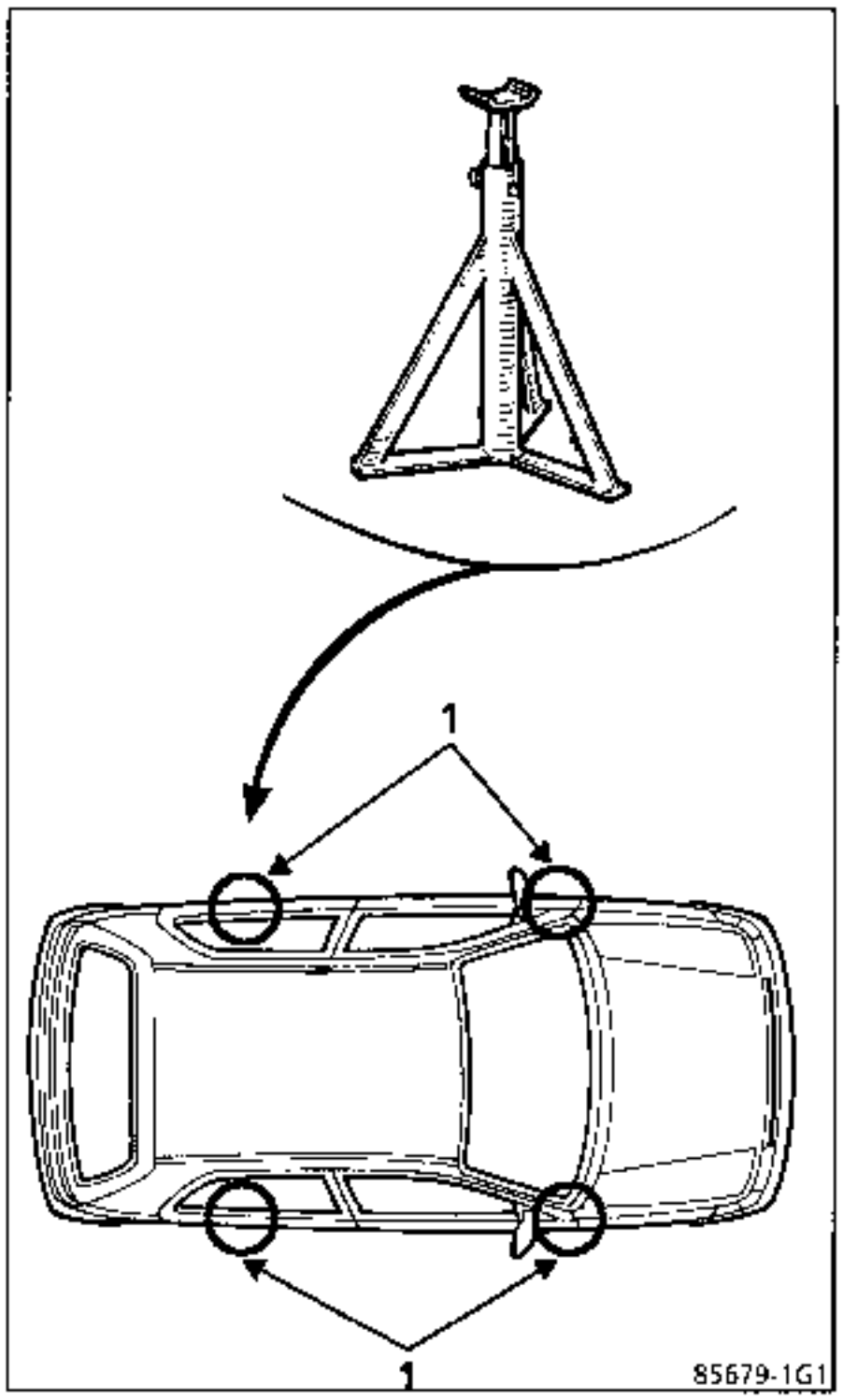
Ensure that the flange is correctly positioned in the slot on the pad.



AXLE STANDS

When putting the vehicle on axle stands, they must be positioned under the jacking points (1) provided for lifting the vehicle with its own jack.

Rear axle stands are placed in position by lifting the vehicle from the side.

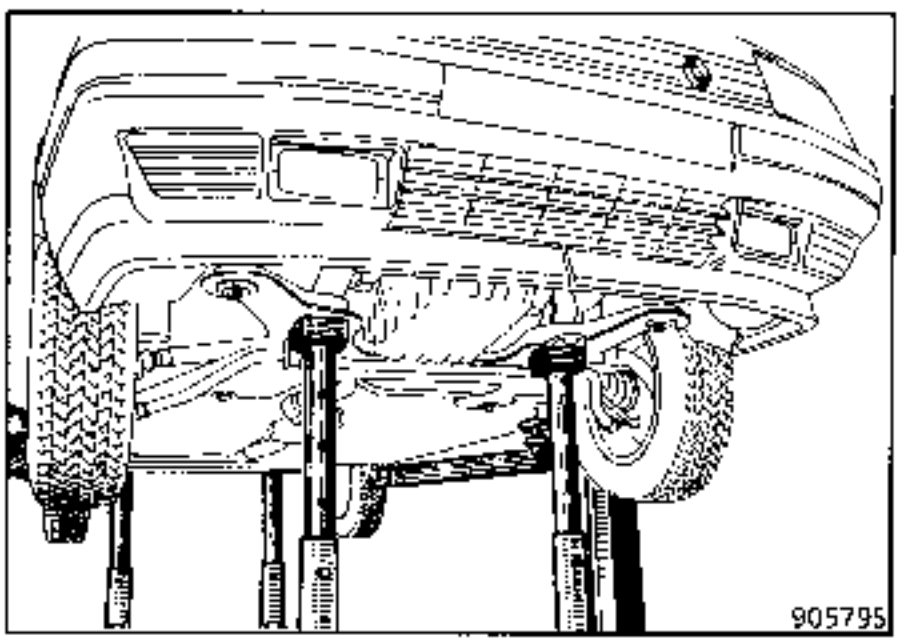


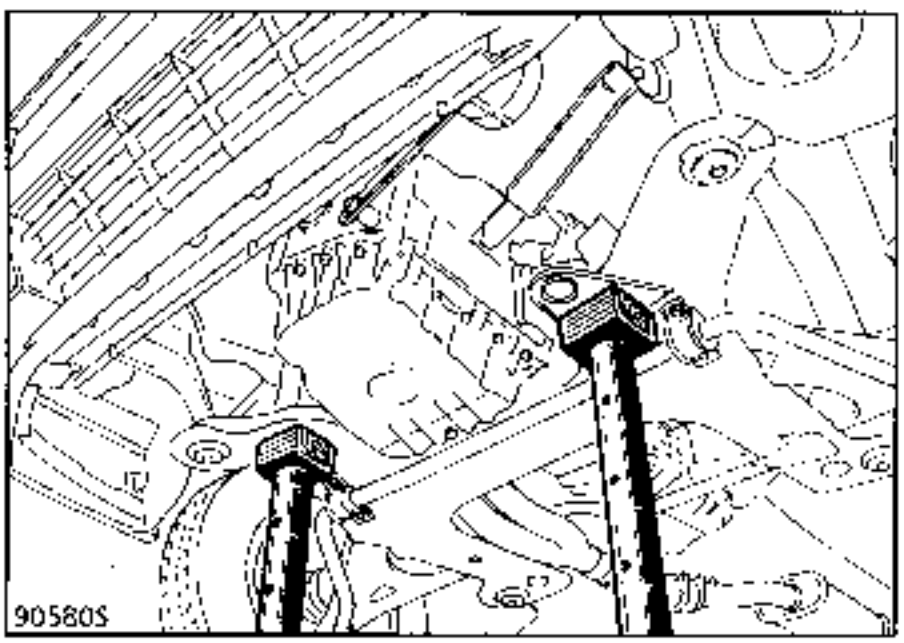
A number of different cases may arise:

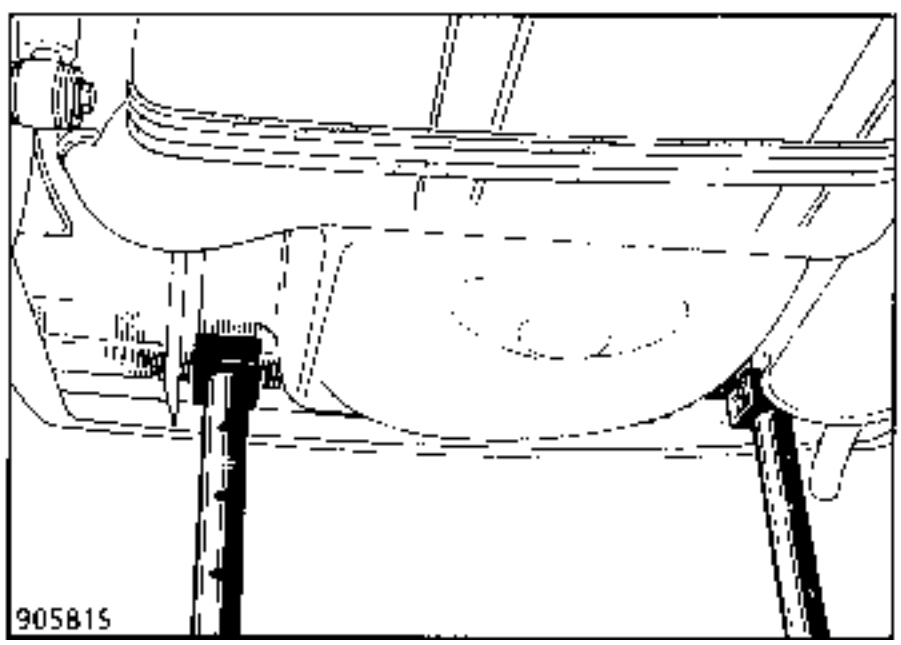
1 - **When components are to be removed**:

a) Generally speaking, **never use a 2 post lift**, if a 4 post **lift** may be used (for example, removing the gearbox, the engine or the engine and transmission assembly).

b) Only in cases **where the lift will not have to be moved (up and / or down)** during the removal - refitting of components (for example, complete rear axle assembly), it is essential that 2 high axle stands (Part Number **FOG 440-8001** for example) **are placed under the opposite end of the vehicle** (in the case already quoted of removing the rear axle assembly, the stands would be placed under the front end of the vehicle).





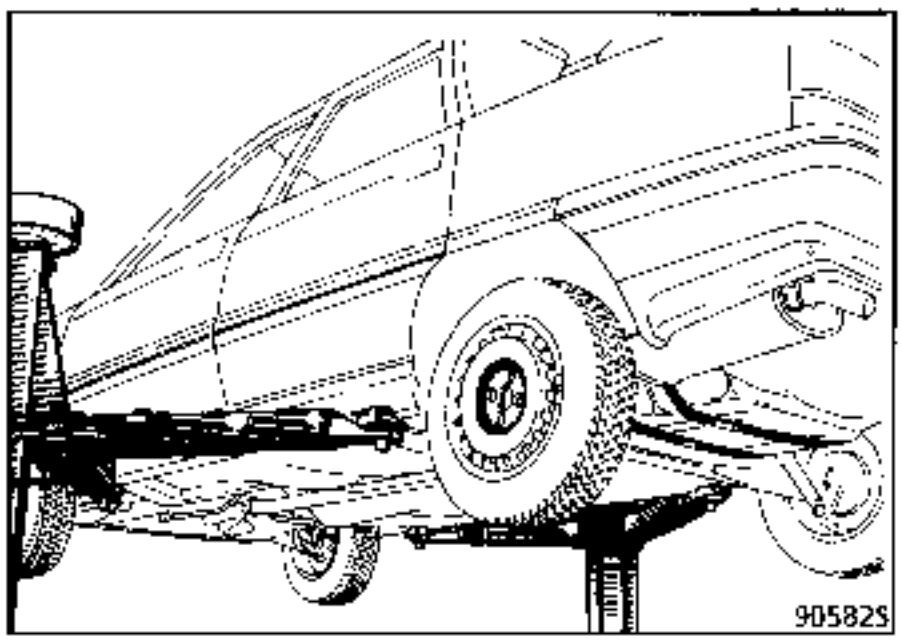


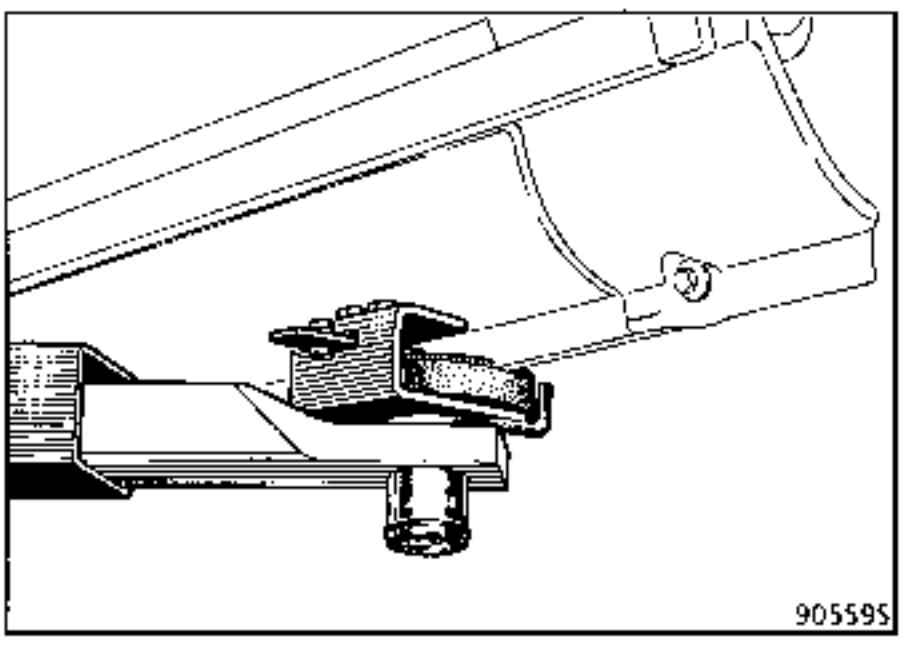
2 - **Particular case of removing and refitting the engine - transmission assembly secured to its sub-frame :**

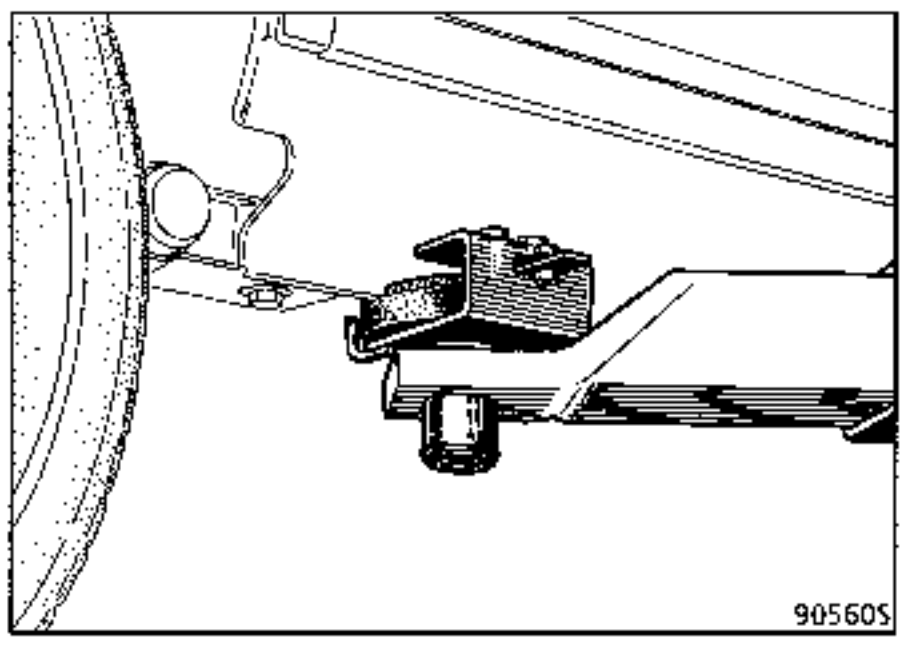
First of all, it should be noted that this operation is only to be undertaken when carrying out body repair operations (replacement of the side members for example, where the vehicle has to be mounted on the jig bench).

In this specific case, **the body of the vehicle must** be secured to the arms of the 2 post lift.

The FOG company supplies a set of special pads.
Part Number : FOG 449 8111.
These should be located under the vehicle jacking points. They must click into the apertures in the body sill flanges.

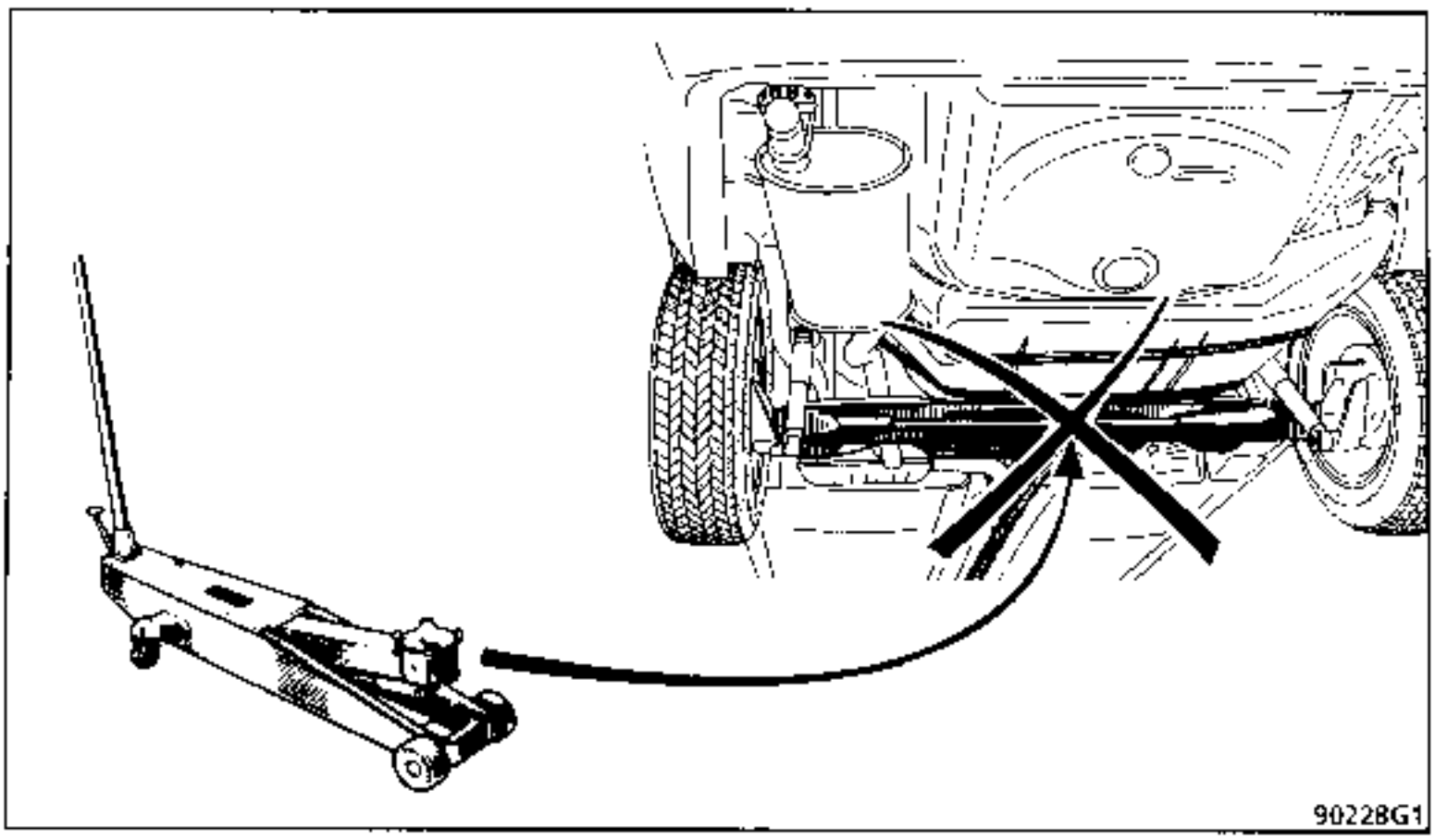






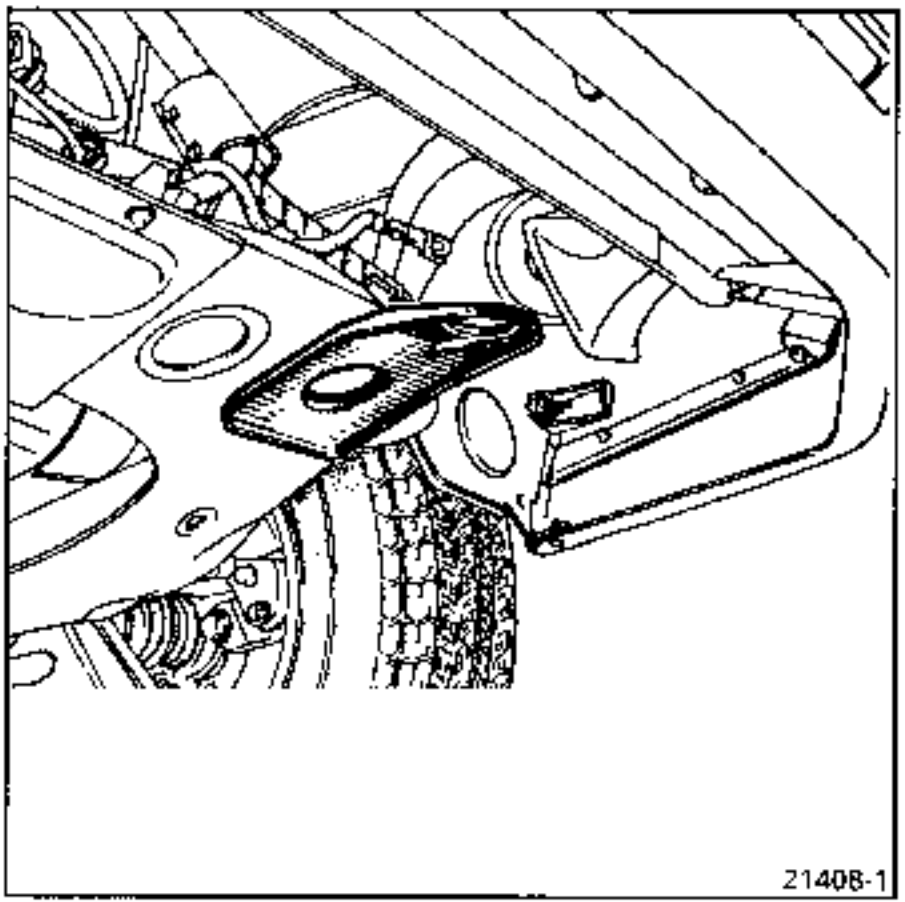
3 - In all other cases when the vehicle is to be raised on a 2 post lift, the lifting pads must be placed under the body sill flanges, in line with the vehicle jacking points.

It is **FORBIDDEN** to jack up the vehicle taking the load under the rear axle V section.

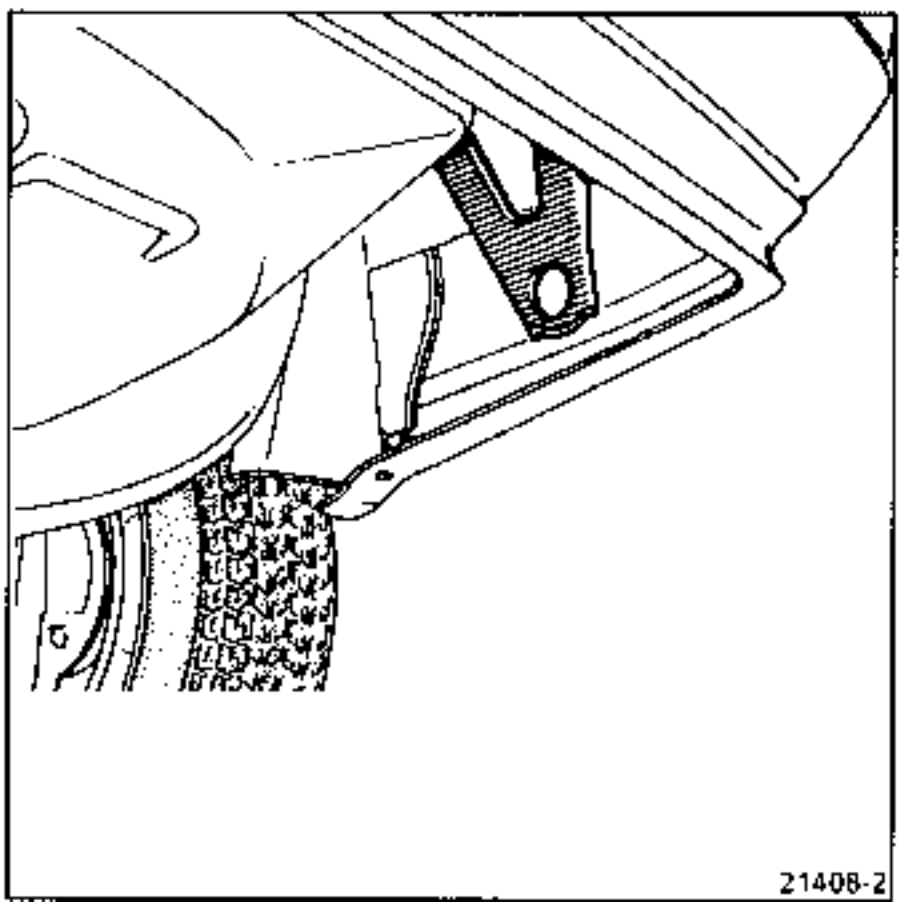


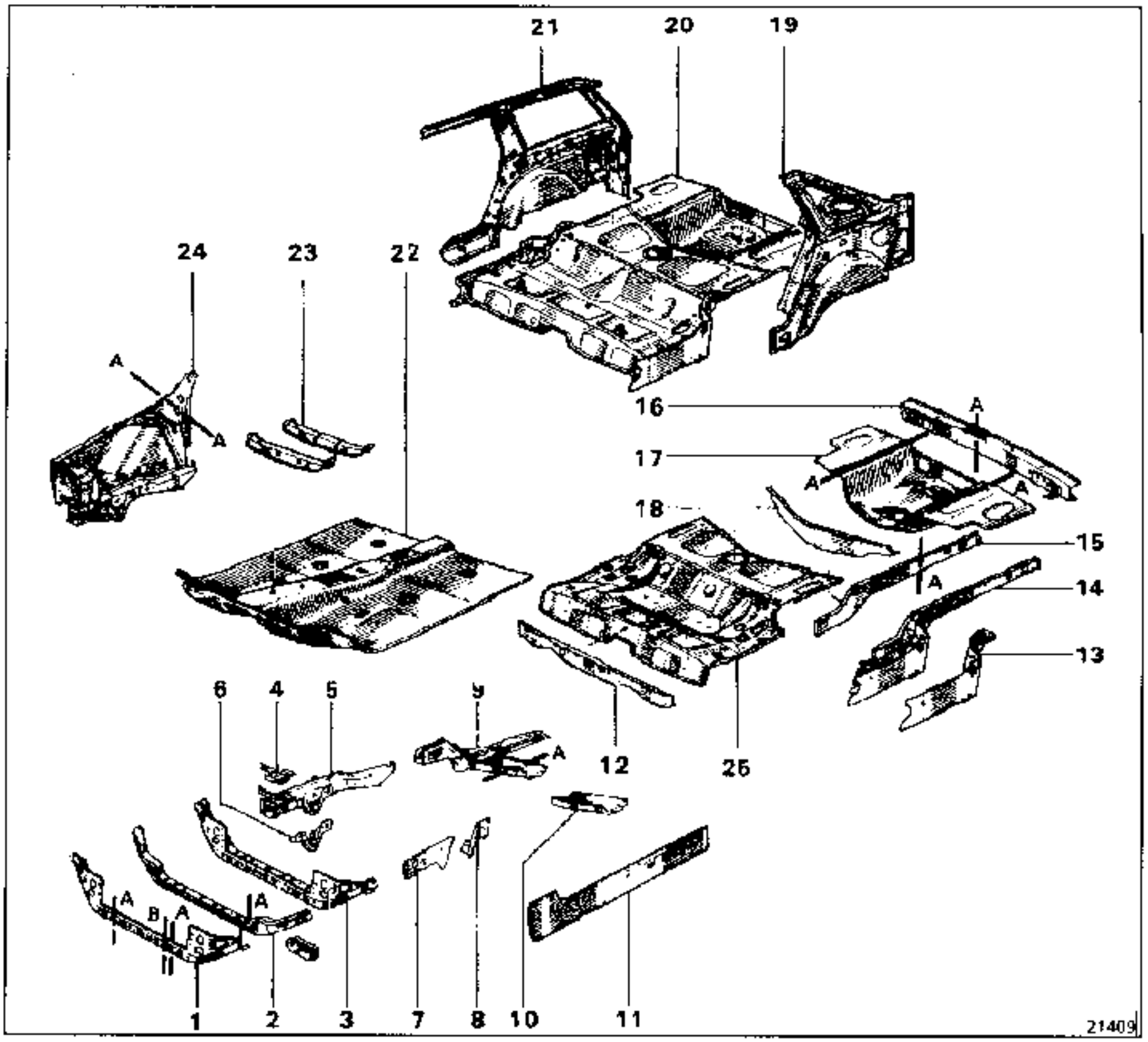
The towing hooks, which are to be used only for towing the vehicle on the road, must under no circumstances be used for pulling the vehicle out of a ditch or any other similar emergency operation and must not be used for lifting the vehicle, either directly or indirectly.

FRONT



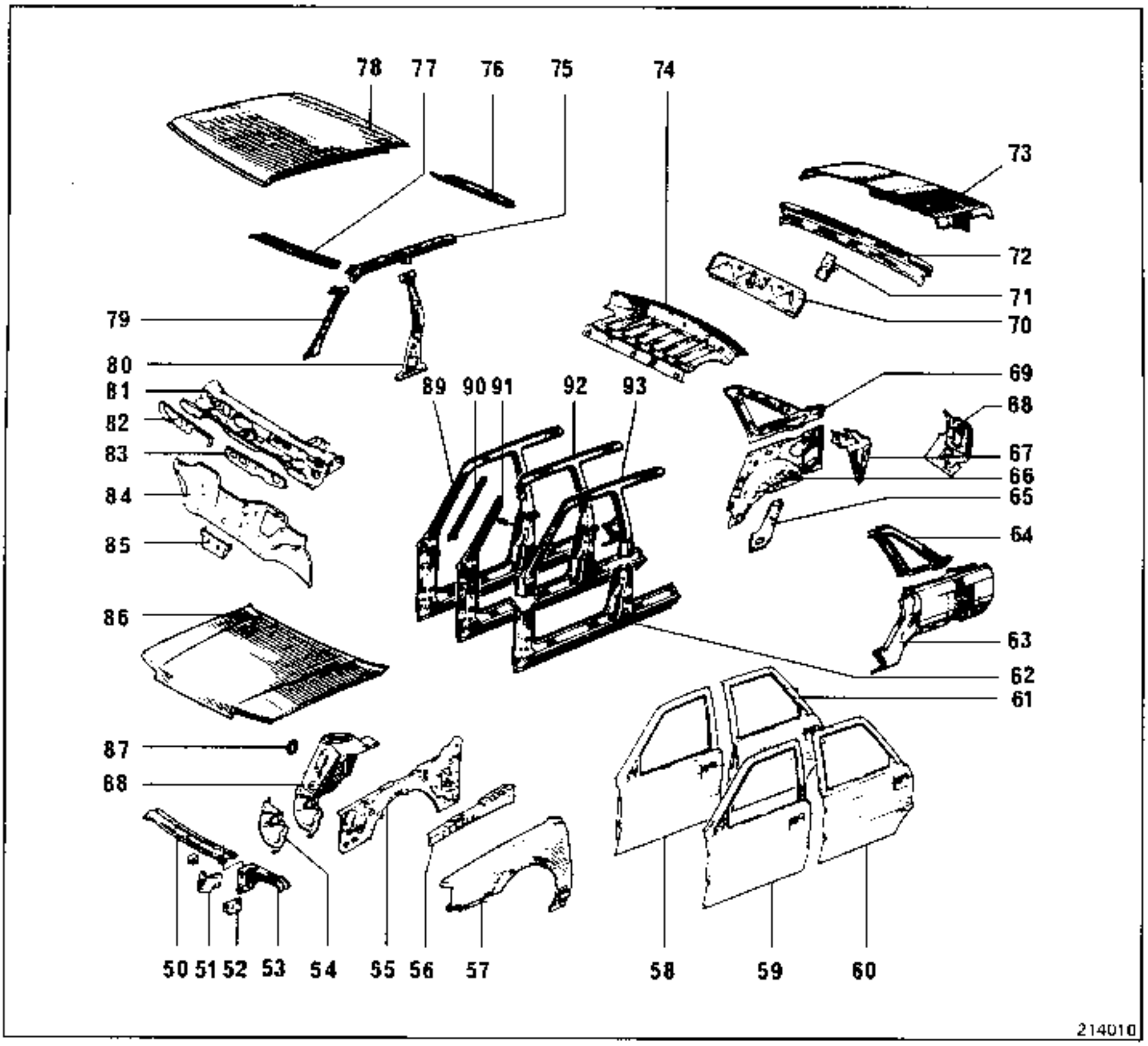
REAR





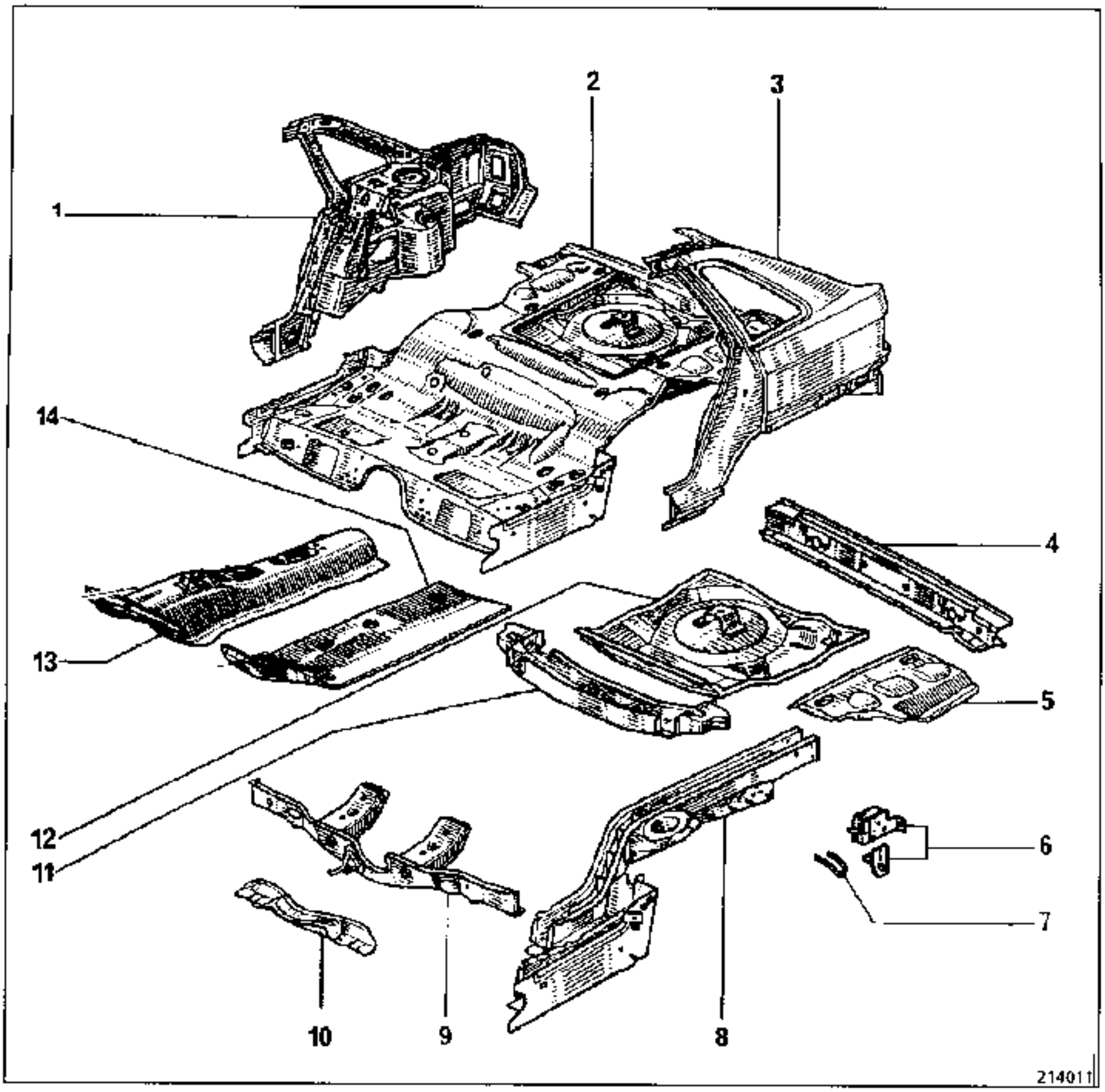
LOWER STRUCTURE

1 Lower cross member closure panel
1AA Cross member closure panel along cut AA
1B Cross member closure panel along cut B
2 Front lower cross member
2A Lower cross member along cut A
3 Front lower cross member, complete
4 Connection gusset
5 Side member, complete front section
6 Sub-frame front gusset
7 Front side member closure panel
8 Rear closure panel
9 Front side member, rear section
9A Side member, rear section along cut A
10 Side cross member
11 Sill closure panel
12 Cross member under floor
13 Valence closure panel
14 Rear side member, complete
15 Rear side member, bare
15A Rear side member along cut A
16 Rear cross member
16A Rear cross member along cut A
17 Luggage compartment floor panel, rear section
17A Side section of floor, along cut A
18 Luggage compartment panel
19 Rear half unit
20 Rear floor assembly
21 Rear half unit
22 Floor, bare
23 Floor cross member
24 Front half unit
25 Centre floor



UPPER STRUCTURE

50	Front upper cross member	**66**	Rear wheel arch	**82**	RH partition under cross member
51	Hinge mounting	**67**	Wing panel reinforcement	**83**	LH partition under cross member
52	Movable gusset	**68**	Rear lights carrier panel	**84**	Bulkhead
53	Headlight carrier panel	**69**	Rear quarter panel lining	**85**	Steering mounting
54	Wheel arch extension	**70**	Rear end panel lining	**86**	Bonnet
55	Front pillar lining	**71**	Striker plate reinforcement	**87**	Steering mounting flange
56	Lining reinforcement	**72**	Rear end panel	**88**	Wheel arch
57	Front wing	**73**	Boot lid	**89**	Body side
58	Front door	**74**	Rear parcel shelf	**90**	Windscreen aperture stretcher
59	Front door panel	**75**	Side stretcher	**91**	Front pillar
60	Rear door panel	**76**	Roof rear cross member	**92**	Centre pillar
61	Rear door	**77**	Roof front cross member	**93**	Body top
62	Sill panel	**78**	Roof		
63	Rear wing panel	**79**	Windscreen pillar lining		
64	Rear quarter panel	**80**	Centre pillar lining		
65	Pillar reinforcement	**81**	Windscreen lower cross member		



LOWER STRUCTURE

1 Rear half unit L48

2 Rear floor assembly B48 - L48

3 Rear half unit B48

4 Rear cross member

5 Side rear end floor

6 Impact absorbing pad

7 Towing ring

8 Rear side member

9 Cross member under seat assembly

10 Rear lower spacer assembly

11 Axle support cross member

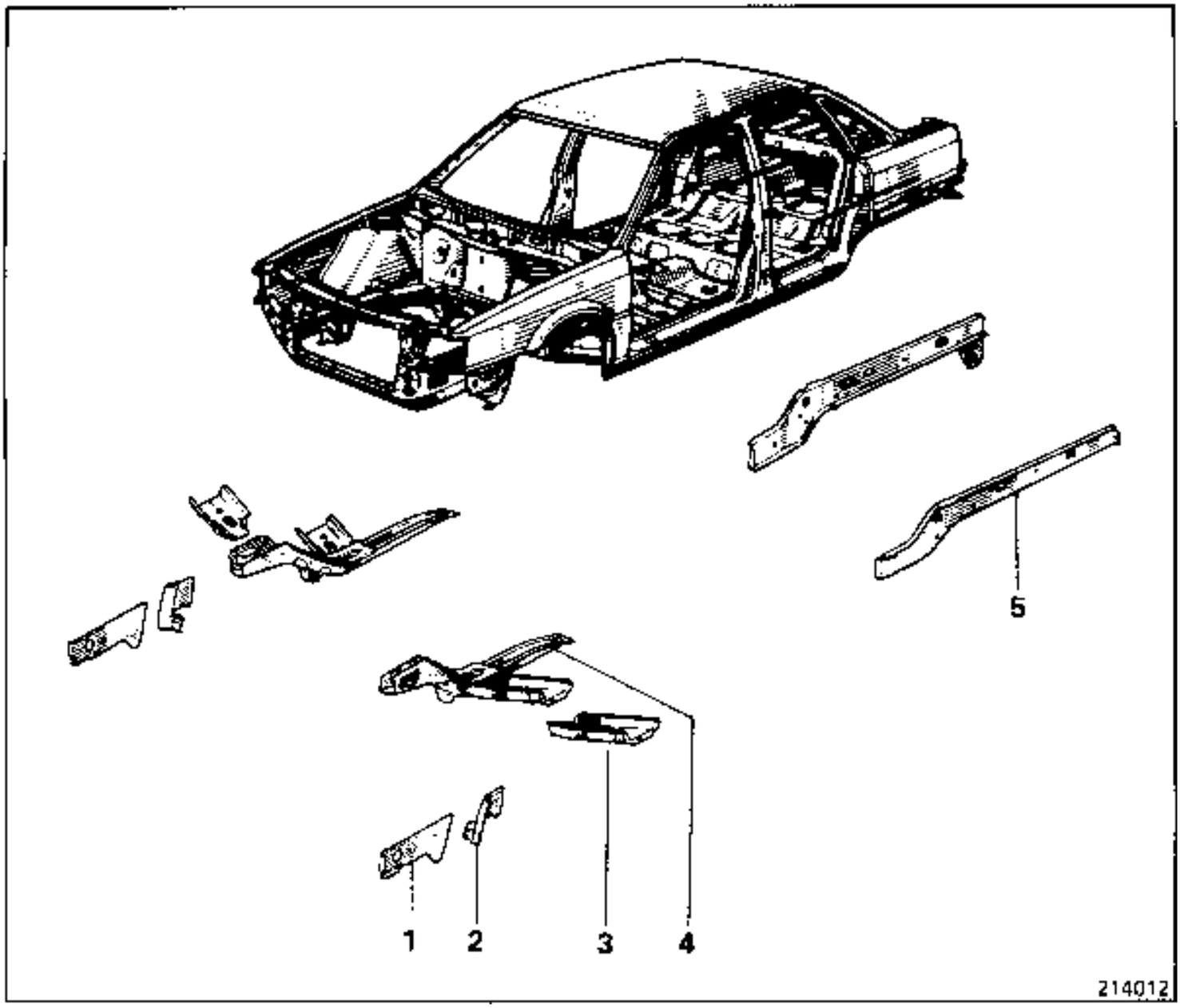
12 Centre rear end floor

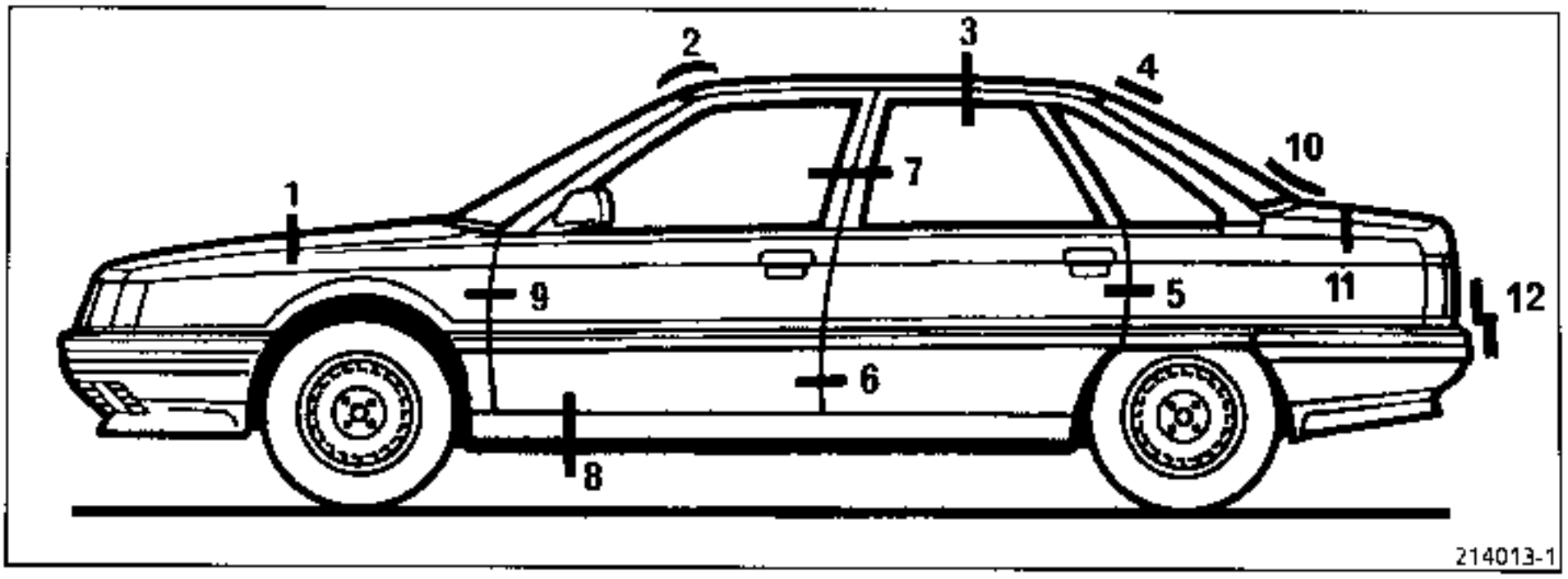
13 Floor tunnel

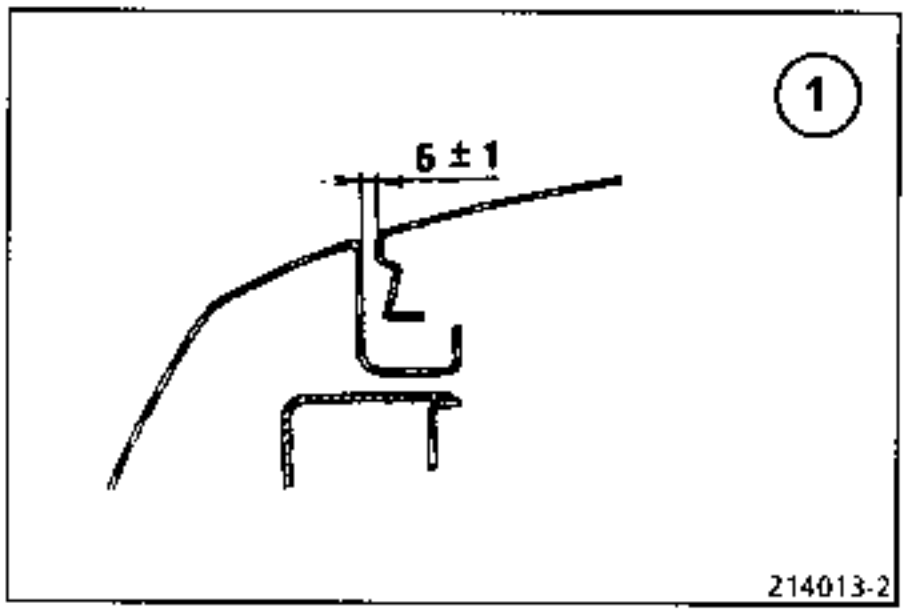
14 Side floor

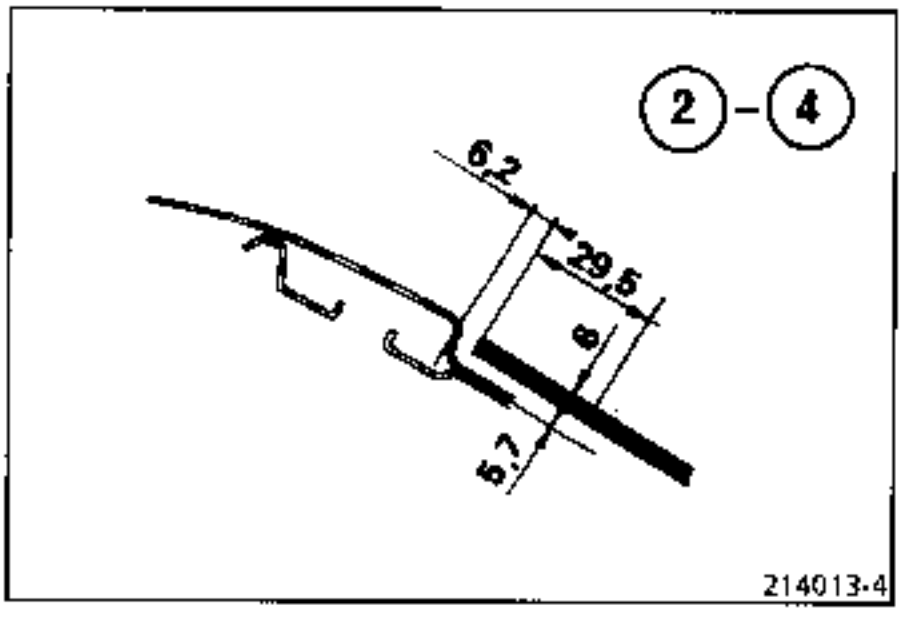
High tensile components

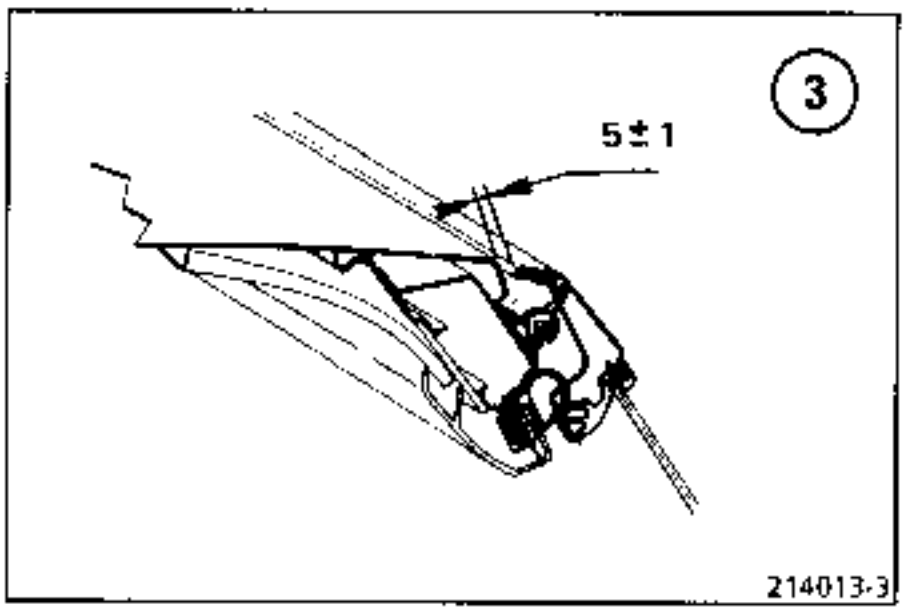
1 Front side member closure panel
2 Rear closure panel
3 Side cross member
4 Side member, rear section
5 Rear side member

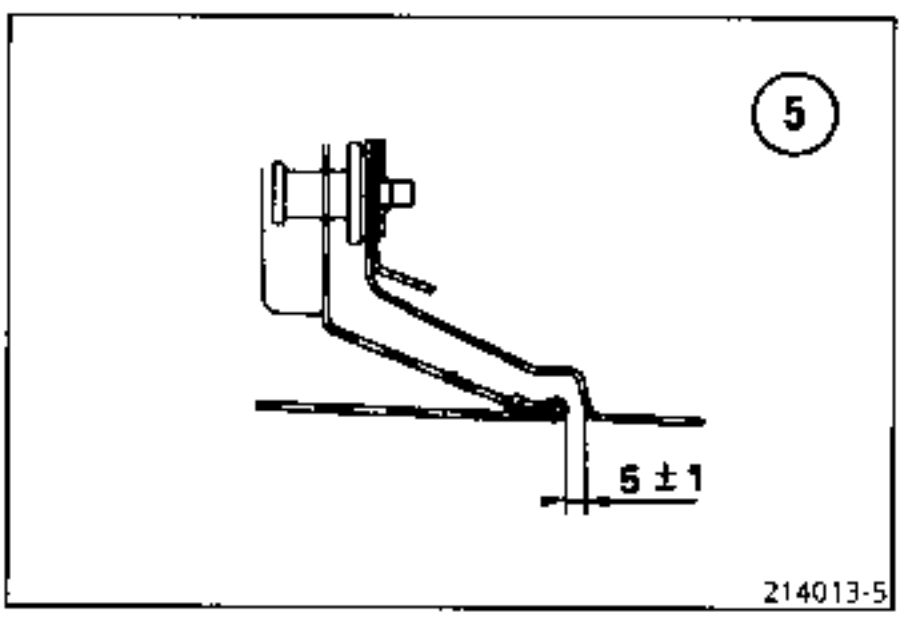


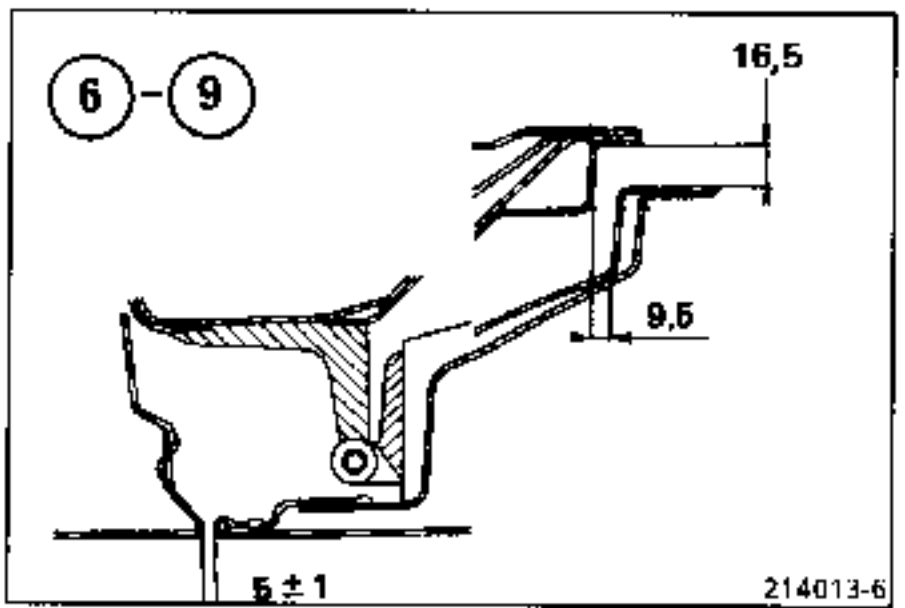

1
2
3
4
5
6
7
8
9
10
11
12
214013-1

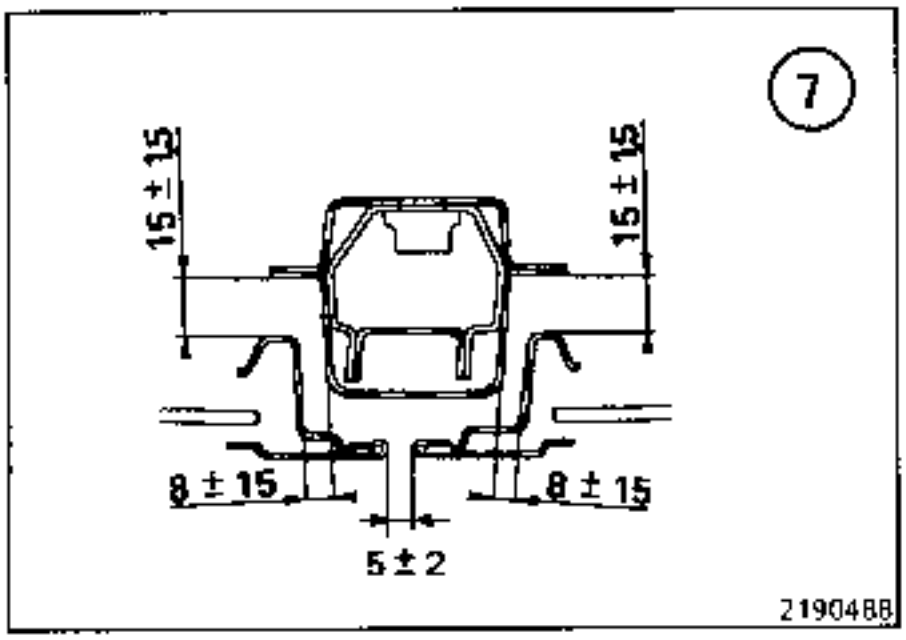

1
6 ± 1
214013-2

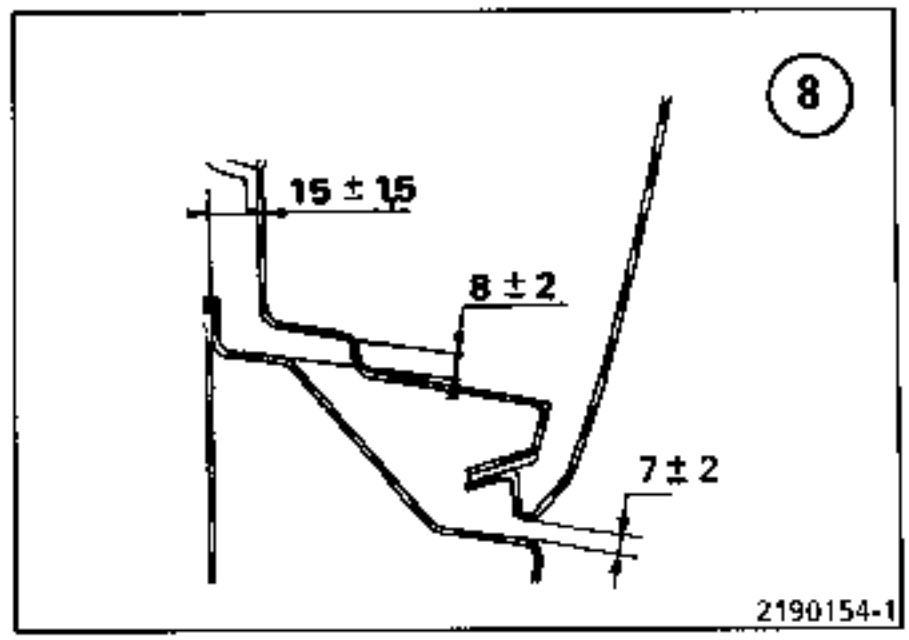

2 – 4
6,2
29,5
8
5,7
214013-4

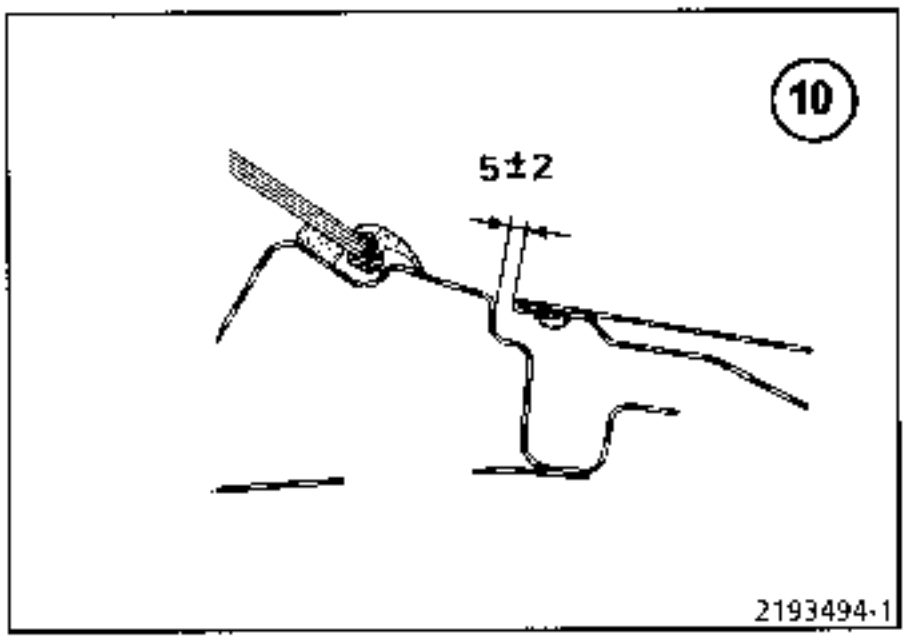

3
5 ± 1
214013-3

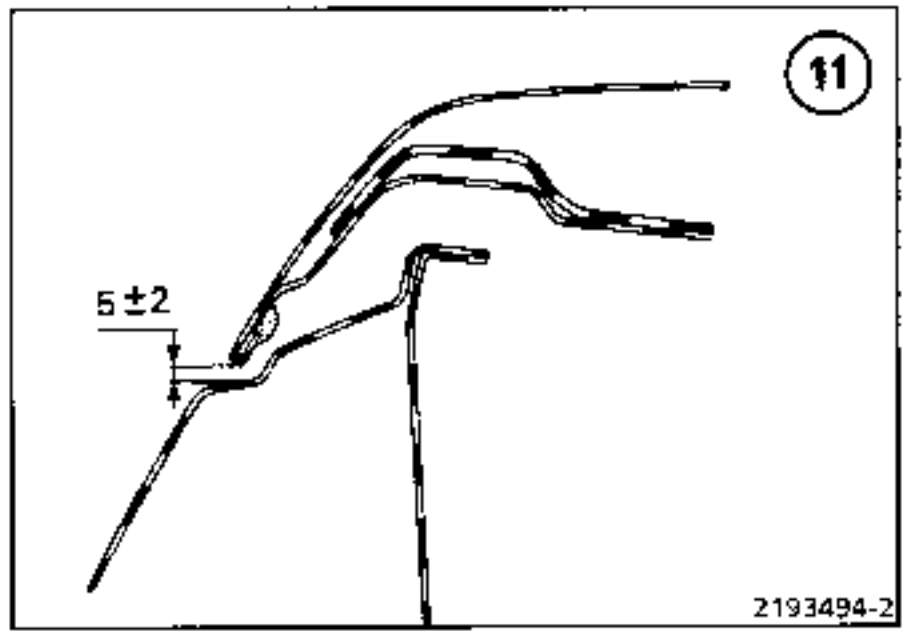

5
5 ± 1
214013-5

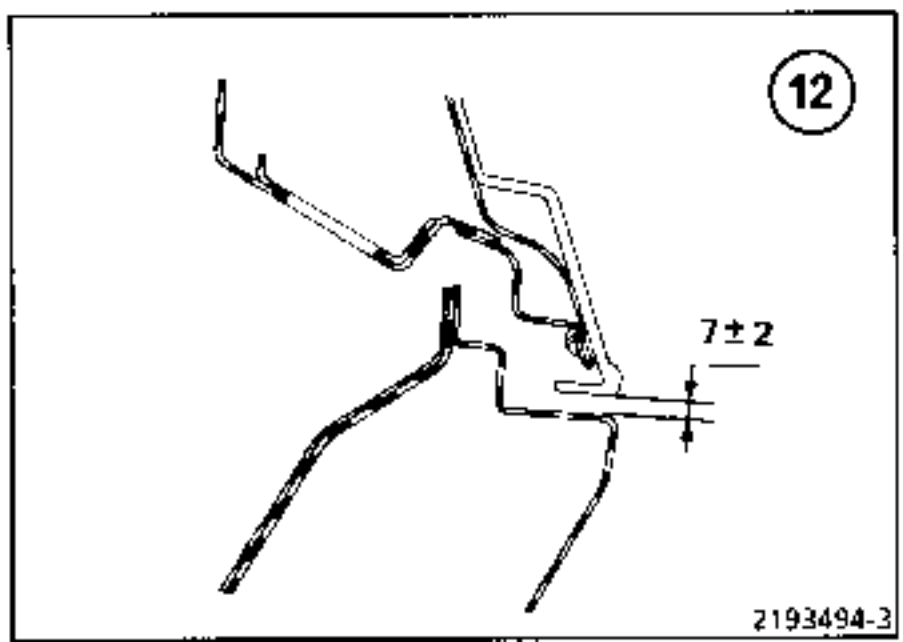

6 – 9
16,5
9,5
5 ± 1
214013-6


7
15 ± 15
15 ± 15
8 ± 15
8 ± 15
5 ± 2
2190488


8
15 ± 15
8 ± 2
7 ± 2
2190154-1


10
5±2
2193494-1


11
5±2
2193494-2


12
7±2
2193494-3



Chiselling.



Grind back beads or spot welds.
Straight grinding wheel with 75 mm diameter bakelite impregnated disc, thickness 1.8 to 3.2 mm.



Grind back spot welds.
20 000 rpm straight grinder with 10 or 16 mm diameter spherical burr.



Grind back spot welds.
Hardened steel bit. Speed of rotation 800 to 1 000 rpm.



Unpicking.



Cleaning surfaces to be welded.
100 mm diameter fibre disc.



Cutting with a saw.
Alternating pneumatic saw.



Cutting out part by grinding off flange or grinding back remaining traces of spot weld.
Angle grinder equipped with a rubber pad and a 120 to 180 mm diameter fibre disc grain size P36.



Unsoldering.

Dimensions and types of electrode to be used for given operations:



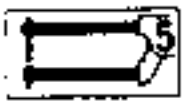
L = 100



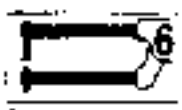
L = 100



L – 100 + flat

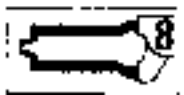


L = 250



L – 350





L – 230



MAG stitch weld
Note : to obtain a good quality weld we recommend the use of a gas consisting of argon - 15 % CO_2. This is considered to be an active gas (MAG).



Plug welding.
under MAG gas protection.

Injection a product for hollow sections.
Pressurised spray gun equipped with a flexible end piece with different ends.

Safety symbol.
This means that the welding operation in question concerns one or more of the vehicle's vital safety components.



Body solder.
Hot air torch.
Nozzle output temperature 600° min.
Slipper + 33 % tin solder + tallow.
Note : to a large extent, body solder filling compensates for the heat distortion caused by welding.



Application of weldable sealer.
This sealing mastic conducts electricity. When it is placed between two panels to be spot welded, it seals the joint and prevents the spot welds corroding.

Application of aluminium paint.
This is to be applied to the joint faces of each of the parts to be plug welded. The paint conducts electricity and is is resistant to high temperatures. It provides anti-corrosion protection around the plug welds.

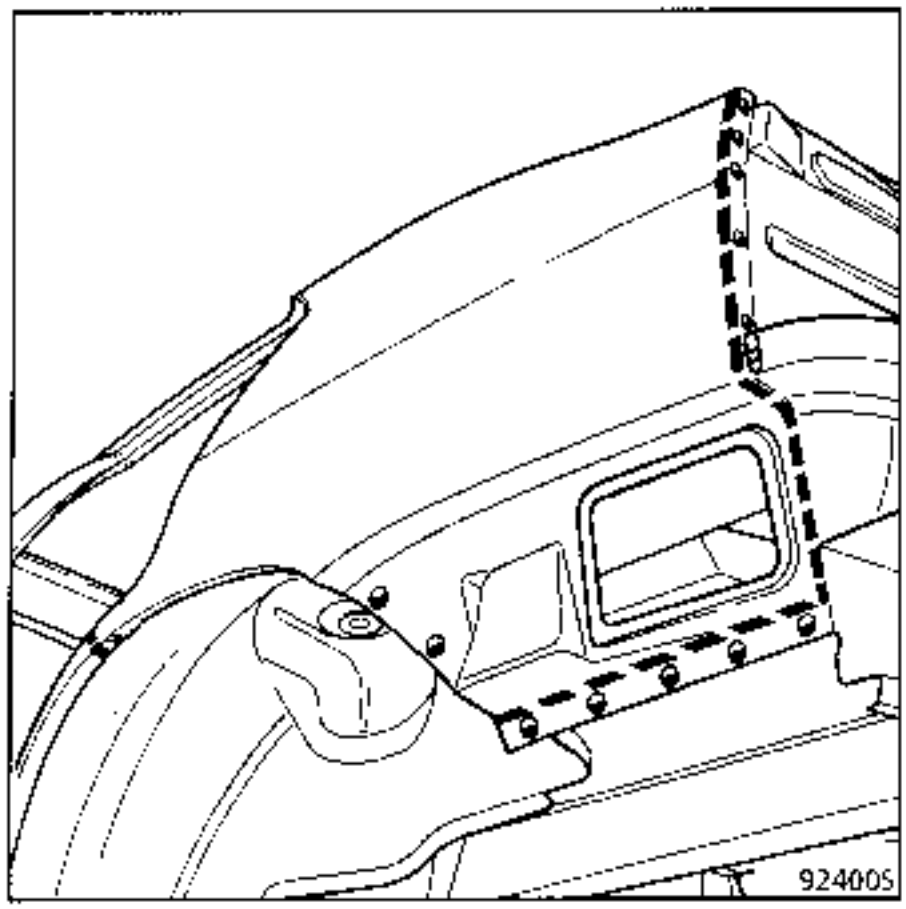


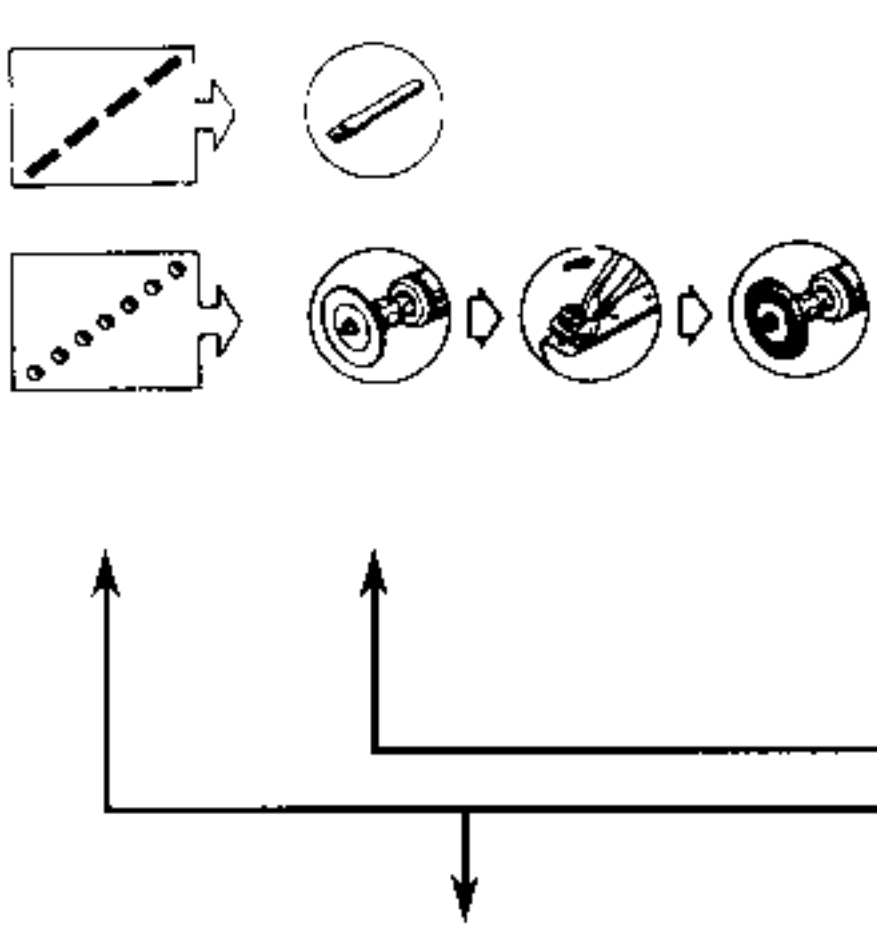
Apply a fillet of extruded mastic:
- from a manual or pneumatic spray gun.
- one or two pot mastic for crimped and butt joints.



Spray on sealer:
- spray gun.
- two pot anti-gravel and anti-corrosion mastic.

CUTTING OUT - UNPICKING



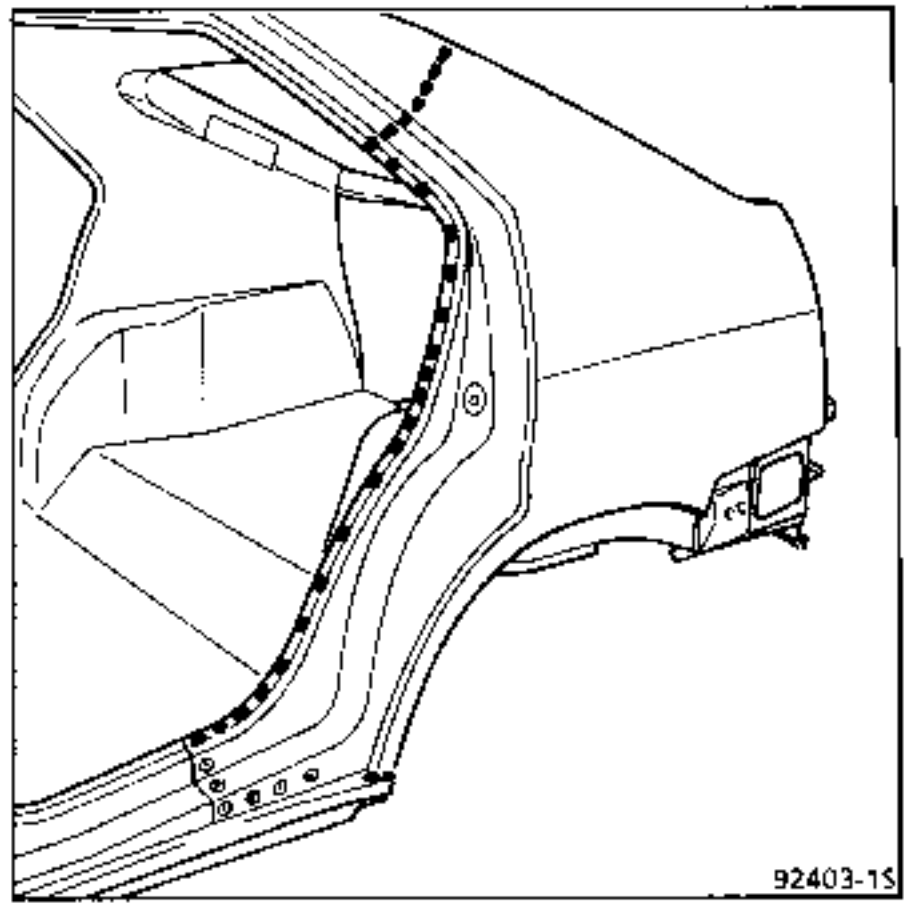


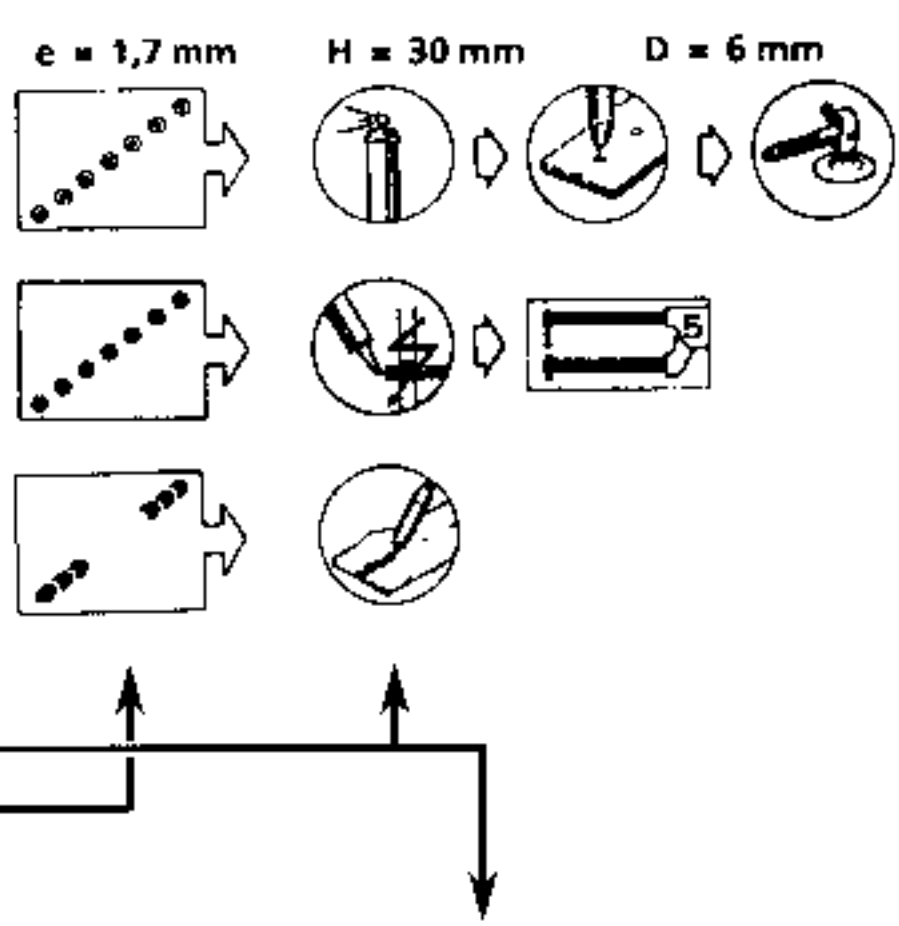
Operation symbols

This determines the type of operation and the exact point at which it is to be applied.

Note : The operations involved in unpicking the strip of steel remaining in place and grinding back the traces of spot weld remaining on the support panels can only be carried out after the part to be replaced has been removed entirely.

WELDING





Tool symbols

These show the type of tools and the logical sequence in which they are to be used at the various points concerned.

Note : the operations involved in protecting spot welds (weldable sealer and aluminium paint) are to be performed before the new part is fitted.

COLLISION FAULT FINDING

Before repairing the bodywork of a vehicle, even that which appears to have been only slightly damaged, a series of checks must be carried out:

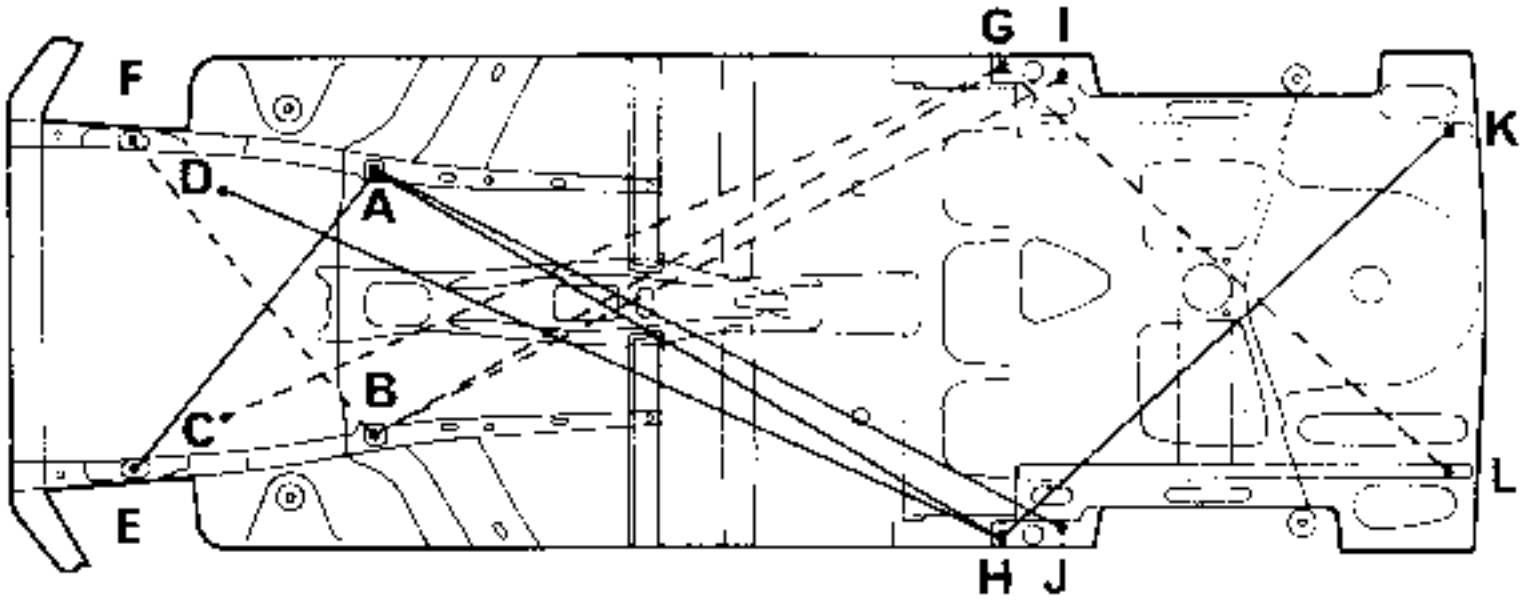
VISUAL INSPECTION

This inspection entails the examination of the vehicle sub-frame where mechanical components are mounted and in crumple zones or vulnerable areas to detect folds where materials have been deformed.

INSPECTION USING TRAMMEL GAUGE

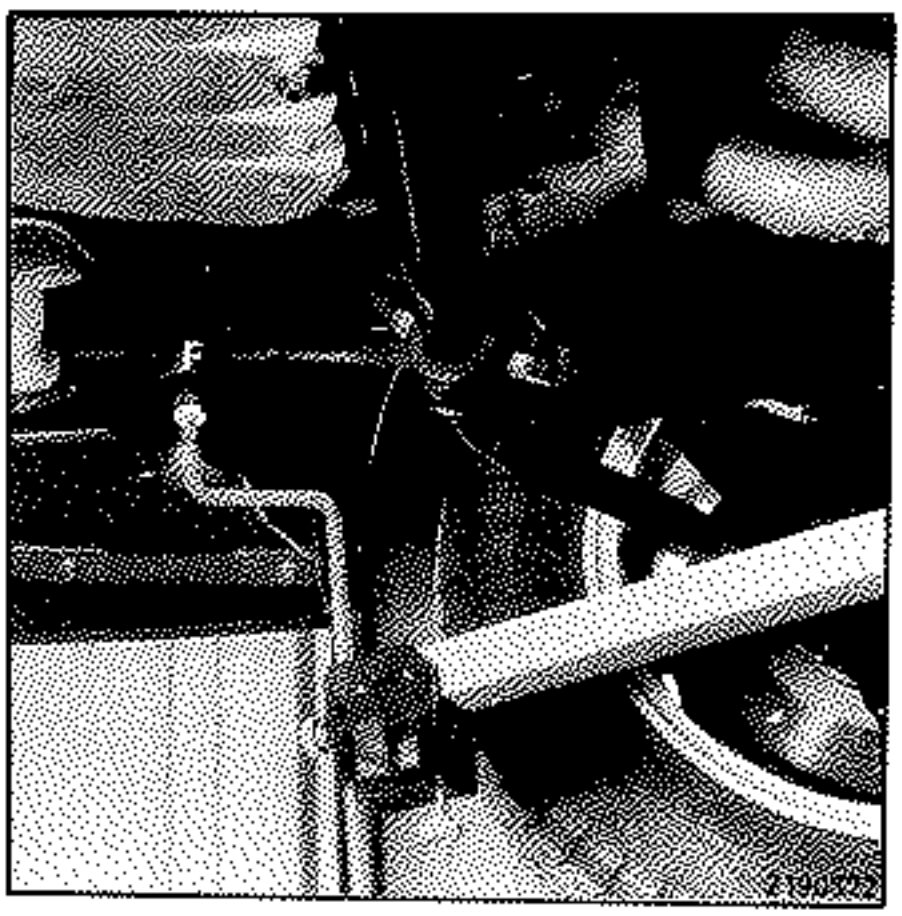
The visual inspection is completed by a check using a trammel gauge which allows measurement of certain deformations by symmetrical comparisons.

Examples of gauge points:

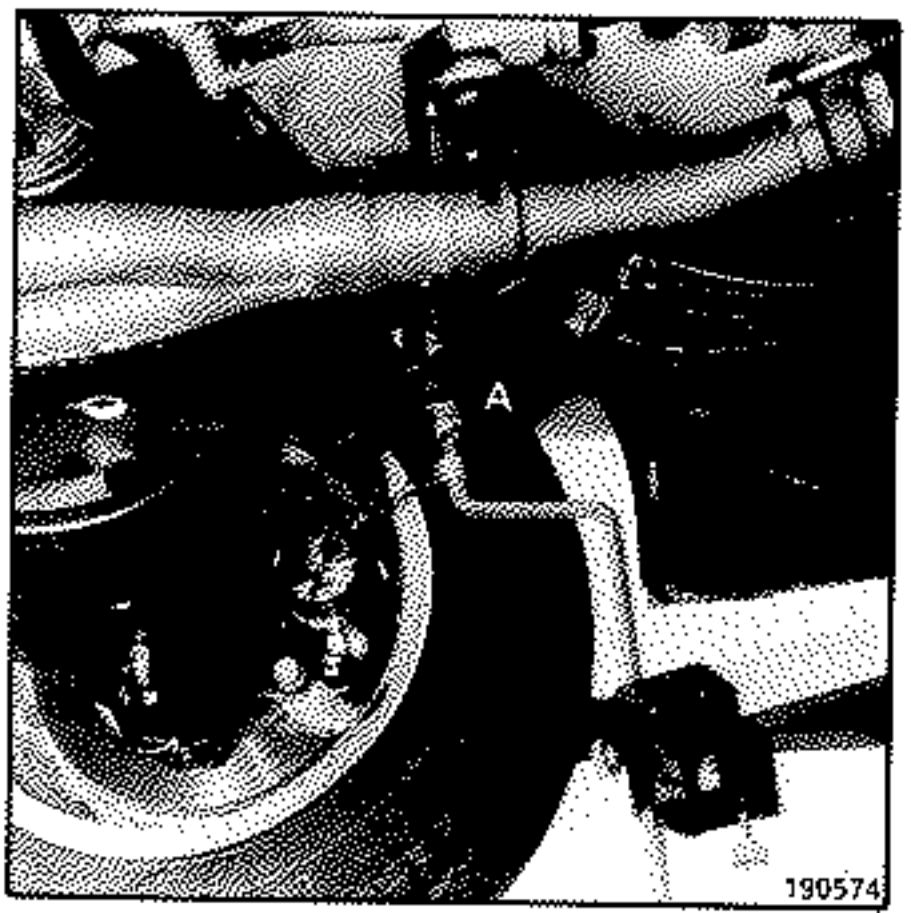


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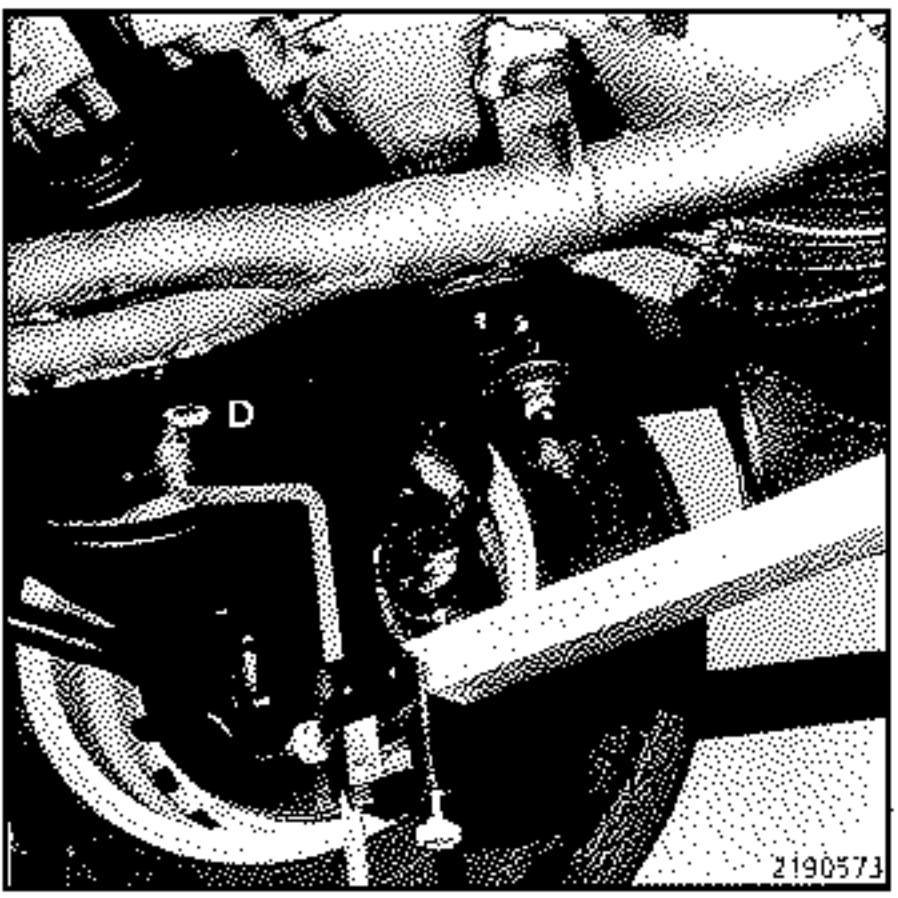
Points E and F



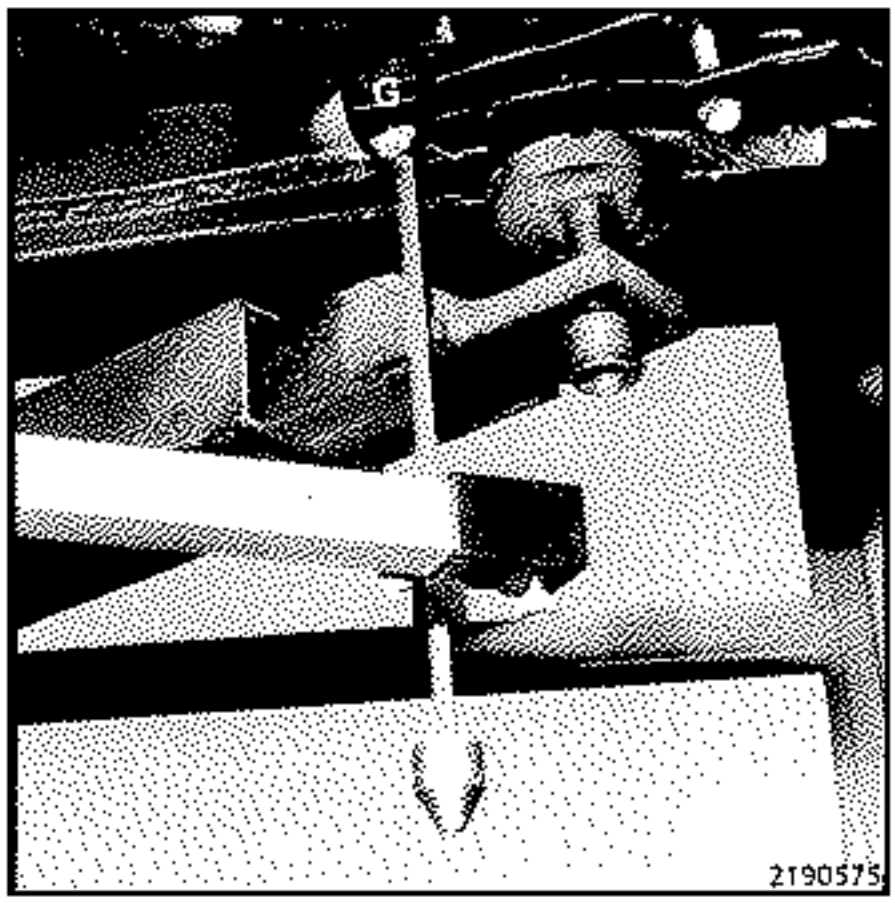
Points A and B



Points C and D

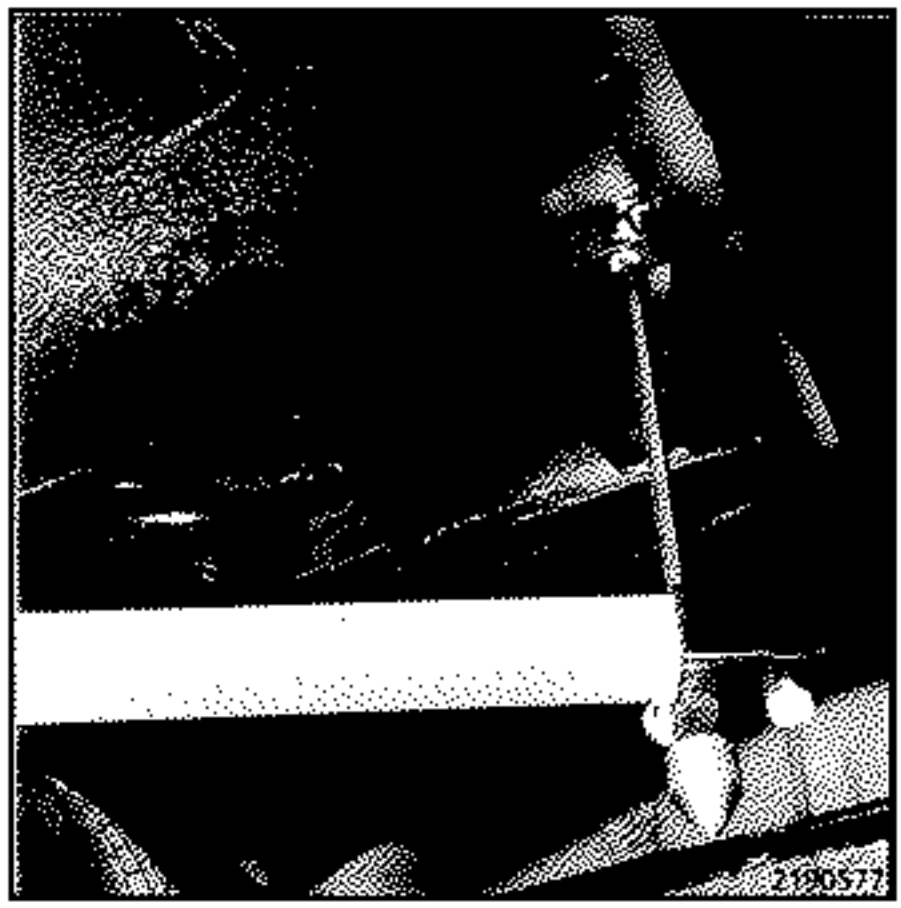


Points G and H



Points I and J

Points K and L

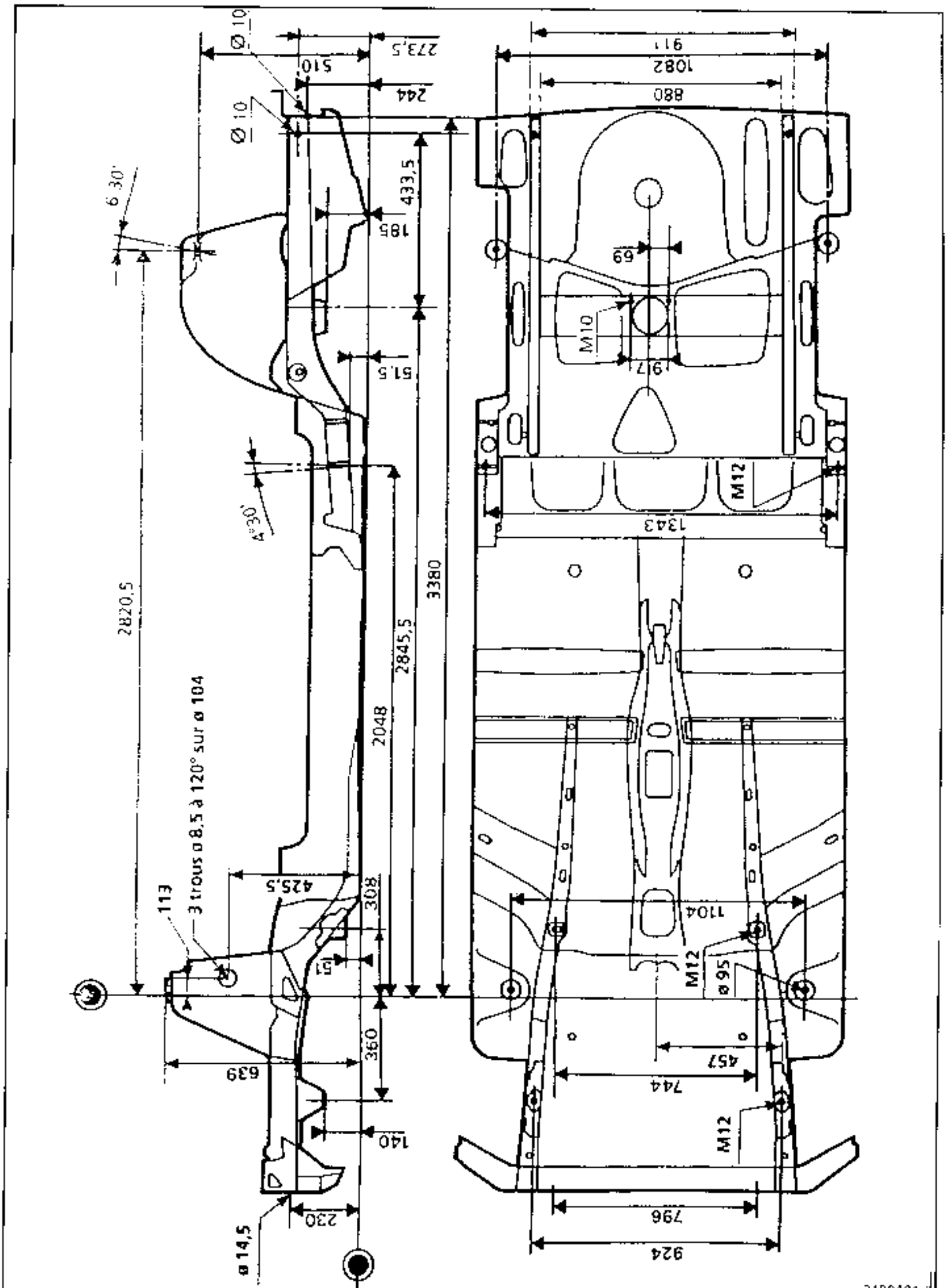


CHECKING THE GEOMETRY OF THE AXLE ASSEMBLIES

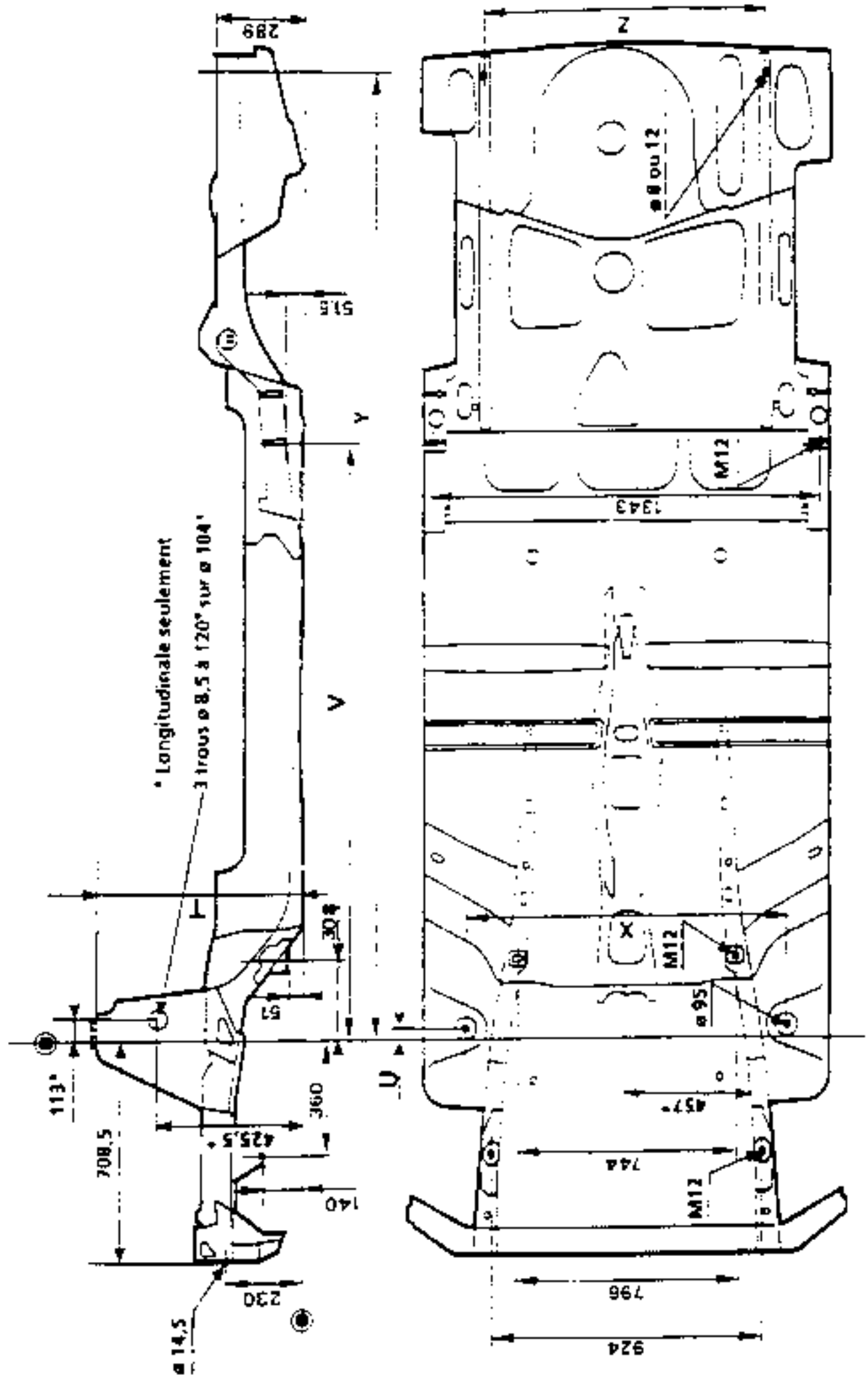
This is the only method of determining whether the impact the vehicle suffered has or has not affected the road holding of the vehicle.

Important : remember to check the components of the axle assemblies which may also have suffered deformation.

In principle, no welded component of the body should be replaced without having first ensured that the sub-frame was not affected by the impact.


Ø 10
273,5
510
244
Ø 10
911
1082
880
6°30'
433,5
185
69
M10
91,5
51,5
M12
1343
4°30'
2820,5
3380
2845,5
2048
3 trous ø 8,5 à 120° sur ø 104
113
425,5
308
15
1104
M12
ø 95
360
639
457
744
140
M12
230
796
ø 14,5
924

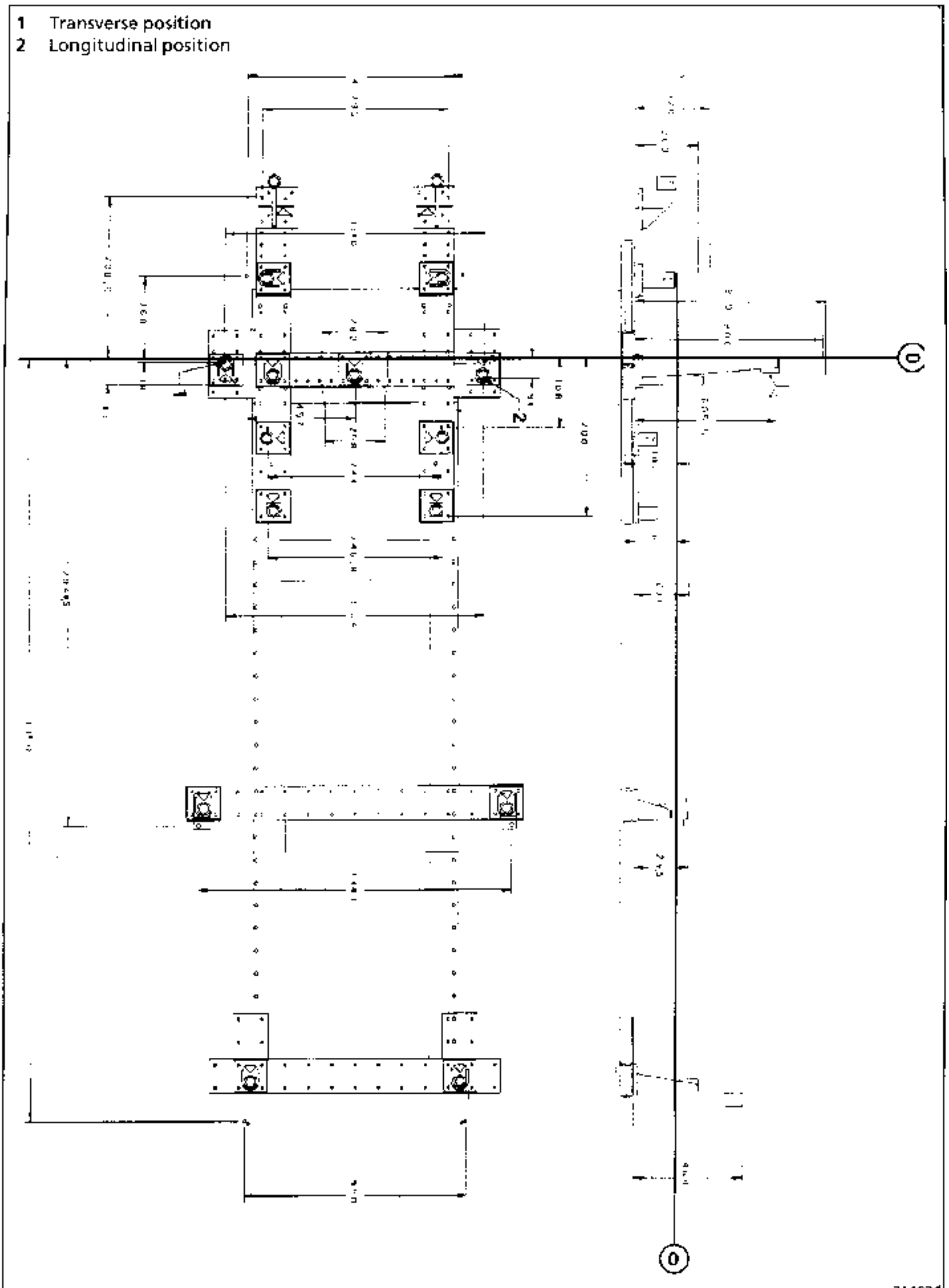
2190401-2



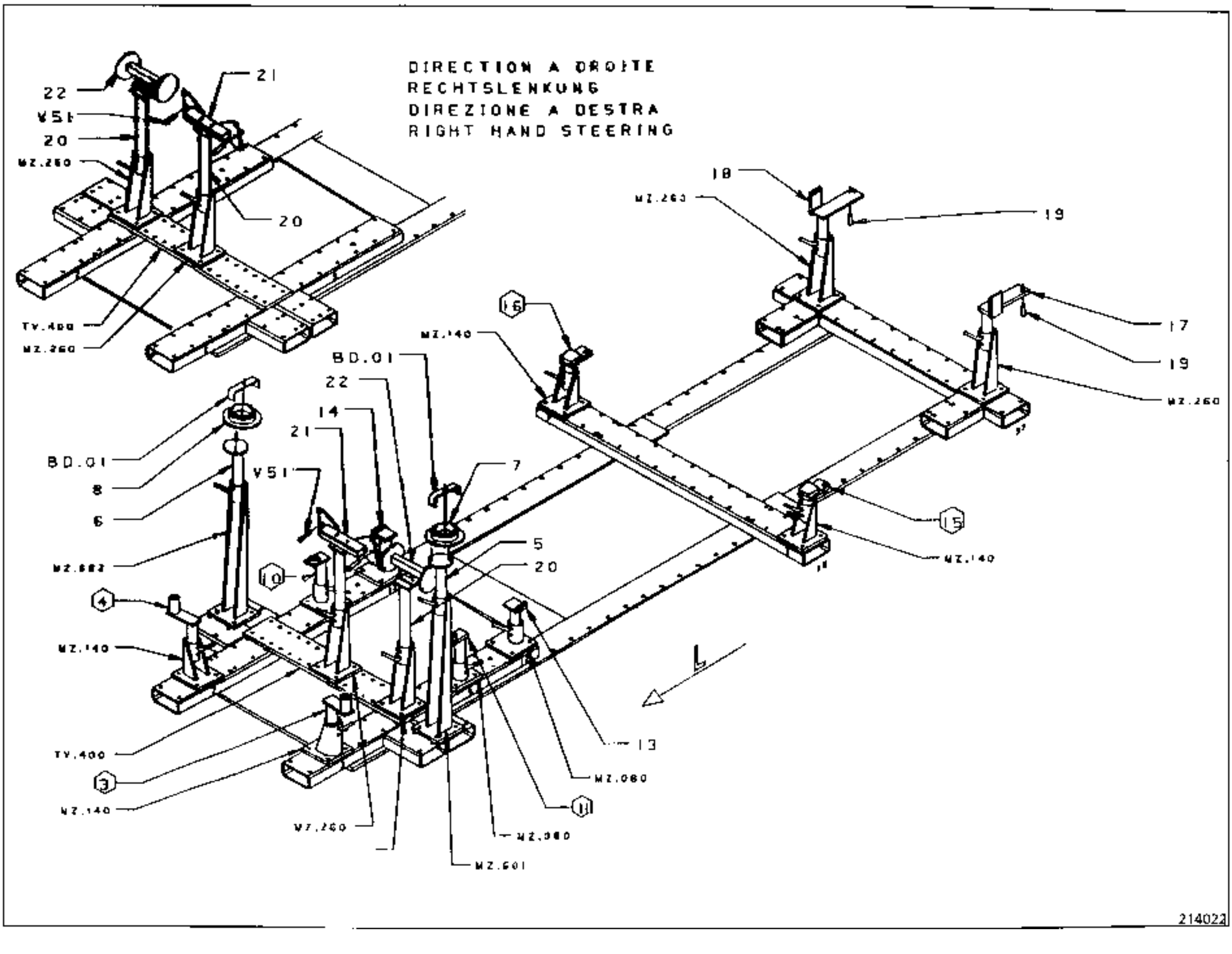
	T	U	V	X	Y	Z
Transverse	626	18	2048	1110	3350	950
In-line	639	91		1104		

2190401

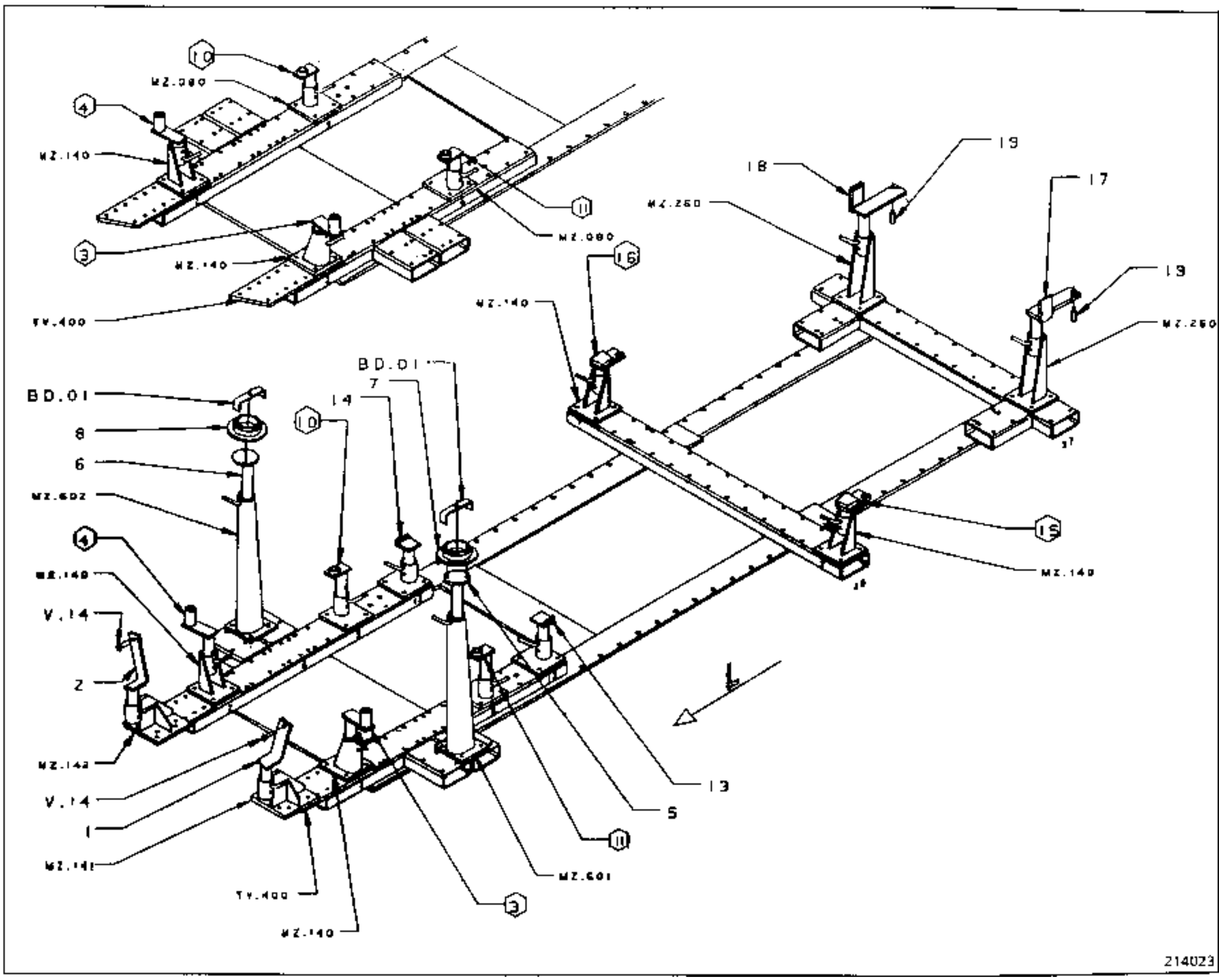
1 Transverse position
2 Longitudinal position



Fitting Célette brackets for in-line engines

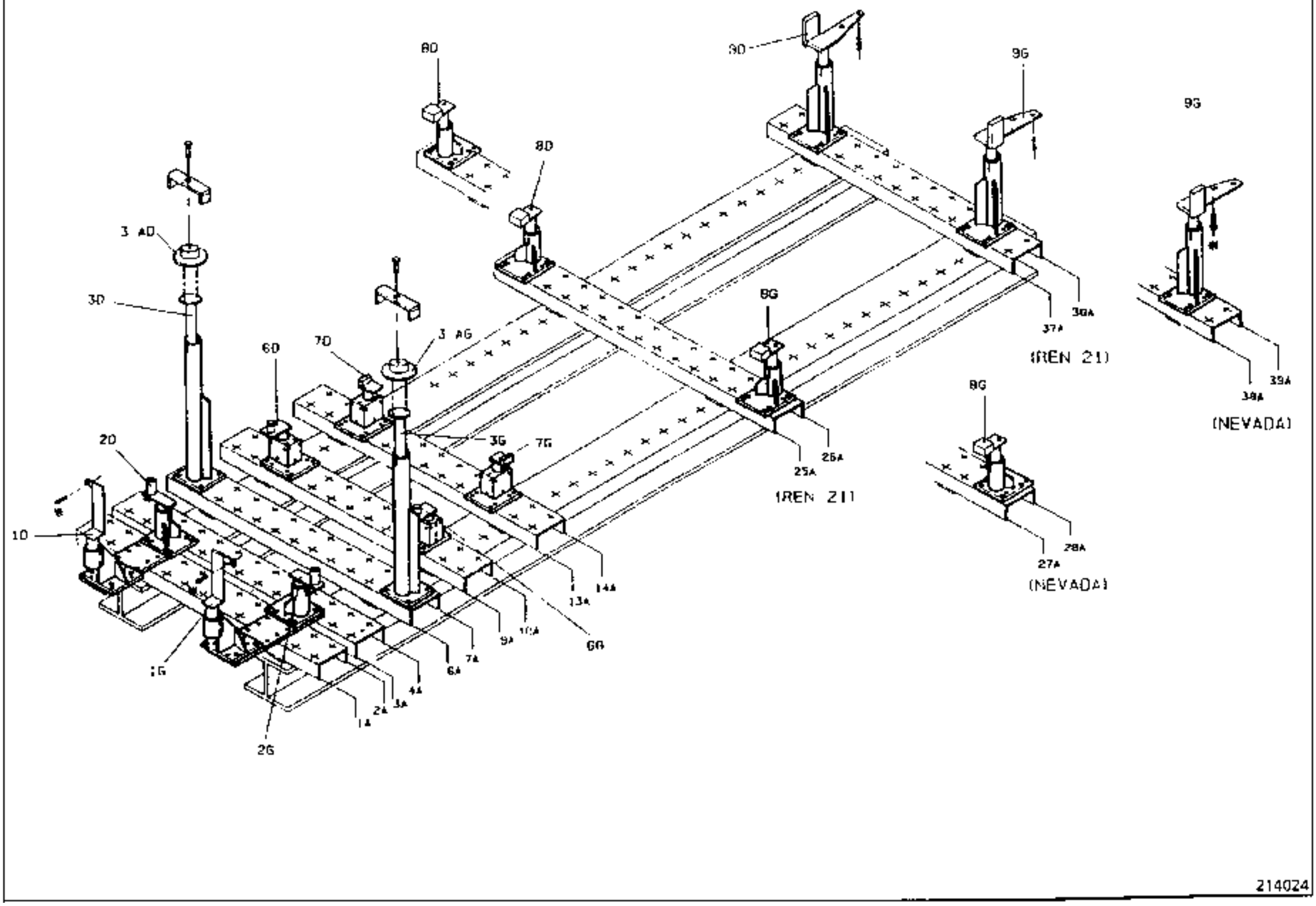


Fitting Célette brackets for transverse engines

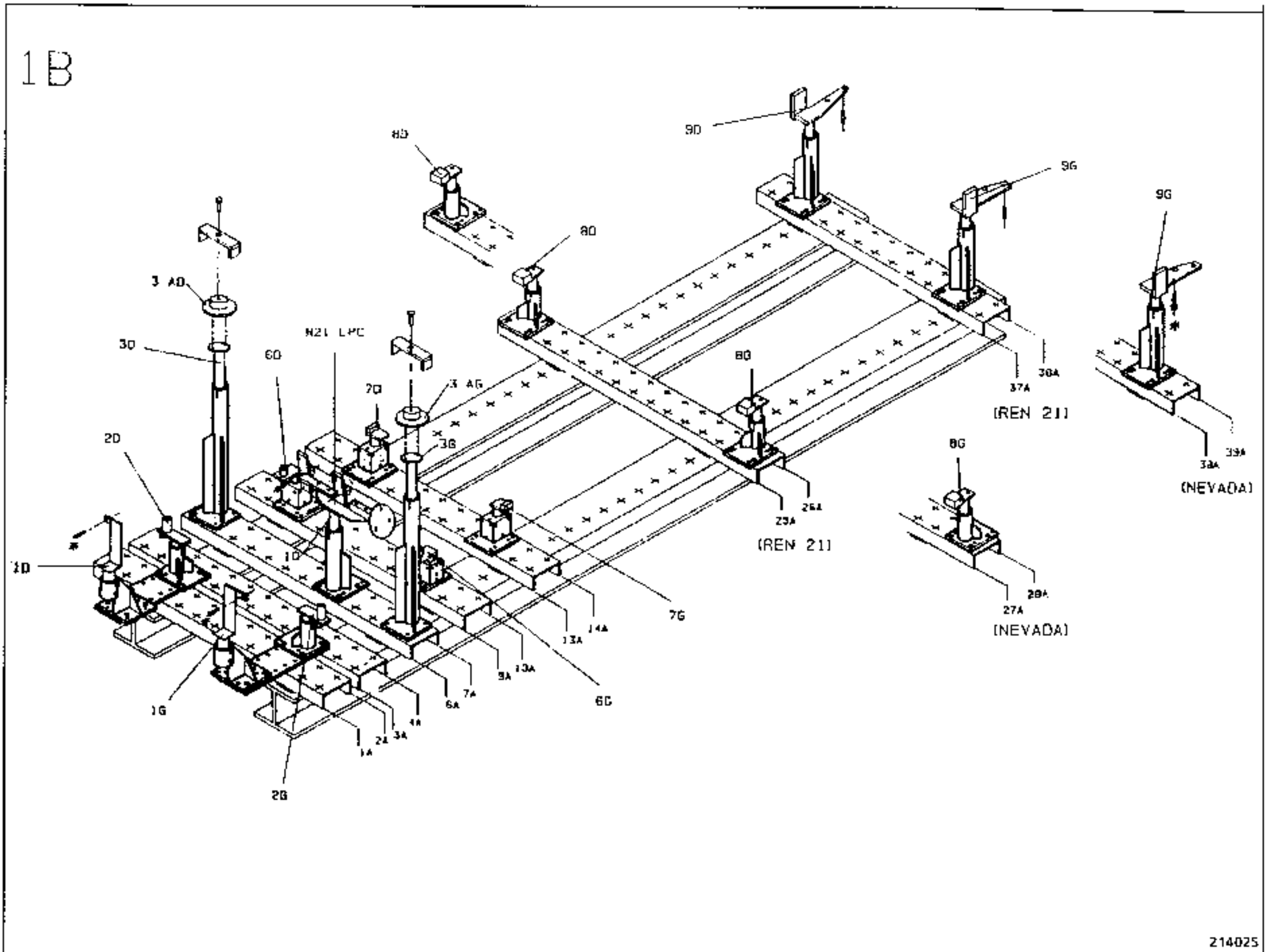


Fitting Blackhawk brackets for transverse engines

1B



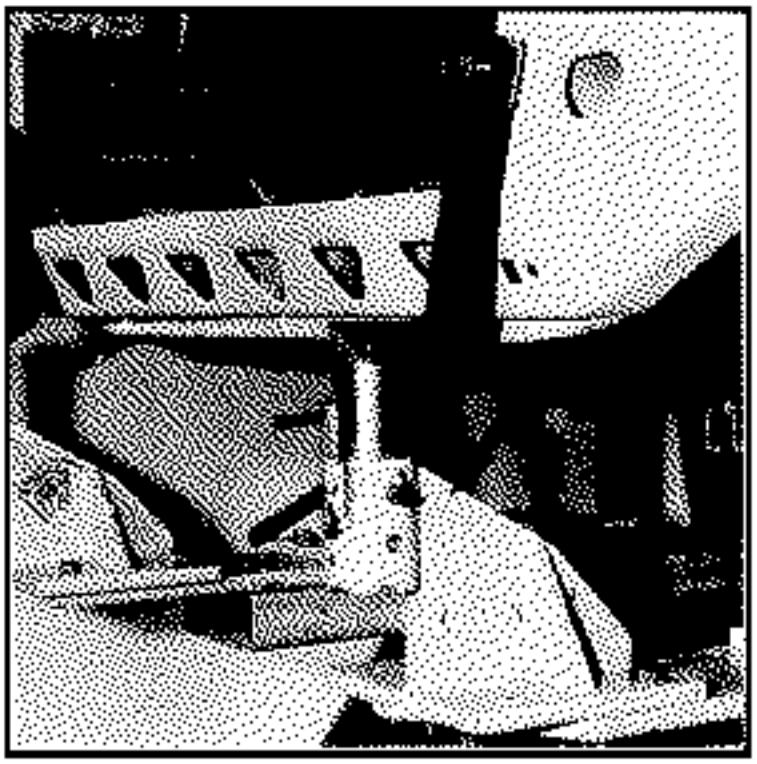
Fitting Blackhawk brackets for in-line engines



All types except 4 x 4

Front end lower cross member

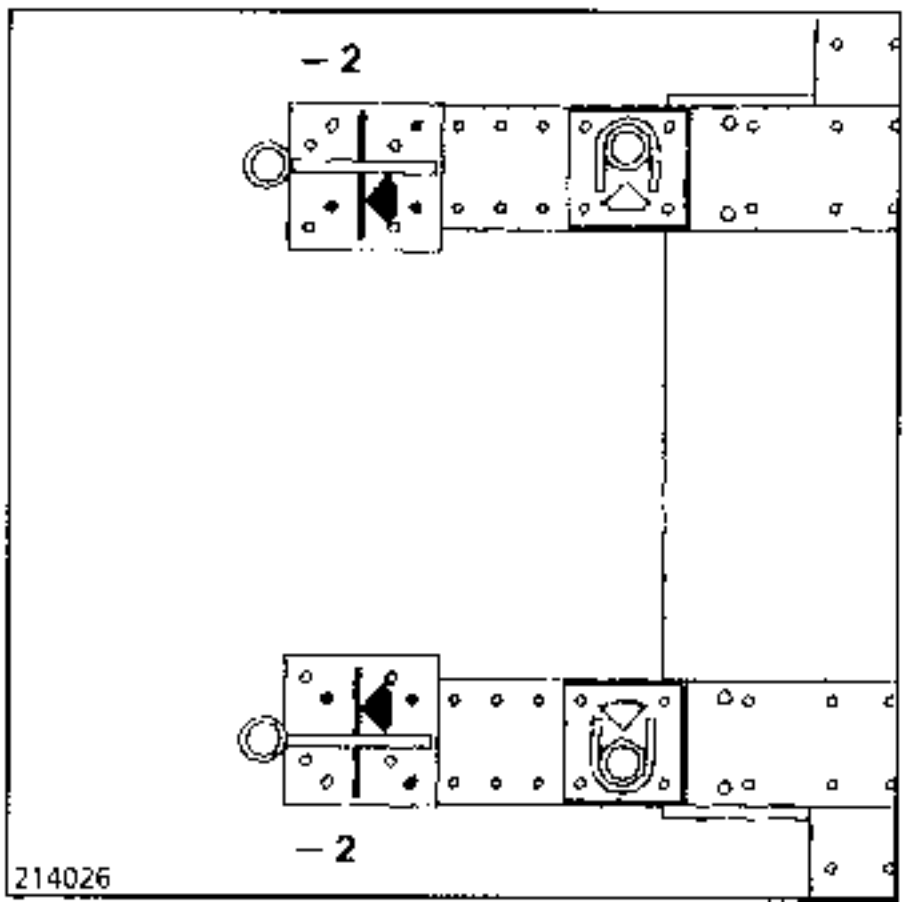
This bracket positions the front end cross member.
It is used mainly following a front end impact, after removal of the mechanical units.
It has no function when carrying out rear end repairs.



Bases **MZ 141** left hand side.
MZ 142 right hand side.

The special head is locked in the upper hole.

POSITIONING



Fit the two front modular cross-member extensions **TV 400** in position 2.

Position the bases **MZ 141 - MZ 142** on the front end extensions, in modular position space **N°** 2, with the arrows pointing forwards.

Sub-frame front mounting

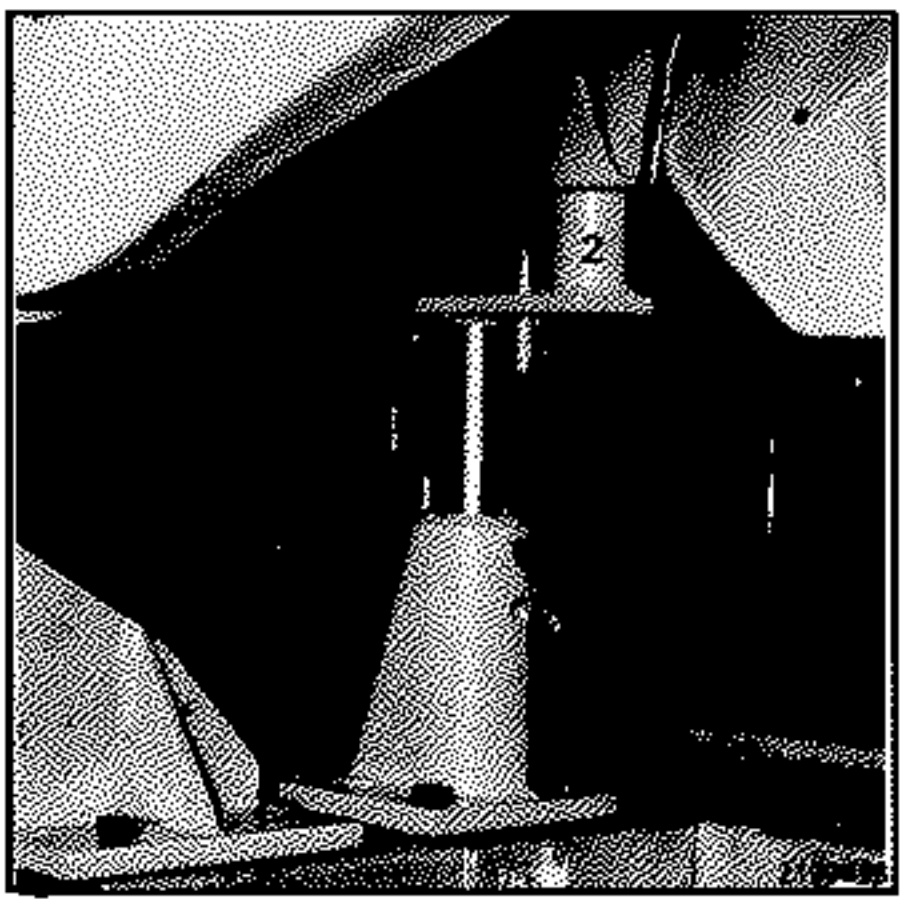
For front end impact repairs:

It is used to position the engine sub-frame front gusset.

It is fitted after removal of the front end mechanical units.

For rear end impact repairs:

It is used with the mechanical units in place and helps to align and centre the vehicle on the bench.

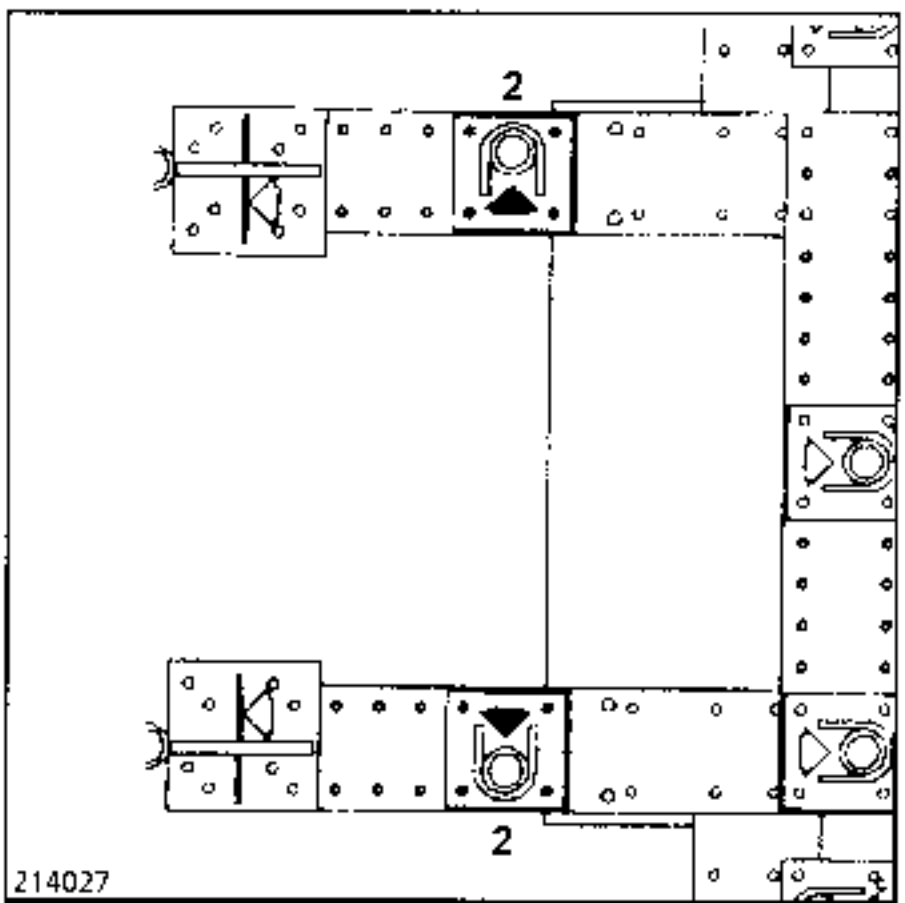


Following front end impact, mechanical units removed.
Base **MZ 140**.
The head is locked at the upper hole.



Following rear end impact, mechanical units in place.
Base **MZ 140**.
The head is locked at the lower hole

POSITIONING



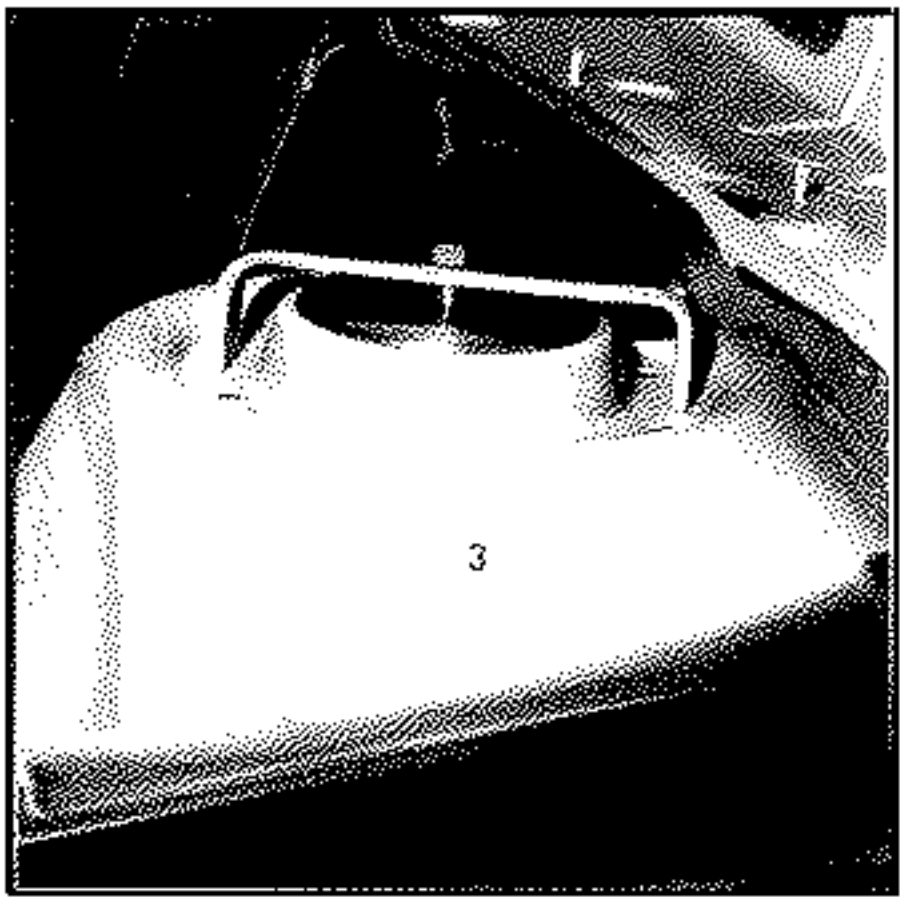
Fit the two modular front cross member extensions **TV 400** in position **2**.

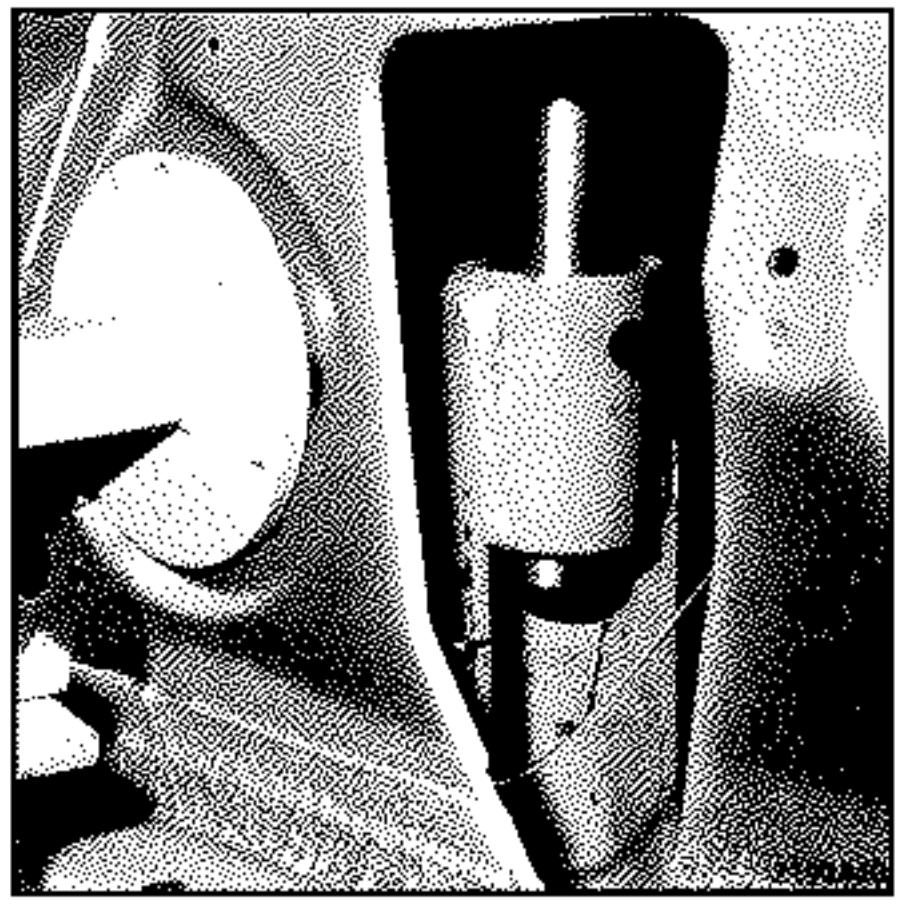
Position the bases **MZ 140** on the front extensions, in modular position space N° **2**, arrows pointing outwards.

Front shock absorber upper mounting

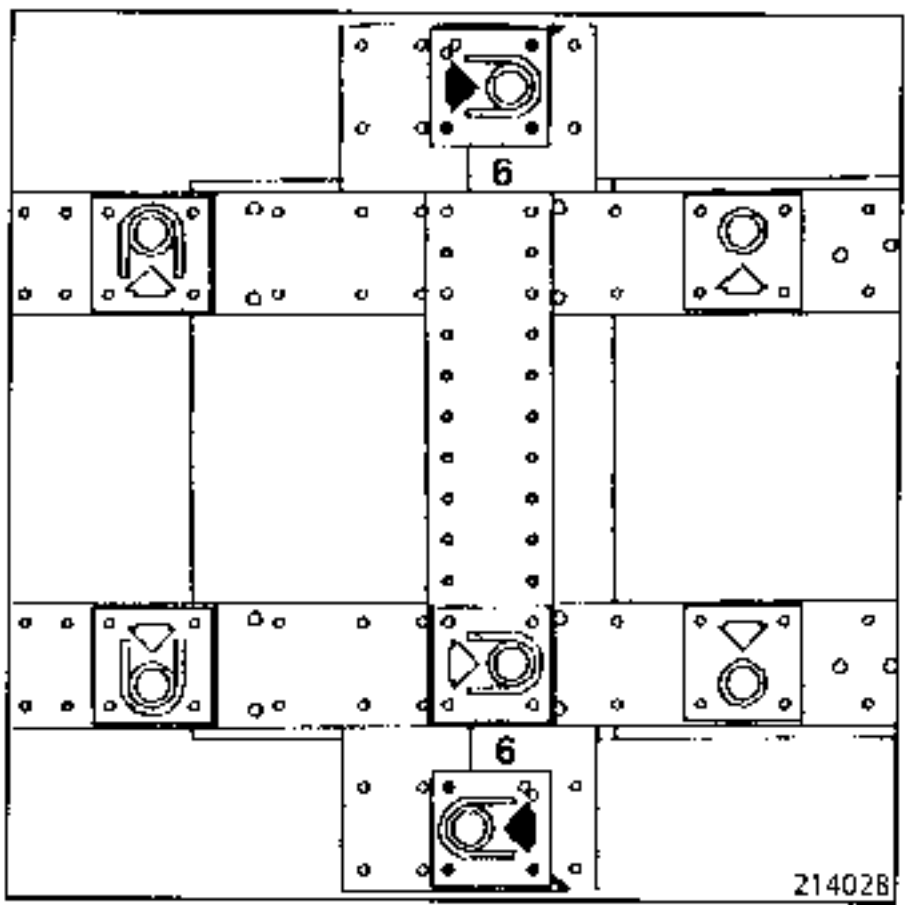
These are only used for front end impact repairs, with the mechanical units removed. They enable the shock absorber turret to be fitted when replacing a cowl side panel.

When jacking out a cowl side panel, unlock the bracket head to free the shock absorber turret.





POSITIONING



Position the bases **MZ 601** and **MZ 602** on the front cross member flanges at modular space **N° 6**, arrows pointing towards the rear for a version with in-line engine and towards the front for a version with transverse engine.

Each base is secured by 3 bolts.

Due to the complexity of fitting front suspension brackets and owing to the difference in engine arrangements for this vehicle (transverse and in-line), it is proposed that you obtain a second set of two special heads, consisting of two parts per side (support piston and thrust cup) which can be left permanently assembled for one of the two versions, the old set staying assembled for the other version.

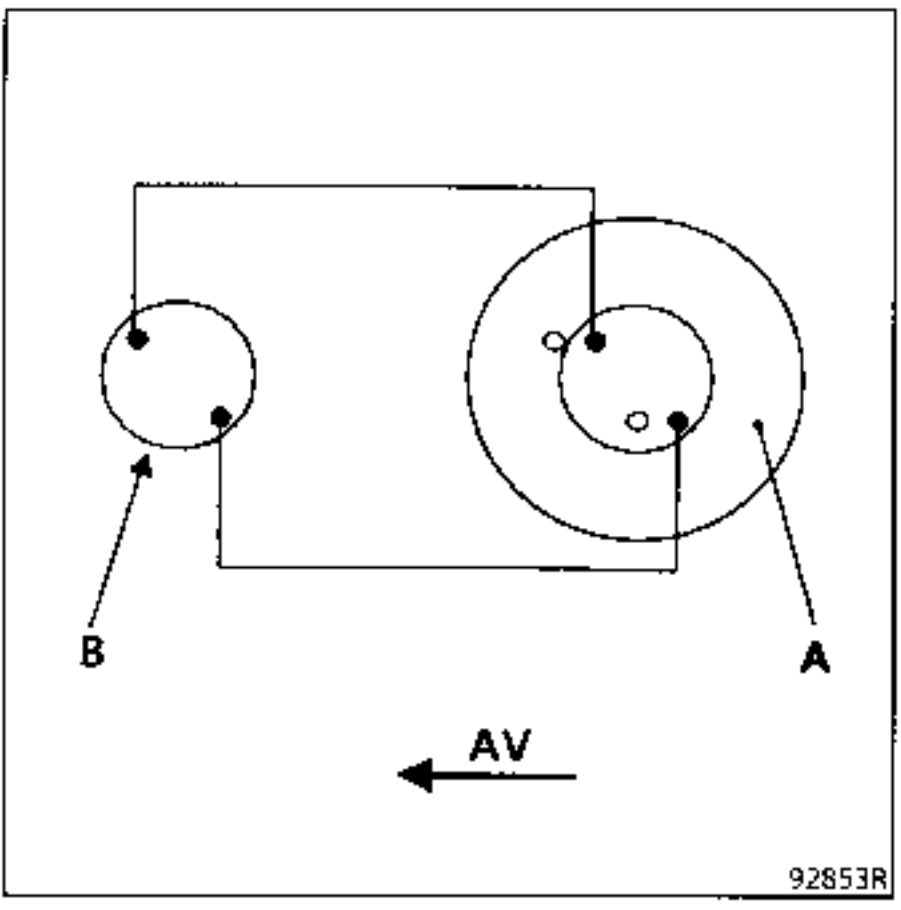
For this purpose you must order under one single Part Number : **Célette 486 LONGIT** a kit comprising:

- 1 LH and RH thrust cup,
- 1 LH and RH cup support piston
- 4 mounting bolts,

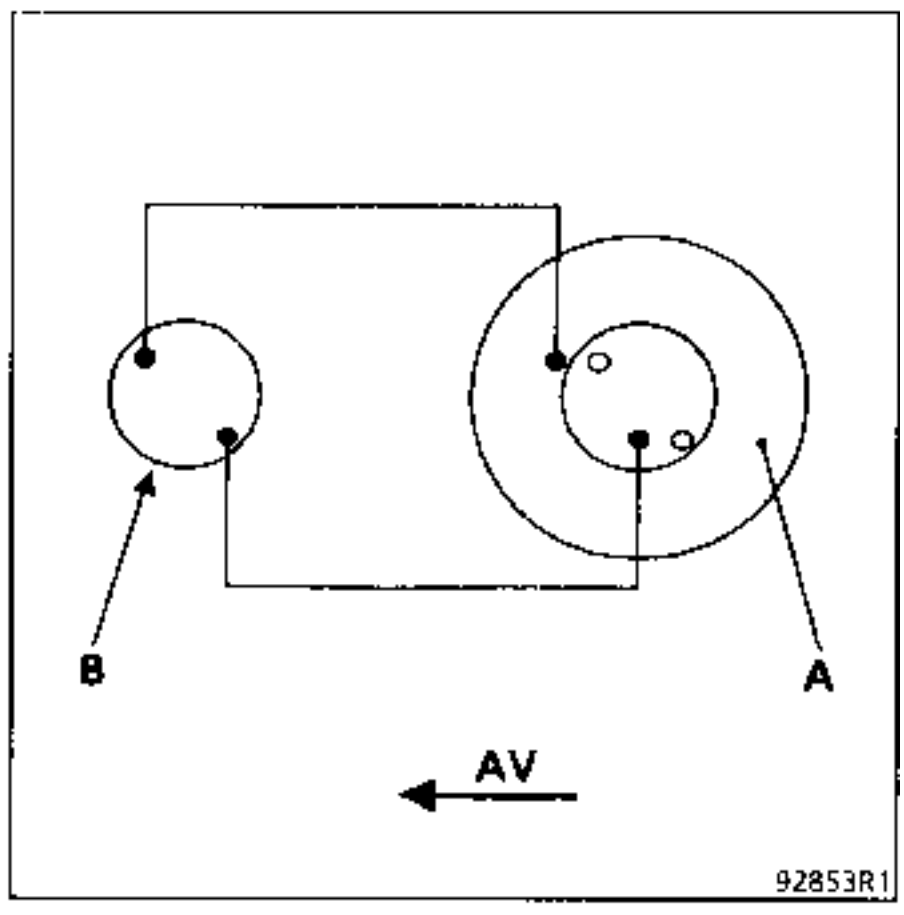
and in addition you will receive 2 plastic positioning cards (one per version).

ASSEMBLING THE PARTS

Transverse engine

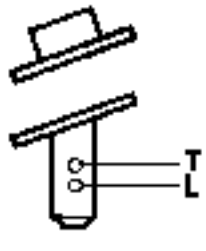


In-line engine



A Thrust cup

B Cup support piston



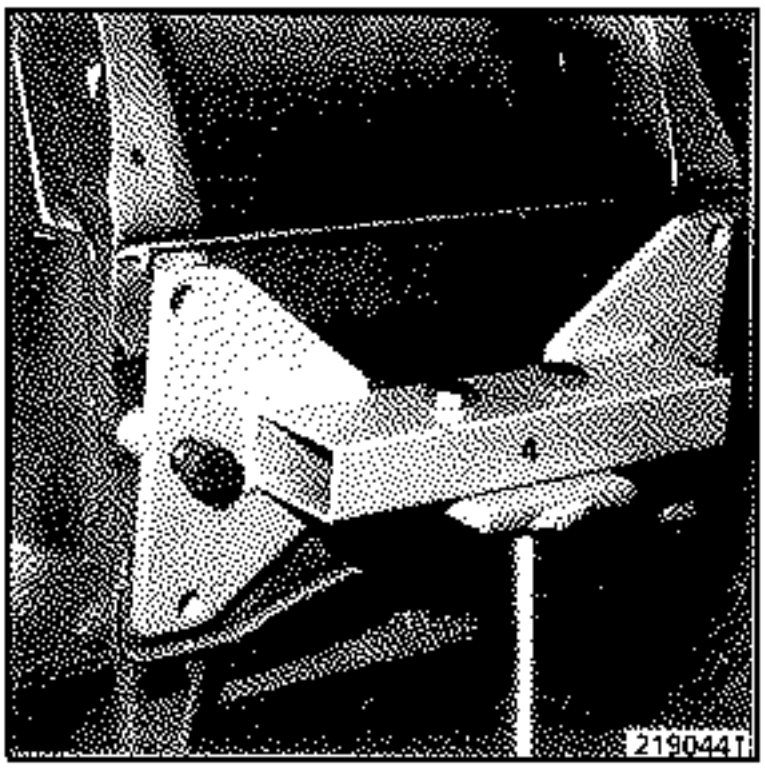
9285351

Steering box mounting

This bracket is only used for carrying out front end impact repairs on in-line engines after removal of the mechanical units.

It enables the positions of the steering box mounting holes to be checked.

It also positions the steering box mounting holes so that they can be drilled through when replacing the mounting on the bulkhead.

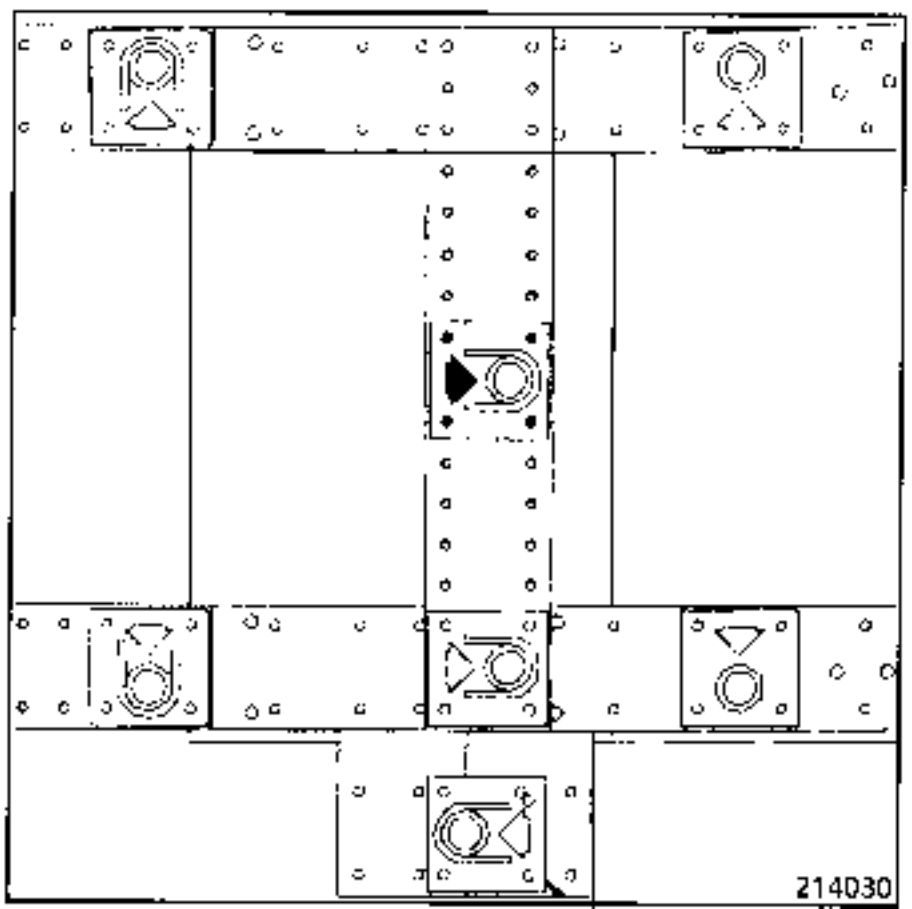


Use base **MZ 260**.

The special head is secured to the piston which is common to support **N° 5**.

Lock it at the upper hole.

POSITIONING



Fit the two extensions **TV 400** securing them at space **N° 6** on the front cross members.

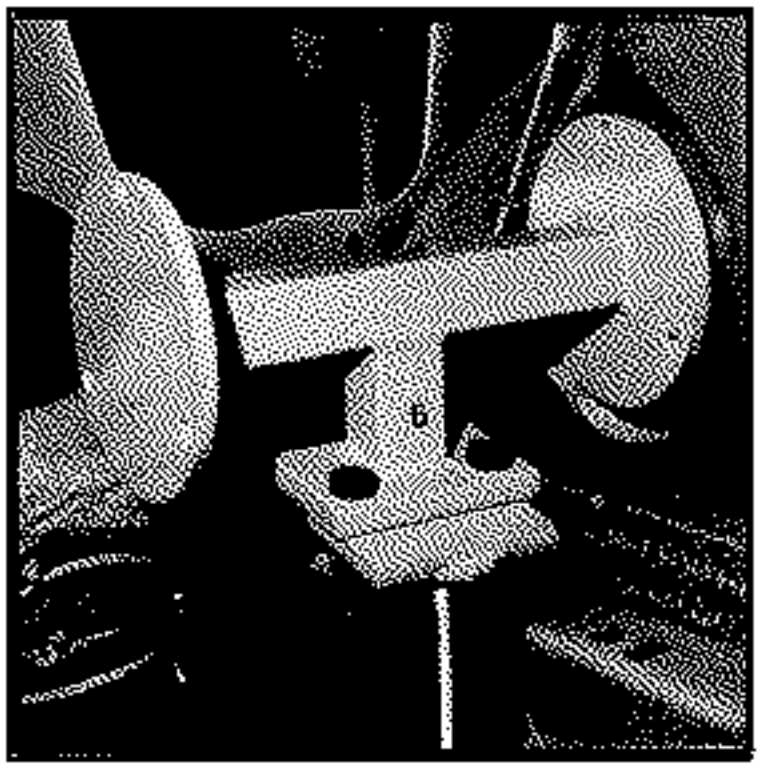
Align base **MZ 260** with the centre line of the vehicle.

The arrows are to point to the rear.

This bracket is only used for front end impact repairs on in-line versions, after the mechanical units have been removed.

It enables the position of the steering swivel lever cup which is welded to the cowl side panel to be checked.

It positions the swivel lever cup so that it can be welded in place when a cowl side panel is replaced.

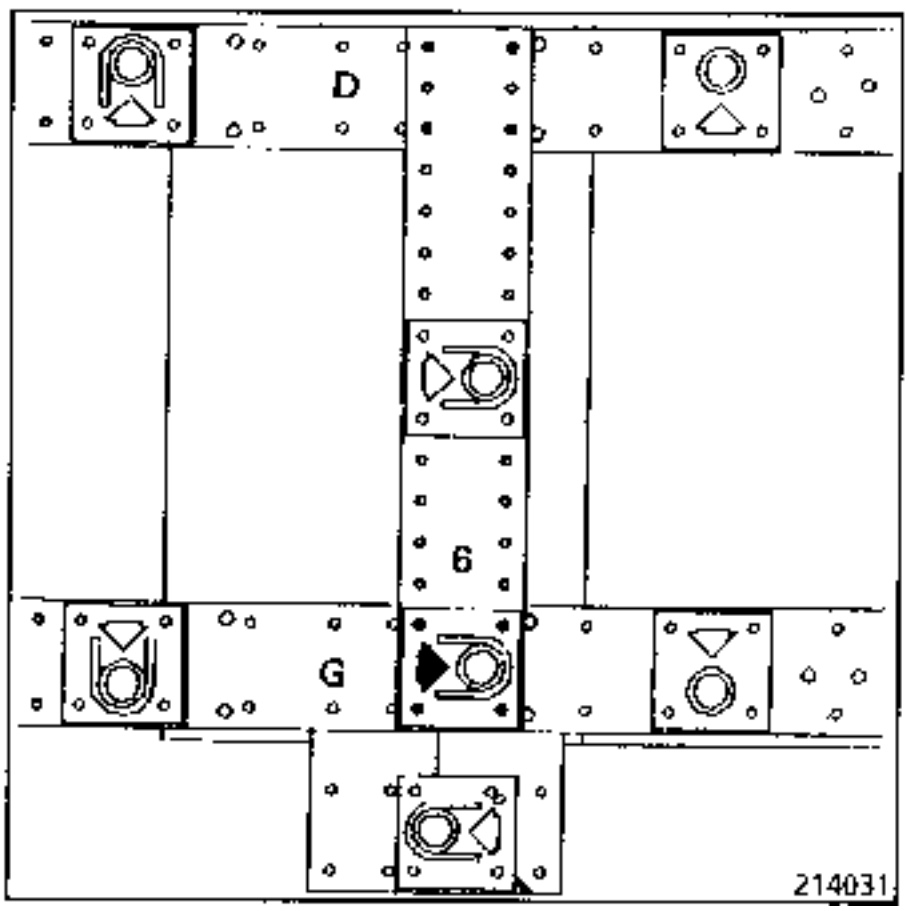


Use base **MZ 260**.

The special head is secured to the piston which is common to support **N° 4.**

It is locked in the upper hole in the piston and the lower hole in the base.

POSITIONING



Fit the two extensions **TV 400** at space **N° 6** on the front cross members.

Position base **MZ 260** at space **N° 6** :

- on the left hand side for **left hand drive** vehicles,
- on the right hand side for **right hand drive** vehicles.

The arrows should point towards the rear.

Note : when base **TV 400** is not used, the assembly is locked at the lower hole in the piston.

Sub-frame rear mounting

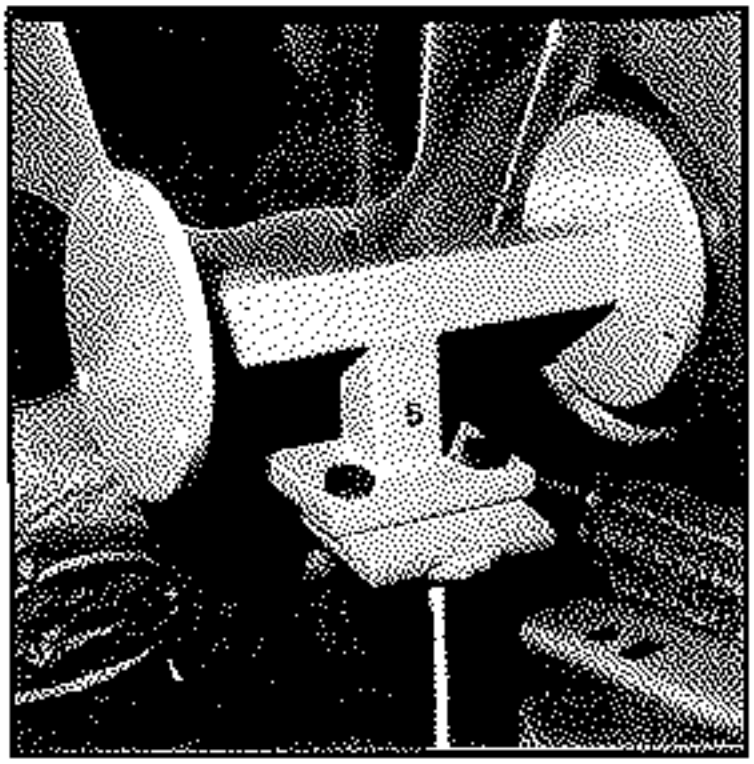
For front end impact repairs:

It positions the engine sub-frame front gusset.

It is used after removal of the front mechanical units.

For rear end impact repairs:

It is used with the mechanical units in place. It helps to centre and align the vehicle on the bench.

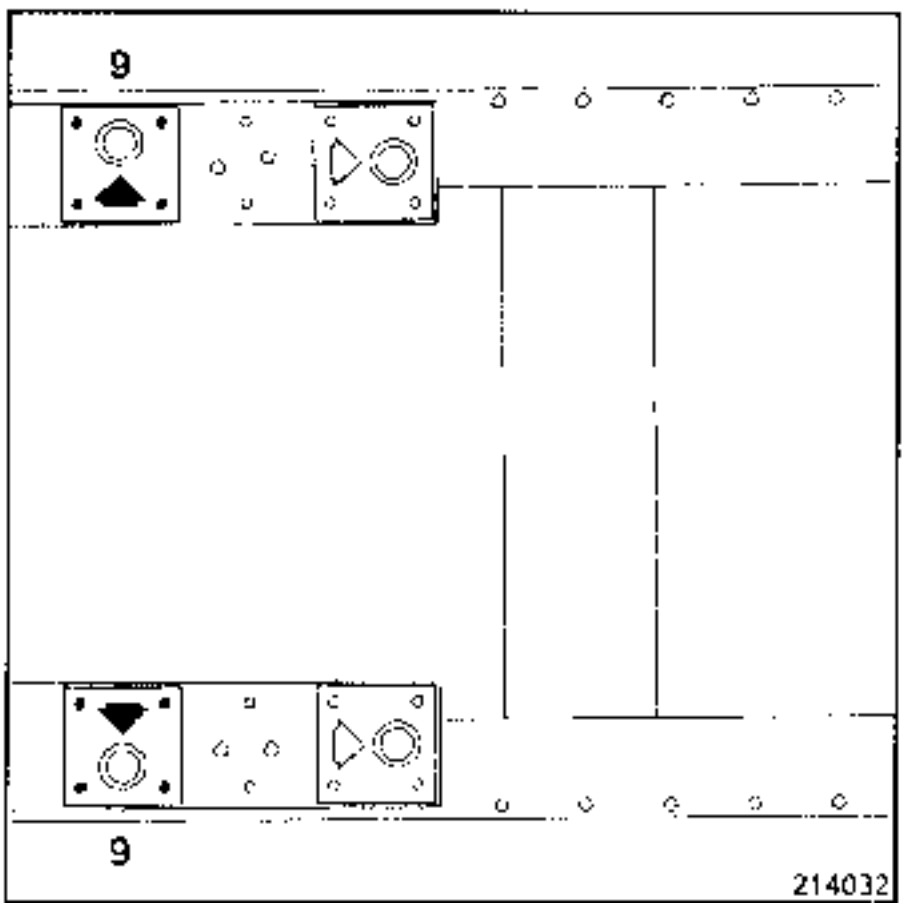


Bases **MZ 080**.

The head is locked in the upper hole in the base.

The position with the mechanical units in place, or after removal of the mechanical units, is determined by the two holes in the piston.

POSITIONING



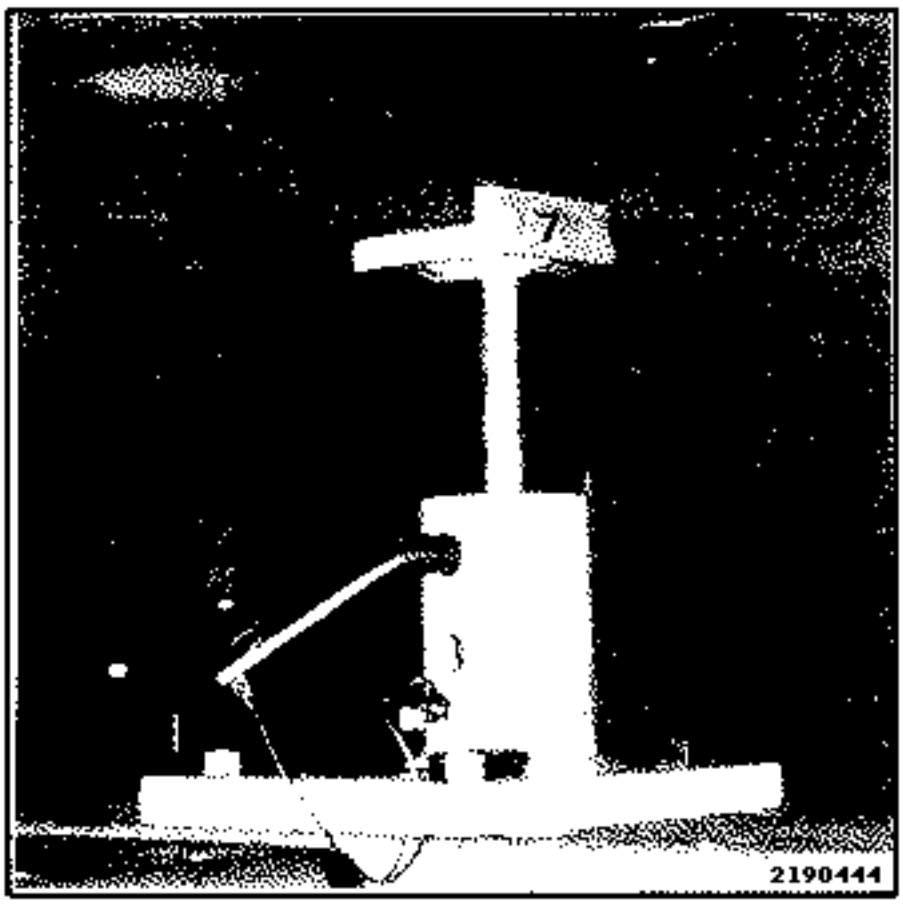
Position the two bases **MZ 080** at modular space **N° 9** on the front cross members.

The arrows are to point outwards.

Front side member rear end

This bracket supports and locates the rear part of the front side member.

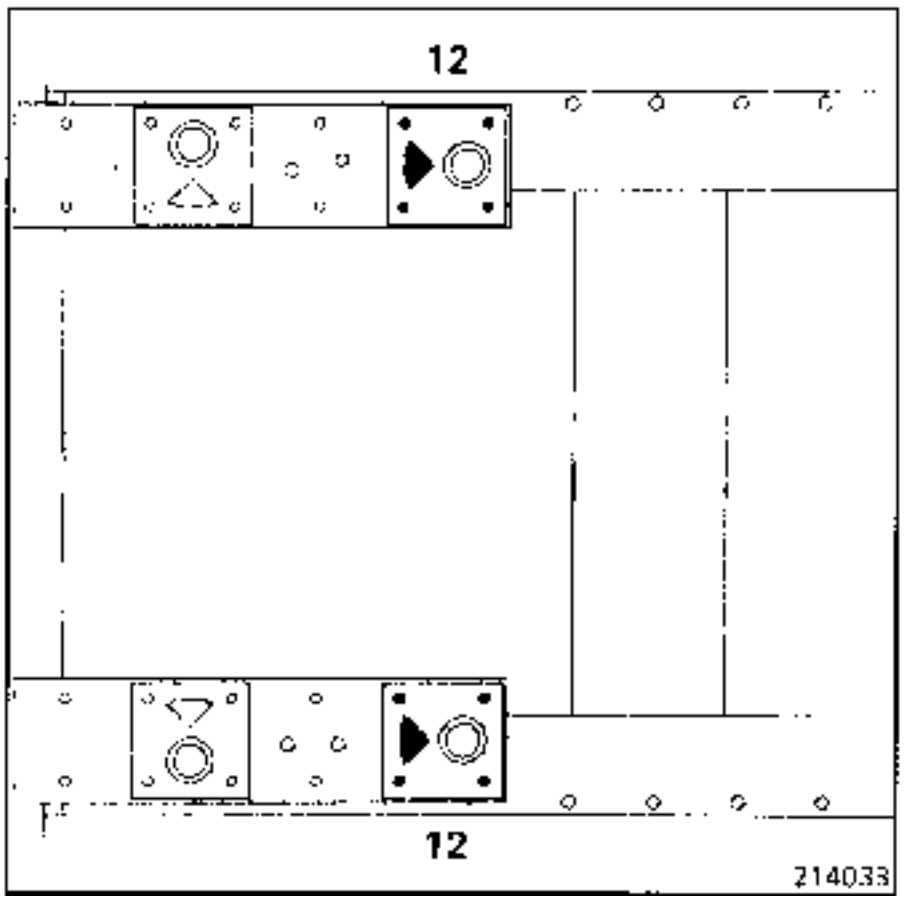
It is used in all cases whether the mechanical units are in position or not and whether the impact damage has been at the front or at the rear.



Use two bases **MZ 080**.

Only the upper hole is to be used for locking the head.

POSITIONING



Fit the bases **MZ 080** to the ends of the front cross members at space N° **12**.

The arrows are to point towards the rear.

Rear axle assembly front mounting

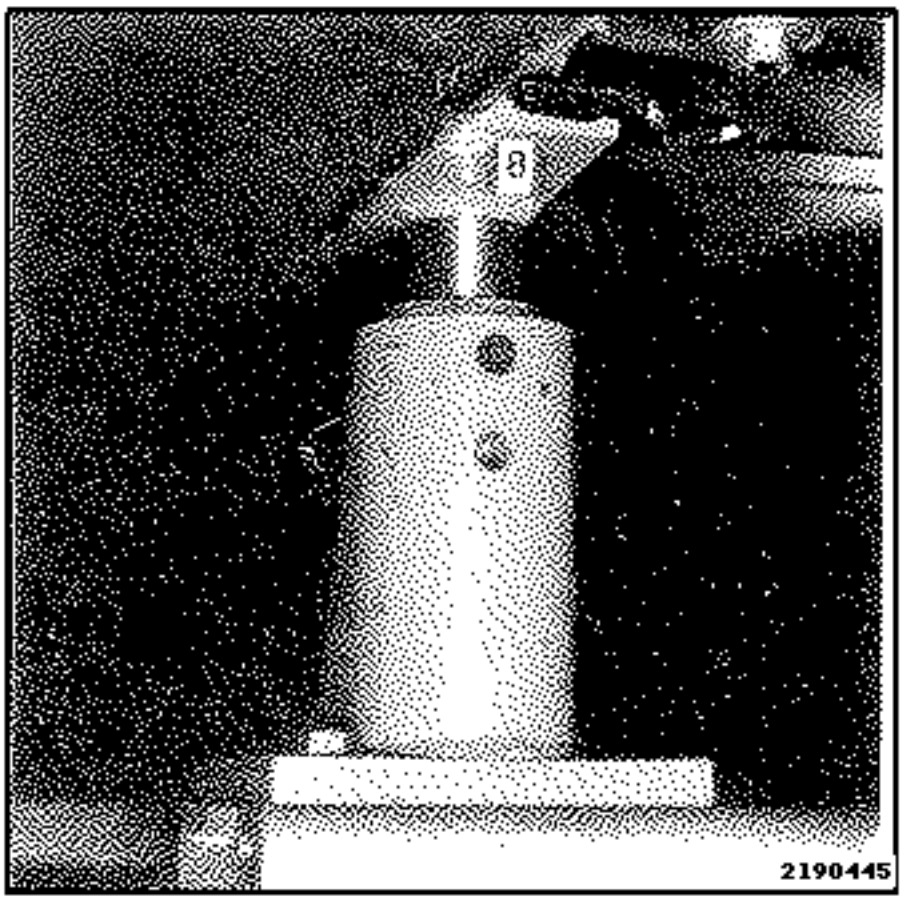
This bracket is used for supporting the rear side member and for centring the suspension arms.

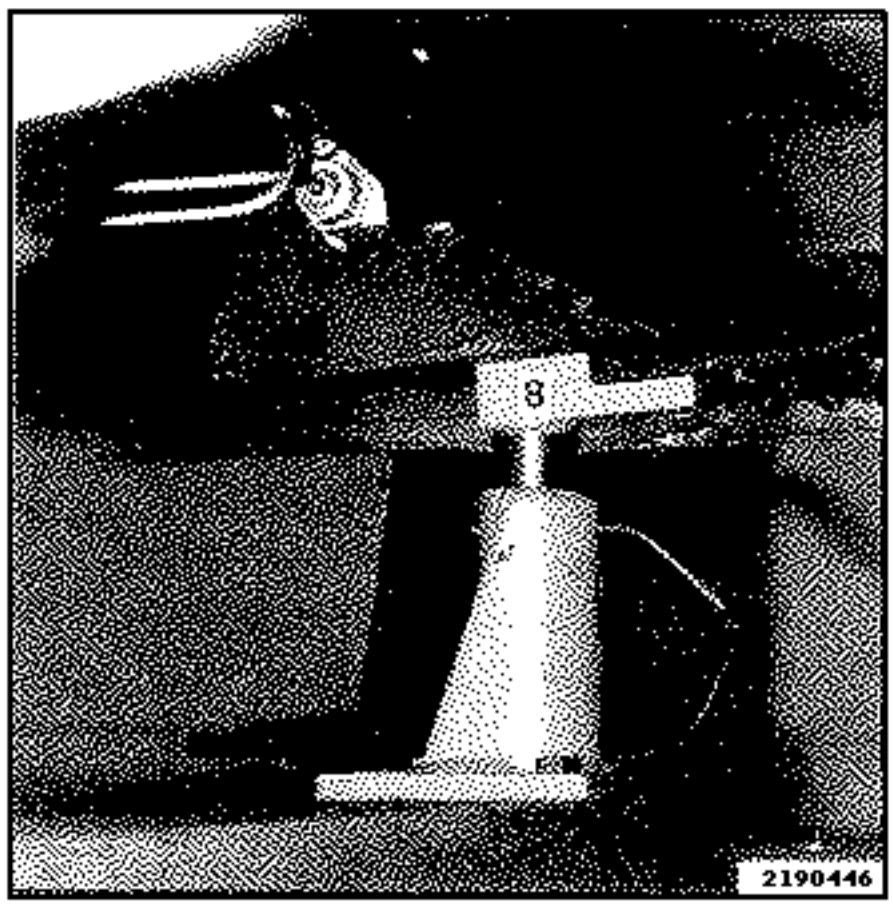
Front end impact repairs:

It is used with the rear mechanical units in place and helps to centre the rear end of the vehicle on the bench.

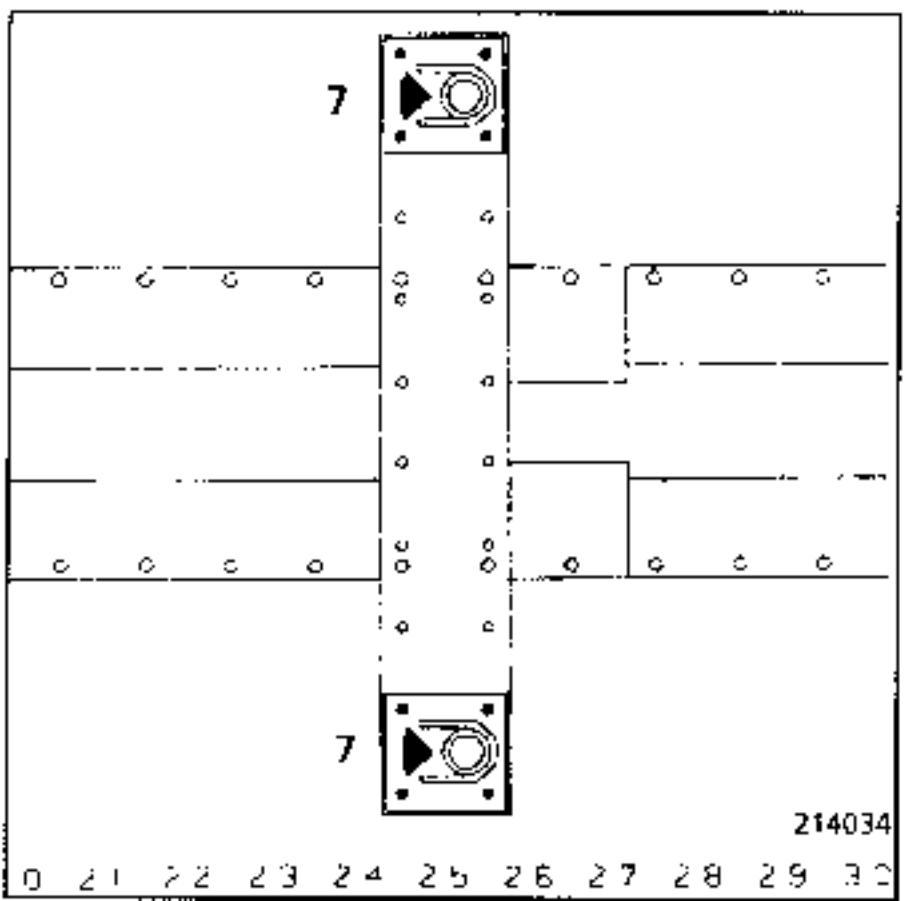
Rear end impact repairs:

It is used following removal of the rear end mechanical units for checking the side suspension arm mounting points.





POSITIONING



Use two bases **MZ 140.**

Lock the head in the upper hole in the base.

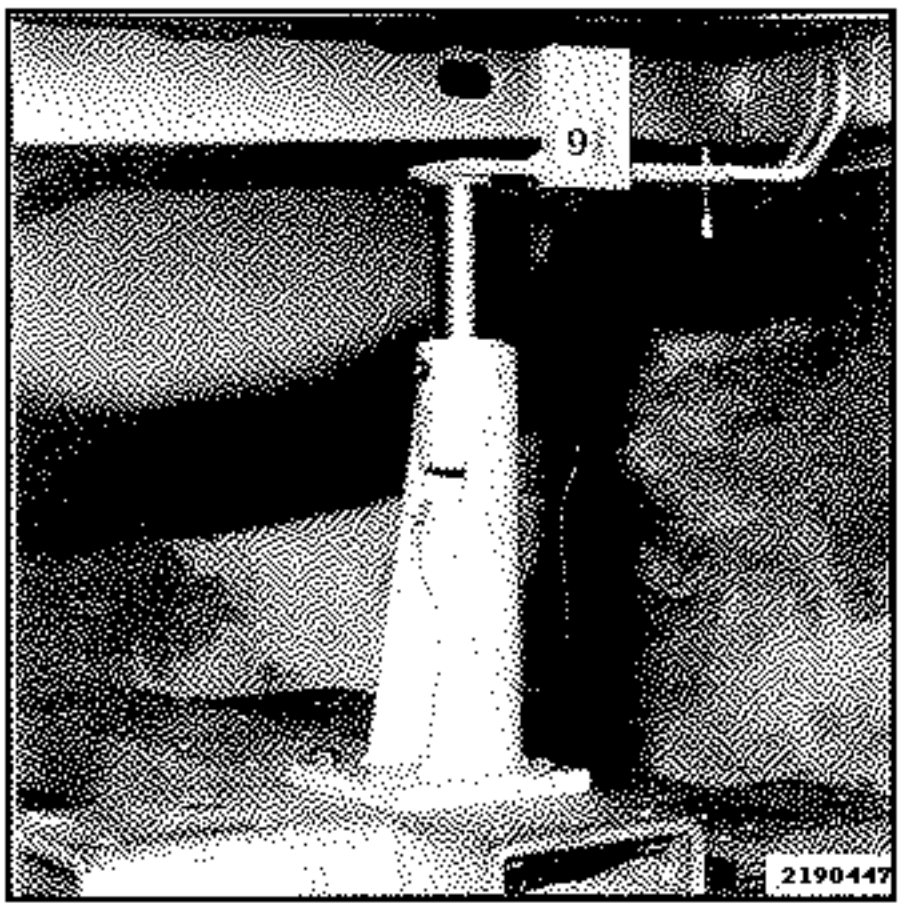
Position the bases at space **N° 7** on the cross member which in turn is secured at modular space **N° 25** on the bench.

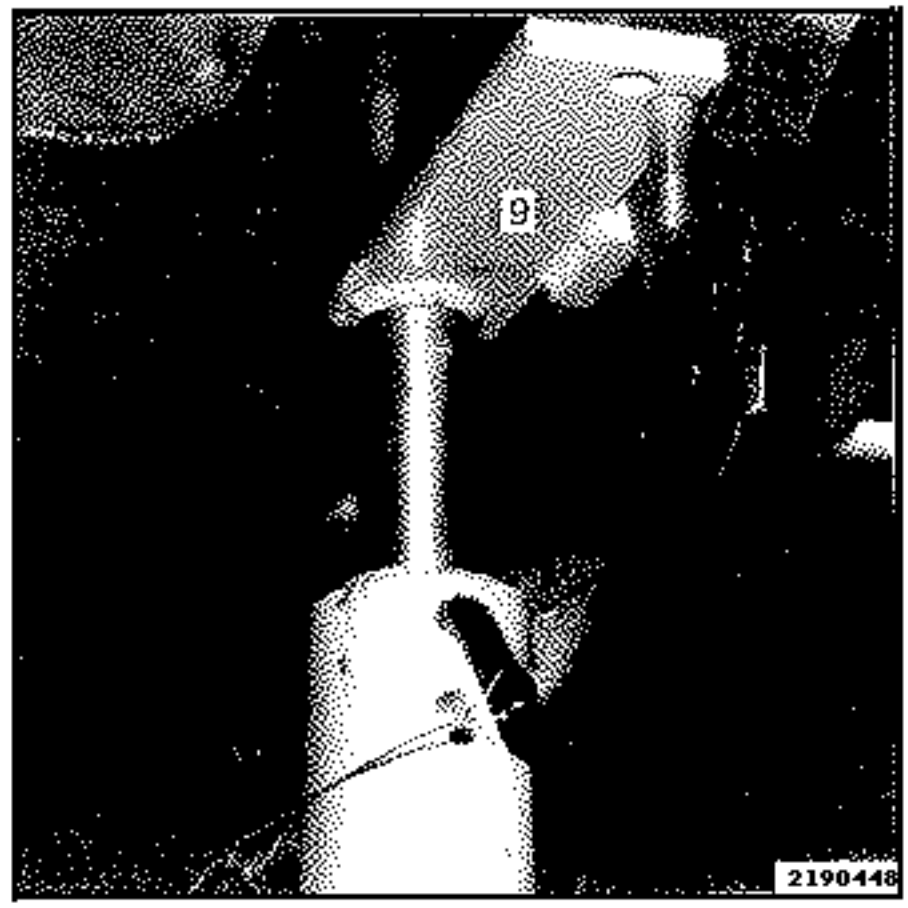
The arrows are to point towards the rear.

Rear side member rear end

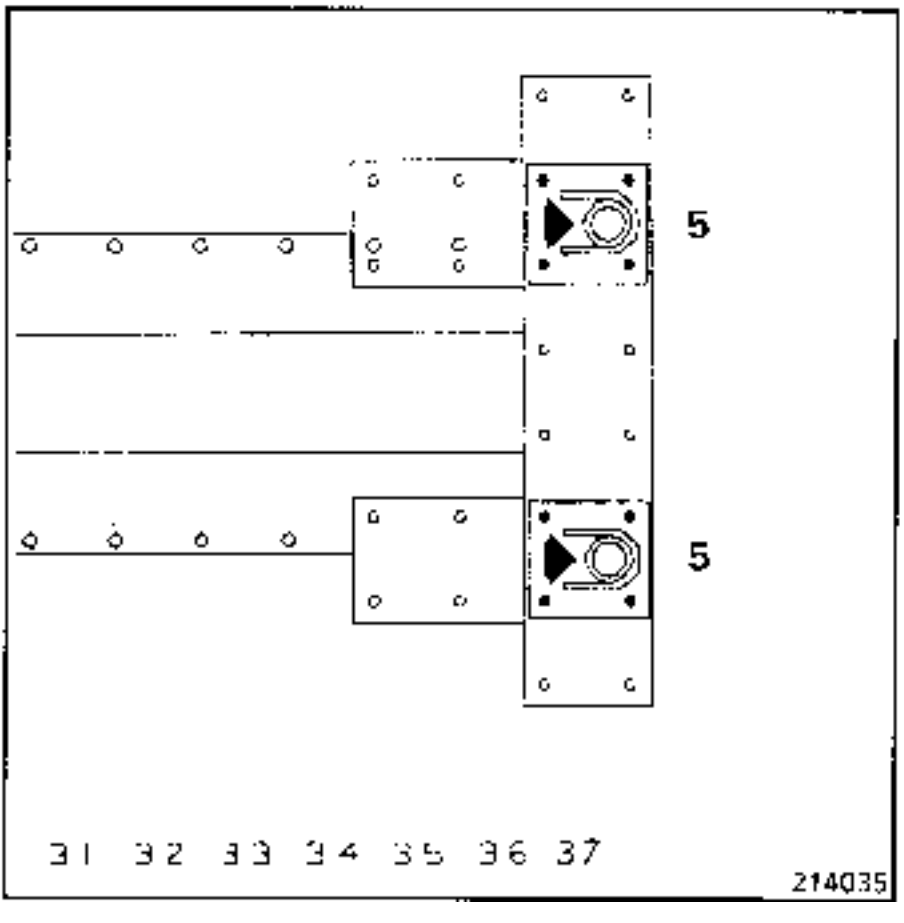
This bracket acts as a rear support for the floor and serves to position the ends of the rear side members.

It is mainly used after removal of the mechanical units, following a rear end impact.





POSITIONING



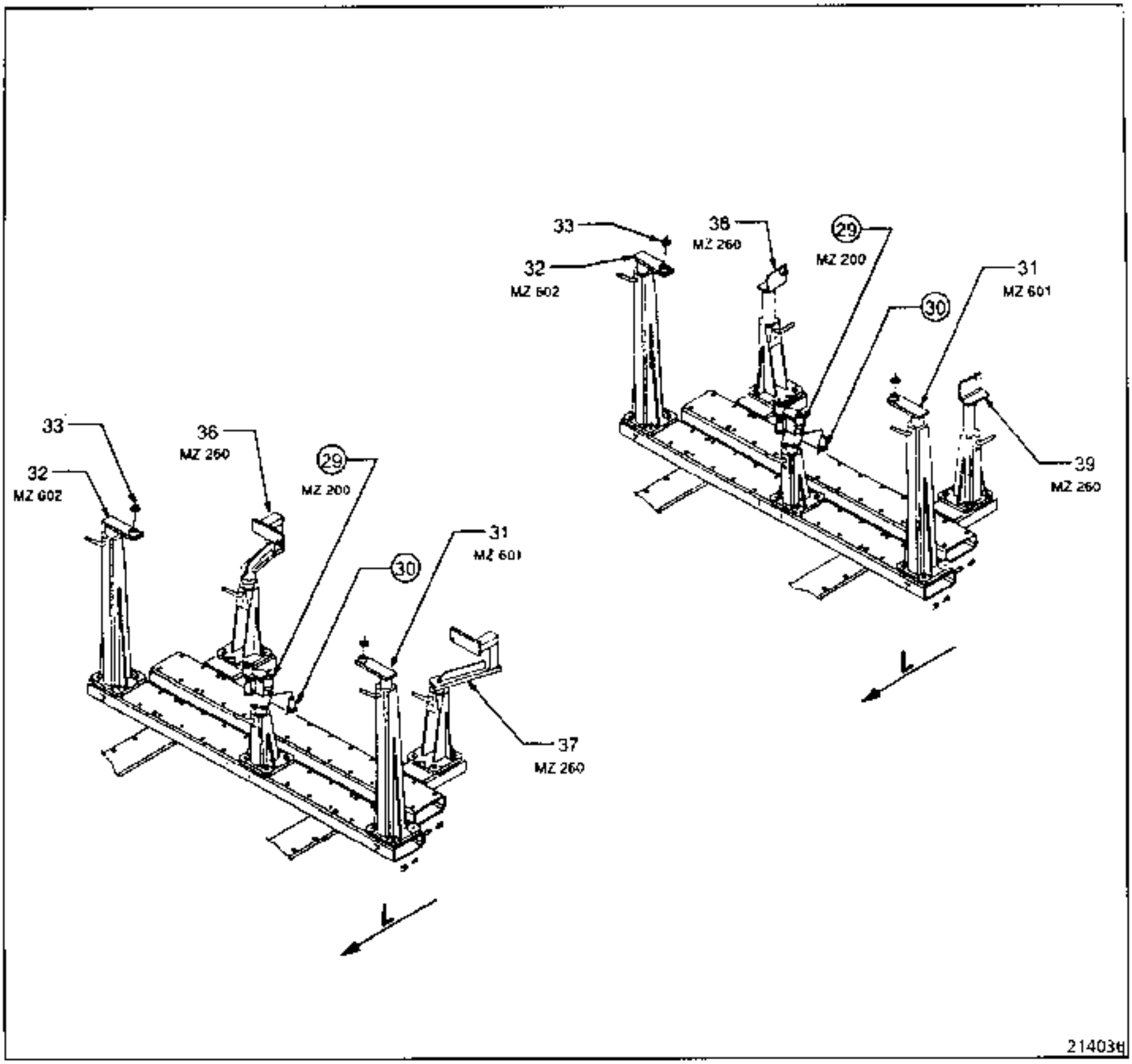
Use two bases **MZ 260**.

Lock the head in the upper hole in the base.

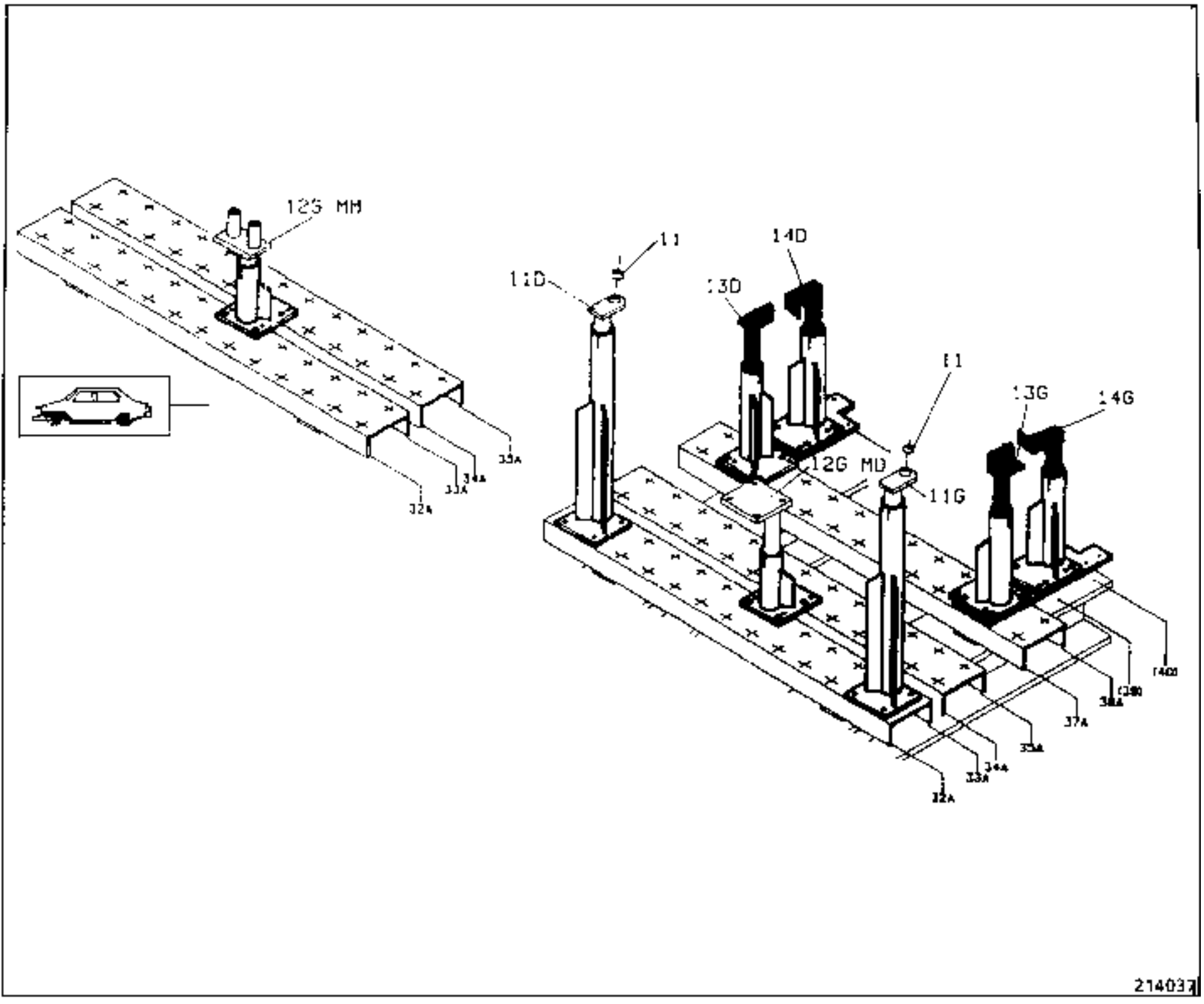
Position the bases at space **N° 5** on the rear cross member which in turn is positioned at space **N° 36** on the bench.

The arrows are to point towards the rear and the base is to be in space **N° 37**.

4 x 4 version


33
32
MZ 602
36
MZ 260
29
MZ 200
30
31
MZ 601
37
MZ 260
L
33
38
MZ 260
29
MZ 200
32
MZ 602
31
MZ 601
30
39
MZ 260
L
21403t

4 x 4 version

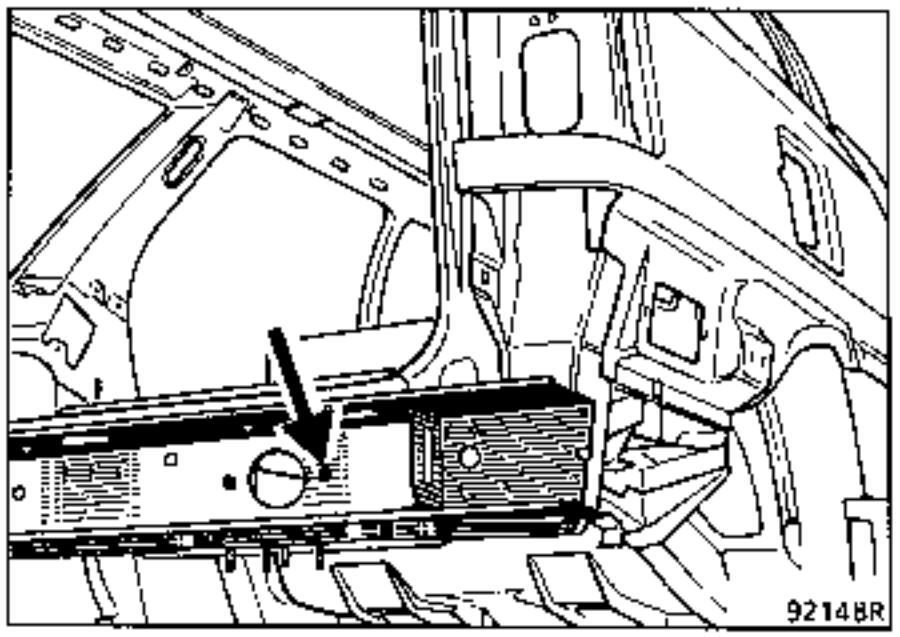

12G MM
11
14D
11D
13D
E1
13G
14G
12G MD
11G
38A
37A
35A
34A
33A
32A
214037

For brackets **1** to 8, there is no alteration in relation to the reference vehicle (**L48** 4 x 2).

Rear side member, rear end point

This is used when rebuilding the rear end, when replacing the side member.

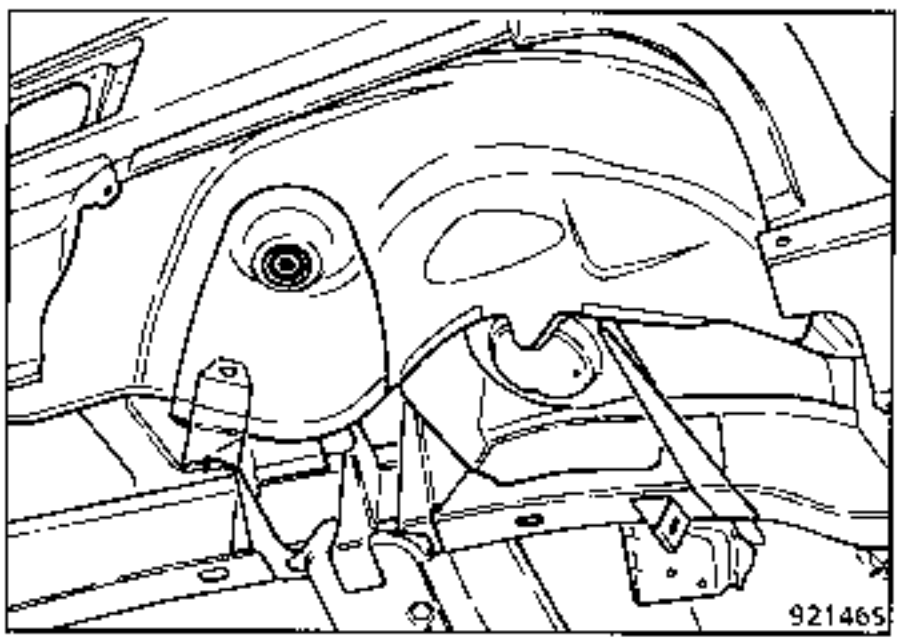
NOTE : this bracket is specific to versions **B** and **L48**.



Rear **shock absorber upper mounting point**

This is used when rebuilding the rear end, when replacing the inner wheel arch.

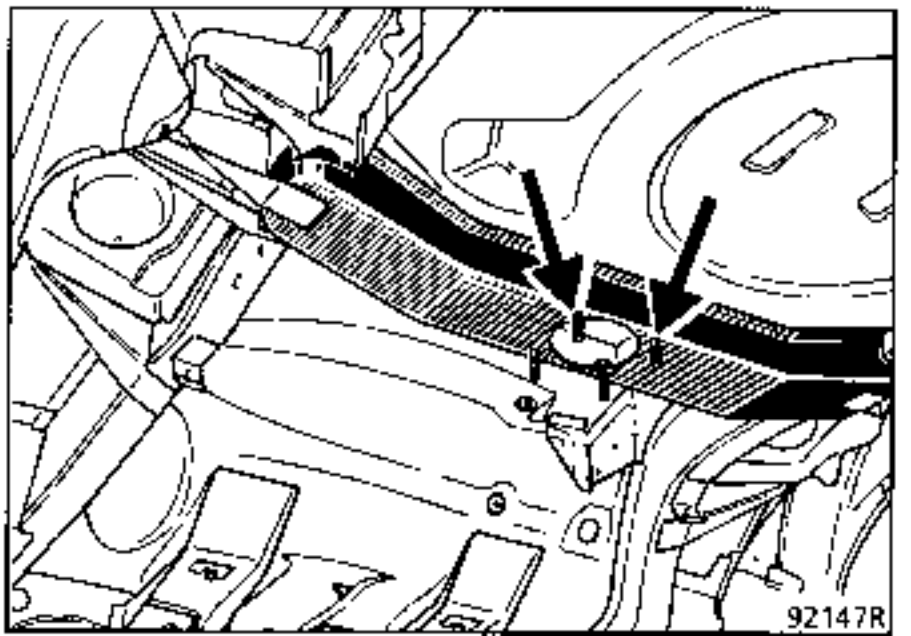
NOTE : this bracket is identical to **K48** versions (but is positioned differently).



4 x 4 rear axle mechanical unit mounting point

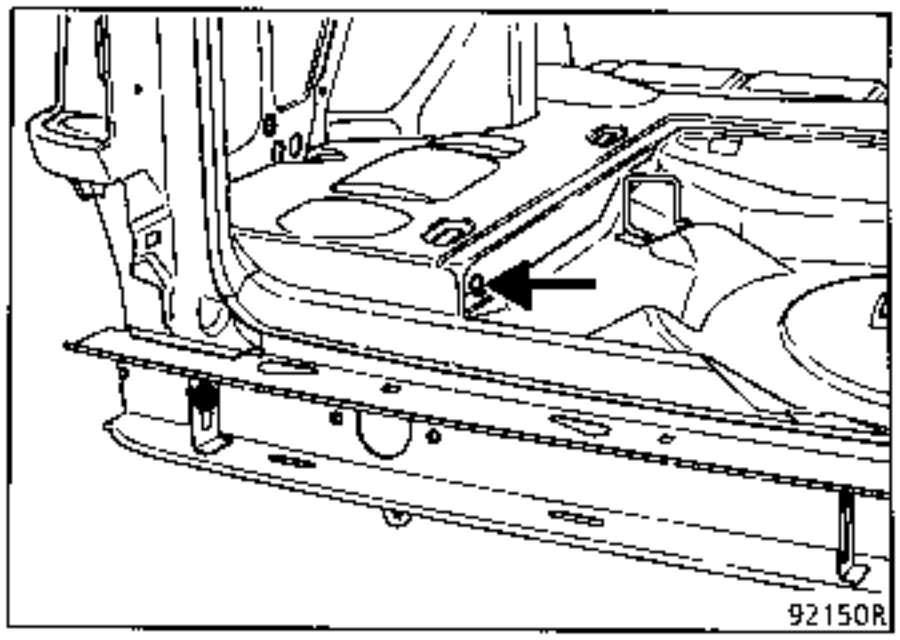
This is used when rebuilding the rear end, when replacing the axle support cross member and for rebuilding the front end to centre the rear of the vehicle.

NOTE : this bracket is identical to **K48** versions (but is positioned differently).



Towing point mounting point

This is used when rebuilding the rear end, when replacing the side members.



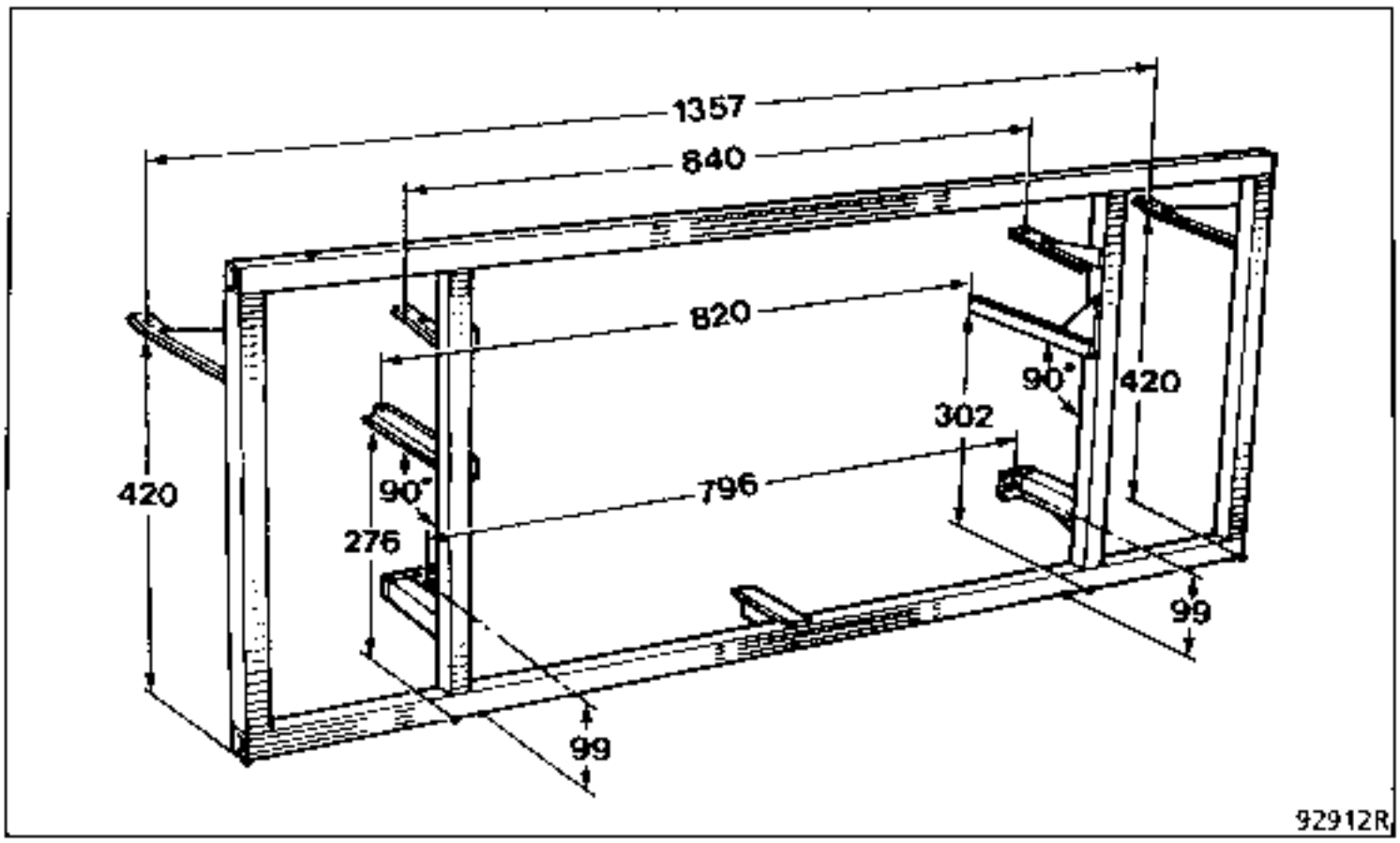
Replacing specific parts

1) When replacing the rear end cross member and the rear end panel, refer to operation 41 A of section B48 or L48 depending on version.

2) When replacing specific parts without the rear and front floor, refer to section K48.

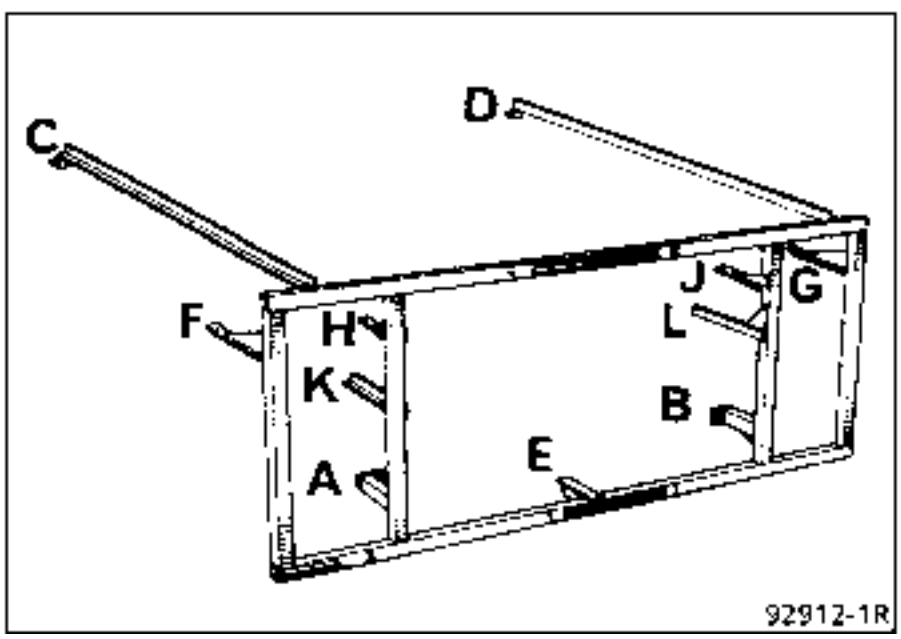
PRESENTATION

Part Number 00 00 1062-01



The dimensions given in the above drawing enable the geometry of the jig to be checked.

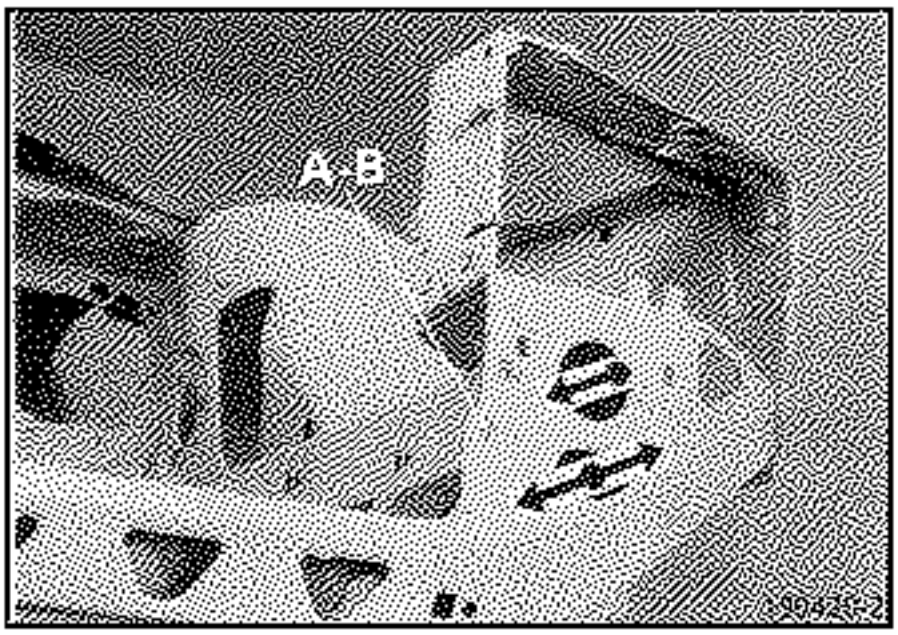
FITTING IN PLACE

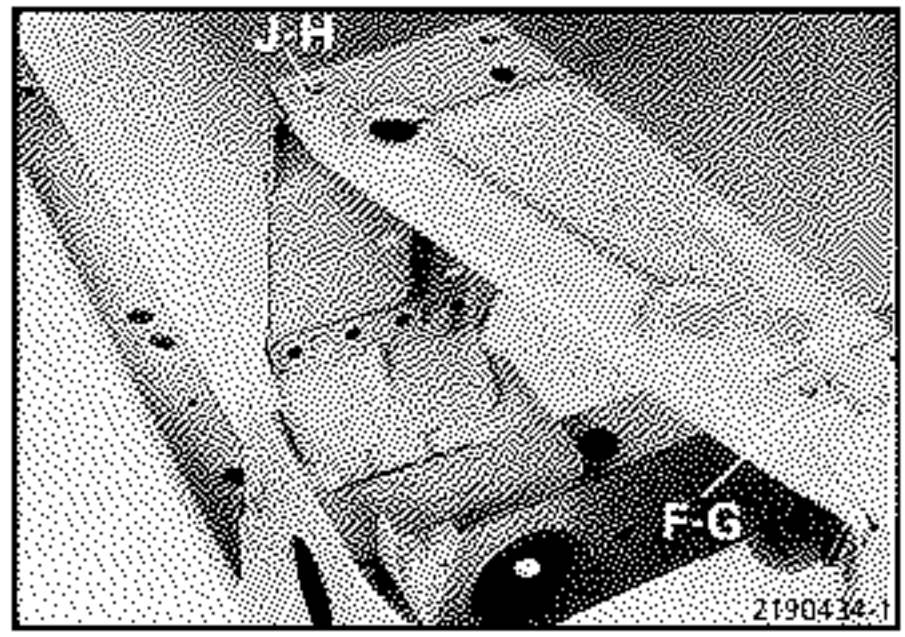


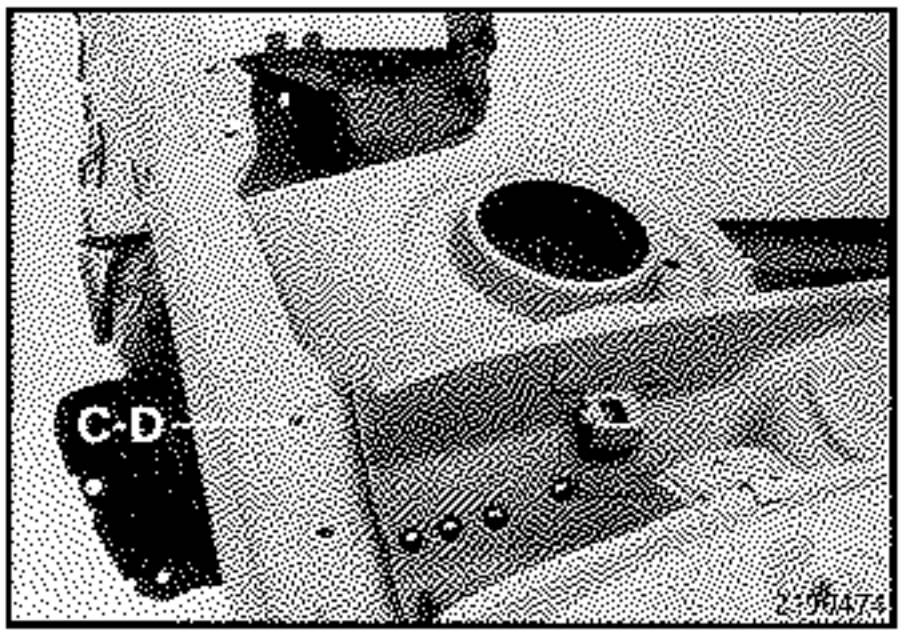
Points (A), (B), (C), (D) and (E) are the reference marks for positioning the jig on the vehicle. Before fitting it, you must check during the fault finding operation that these points are correct.

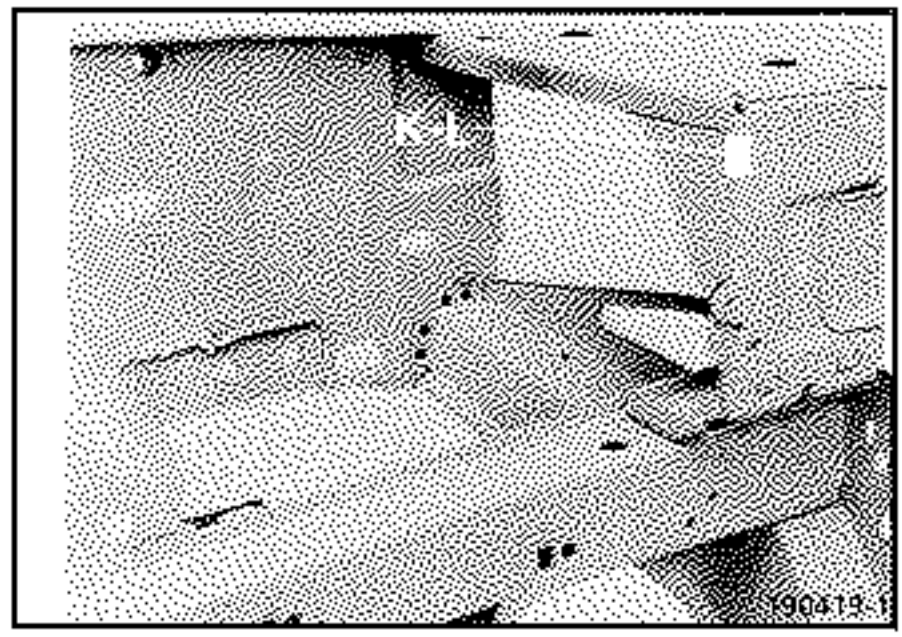
Points (F), (G), (H), (J), (K) and (L) are used firstly to secure and then to position the replaced components. But if one of points (A) or (B) cannot be used as a reference mark, the point on the side opposite the impact must be used for this purpose.

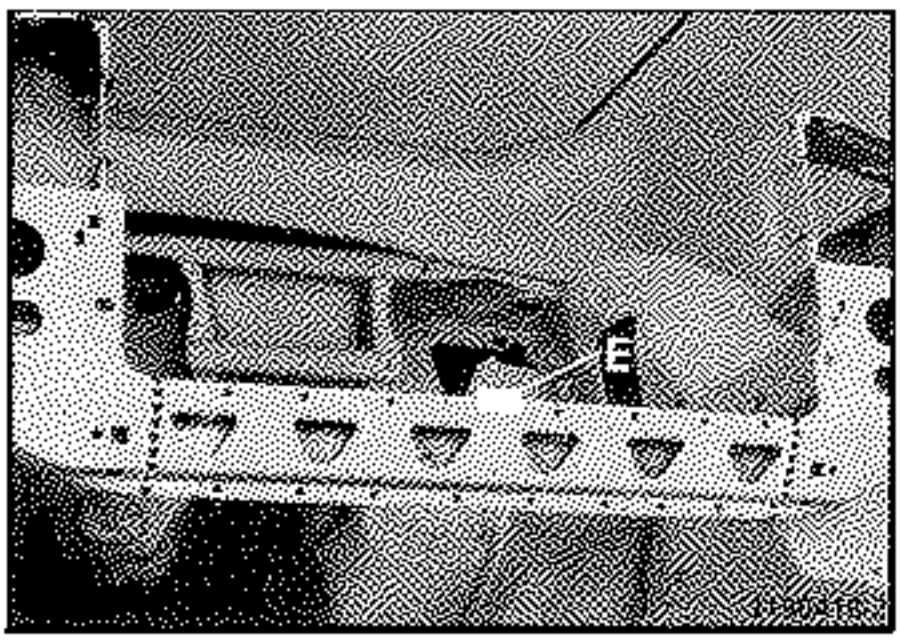
POSITIONING

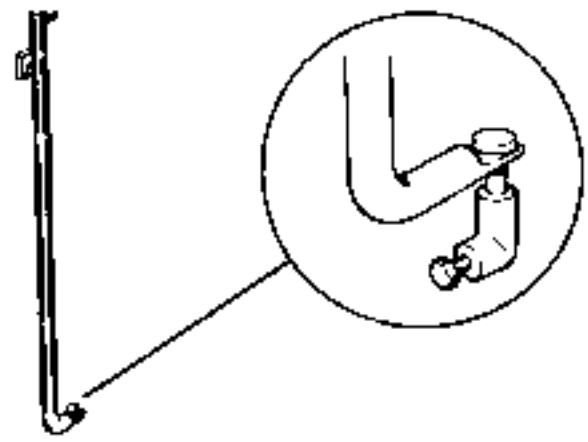
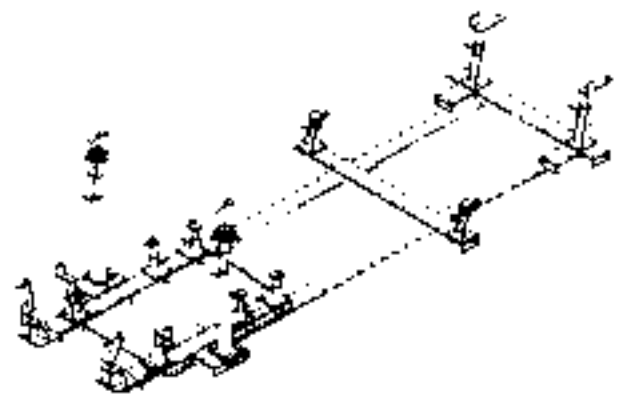
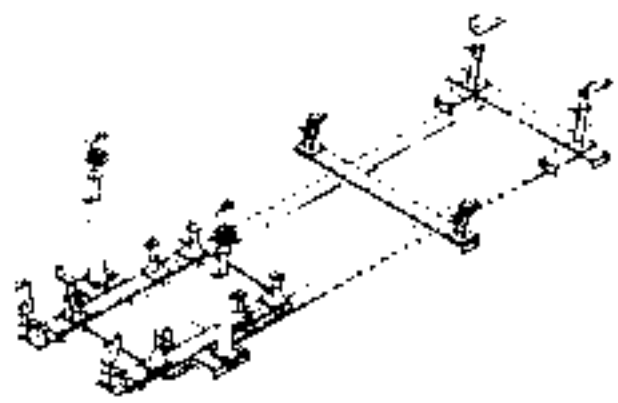






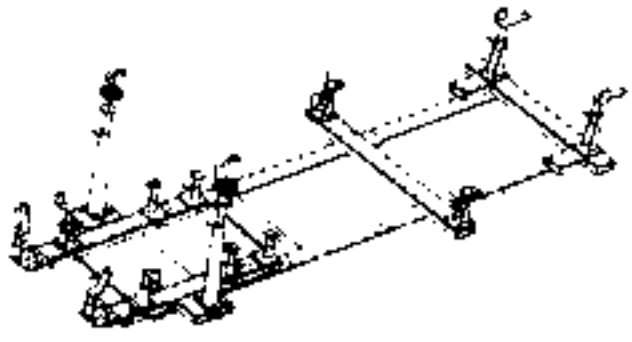




Car. 1055 **Part Number 00 01 055 00**	
Hinge pin extracting tool (short and long) (can be fitted to **FENWICK REN 1303**)	 214042-1
Car. 1060 **Part Number 00 00 106 000**	
Dashboard protector	 2188400
Car. 1062 **Part Number 00 00 106 200**	
Front component positioning jig	
Célette **Repair bench brackets** **Ref. 486-800**	
1 - system 4 x 4 **K48** Ref. 486-308 1 - system 4 x 4 **B-L48** Ref. 486-307 **MZ System (modular)** The bases are universal and can be used for future vehicles. The heads are specific to the particular vehicles. To order these parts consult your local After Sales Head Office.	 214042-2

Blackhawk Repair bench brackets		Ref. 91254 MMS
1 - system 4 x 4 K48	REN 87106 for the modular system or REN 87107 for the compact system.	
1 - system 4 x 4 B-L48	REN 87109	

To order these parts consult your local After Sales Head Office.



214043-1

STRIPPING

All the parts must be placed on a workshop trolley provided for this purpose.

The details for the removal of trim components are given in the paragraph corresponding to each component.

CUTTING OUT - UNPICKING

Remove the damaged part following the instructions given with the diagram for each operation (if necessary, refer to the paragraph explaining the use of symbols).

Grind back the pieces of spot weld remaining on the vehicle panels.

Cut the new part approximately 50 mm larger than the part to be removed from the vehicle.

Position the new part at the appropriate location on the vehicle, over the part to be replaced, then secure it using a vice grip wrench.

Simultaneously saw through the two panel thicknesses to make it easier to adjust the cuts.

PREPARATION BEFORE WELDING

Lay bare the inner and outer faces of all areas to be welded (on the vehicle and new parts).

Coat the parts to be spot welded with a bead of electro-plastic mastic (see key to the symbols).

Prepare the parts to be plug welded: drill the first panel to diameter D shown below each welding diagram and coat them with aluminium paint.

Adjust the new part then secure it using vice clamps.

WELDING

Apply retaining points along butt welding lines

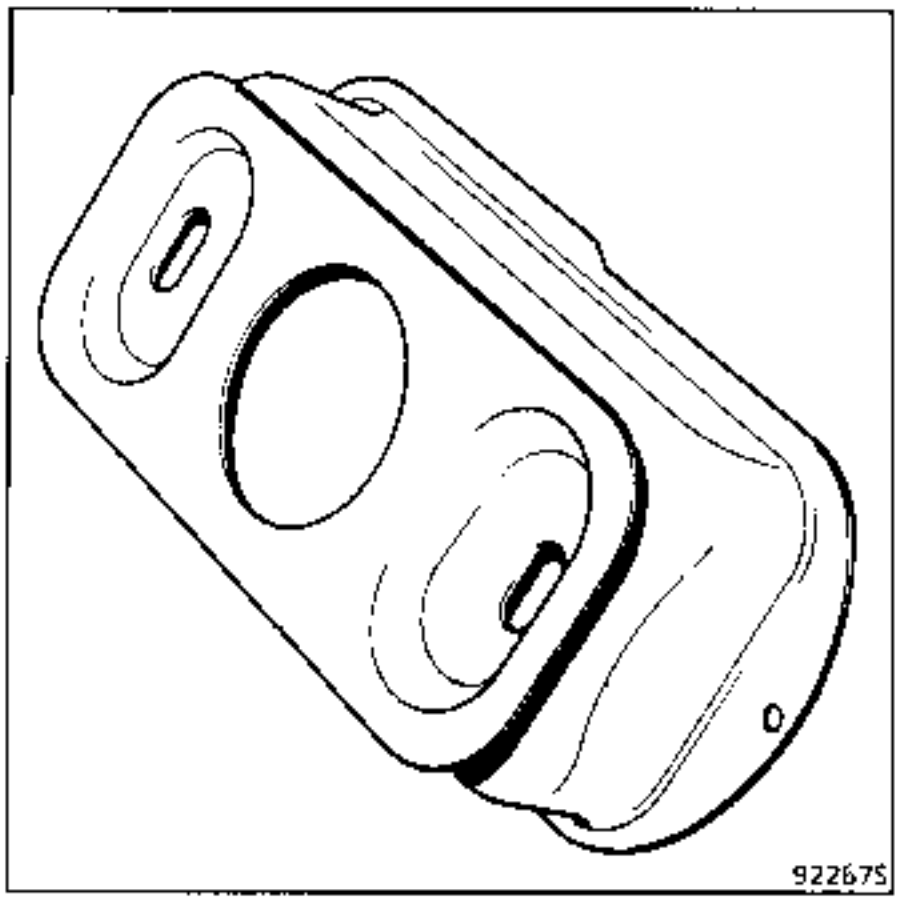
Apply electric spot welds. The corresponding values of (e) and (H) are given under each diagram.

Apply stitch welds under a protective gas envelope.

Apply plug welds under a protective gas envelope.

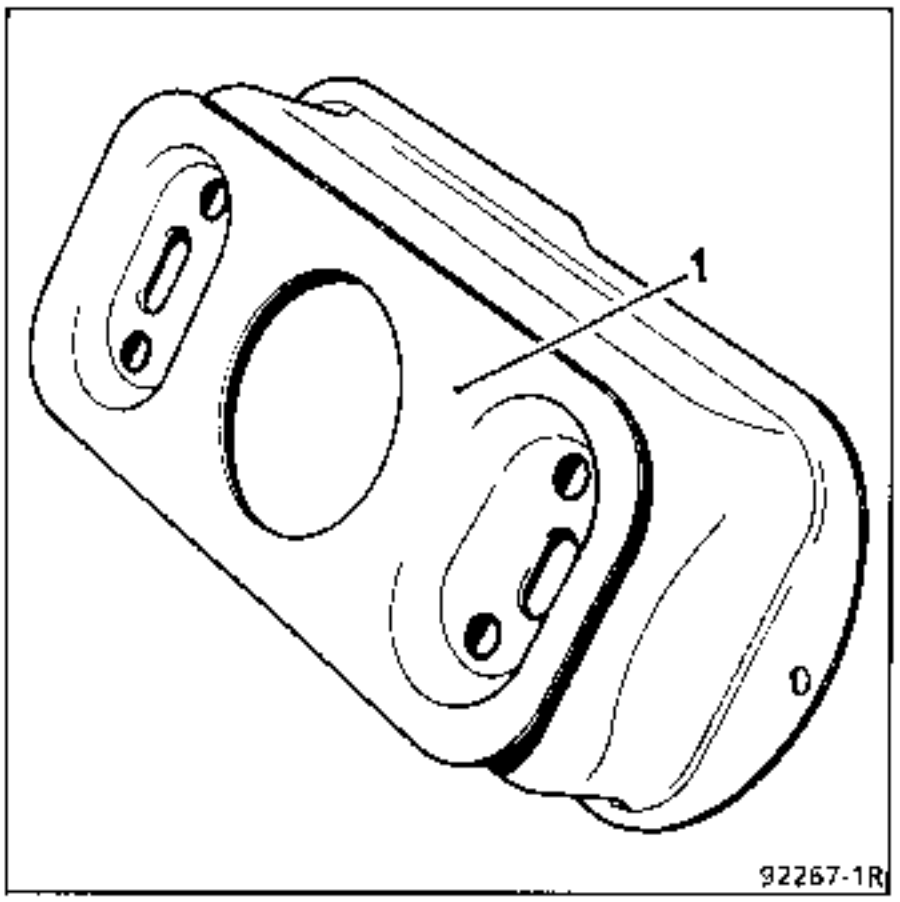
On butt welded parts apply body solder after grinding down the weld bead.

RENAULT 21 TURBO



Parts to be used as they are.

RENAULT 21 OTHER VERSIONS

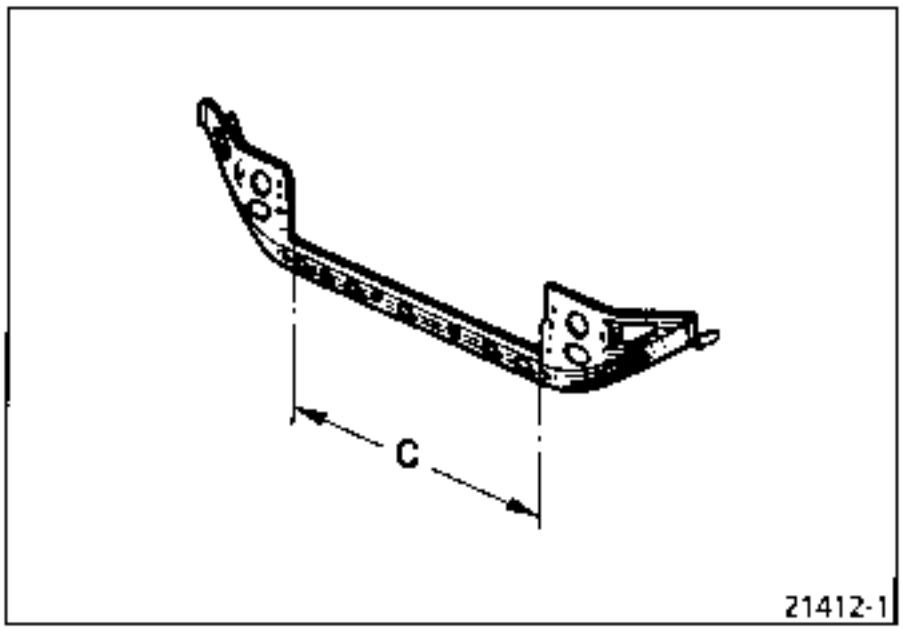


Remove the spacer (1) welded with four spot welds.

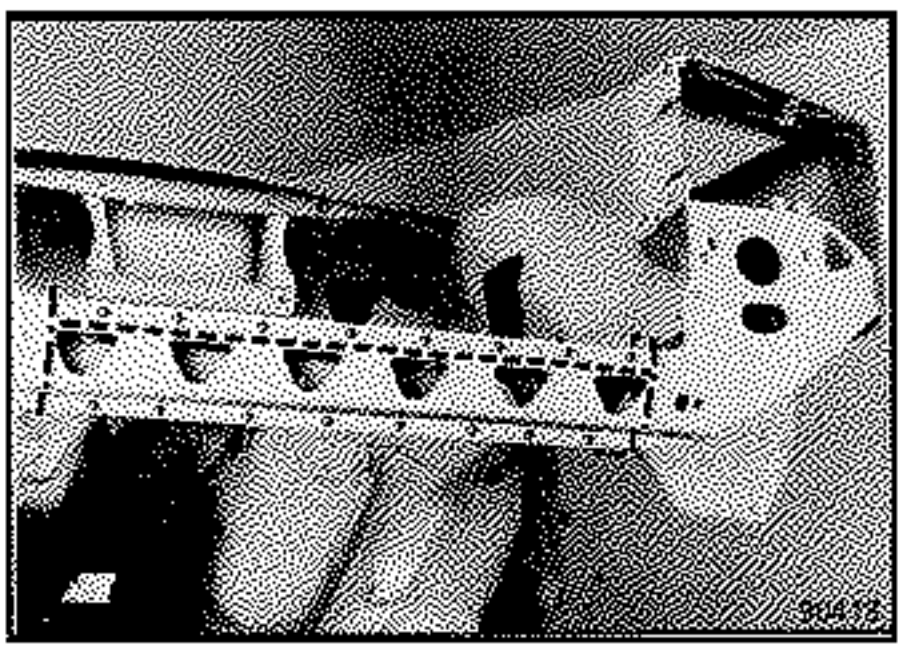


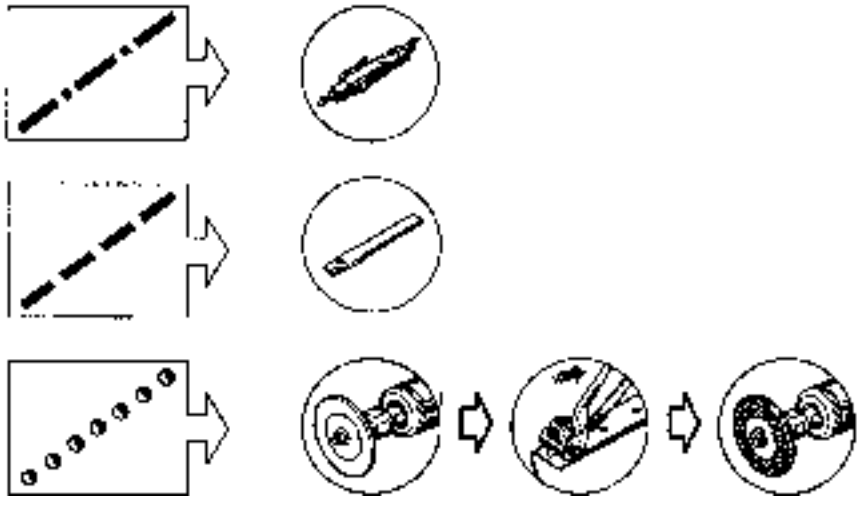
COMPOSITION OF PART FROM PARTS DEPARTMENT

Part assembled with bumper mounting reinforcements.



CUTTING OUT - UNPICKING

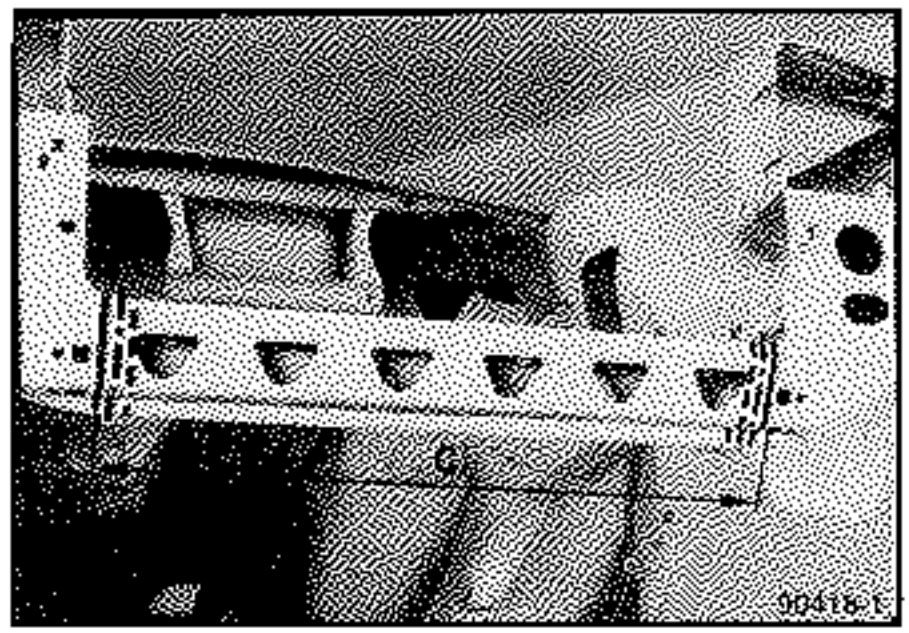


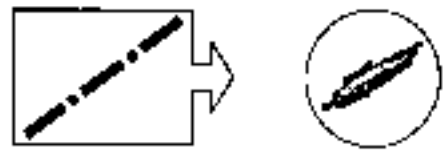


On the new part mark out a part approximately **50 mm** larger than the part cut out from the vehicle.

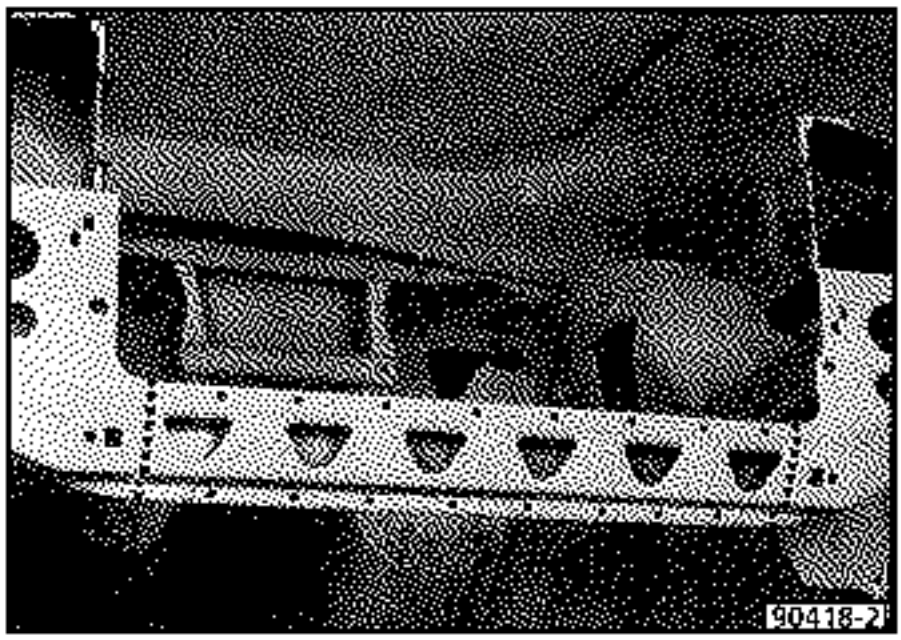
Position the new part on the vehicle over the part to be replaced then secure it using vice clamps.

Simultaneously saw through the two thicknesses of the panel so as to facilitate the alignment of the cuts.





WELDING

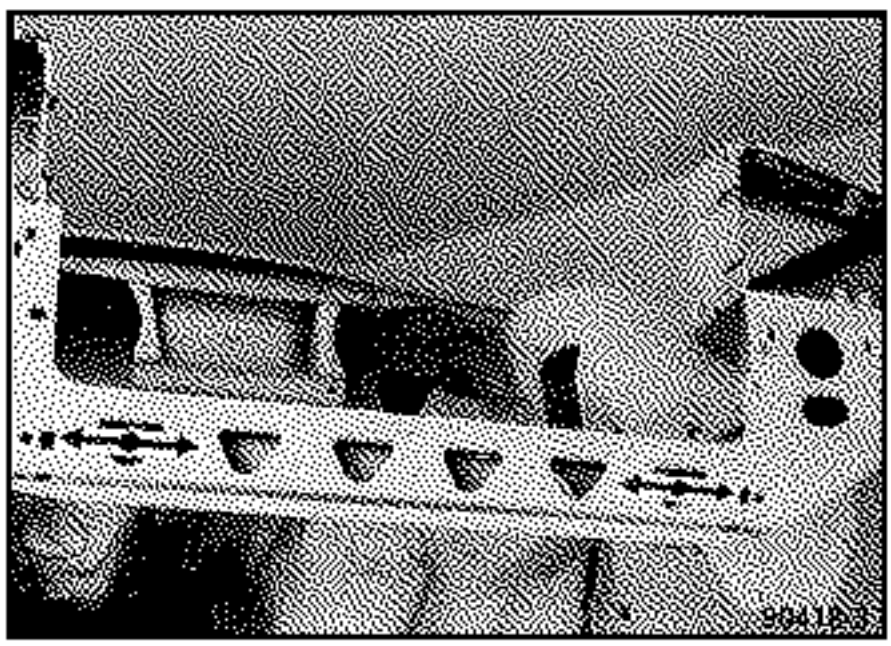


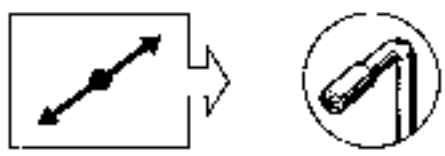


e = 1.6 mm
H = 25 mm



PROTECTING HOLLOW SECTIONS



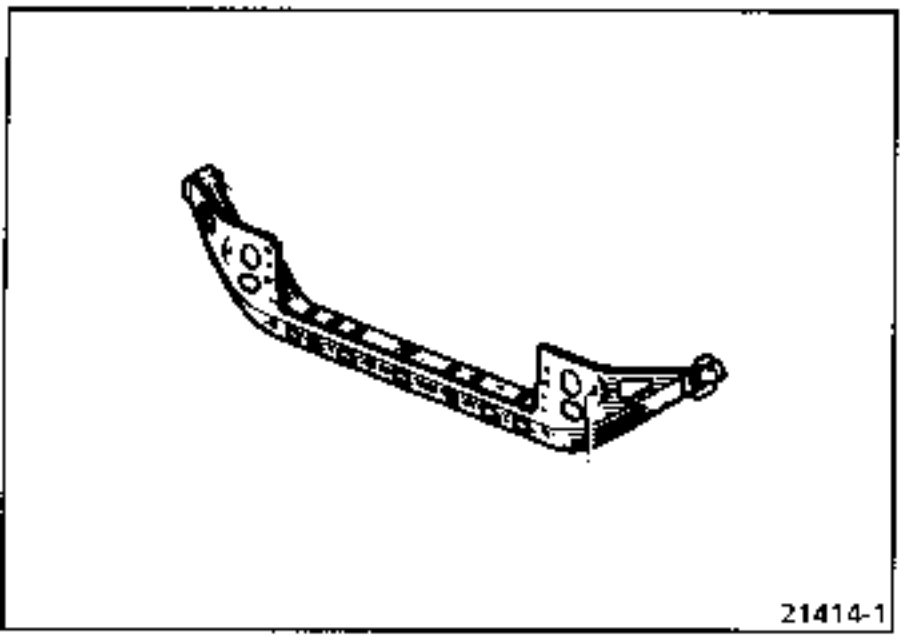


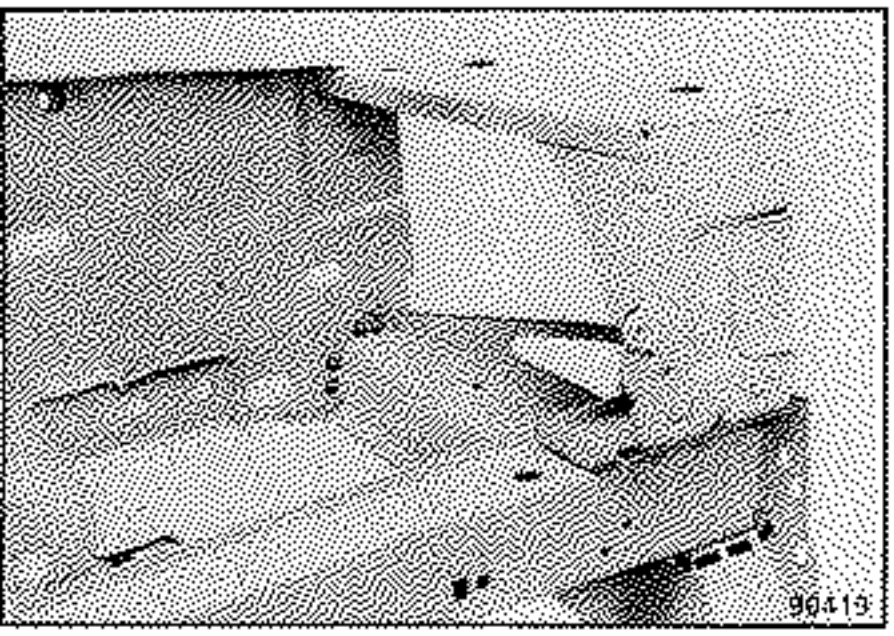
After painting and before refitting the trim, apply the protection for hollow sections.

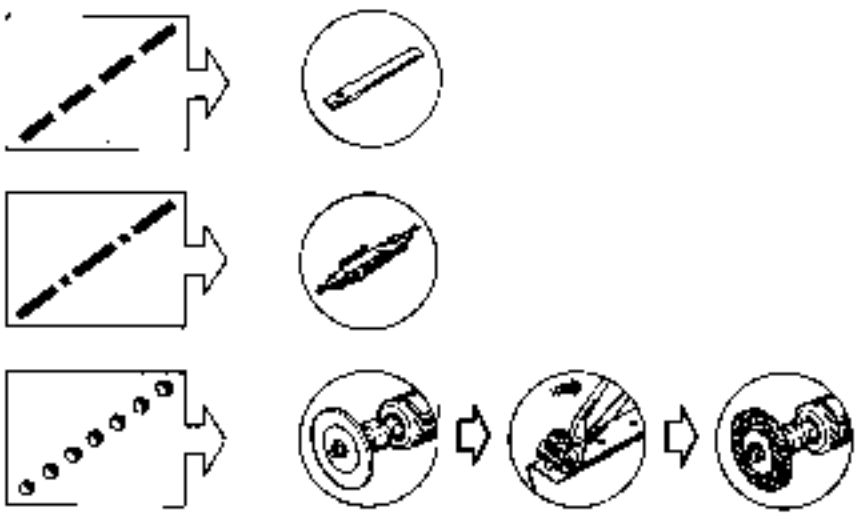
COMPOSITION OF PART FROM PARTS DEPARTMENT

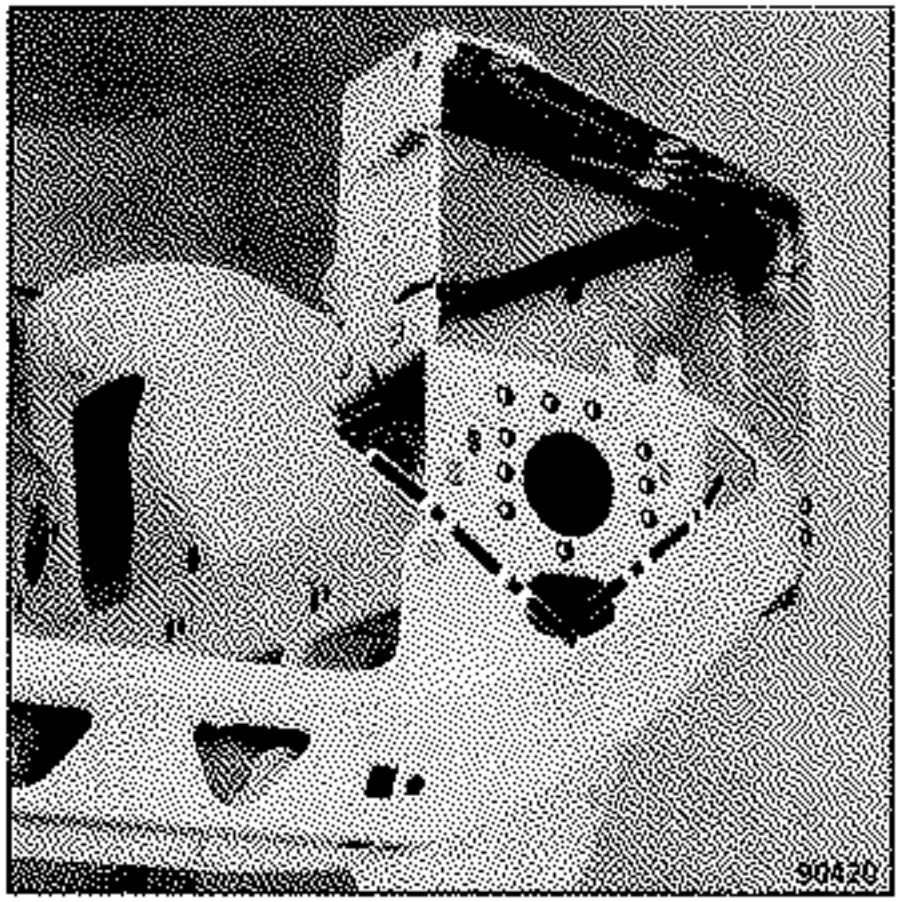
Assembled part comprising:

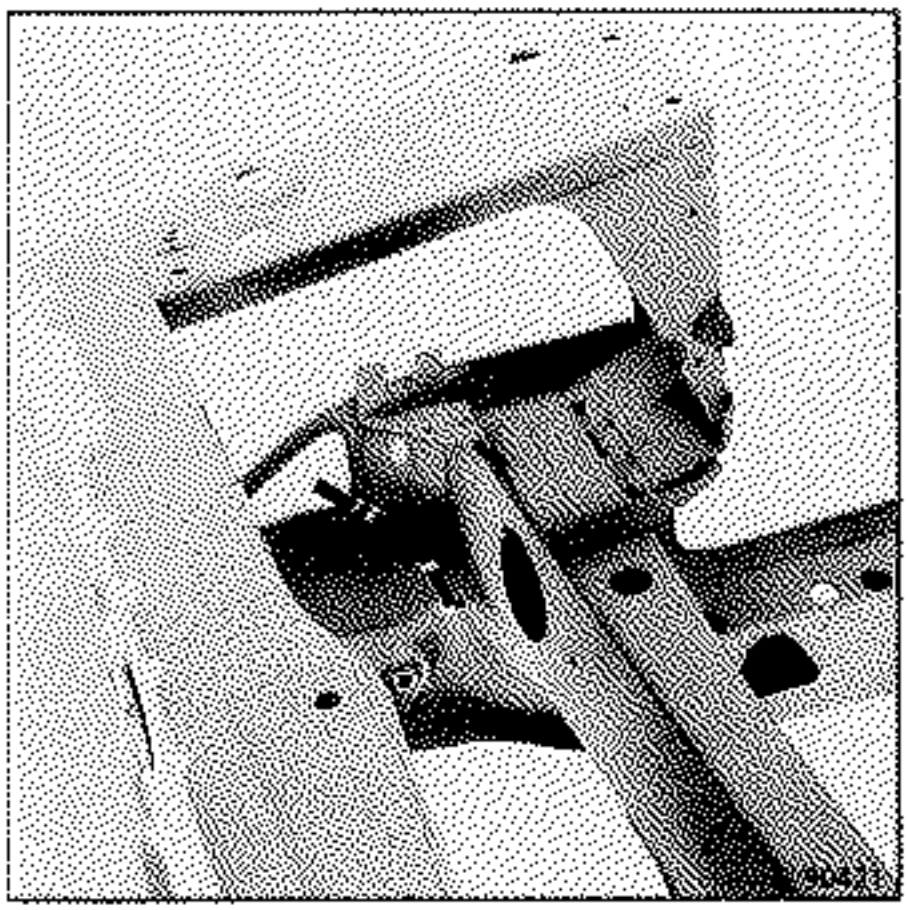
- Closure panel.
- Bumper mounting reinforcement.
- Cross member.

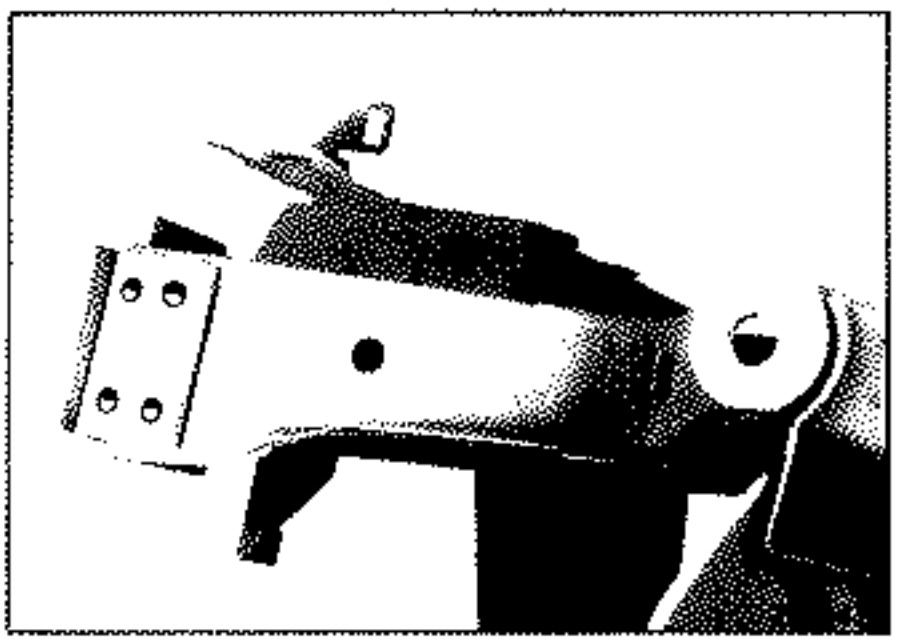




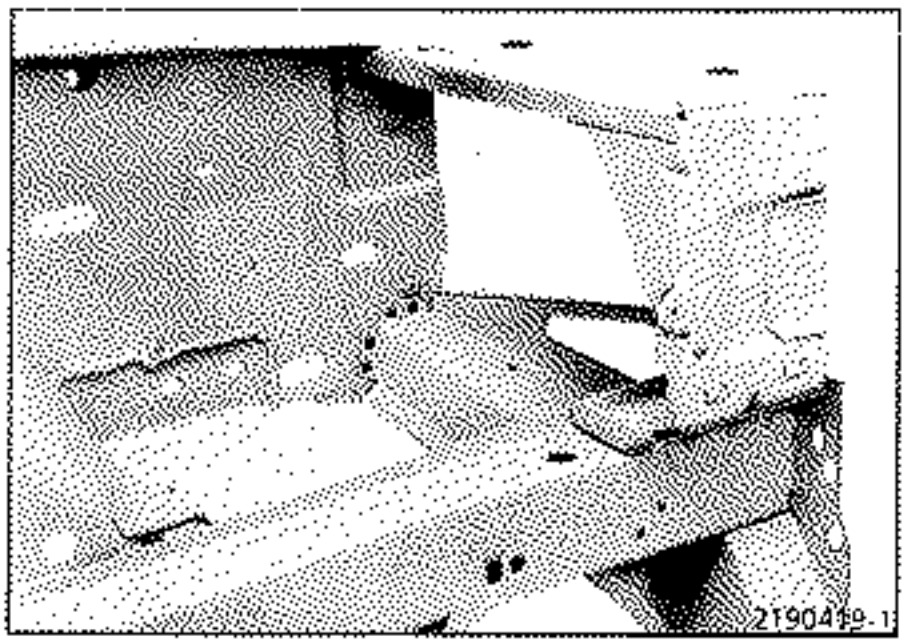


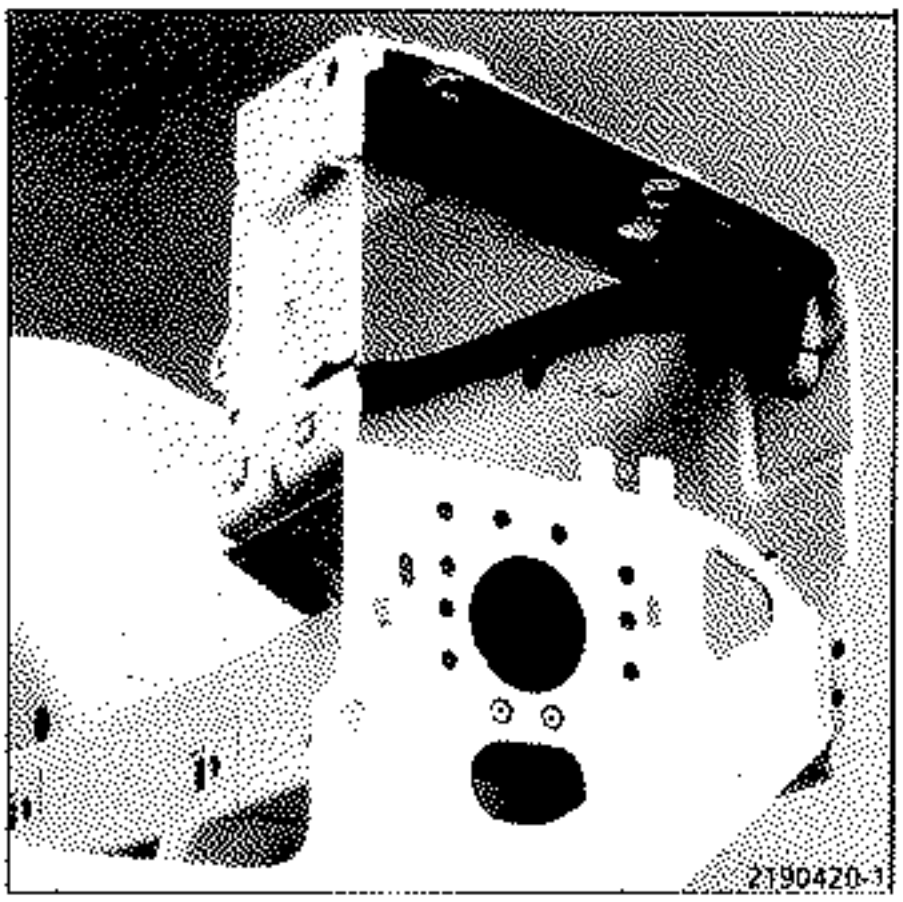


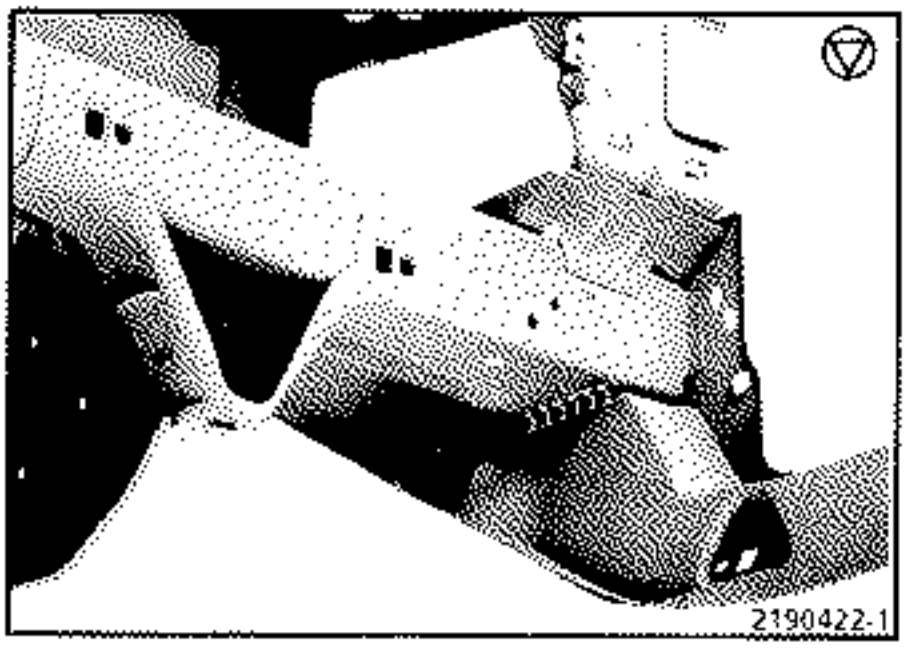




WELDING

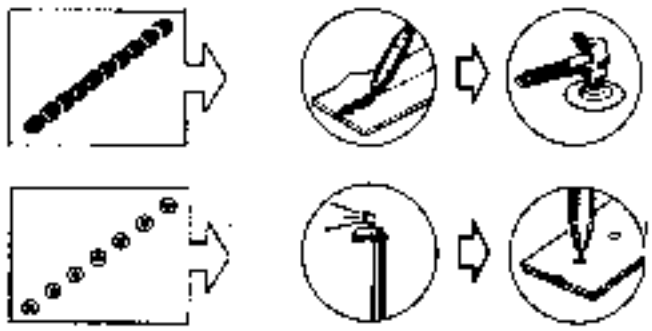






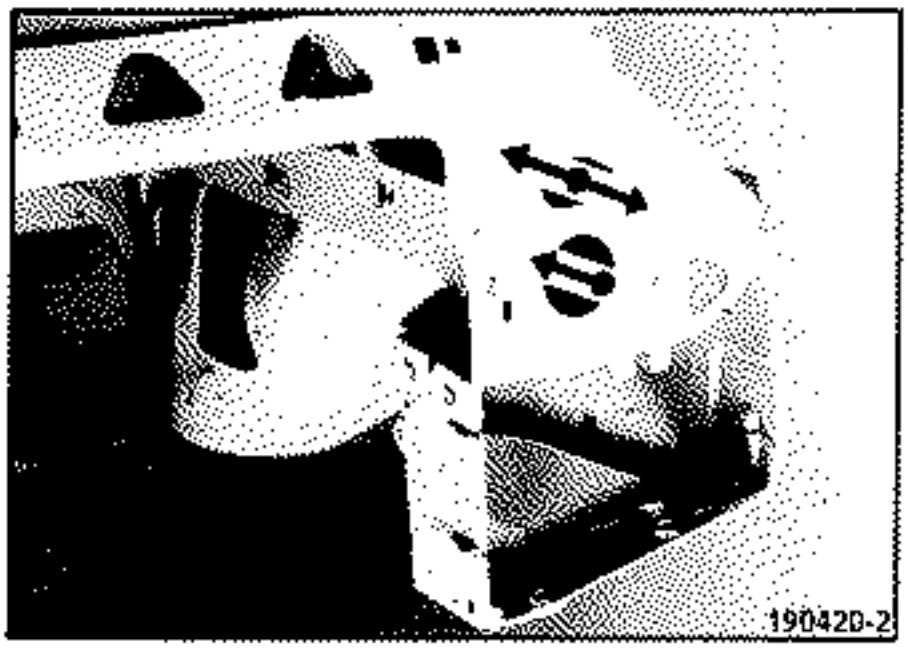


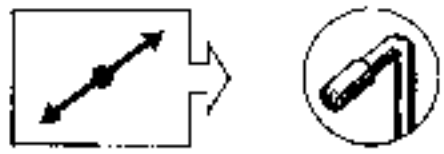
e = 1.6 mm
H = 25 mm



D = 4.5 mm

PROTECTING HOLLOW SECTIONS

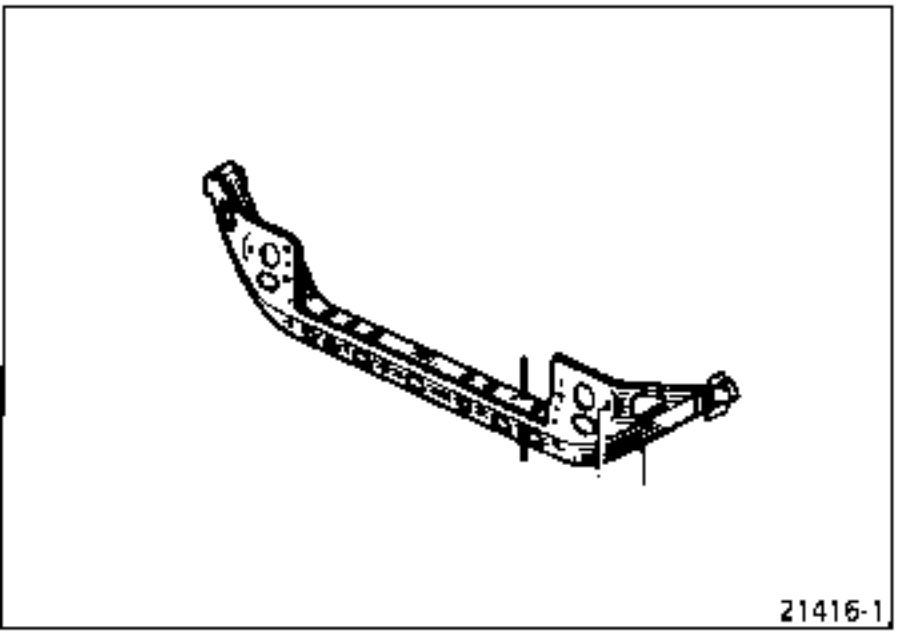




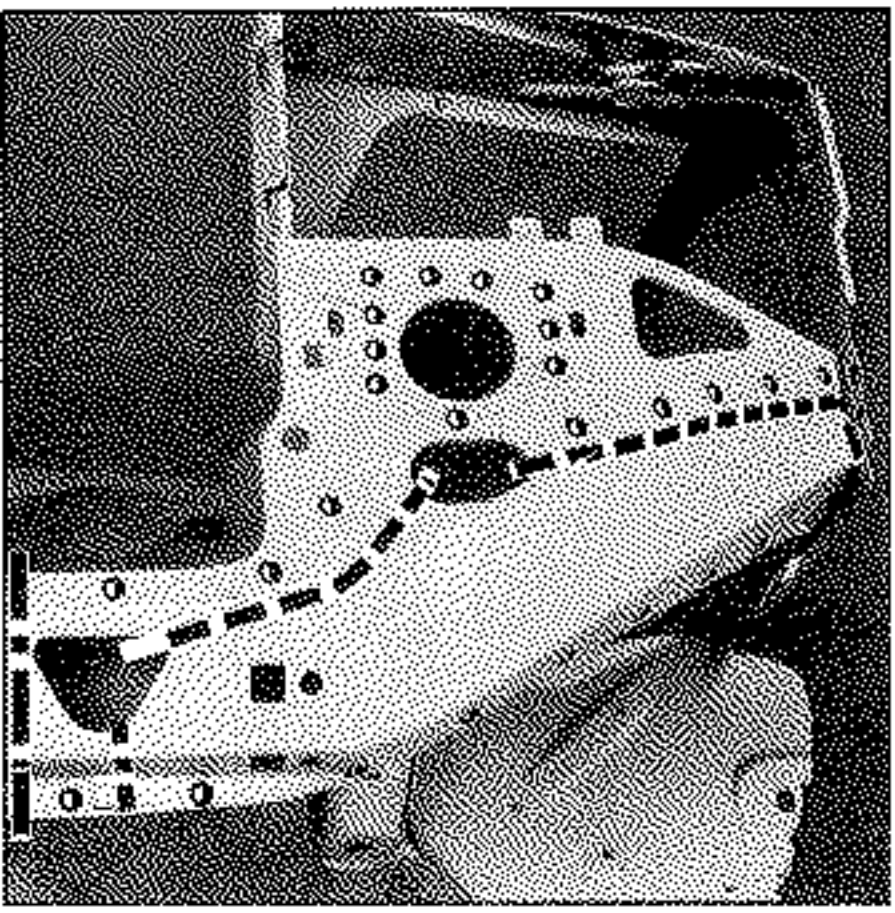
This is performed after painting and before the trim is refitted.

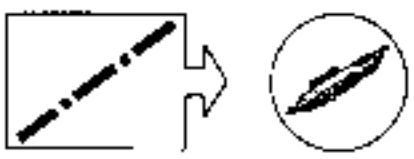
COMPOSITION OF PART FROM PARTS DEPARTMENT

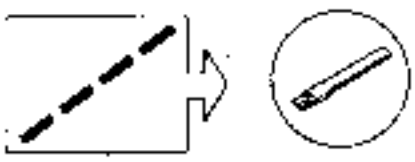
Parts assembled with bumper mounting reinforcements.



CUTTING OUT - UNPICKING

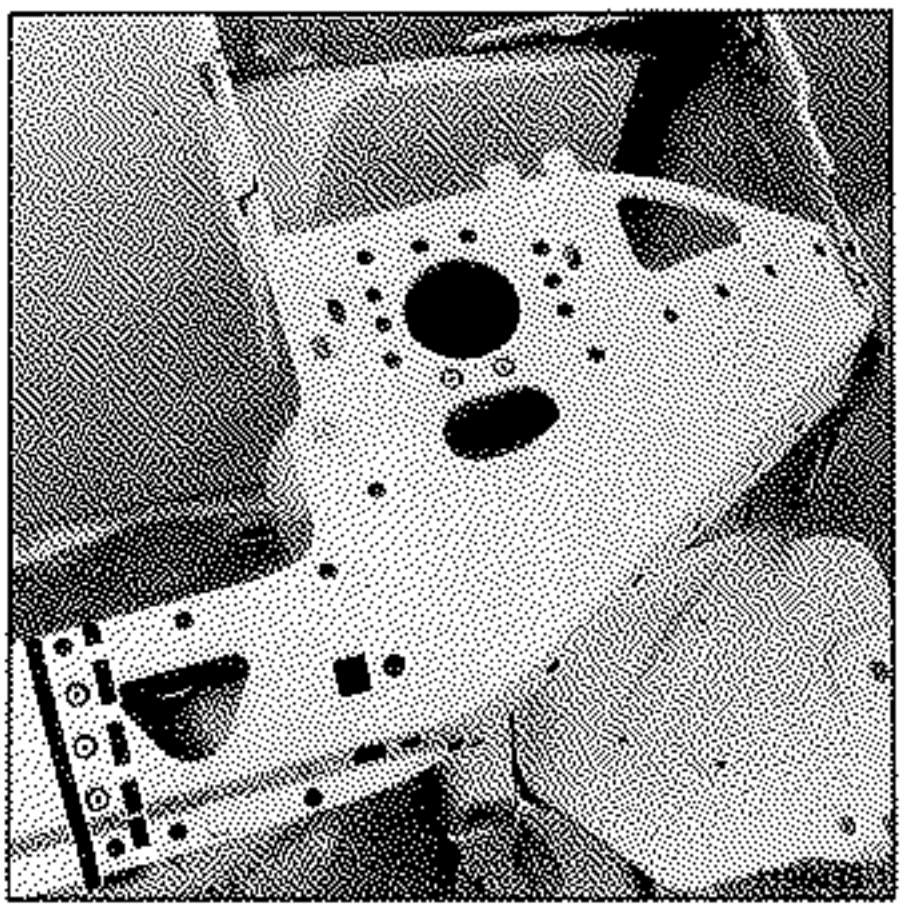








WELDING



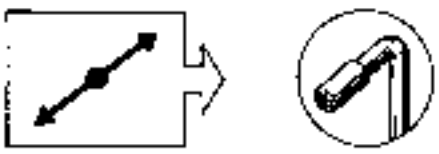


e = 1.6 mm
H = 25 mm



D = 4.5 mm

PROTECTING HOLLOW SECTIONS

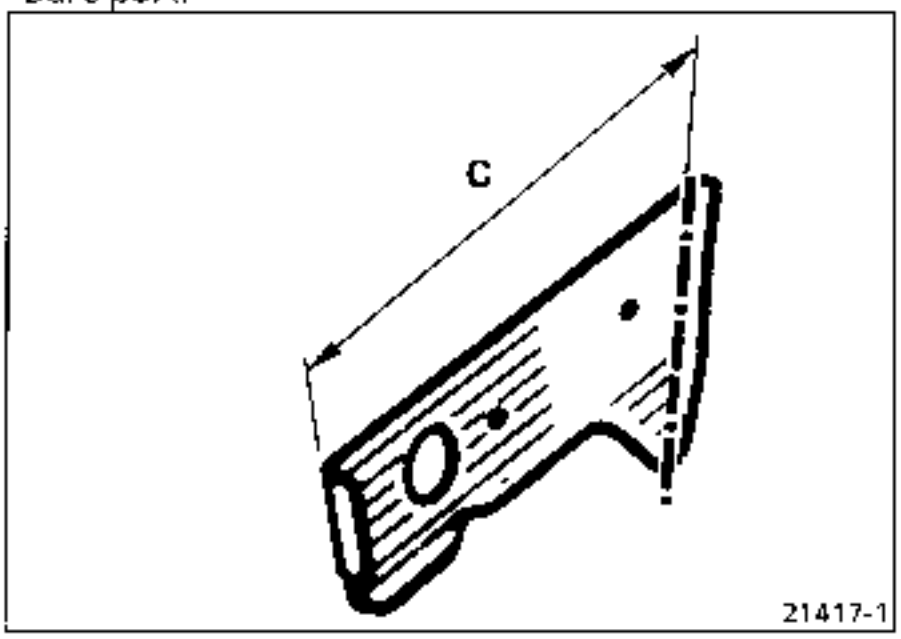


See previous operation.

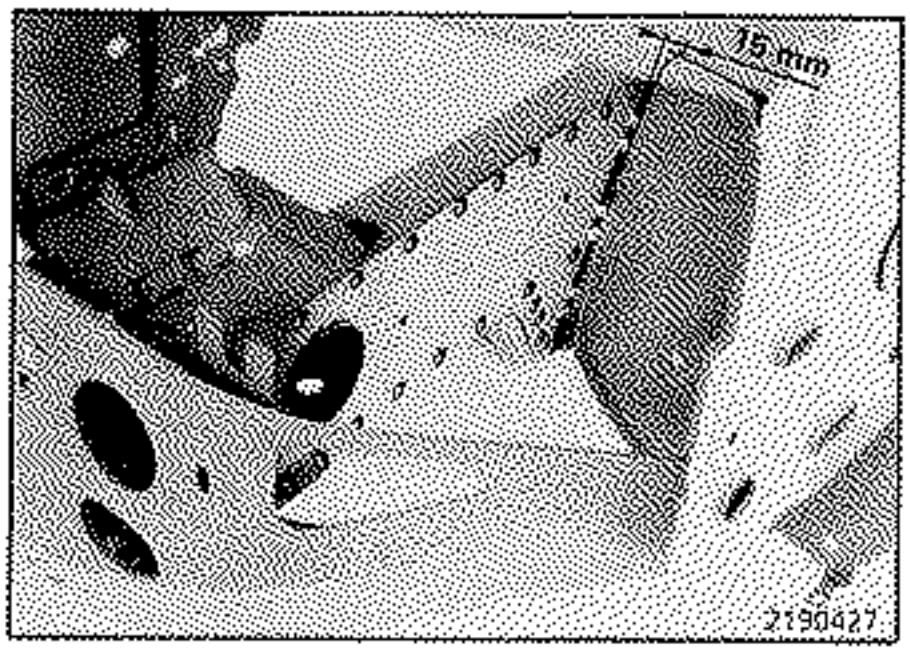
This operation is additional to the preceding ones and is to be performed when the front section of the side member can be recovered by straightening.

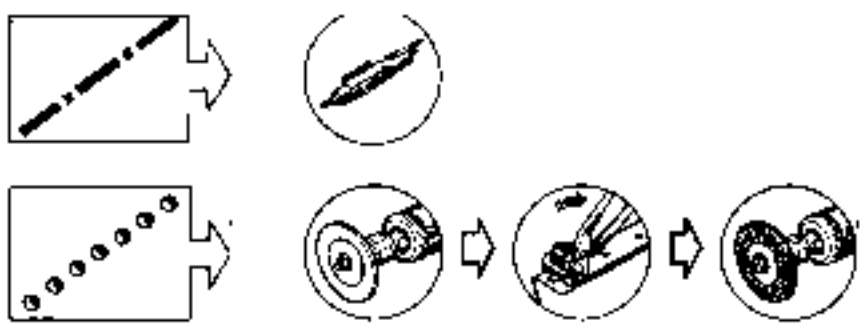
COMPOSITION OF PART FROM PARTS DEPARTMENT

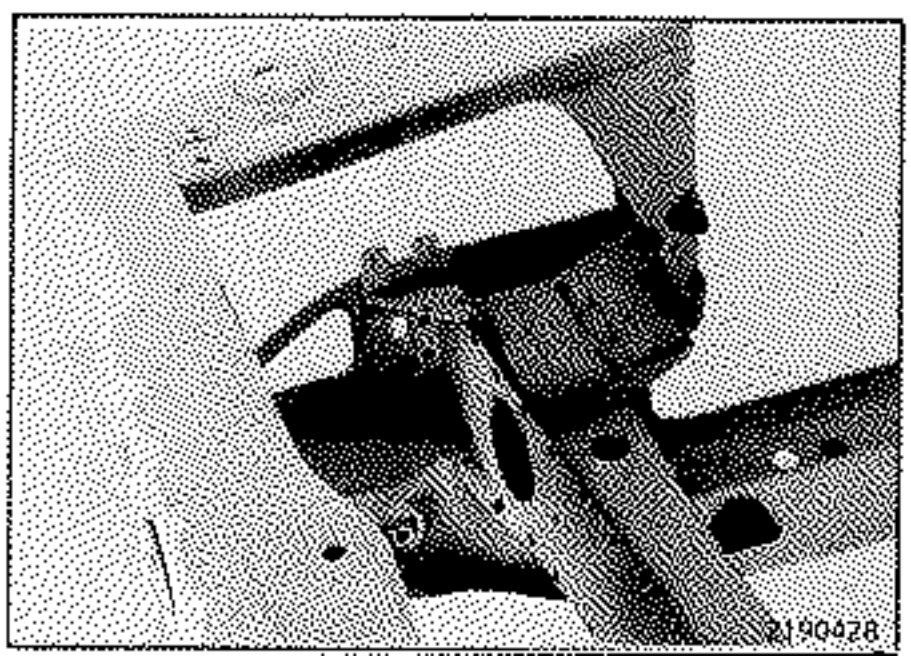
Bare part.



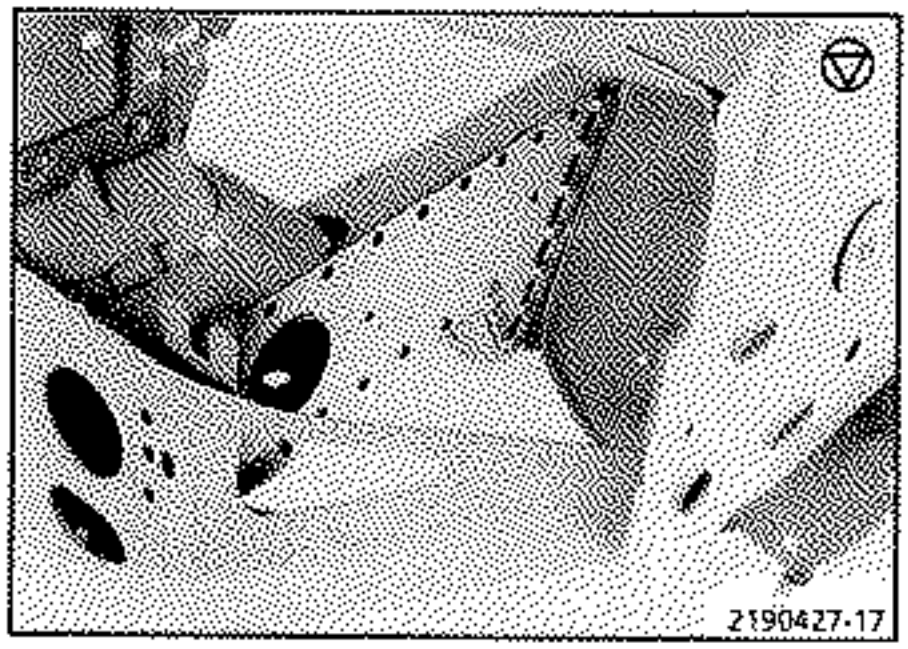
CUTTING OUT - UNPICKING





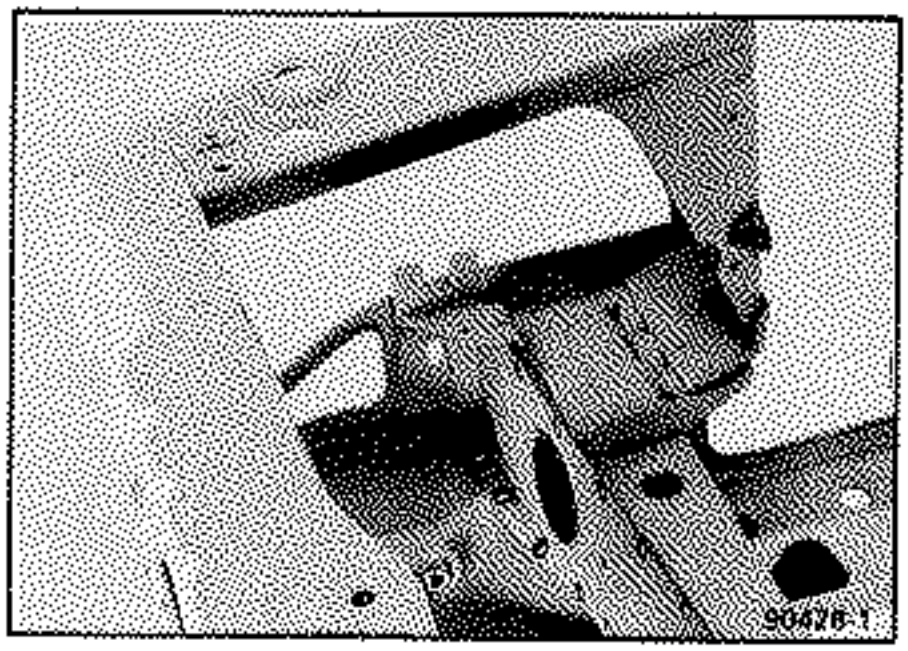


WELDING



D = 4.5 mm **e = 2 mm** **H = 30 mm**

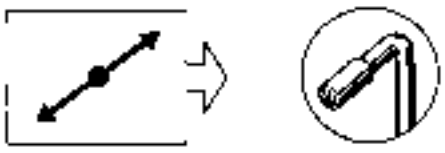




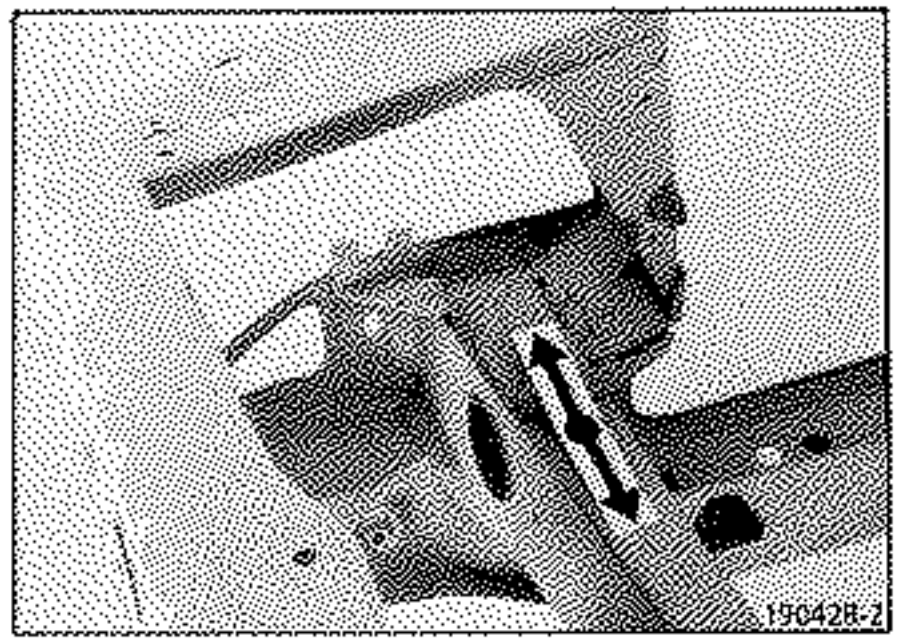
e = 2 mm **H = 30 mm**



PROTECTING HOLLOW SECTIONS



This is performed after painting and before the trim is refitted.



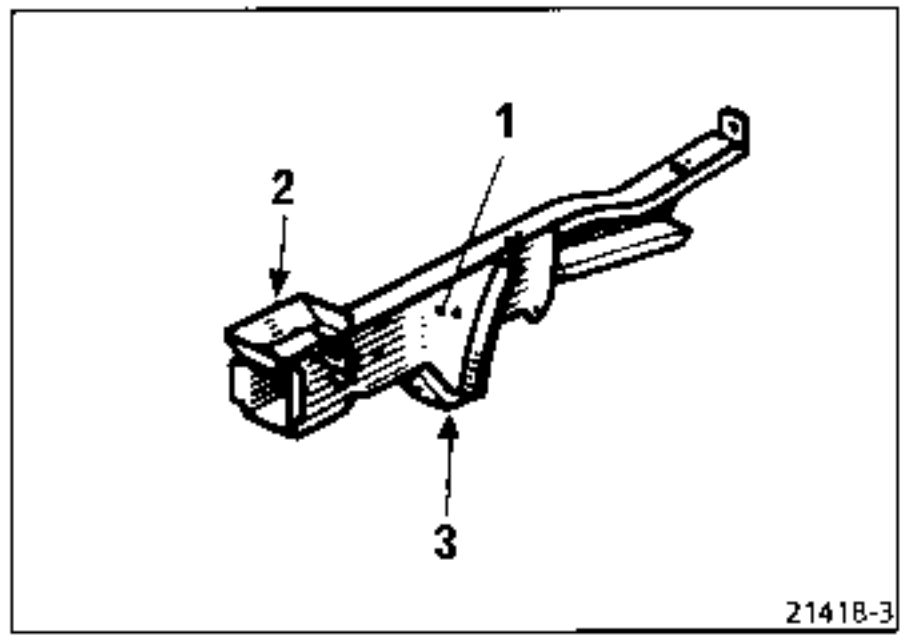
Front side member, front section

This operation is to be performed on the repair bench. Refer to sub-section **40** for the positioning of the components.

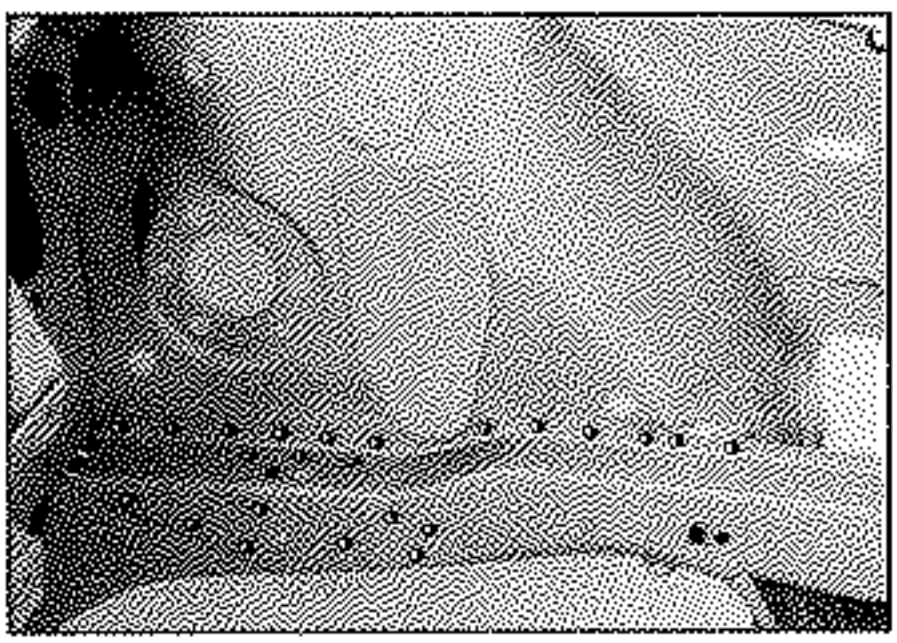
COMPOSITION OF PART FROM PARTS DEPARTMENT

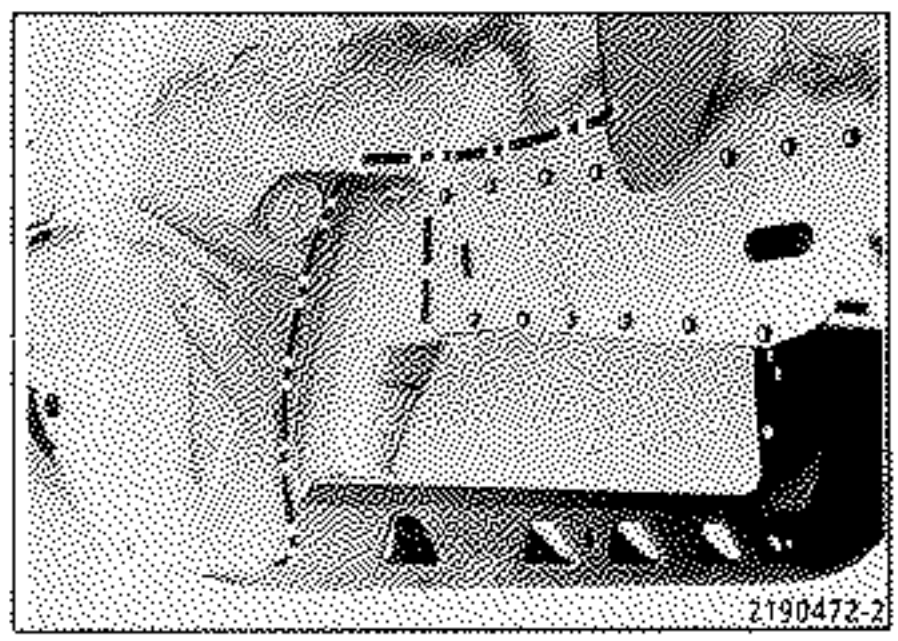
Supplied with:

- Closure panel.
- Headlight carrier panel connecting gusset.
- Sub-frame mounting gusset.



CUTTING OUT - UNPICKING

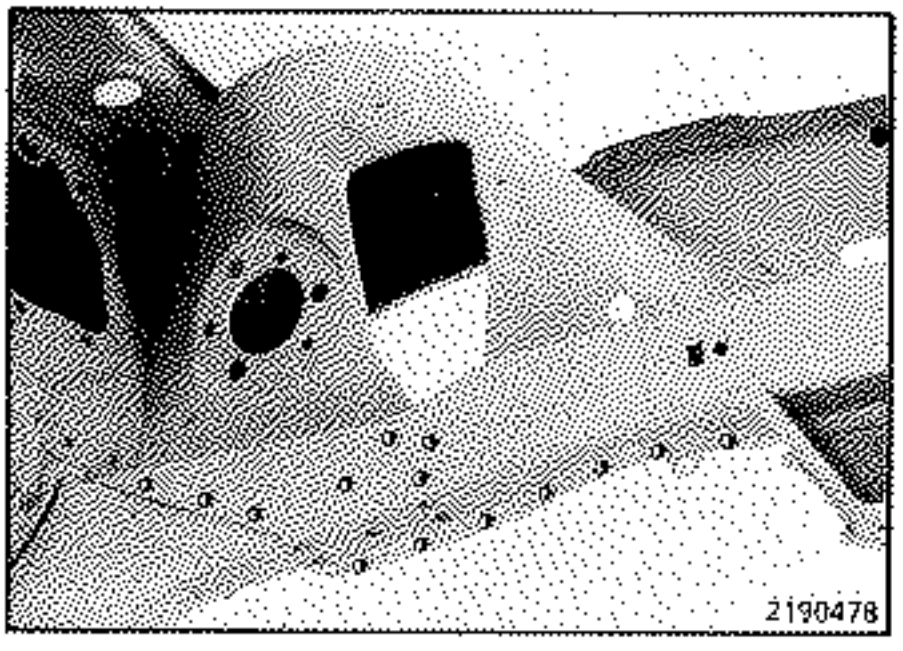


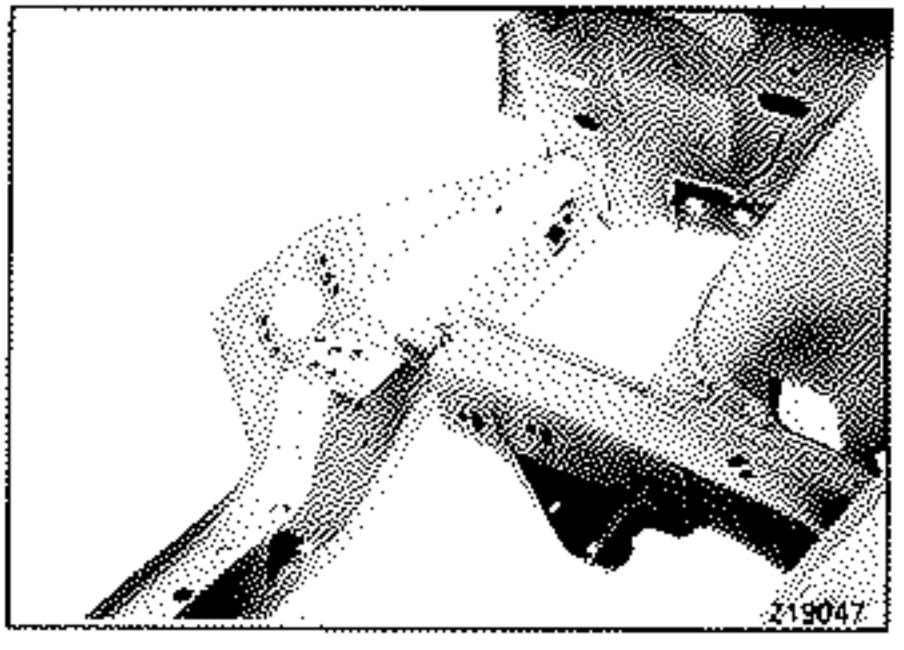




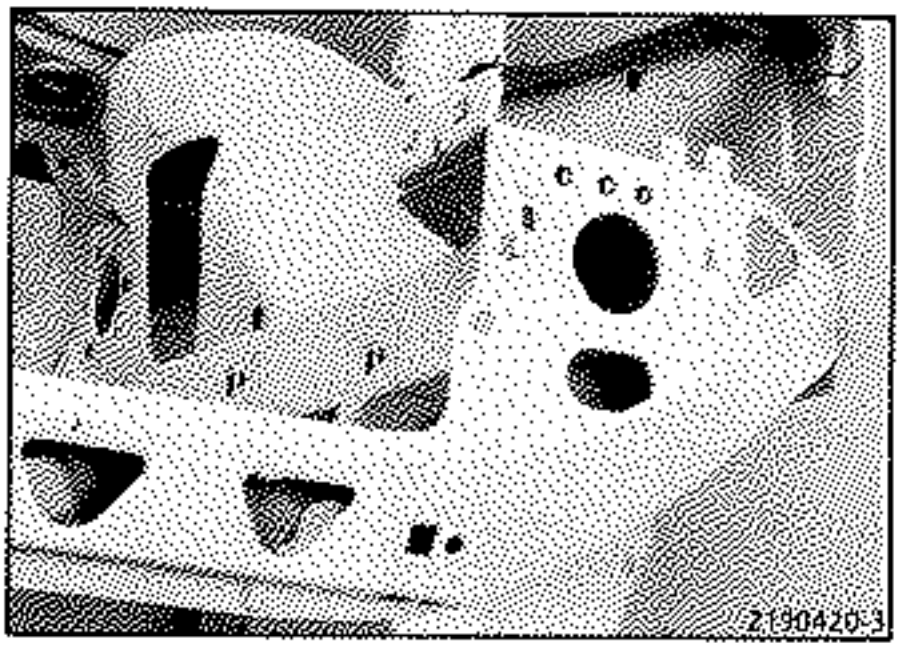


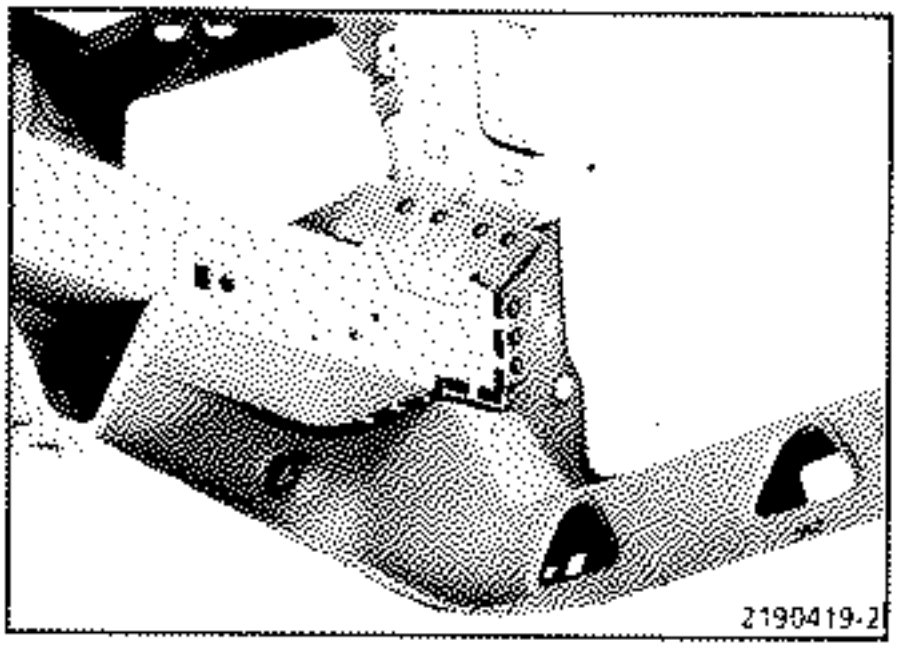
CUTTING OUT - UNPICKING (cont)

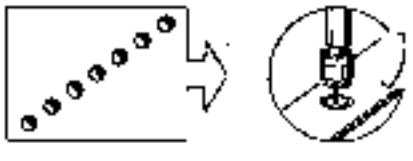


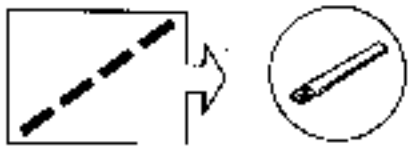




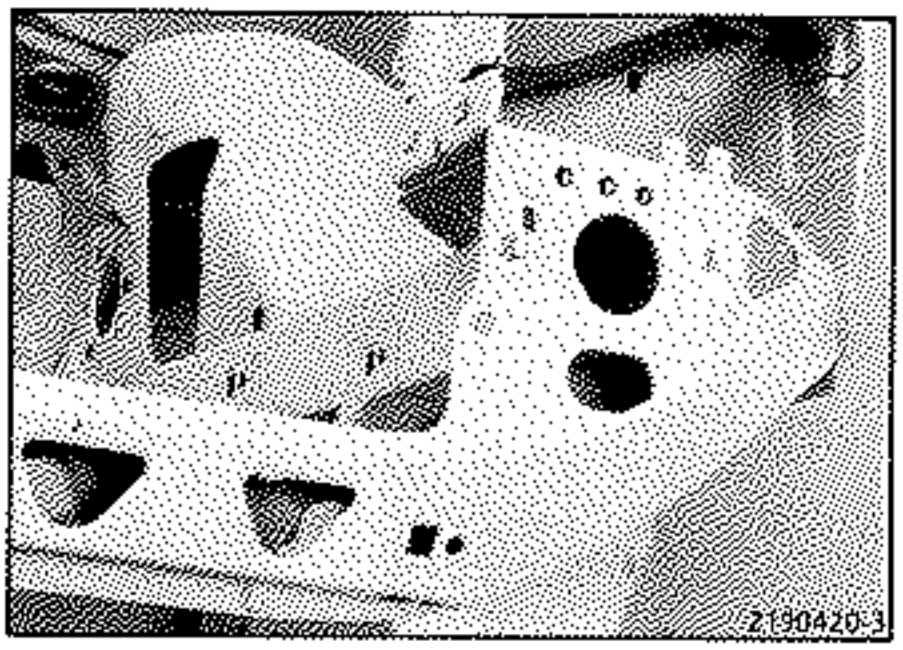


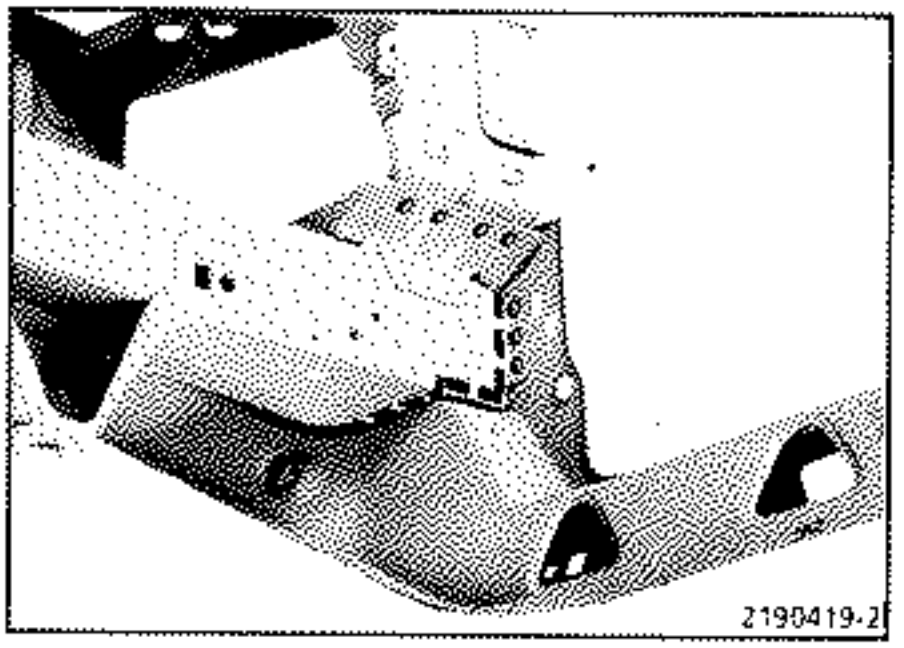






WELDING



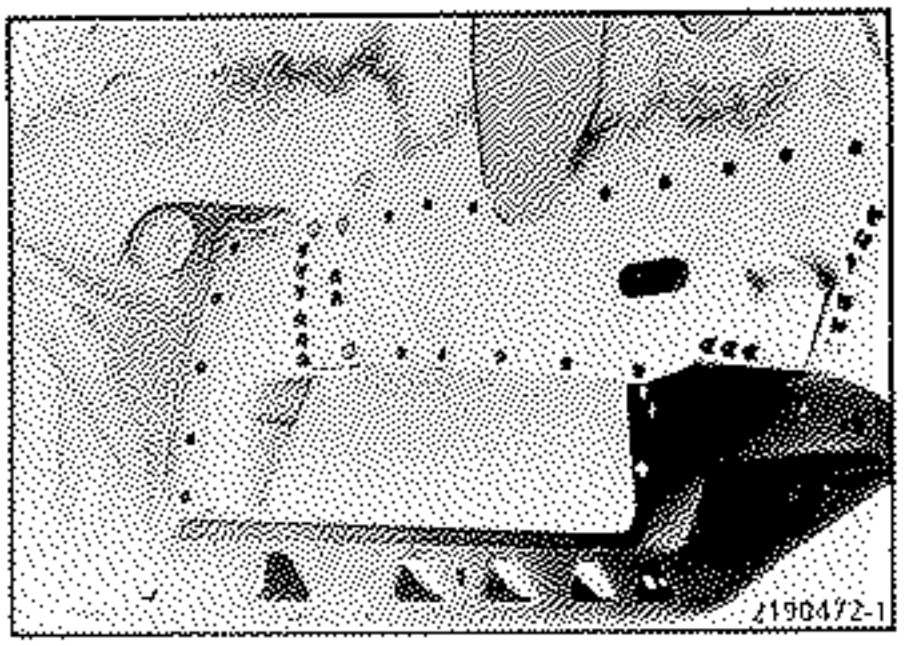


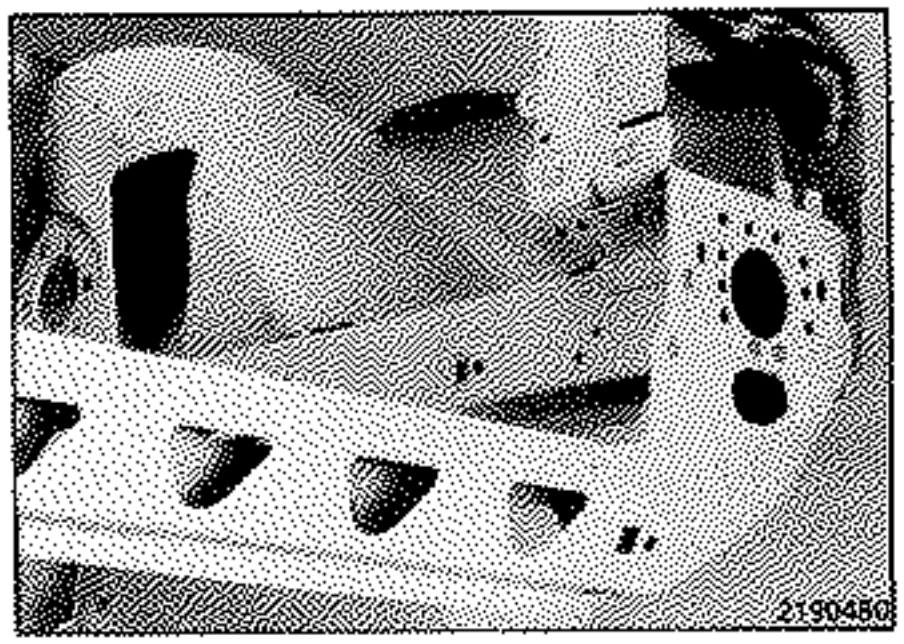
D = 6 mm



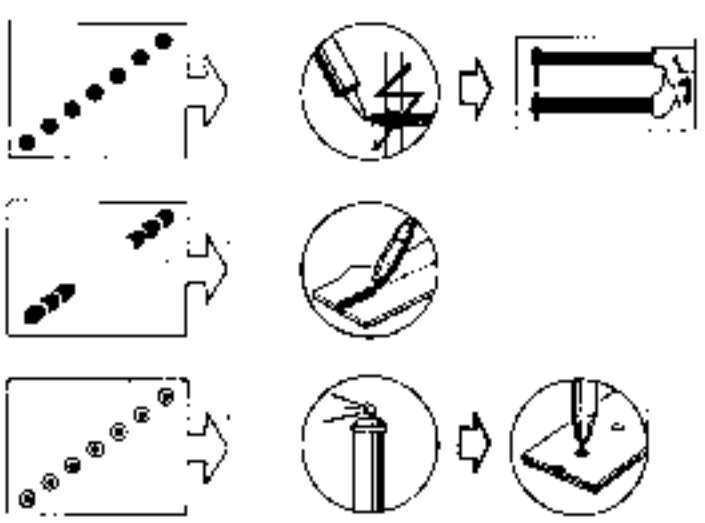
e = 2.5 mm H = 30 mm



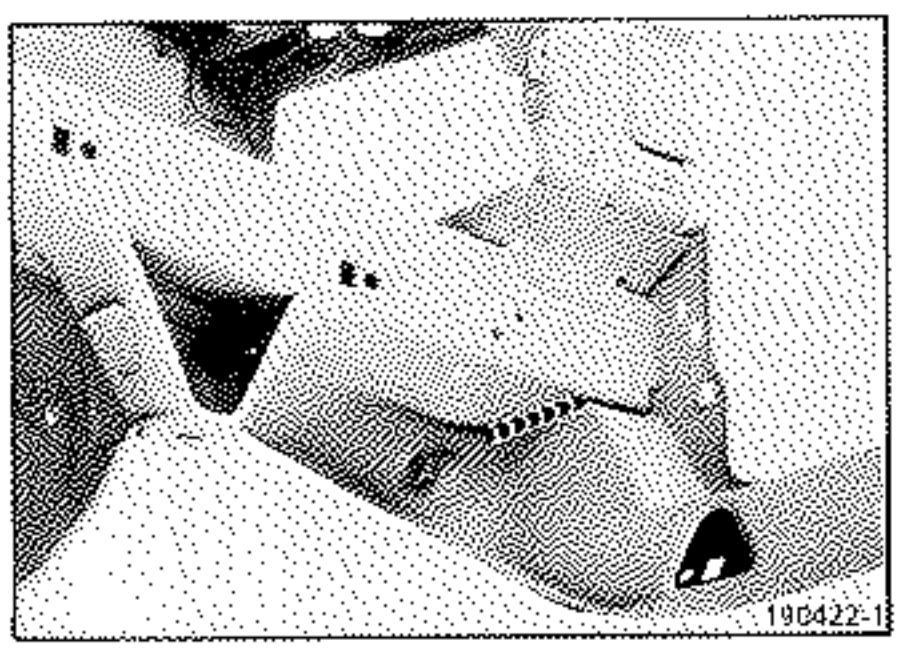




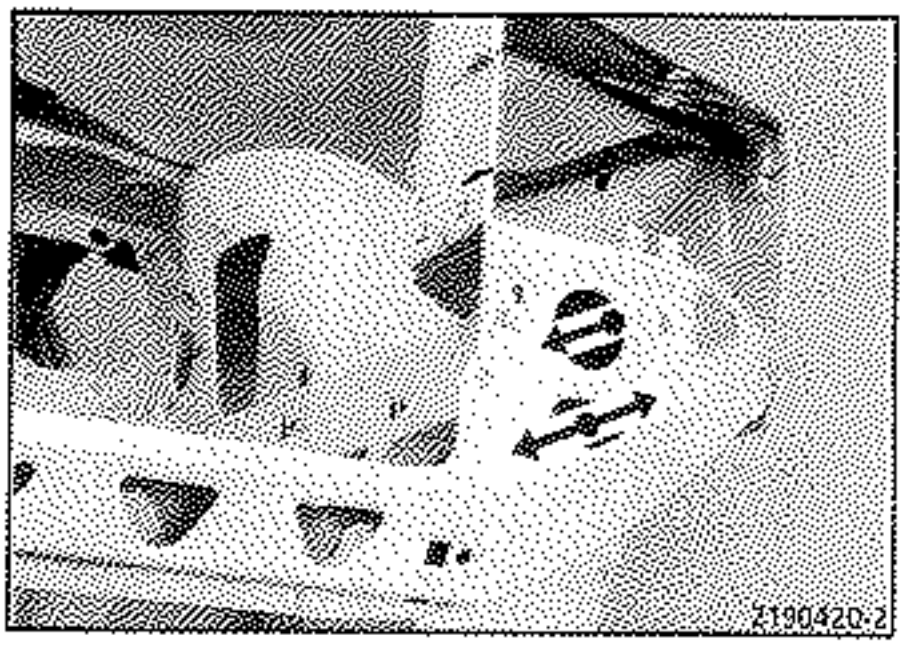
e = 1.5 mm H = 30 mm



e = 2 mm H = 30 mm D = 4.5 mm



PROTECTING HOLLOW SECTIONS



This is performed after painting and before the trim is refitted.





Front half unit

This operation is to be performed on the repair bench. Refer to sub-section **40** for the positioning of the components.

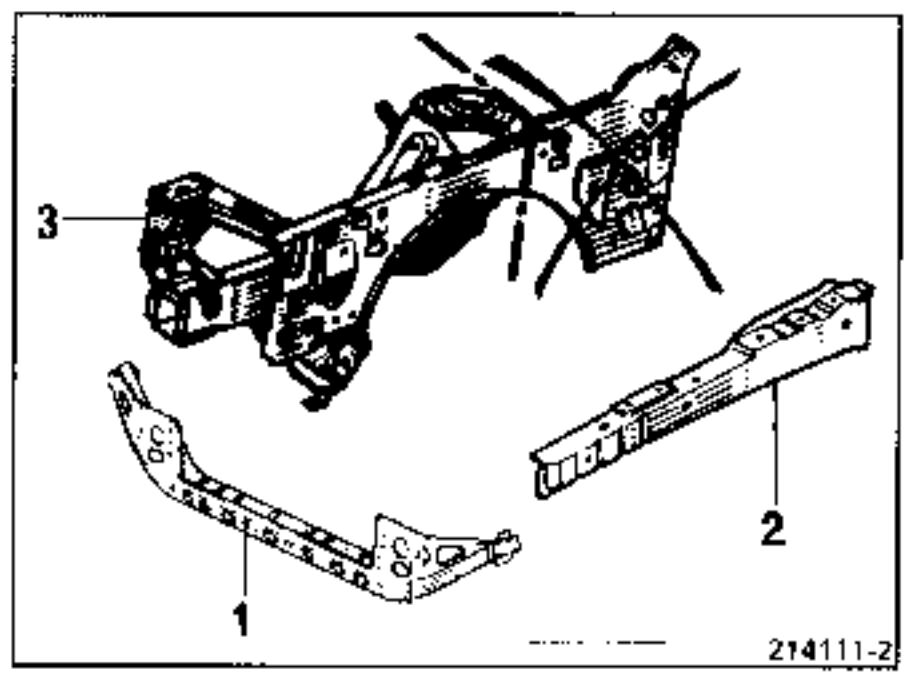
Replacing the half unit also requires the lower front end cross member and the cowl side panel reinforcement to be replaced.

COMPOSITION OF PART FROM PARTS DEPARTMENT

1) Complete lower cross member:
   - Bare cross member.
   - Closure panel.
   - Bumper mounting reinforcement.

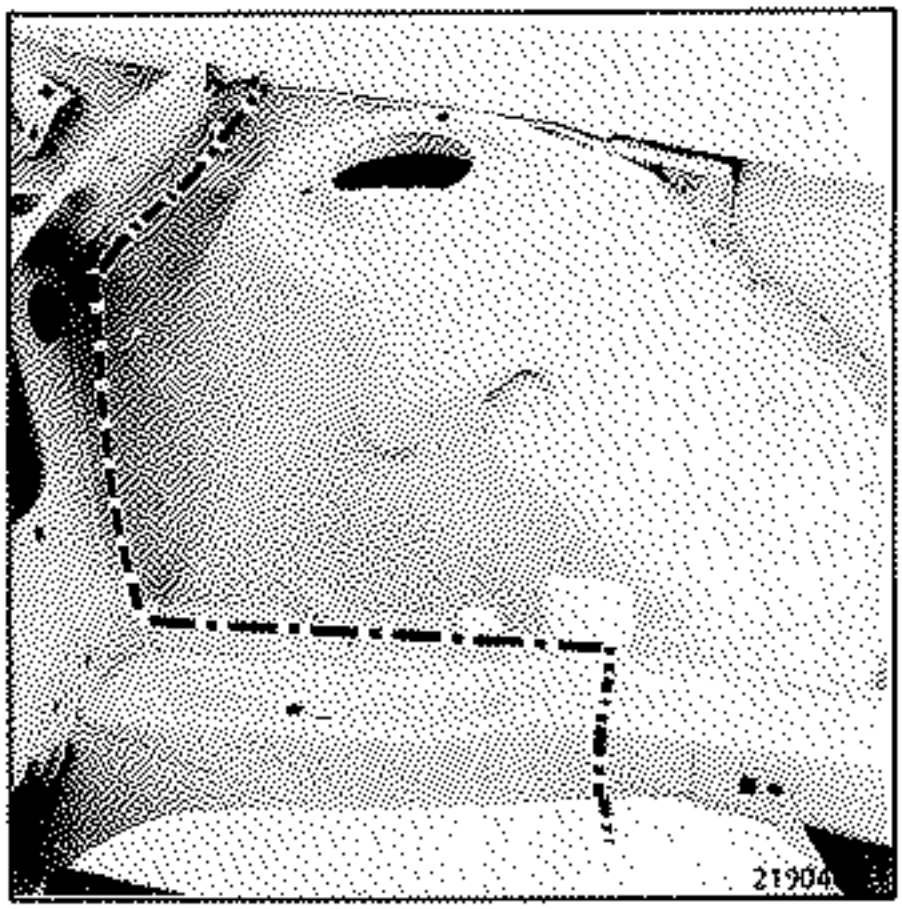
2) Bare cowl side panel reinforcement.

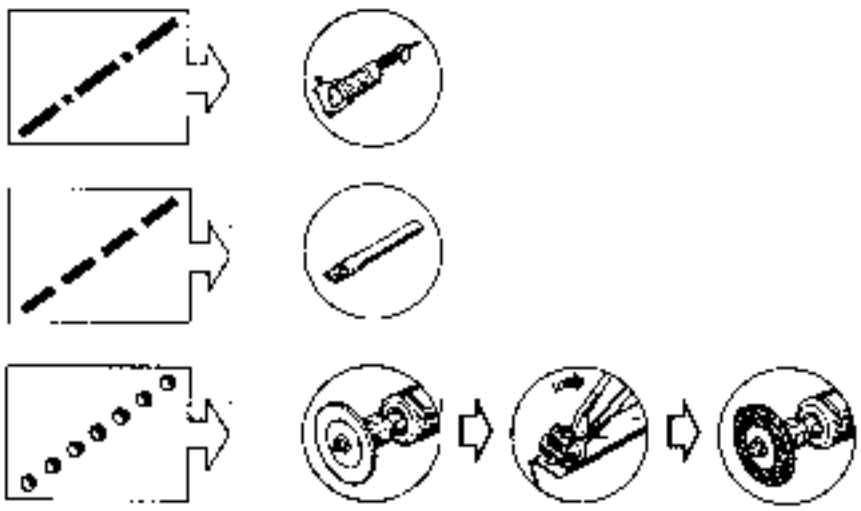
3) Half unit:
   - Front section of side member with closure panels.
   - Wheel arch with reinforcements, mounting and extension.
   - Headlight carrier panels.
   - Cowl side panel.



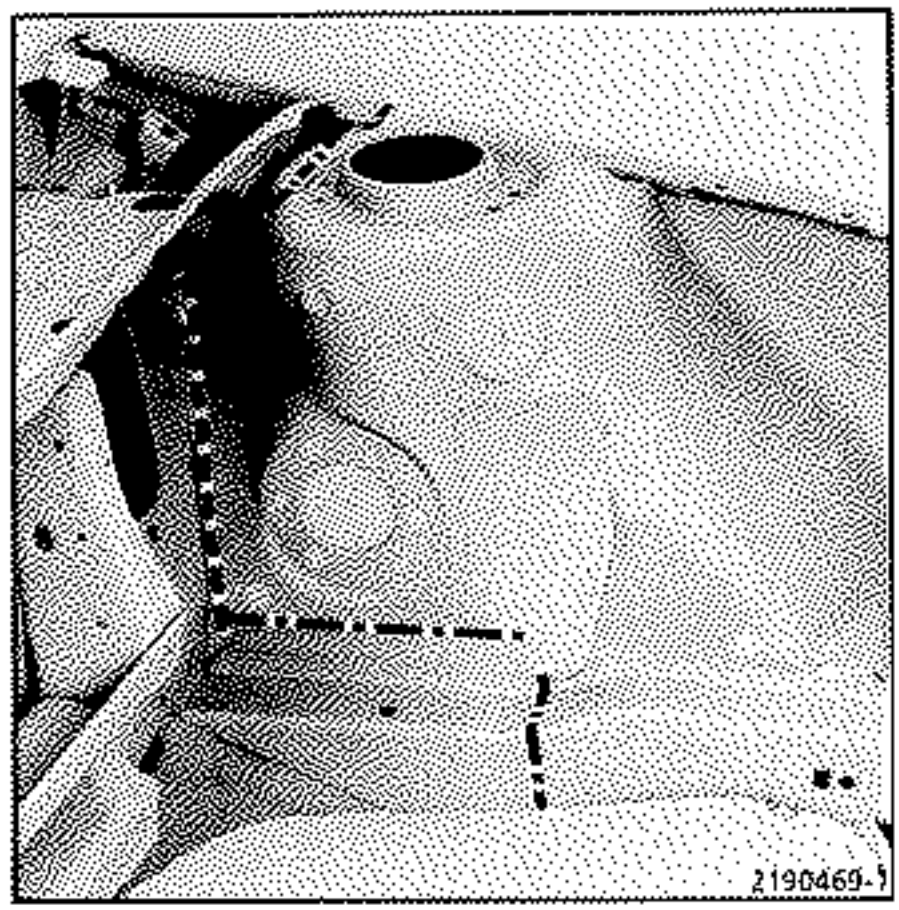
CUTTING OUT - UNPICKING

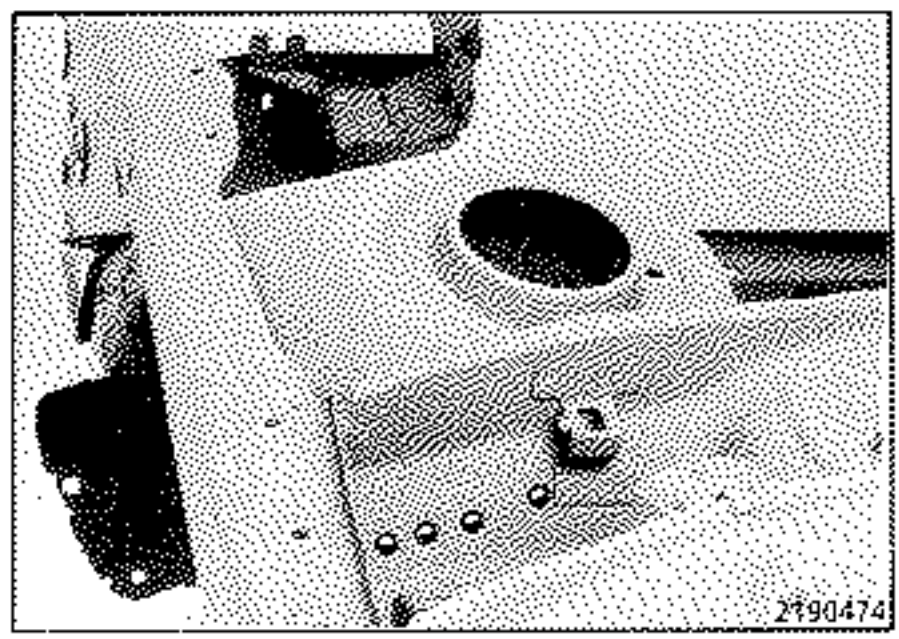
Transverse engine.



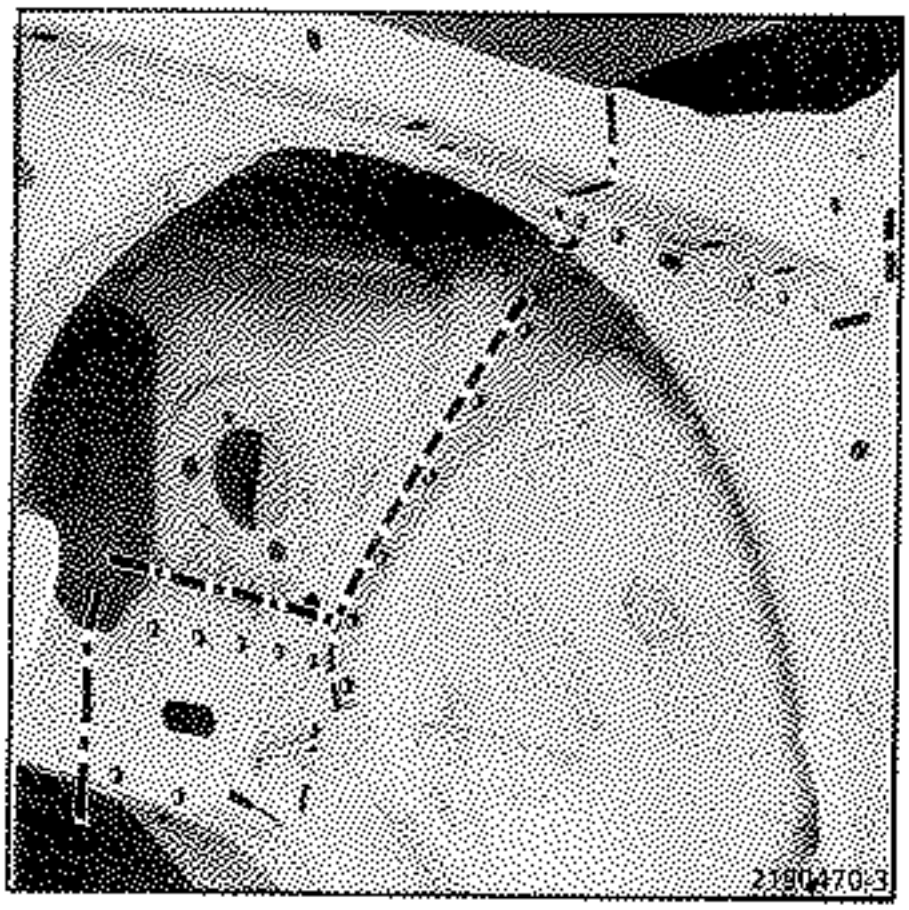


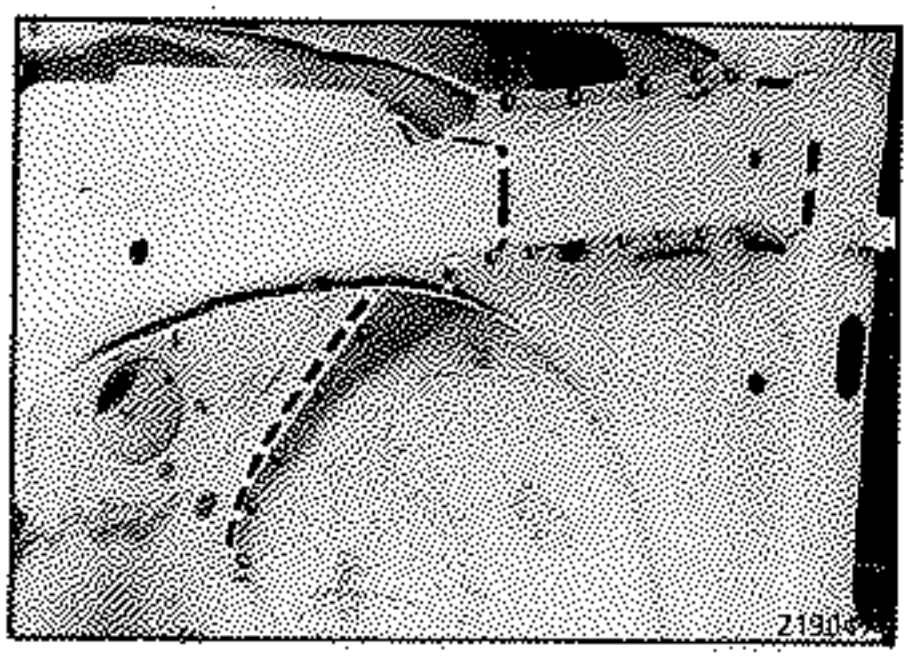
In-line engine.

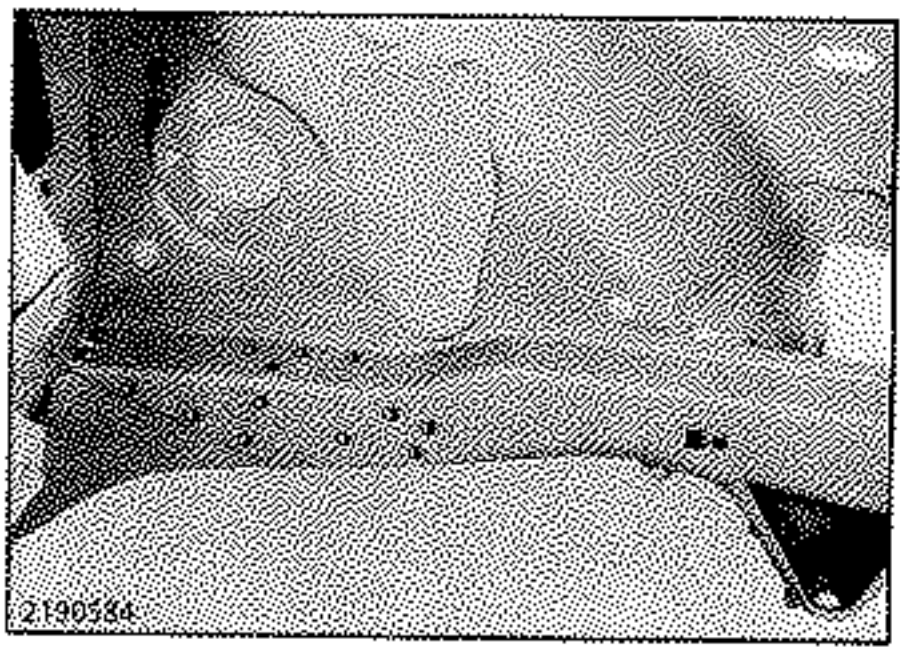


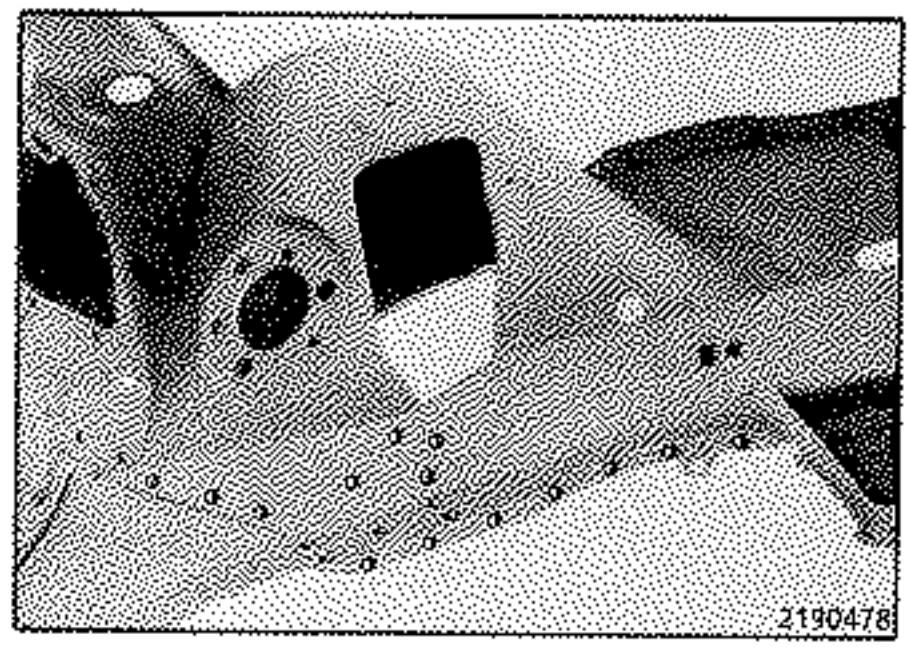


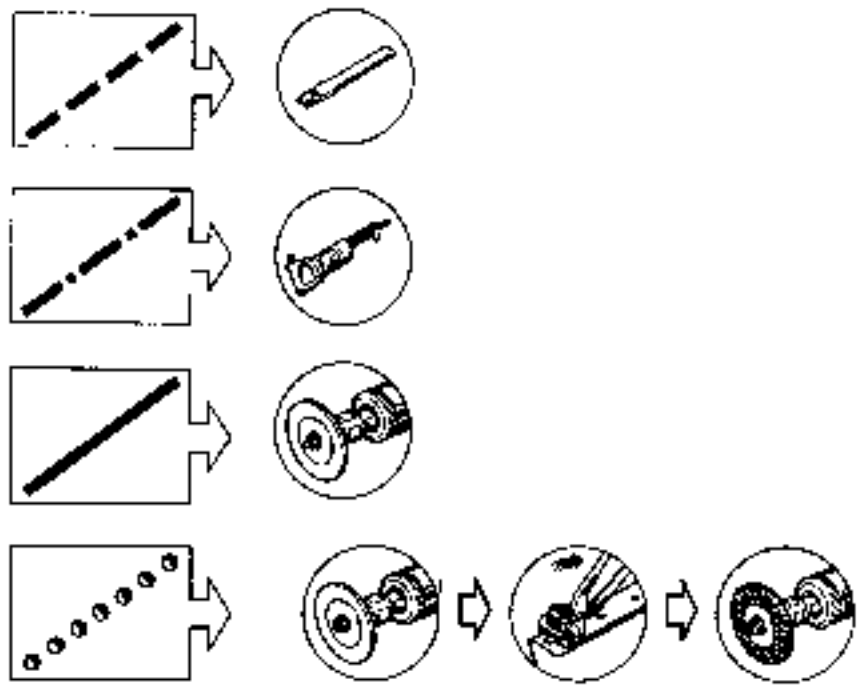
CUTTING OUT - UNPICKING (cont)





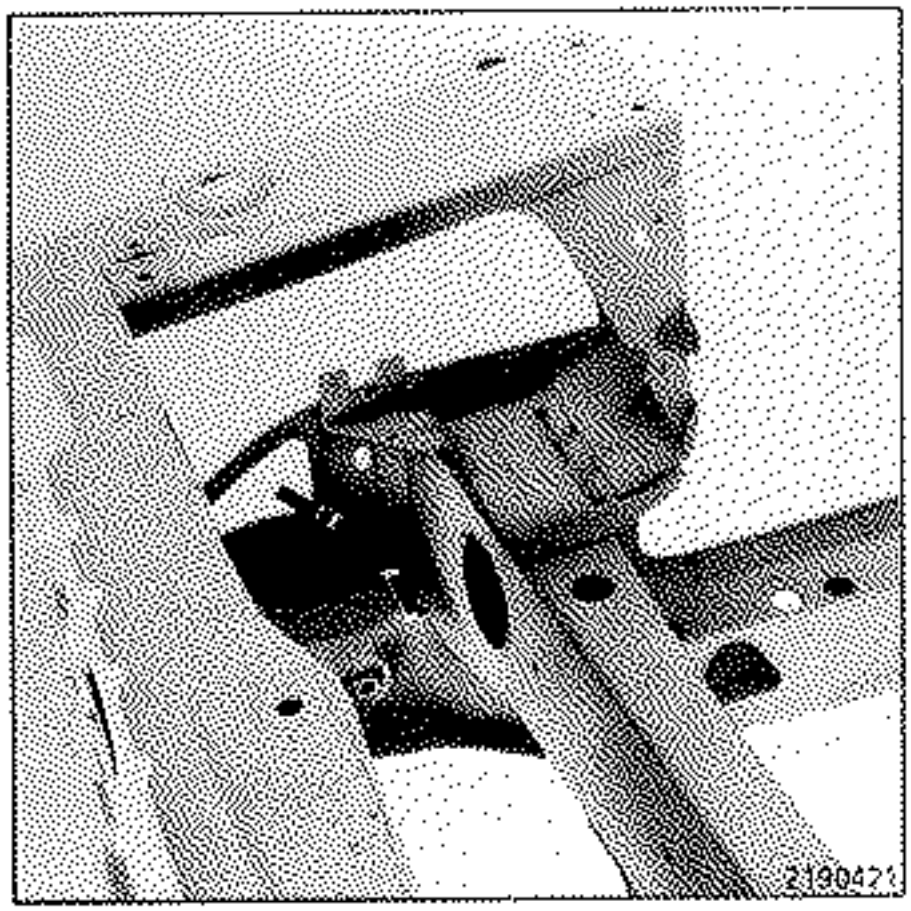


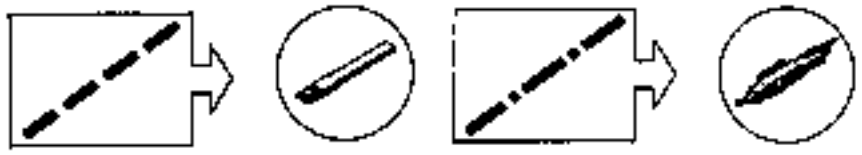


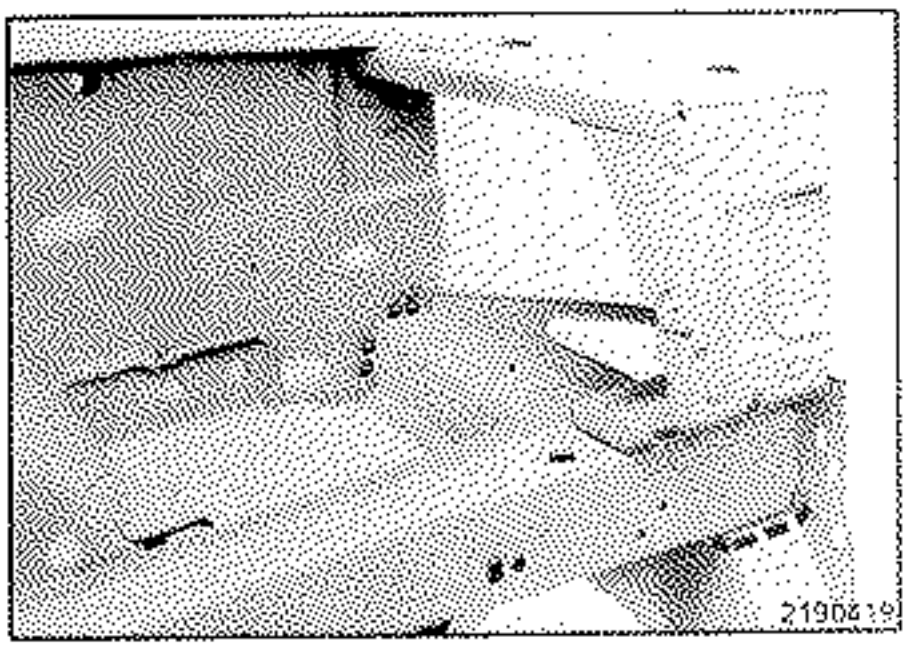


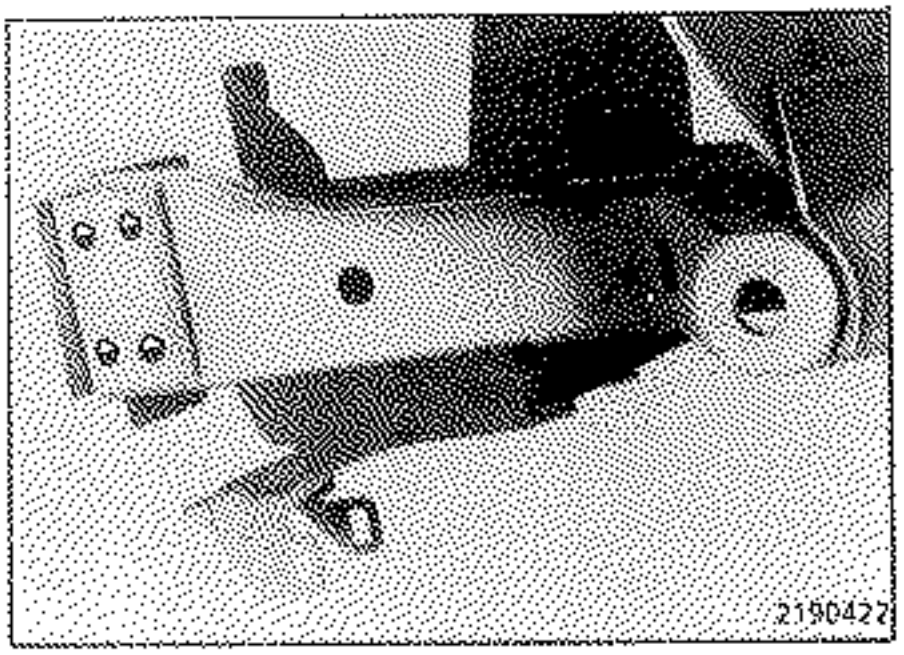
CUTTING OUT - **UNPICKING** (cont)

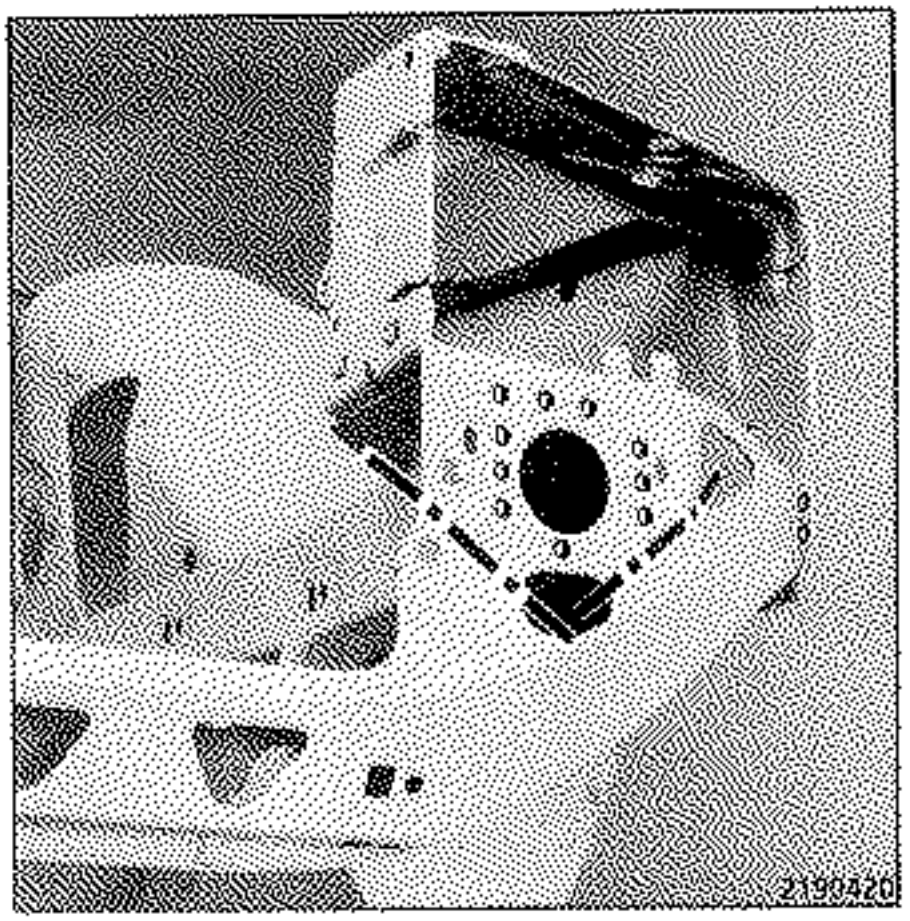
Side opposite impact:





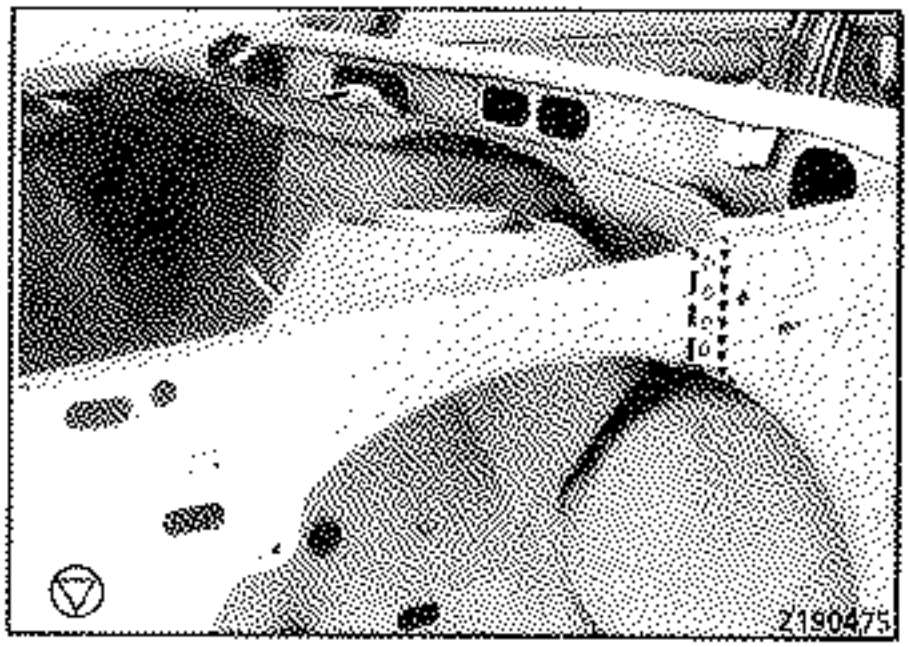




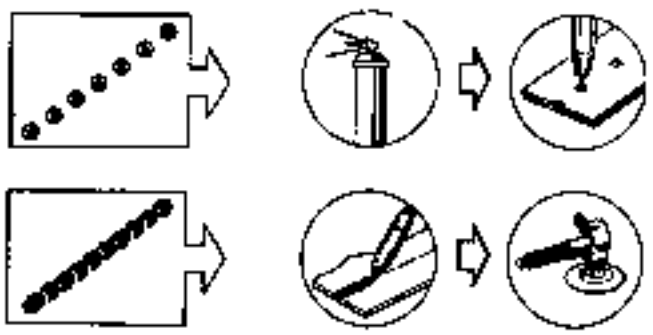


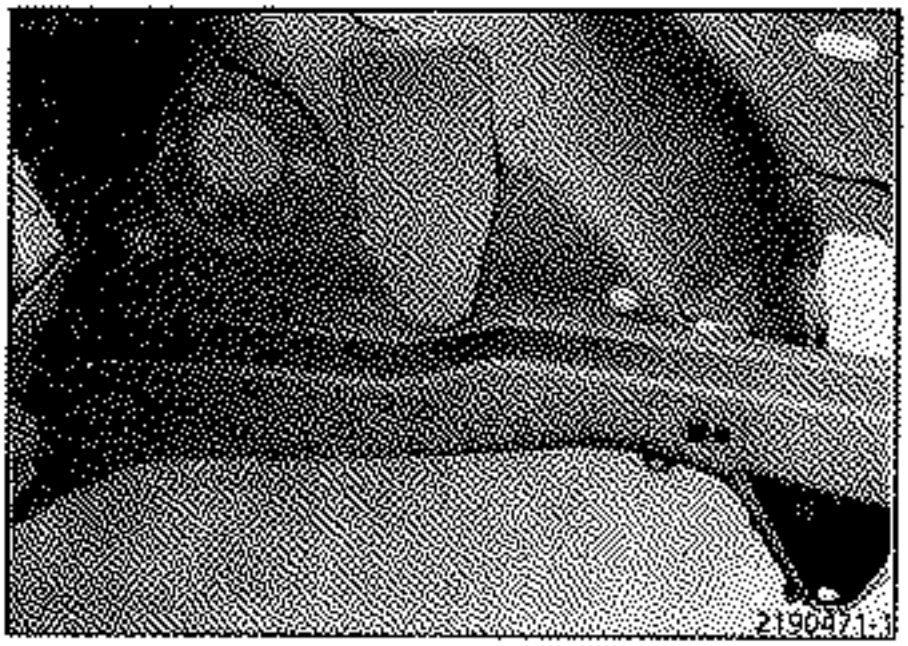


WELDING

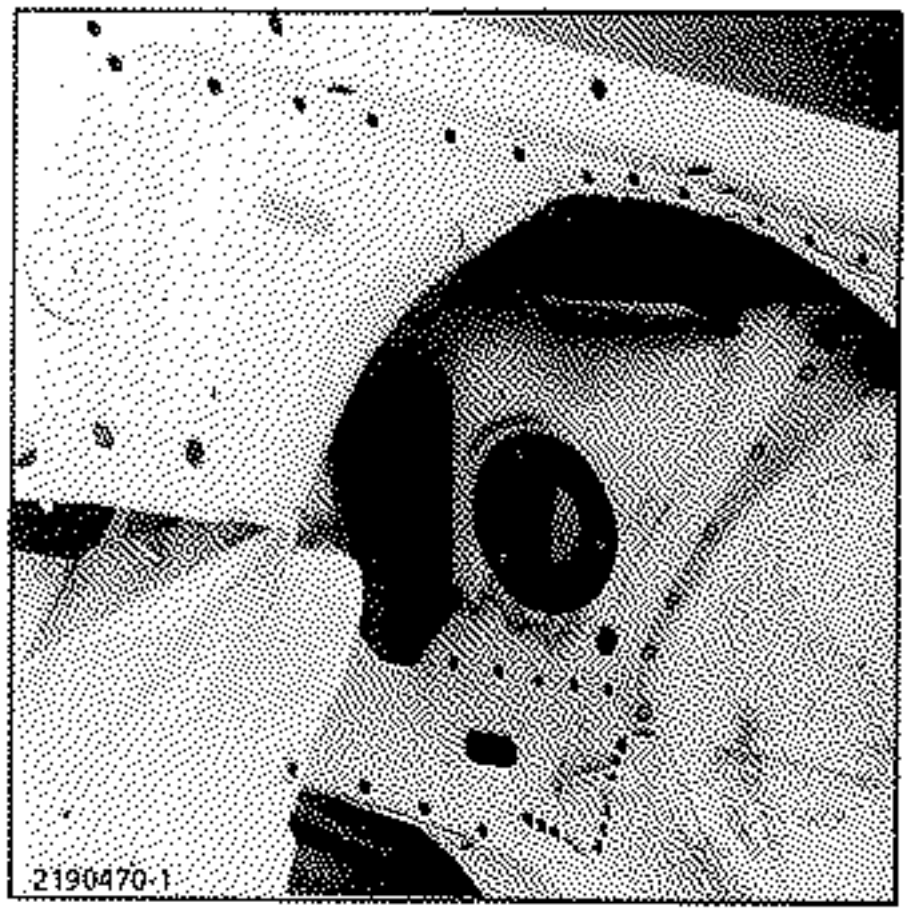


D = 5 mm

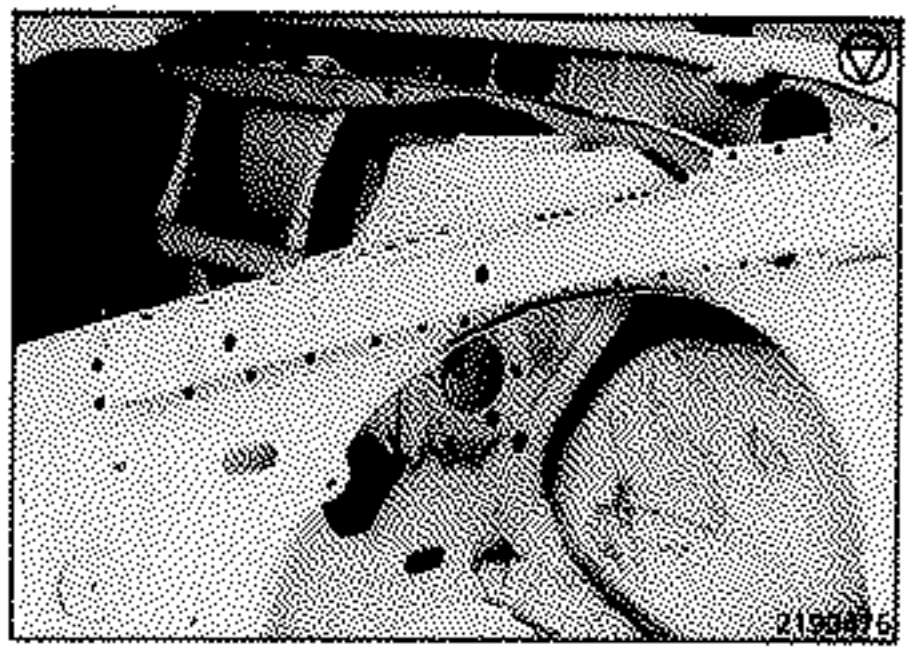




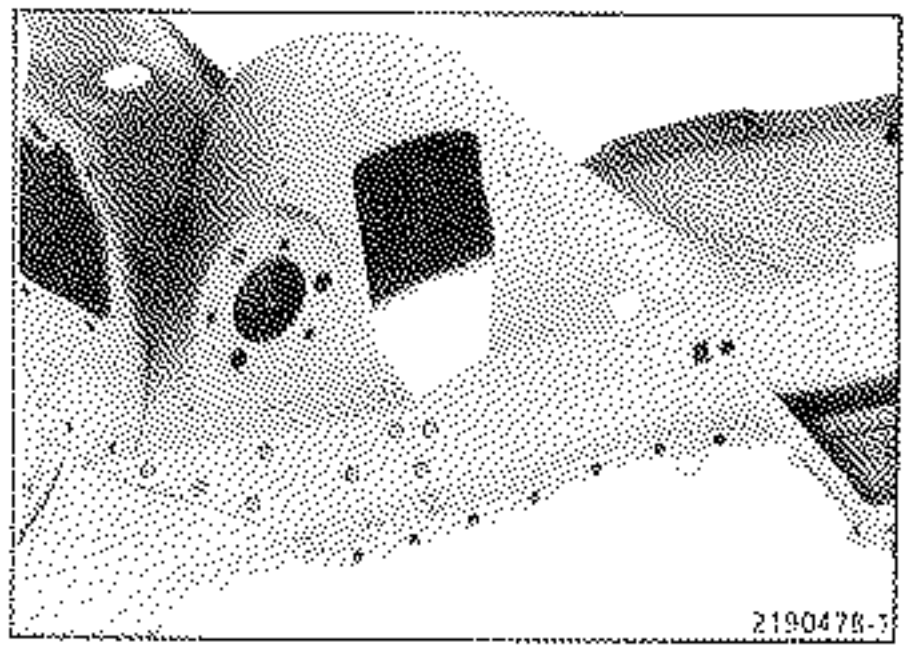
e = 1,7 mm H = 30 mm A : D = 6 mm



D = 5 mm

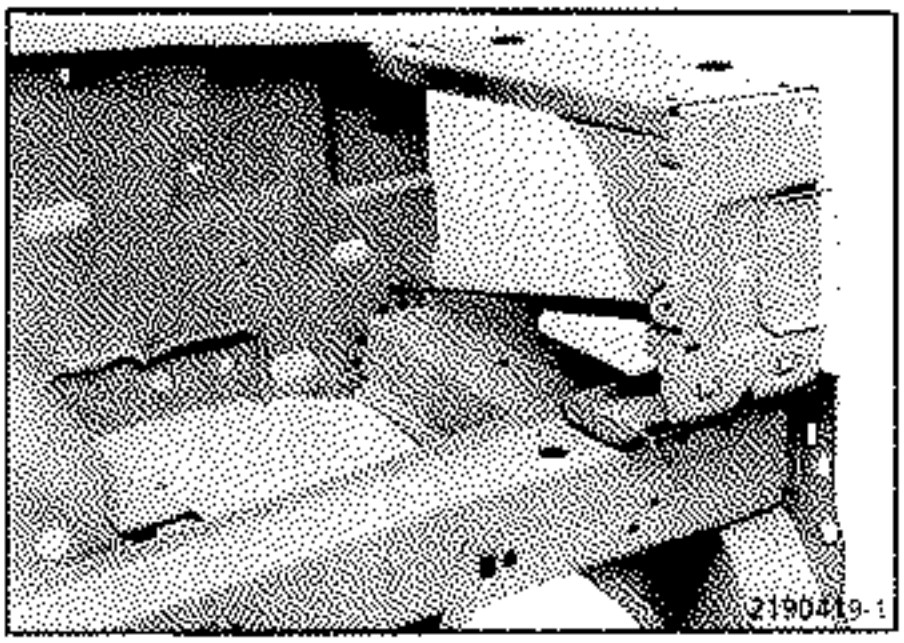


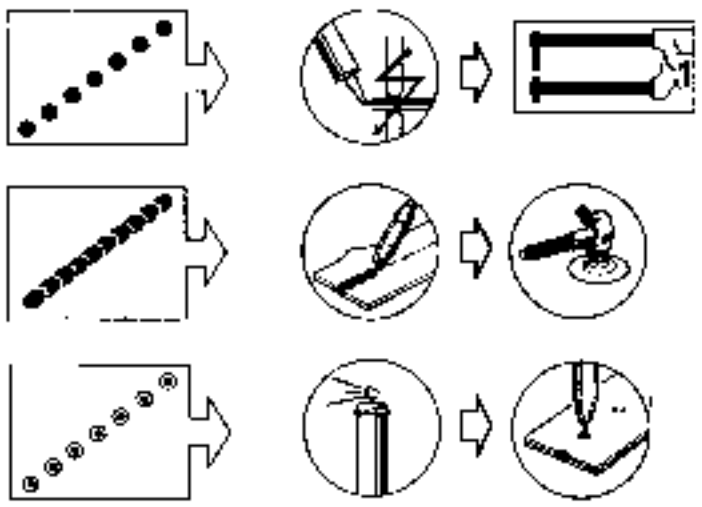
e = 1,7 mm H = 30 mm



D = 5 mm e = 2,5 mm H = 30 mm

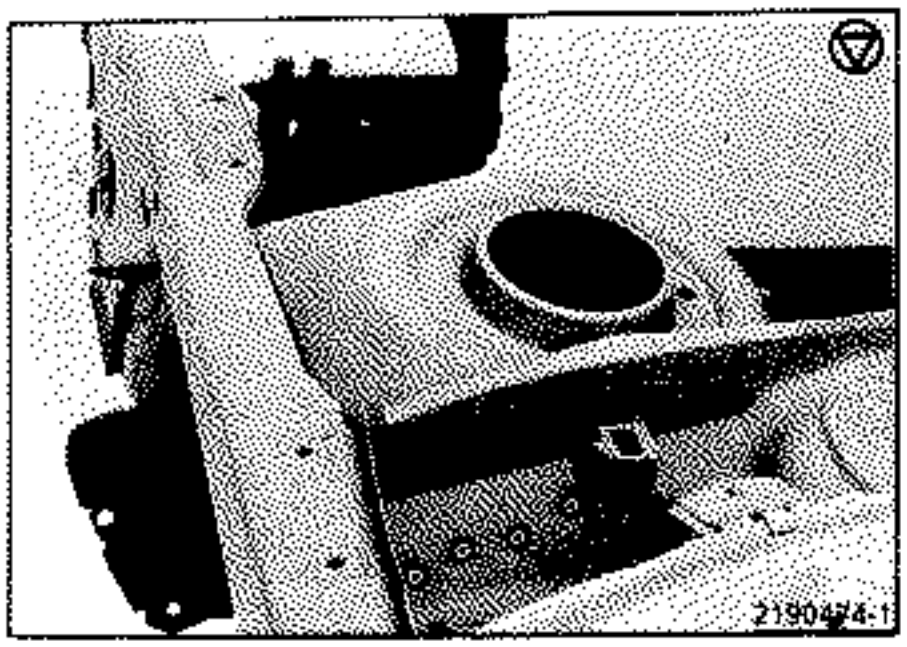
WELDING (cont)



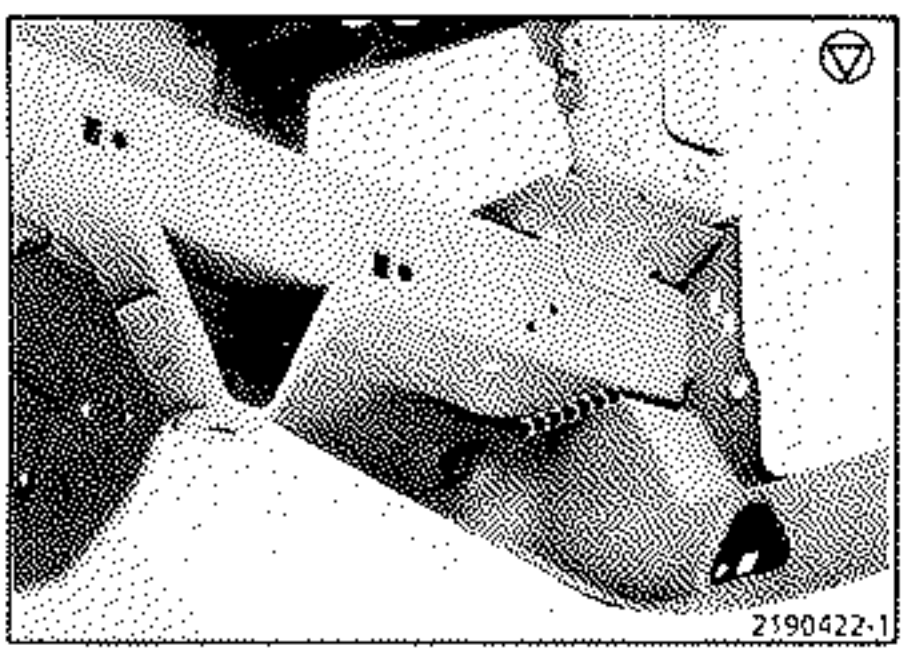


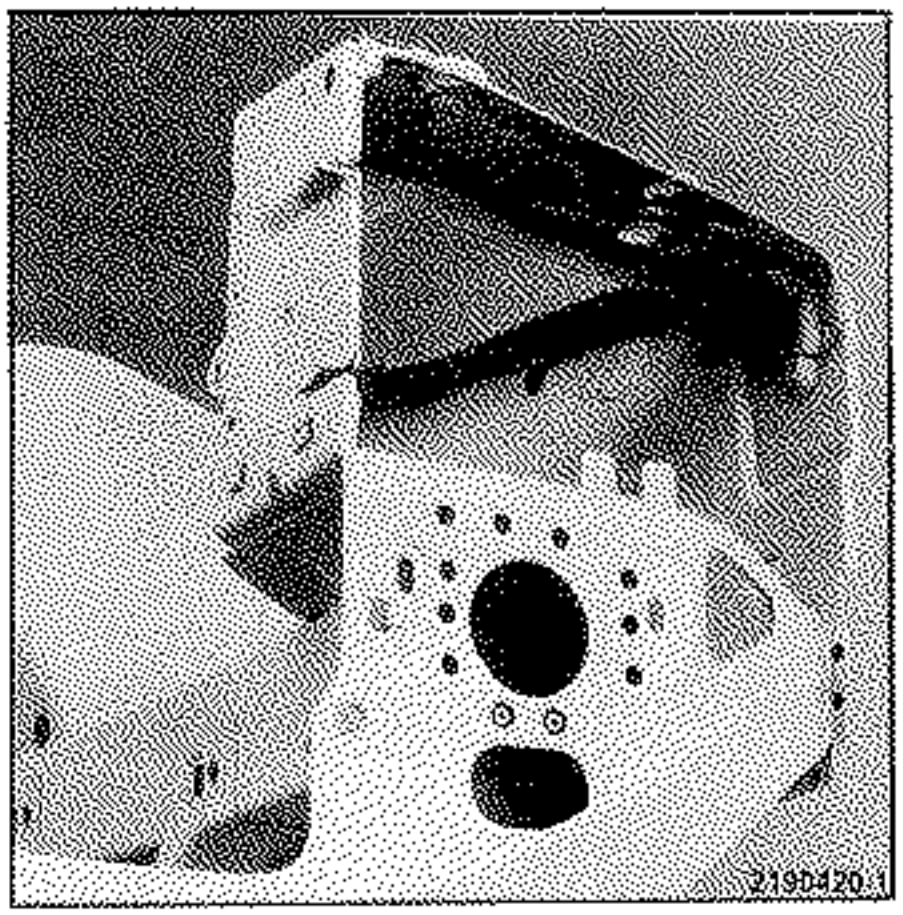
e = 1.6 mm
H = 25 mm

D = 4.5 mm

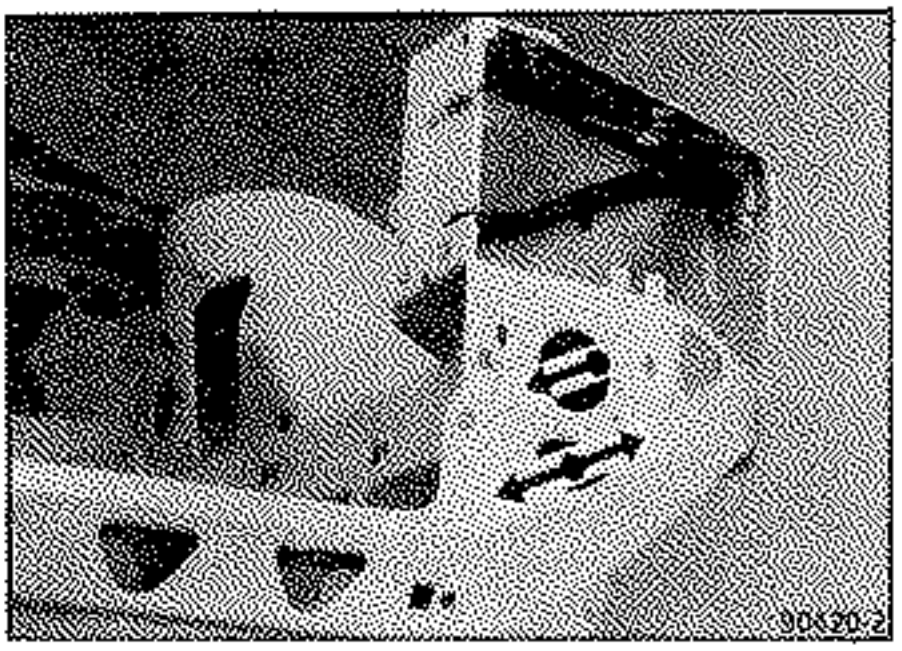


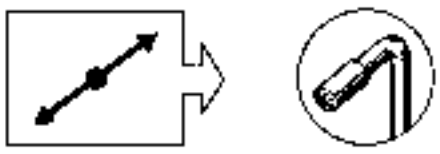
IN-LINE ENGINE

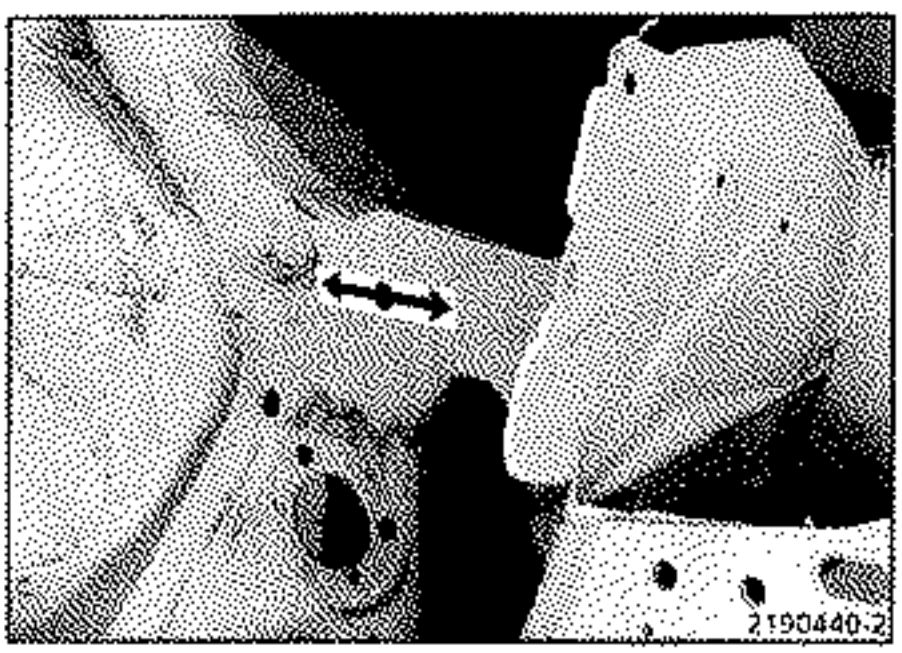




PROTECTING HOLLOW SECTIONS



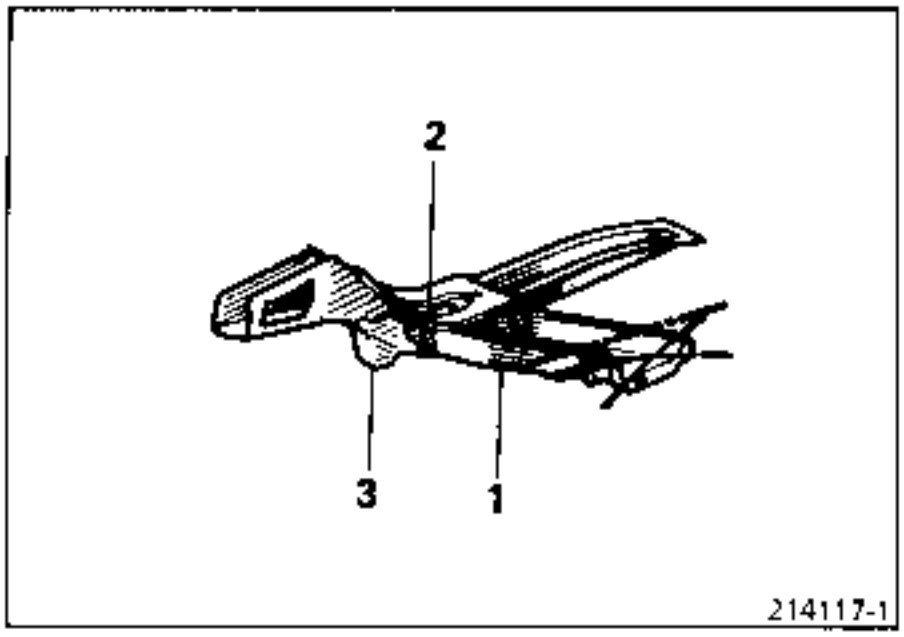


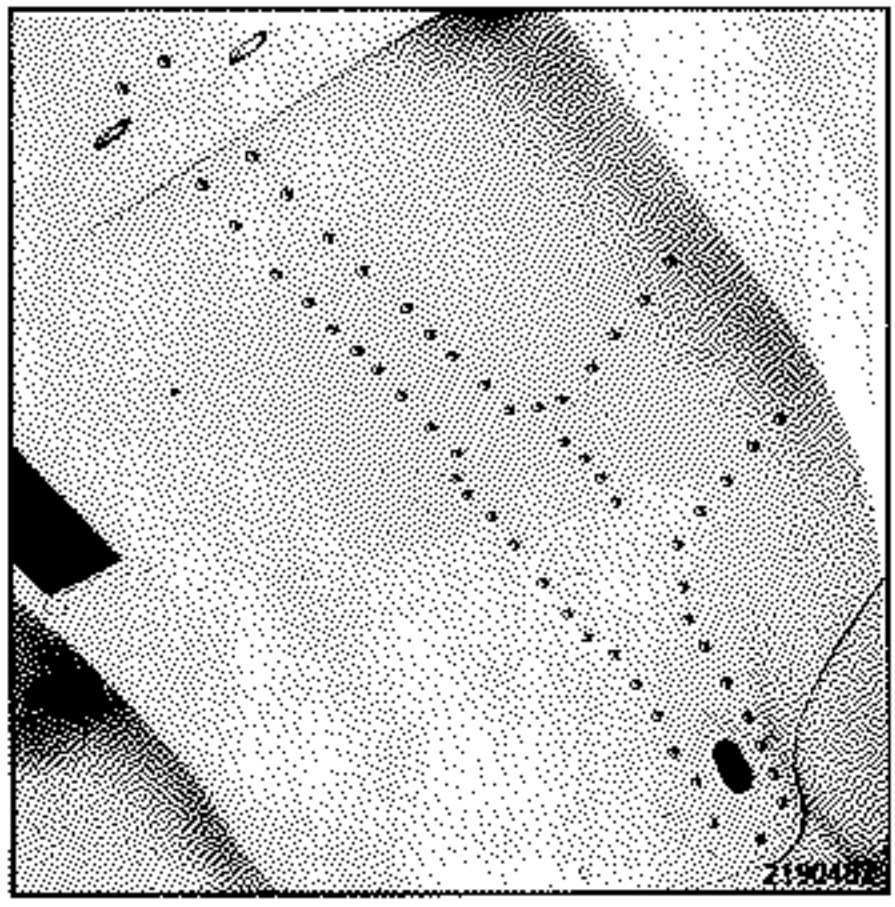


This operation is additional to the preceding one which contains all the information not dealt with below.

COMPOSITION OF PART FROM PARTS DEPARTMENT

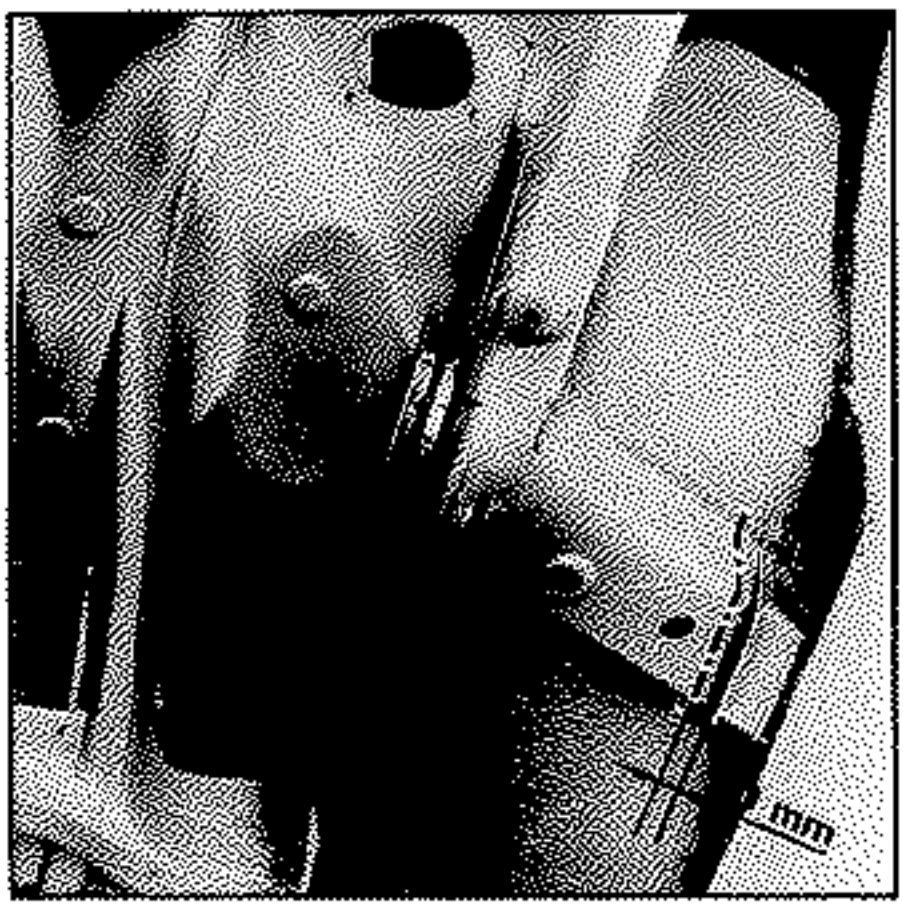
- Side cross member - jack reinforcement (1).
- Upper closure panel (2).
- Sub-frame mounting gusset (3).

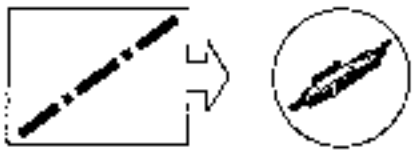




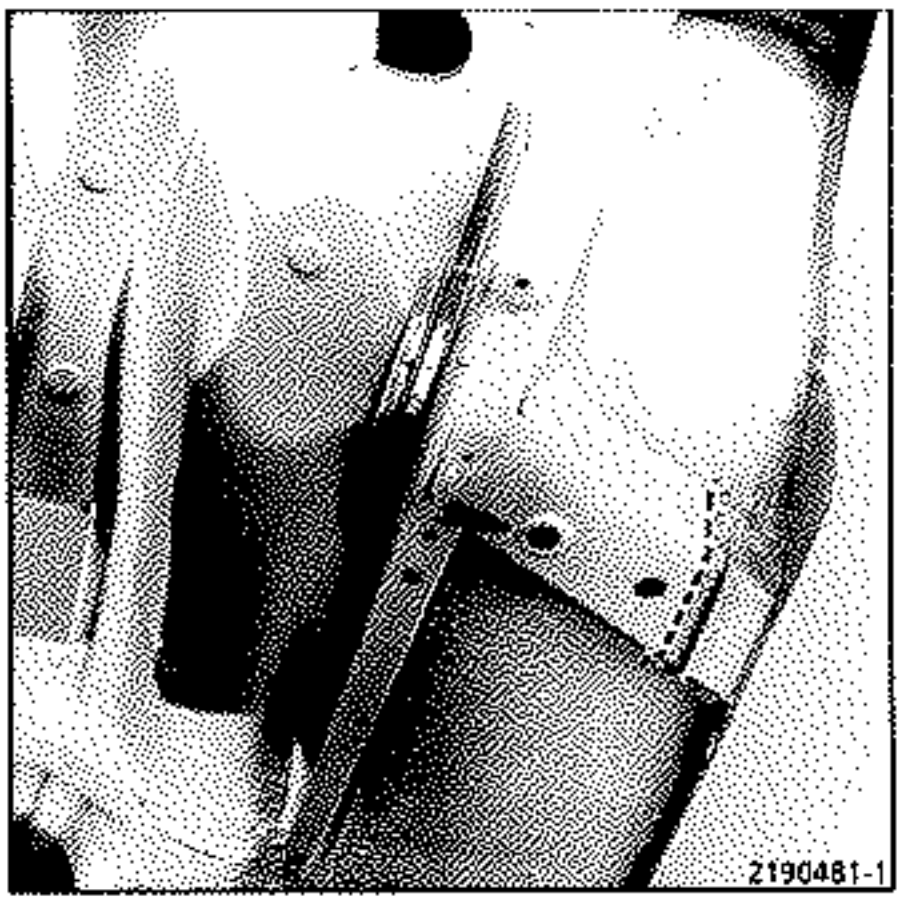


CUTTING OUT - UNPICKING



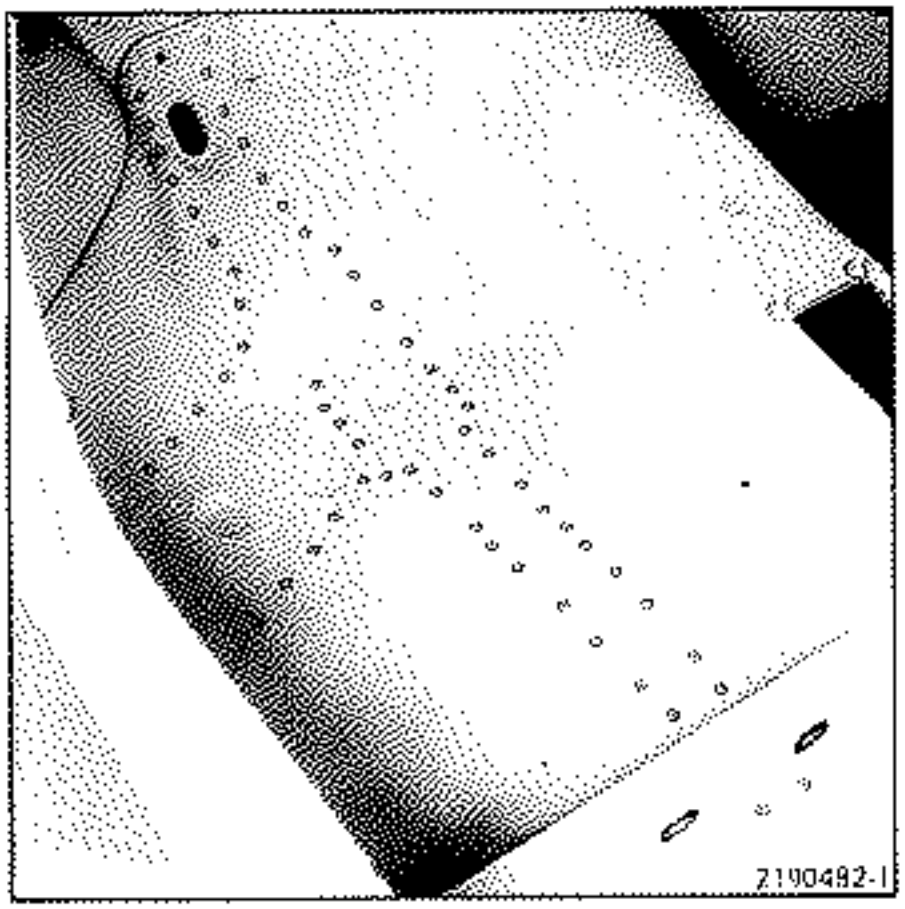


WELDING



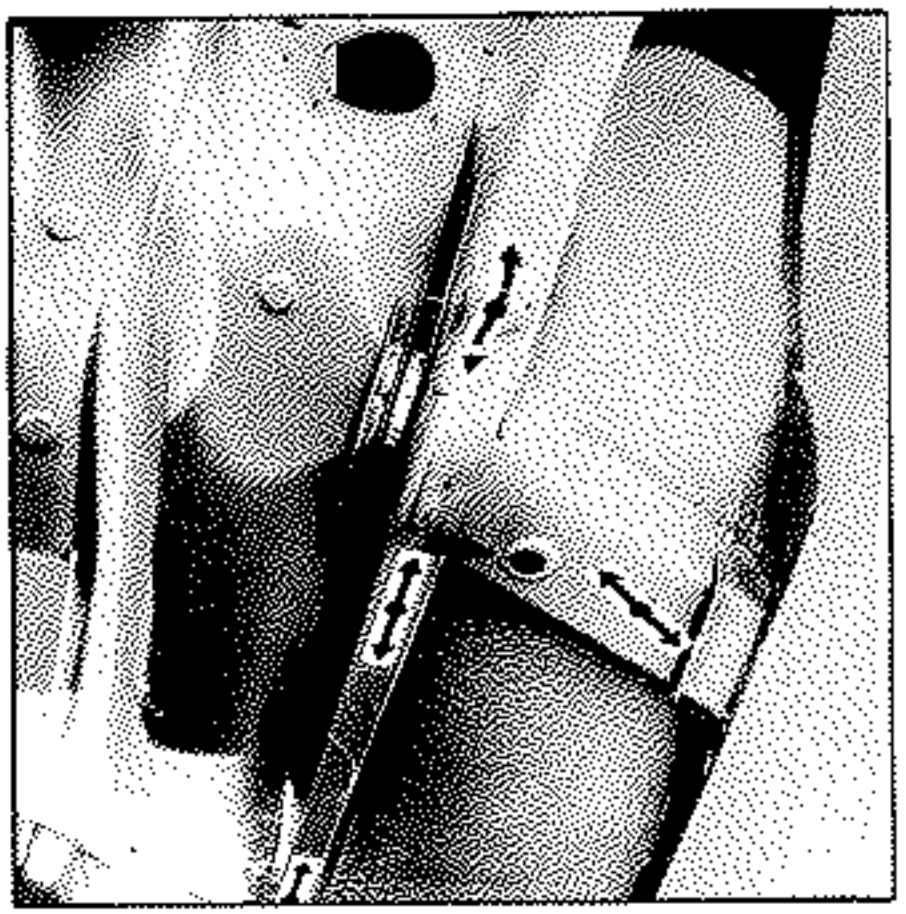


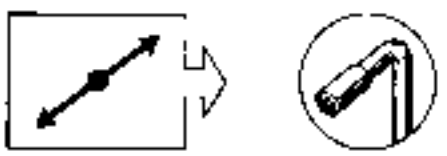
WELDING (cont)





PROTECTING HOLLOW SECTIONS

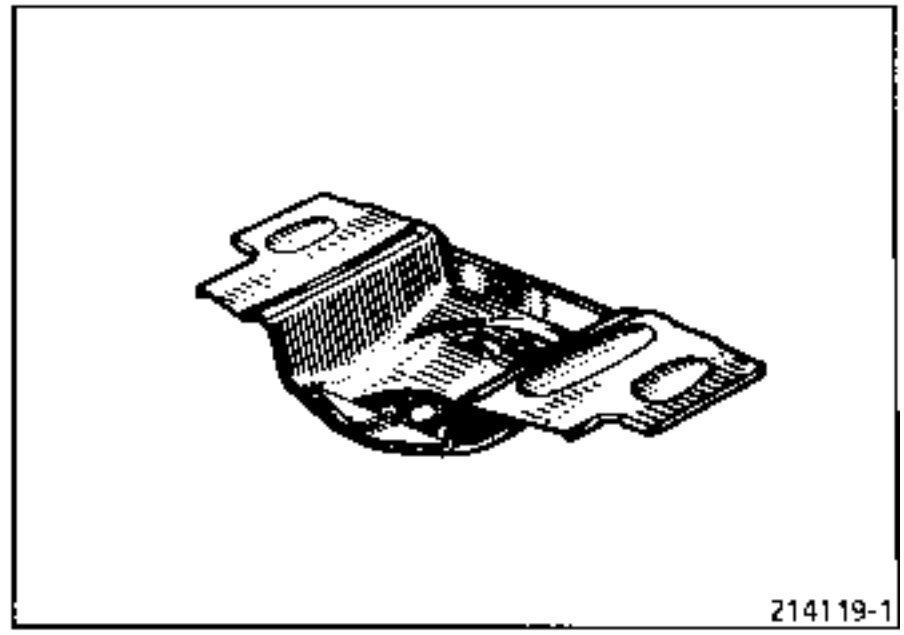




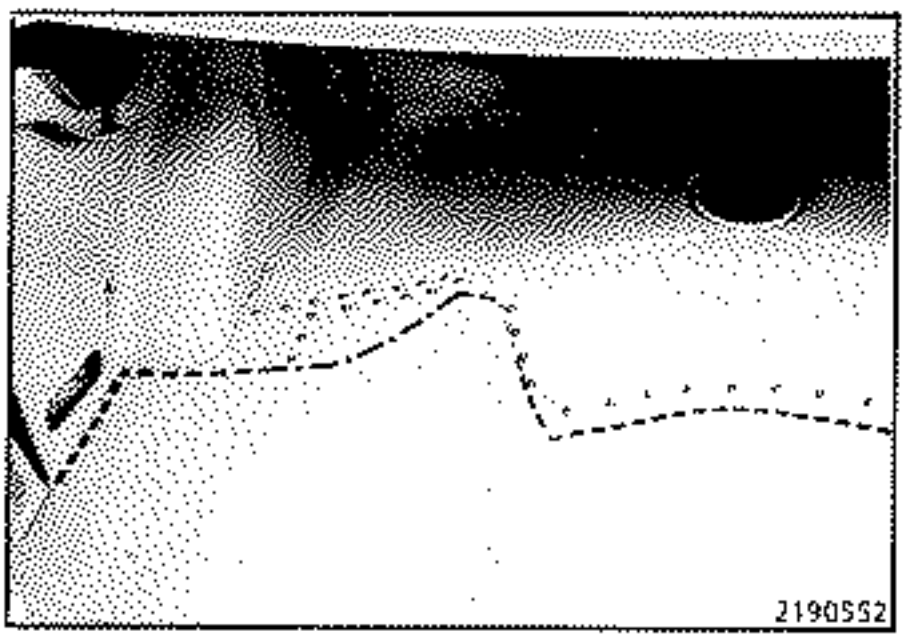
COMPOSITION OF PART FROM PARTS DEPARTMENT

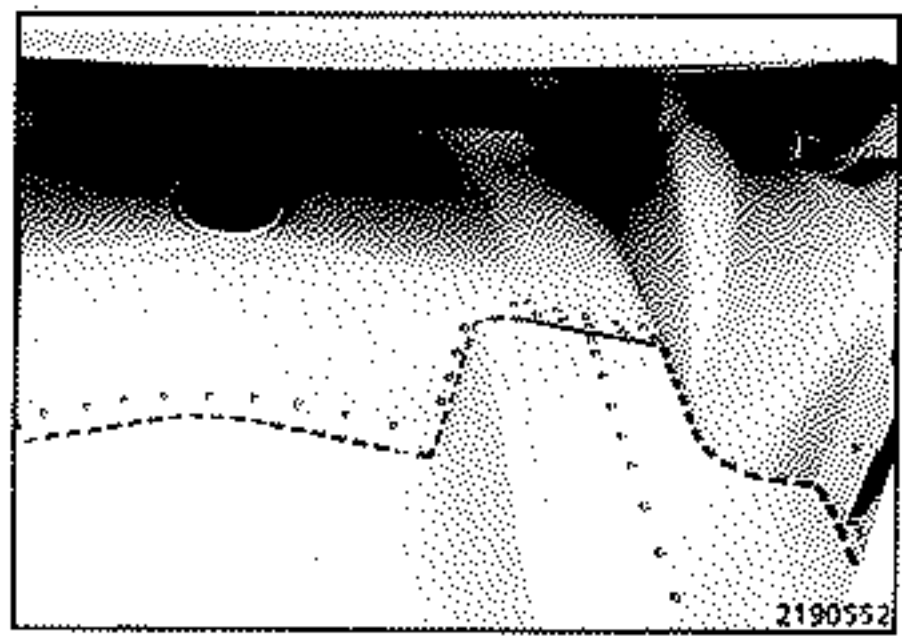
Assembled part comprising:

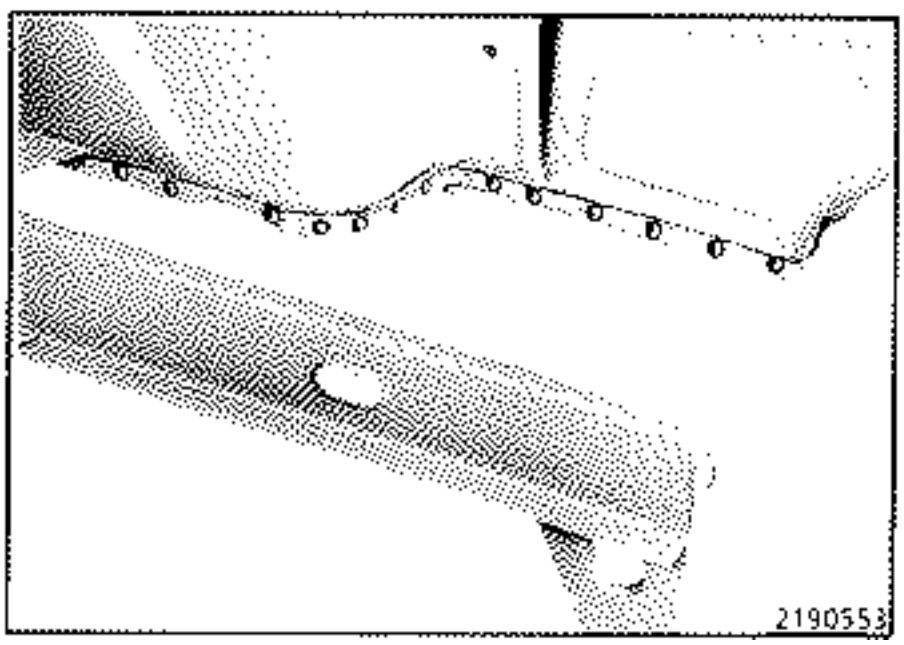
- Rear end floor panel.
- Closure panel.

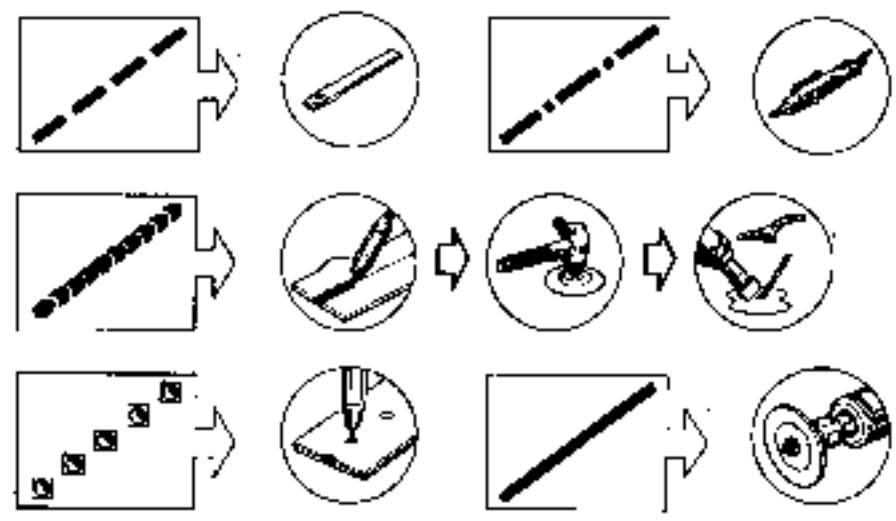


CUTTING OUT - UNPICKING

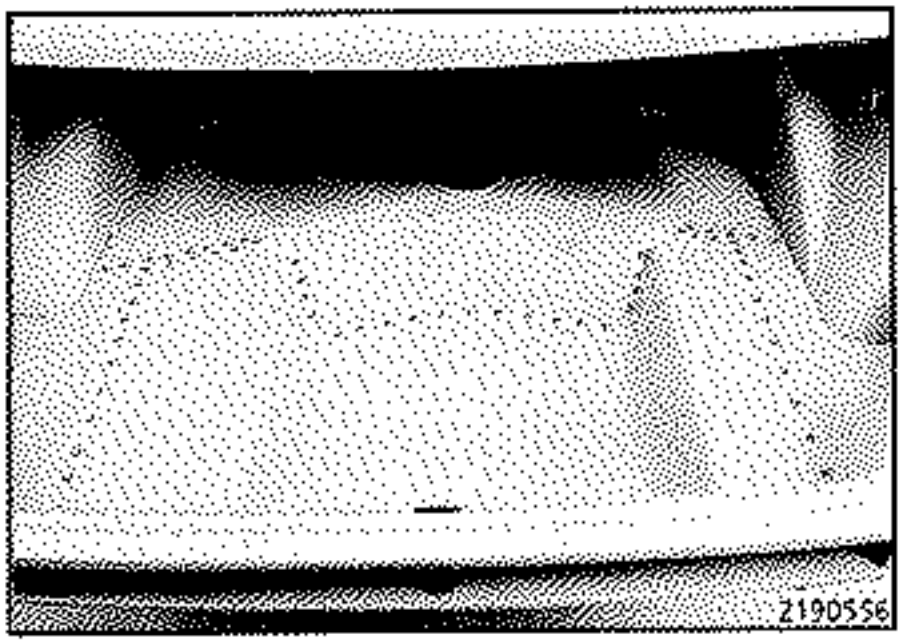






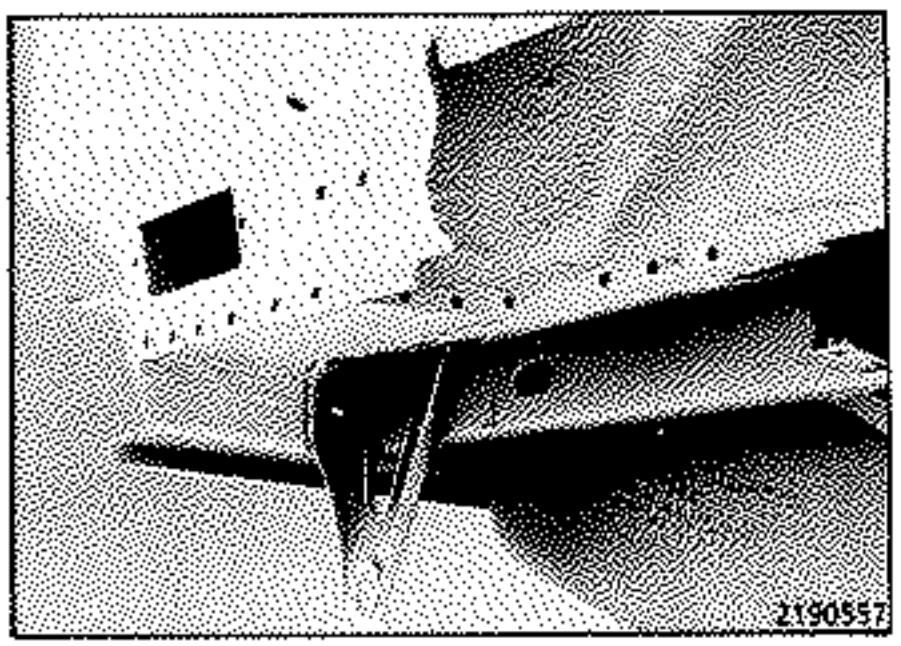


WELDING





D = 4.5 mm





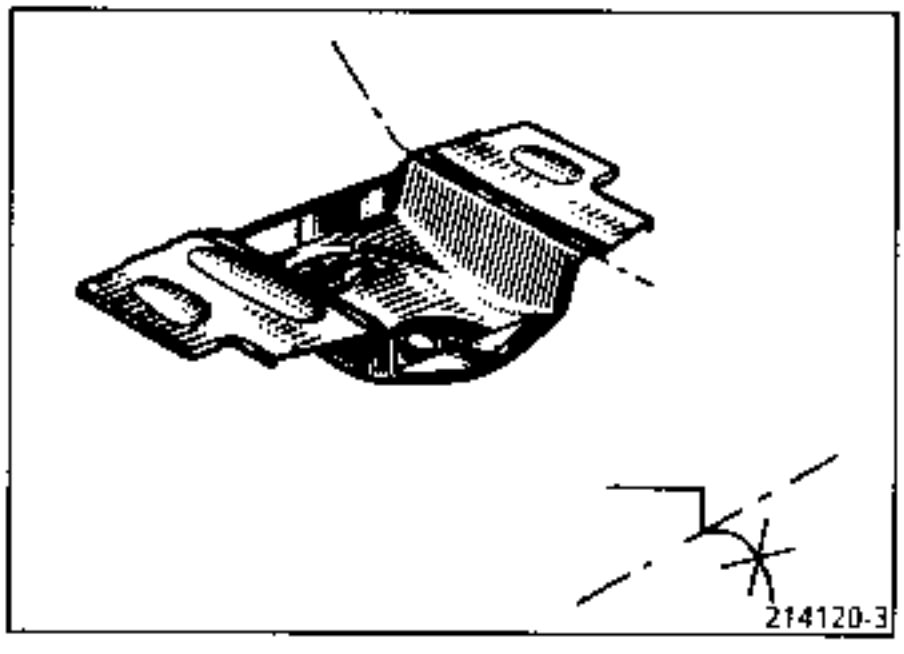
L = 100
e = 1.5 mm
H = 25 mm

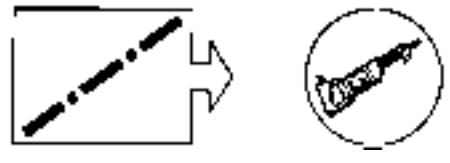
Rear end floor, part section (side section)

COMPOSITION OF PART FROM PARTS DEPARTMENT

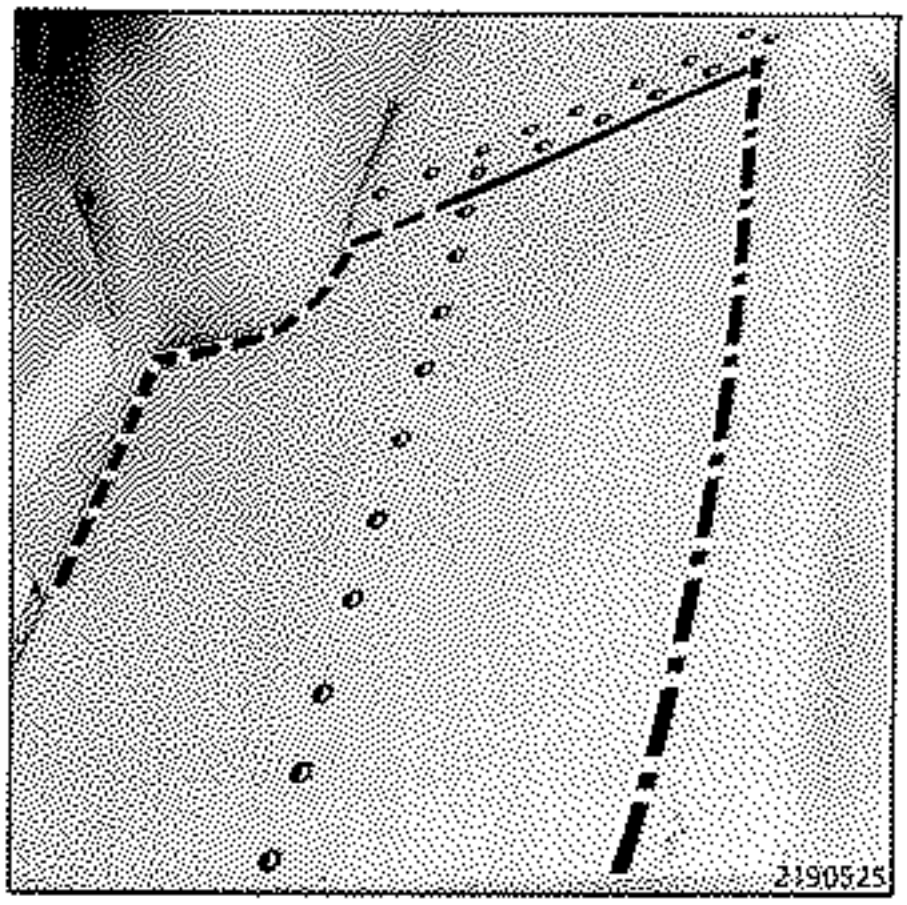
Assembled part comprising:

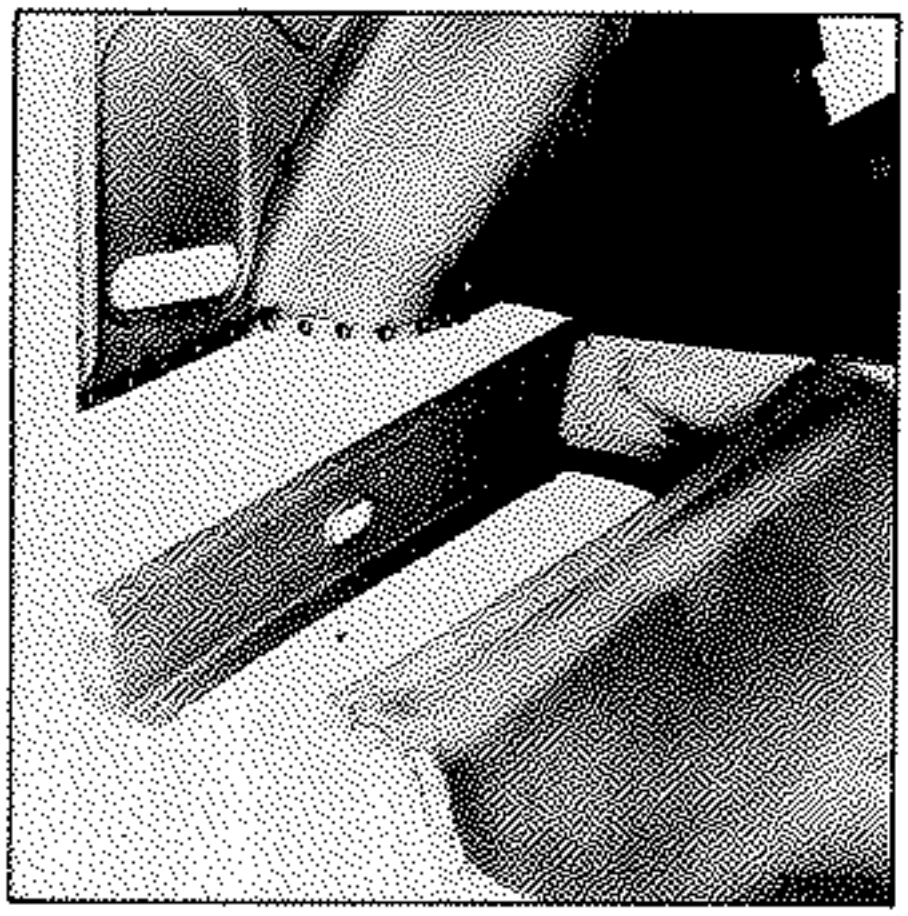
- Rear end floor panel.
- Closure panel.

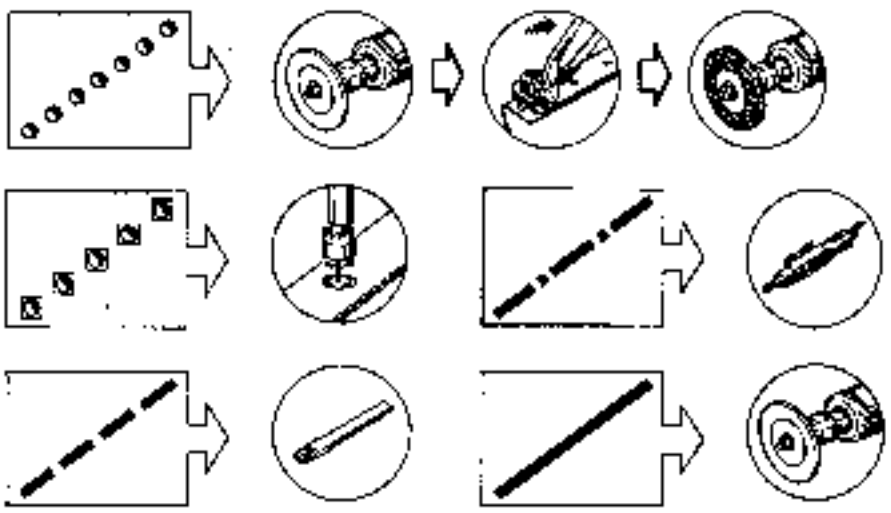




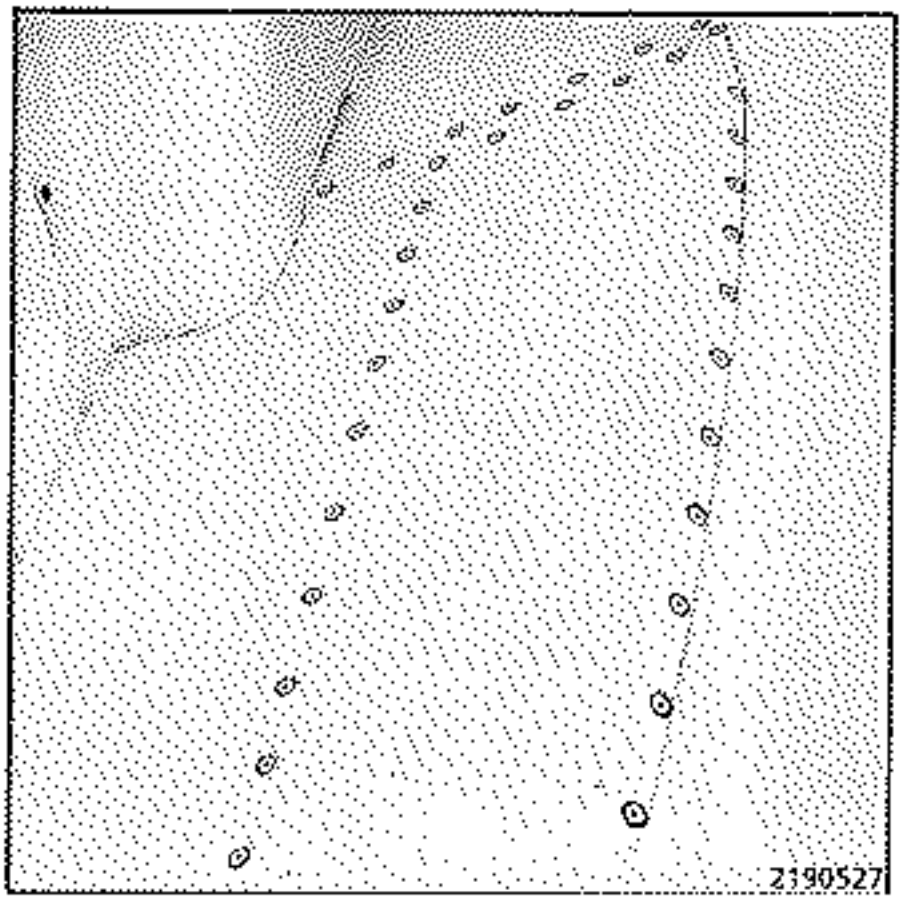
CUTTING OUT - UNPICKING





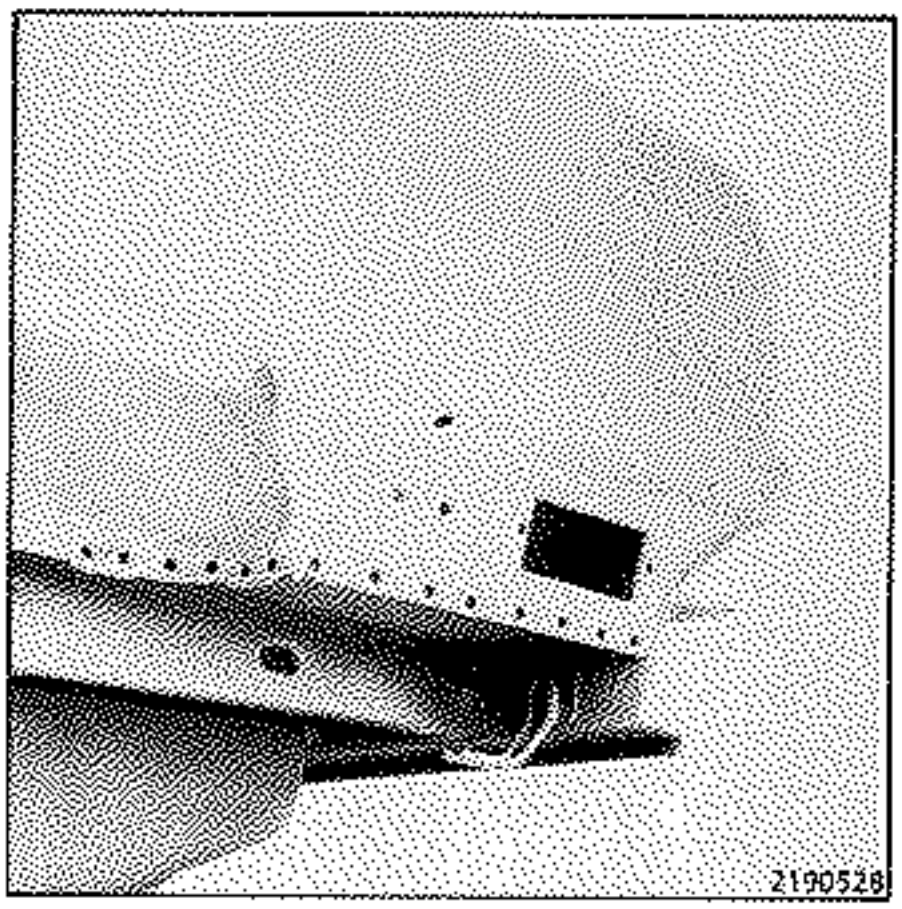


WELDING





D = 4.5 mm





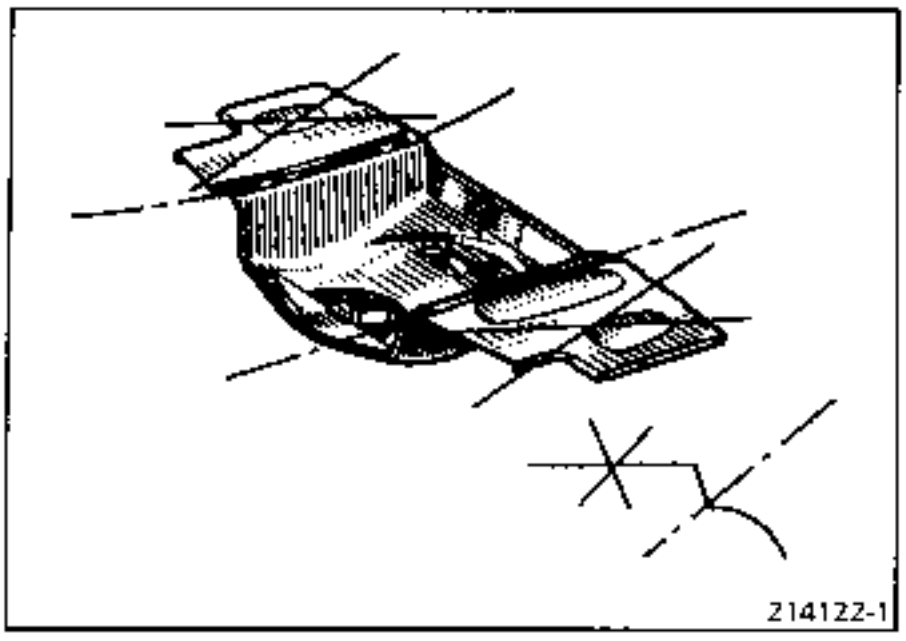
L = 100
e = 1.5 mm
H = 25 mm

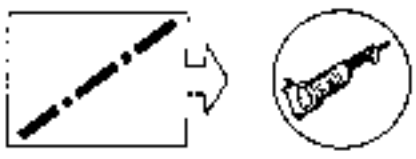
e = 2 mm A

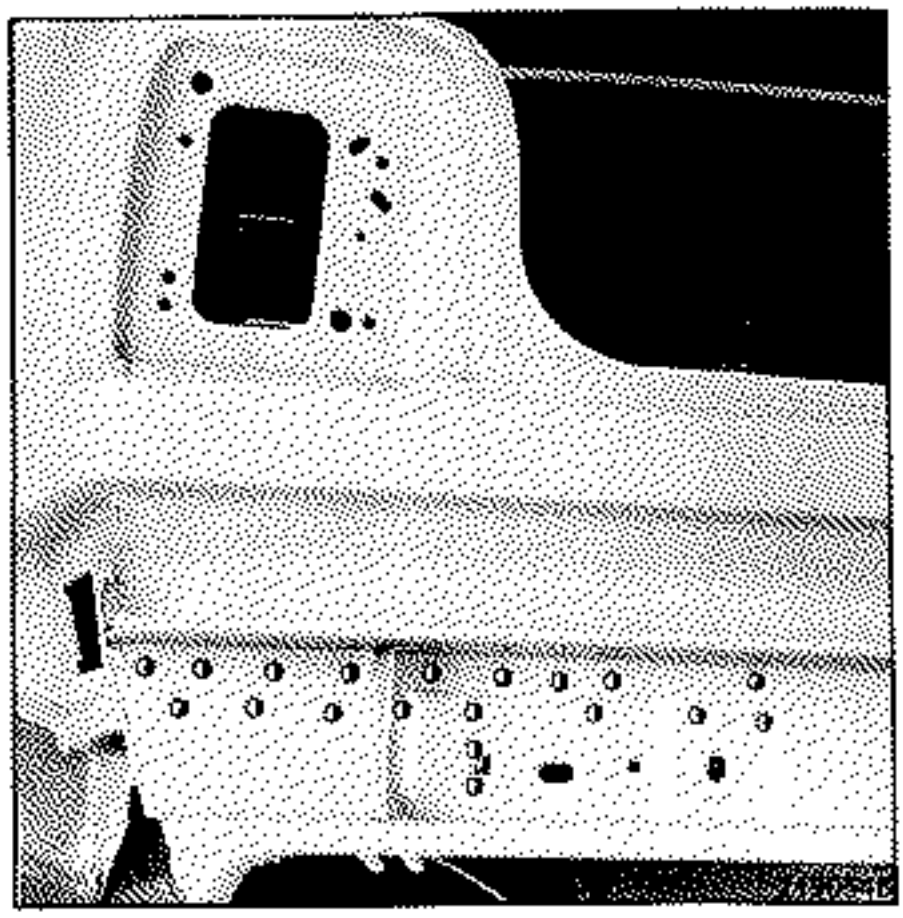
COMPOSITION OF PART FROM PARTS DEPARTMENT

Assembled part comprising:

- Rear end floor panel.
- Rear floor closure panel.

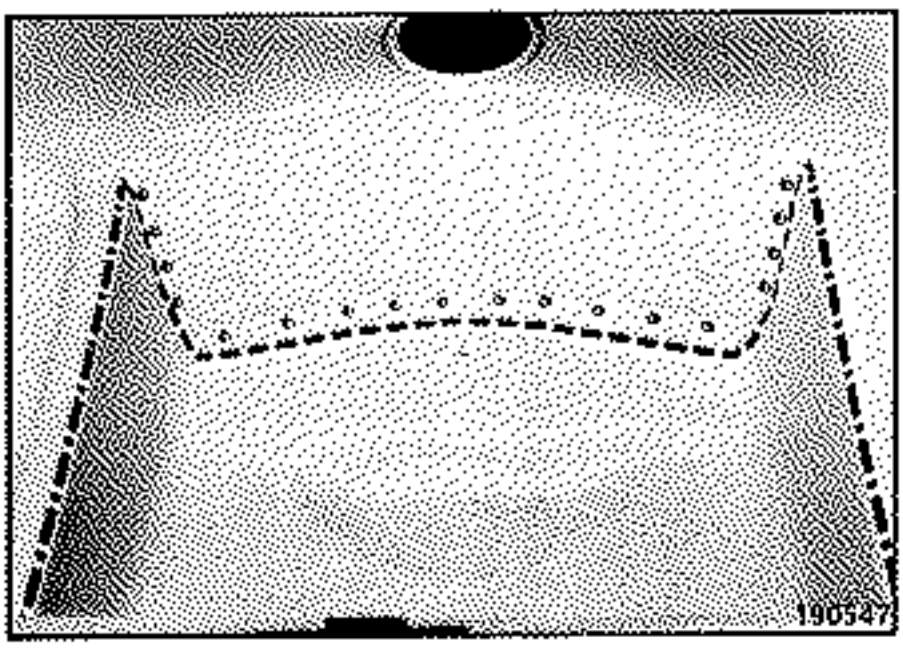


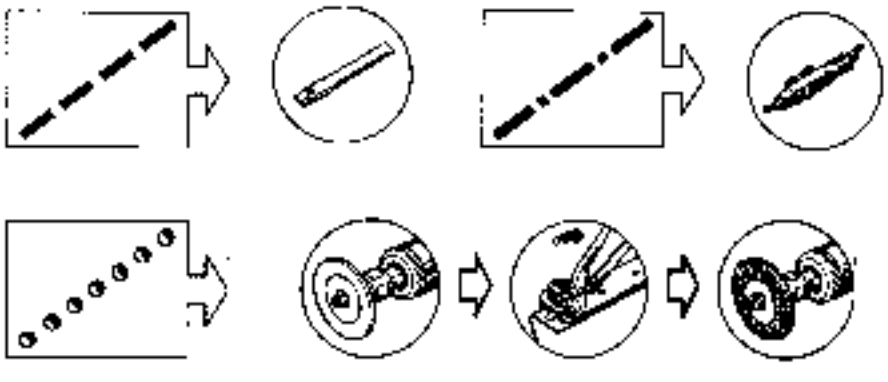




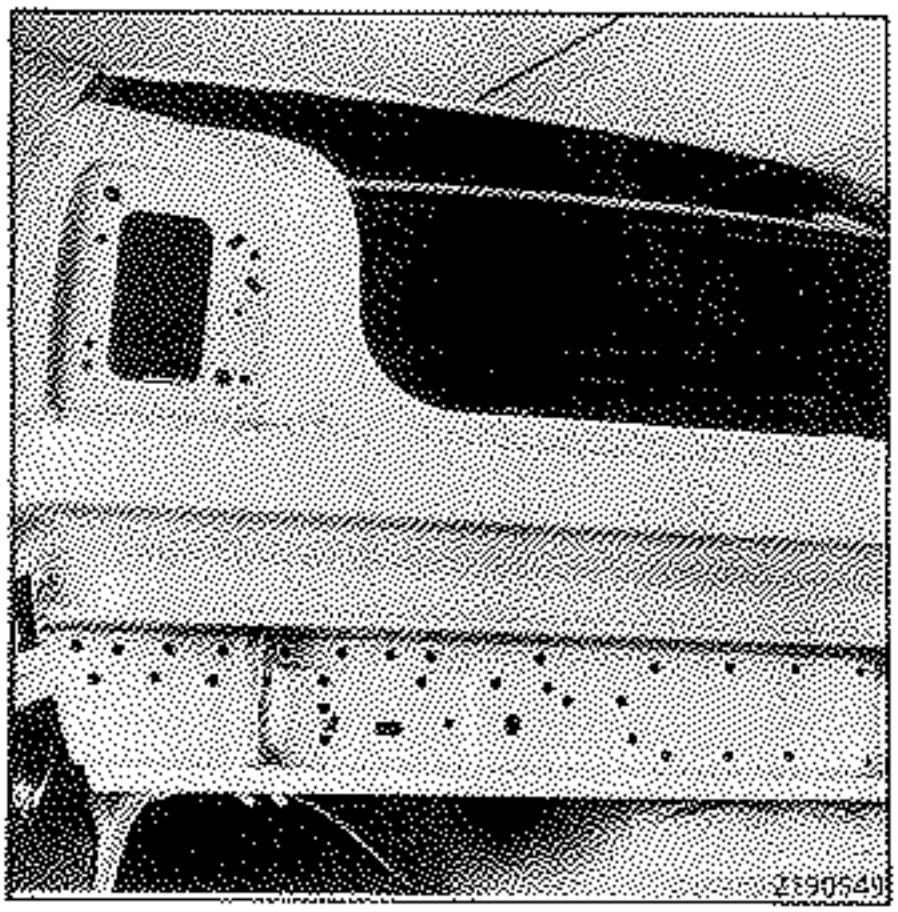


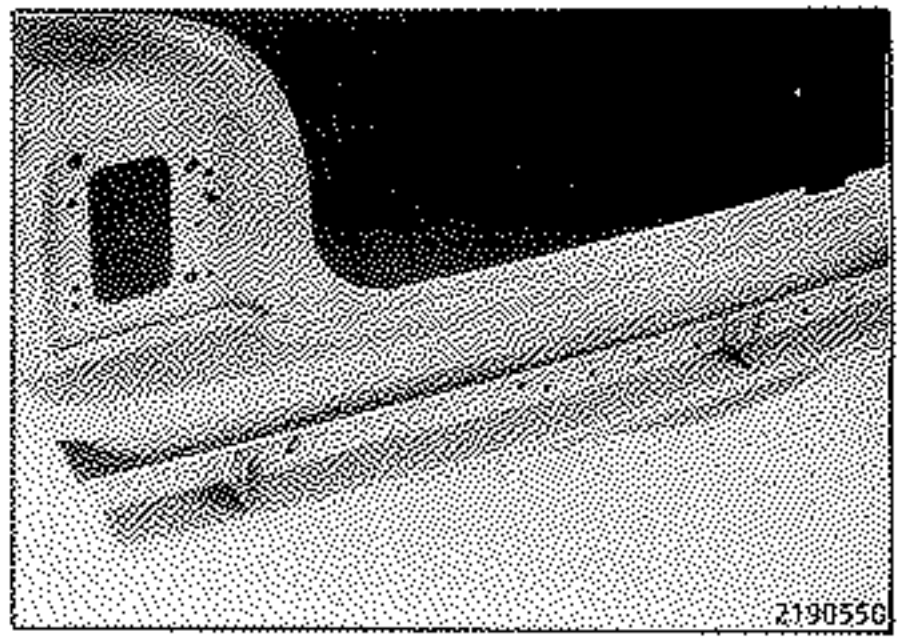
CUTTING OUT - UNPICKING





WELDING







L = 310 mm
e = 2 mm
H = 48 mm

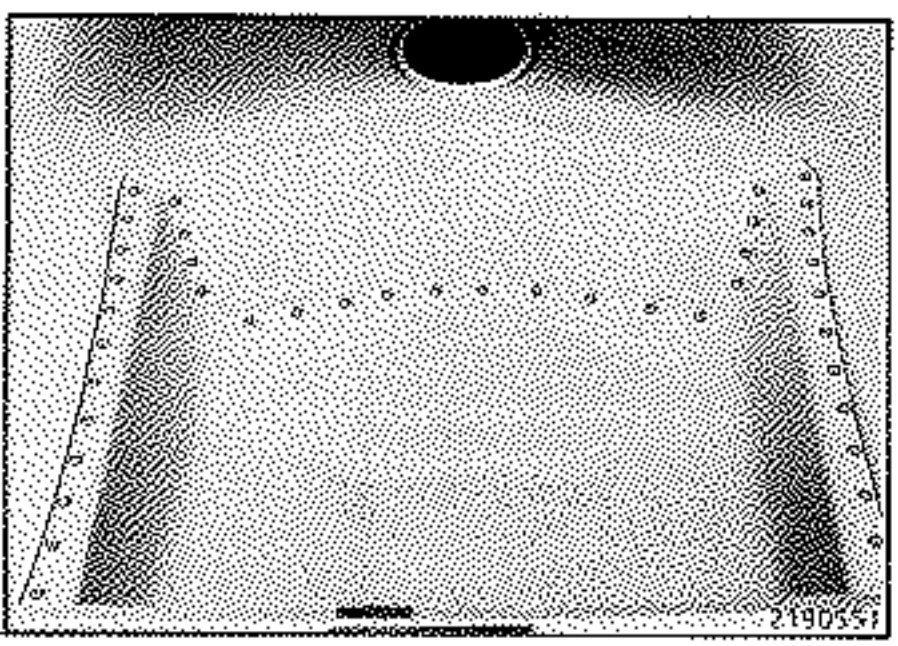
L = 310 mm
e = 2 mm
H = 54 mm



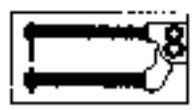
Connection : cross member
Rear floor or rear floor closure panel

Connection: cross member
Lights mounting panel or rear end panel lining

L = 310 mm
e = 2.75 mm
H = 72 mm



Connection : cross member
Rear side member





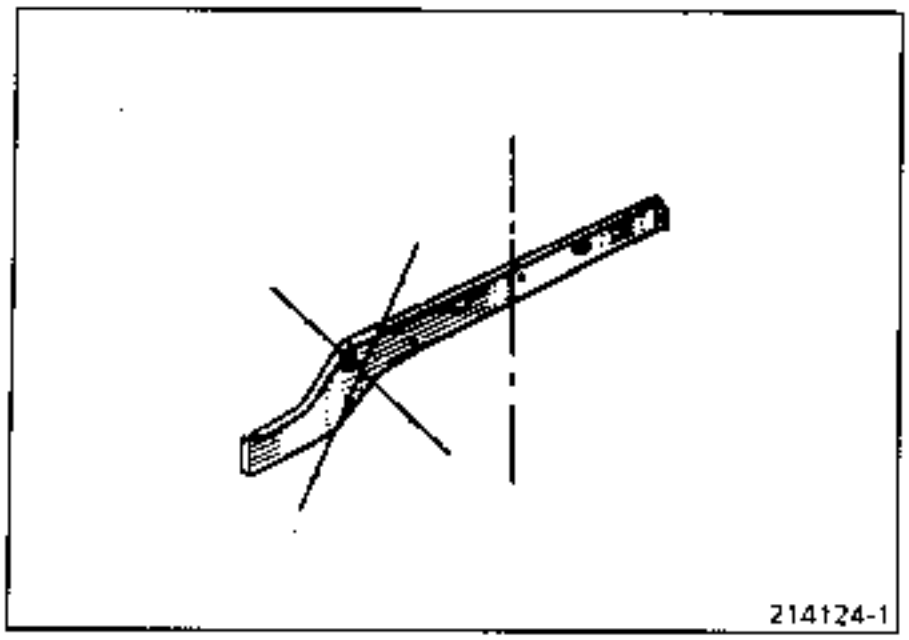
L = 330 mm
e = 2 mm
H = 54 mm

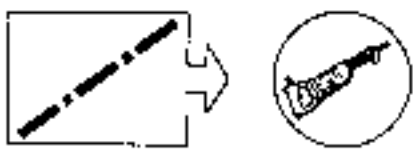
Connection : cross member
Rear end panel

D = 4.5 mm

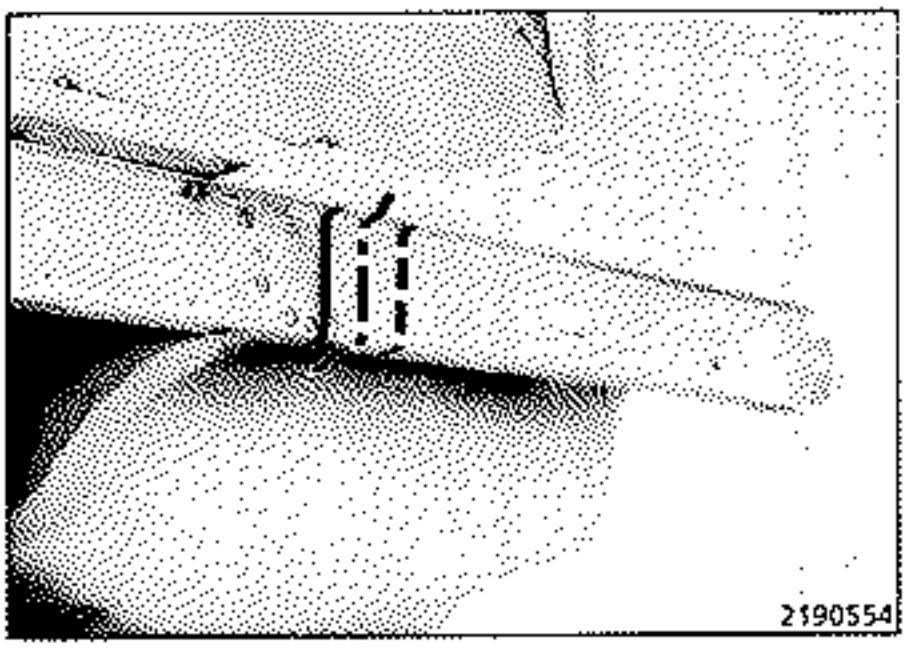
COMPOSITION OF PART FROM PARTS DEPARTMENT

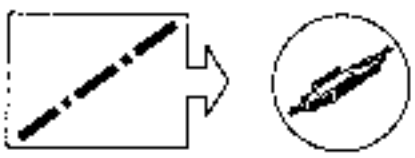
Bare side member.





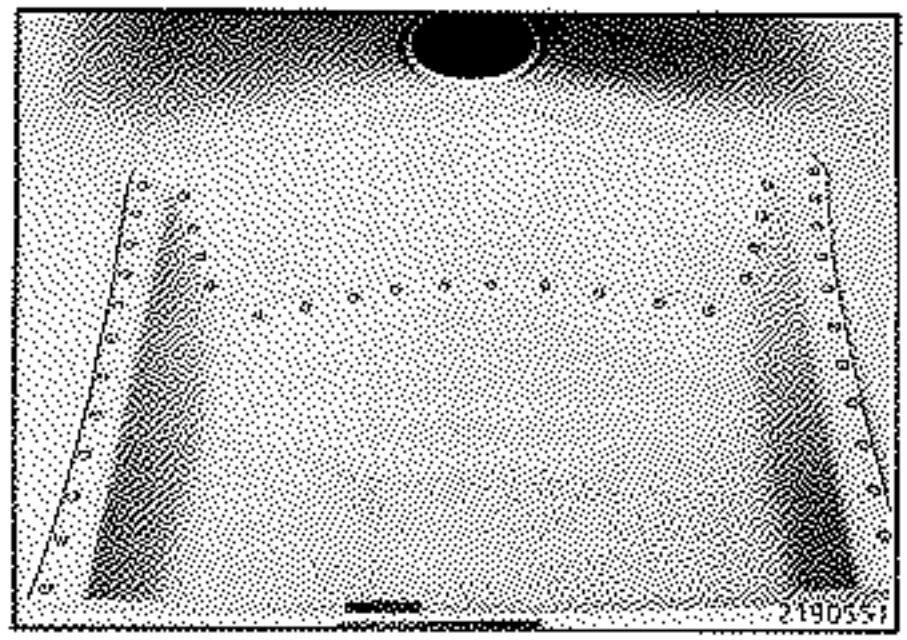
On the new part mark out a part approximately 50 mm larger than the part cut out from the vehicle.





Position the new part on the vehicle on the bracket covering the part to be replaced on the vehicle then secure it using vice clamps.

WELDING

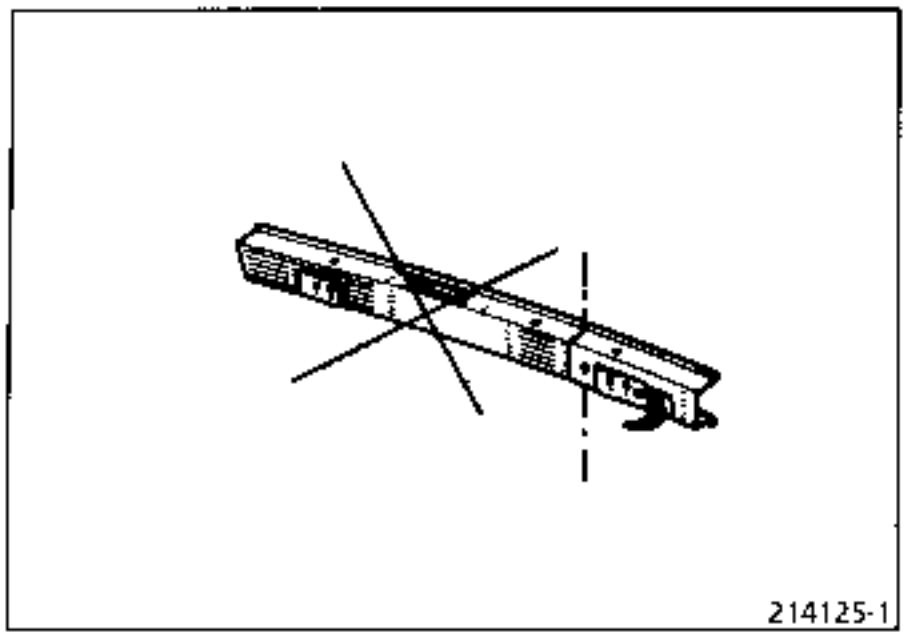


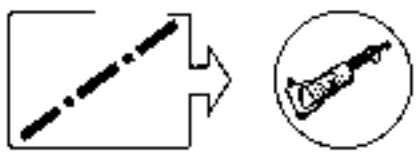


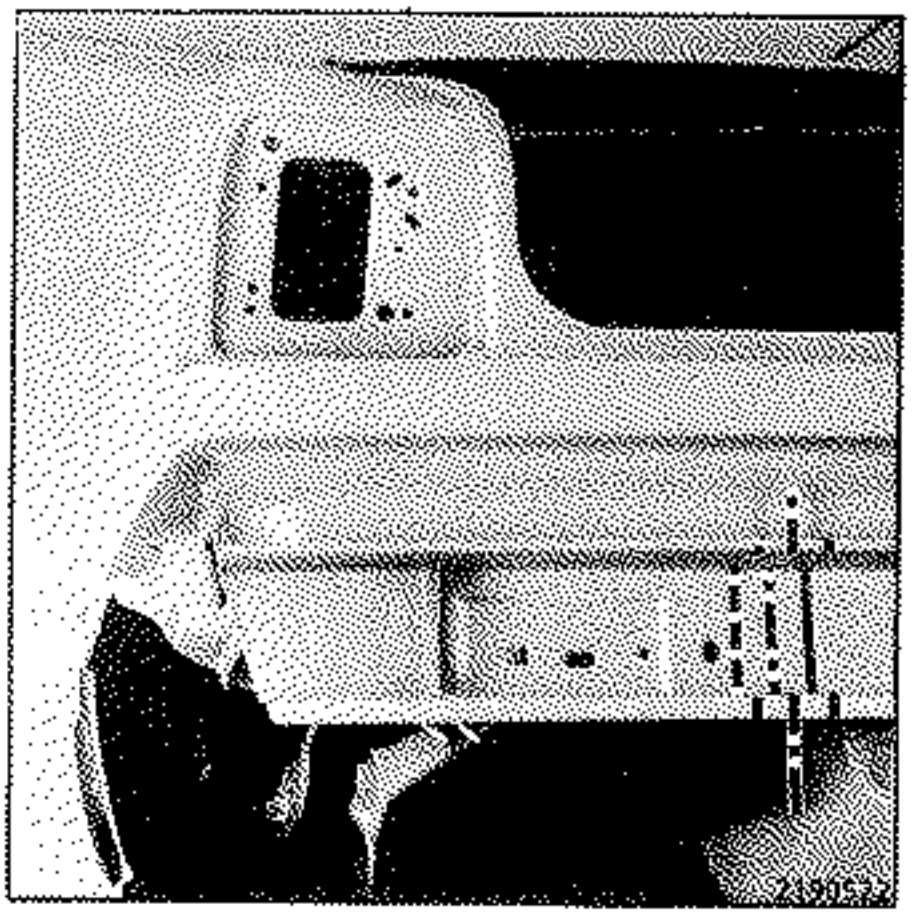
COMPOSITION OF PART FROM PARTS DEPARTMENT

Assembled part comprising:

- Assembled cross member.
- Exhaust mounting hook.

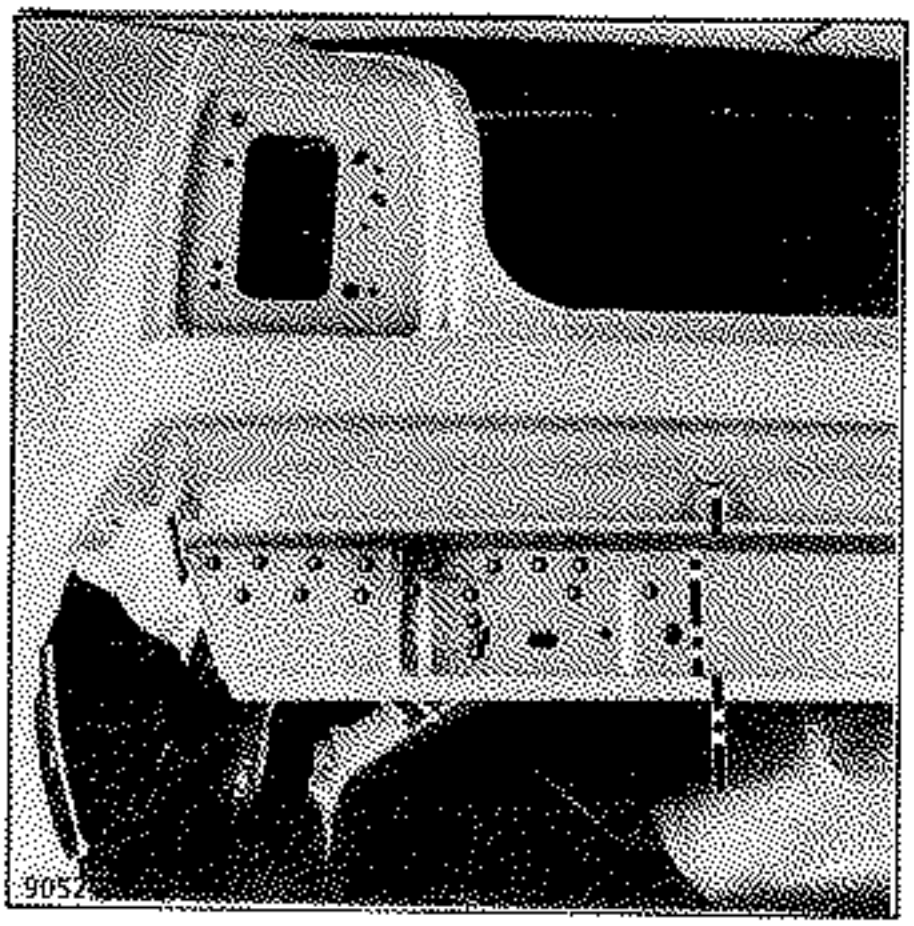


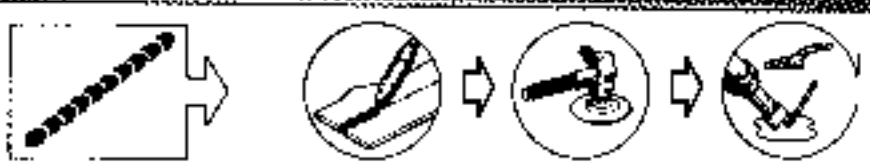


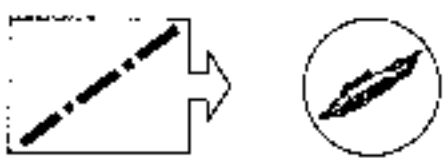




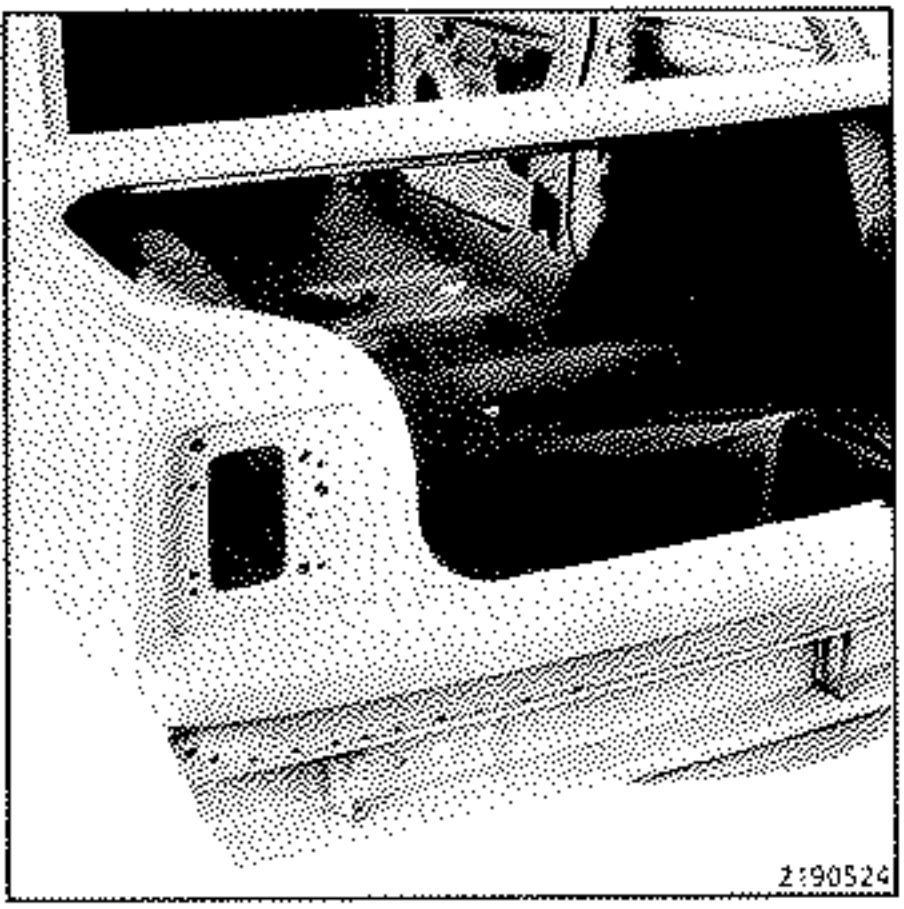
CUTTING OUT - UNPICKING





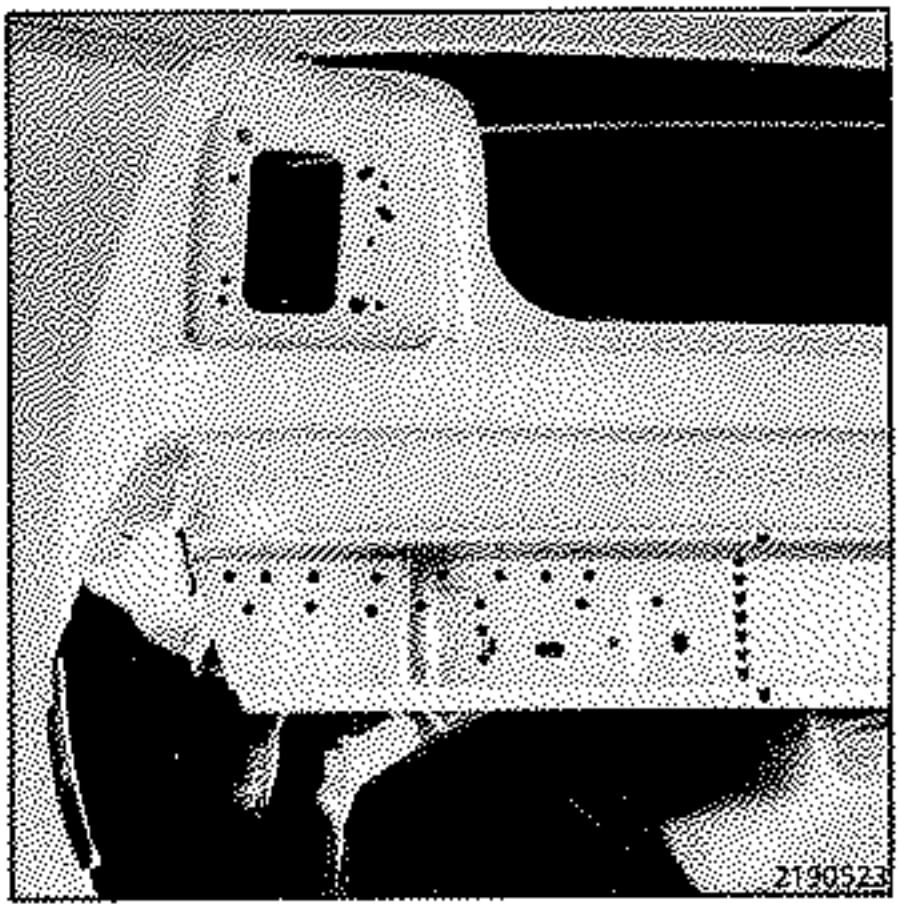


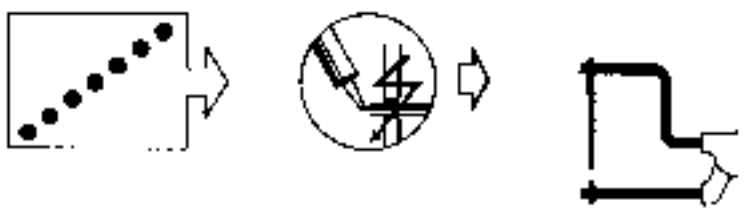
WELDING





L = 330 mm
e = 1.92 mm
H = **54 mm**





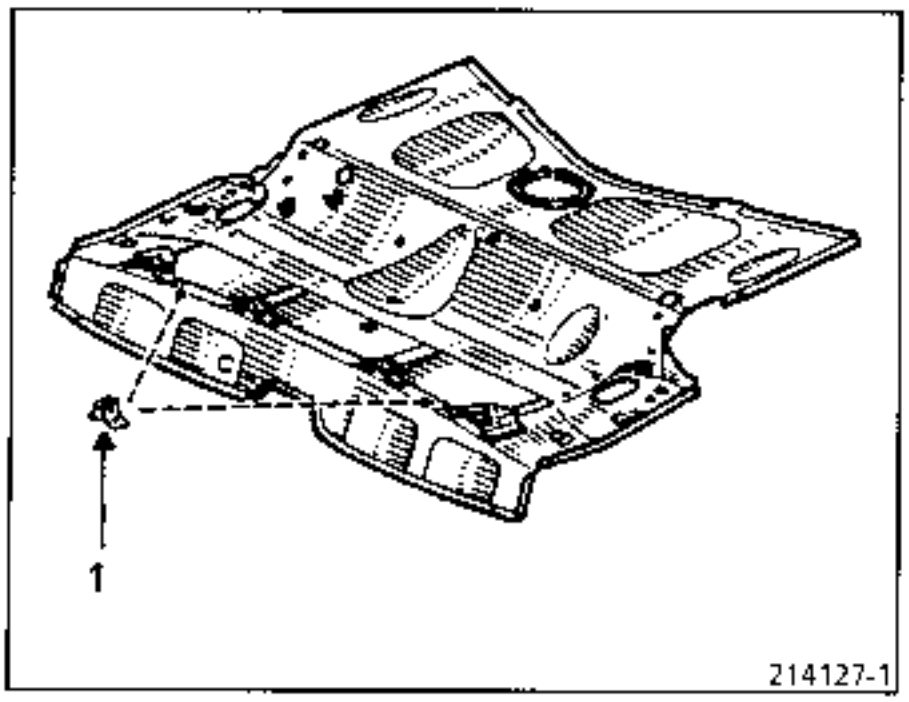
L = 310 mm
e = 1.85 mm
H = 48 mm

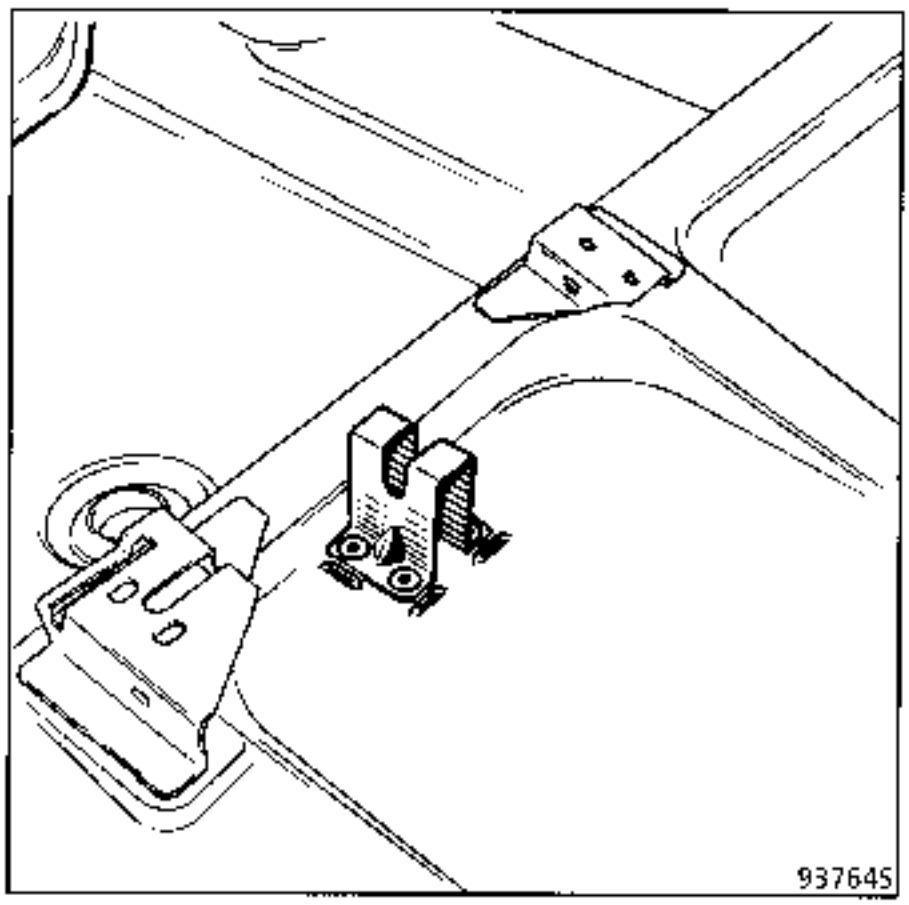
Connection: cross member Rear floor

L = 310 mm
e = 1.95 mm
H = 54 mm

Connection: cross member Lights mounting panel or rear end panel lining

REAR BENCH SEAT MOUNTING





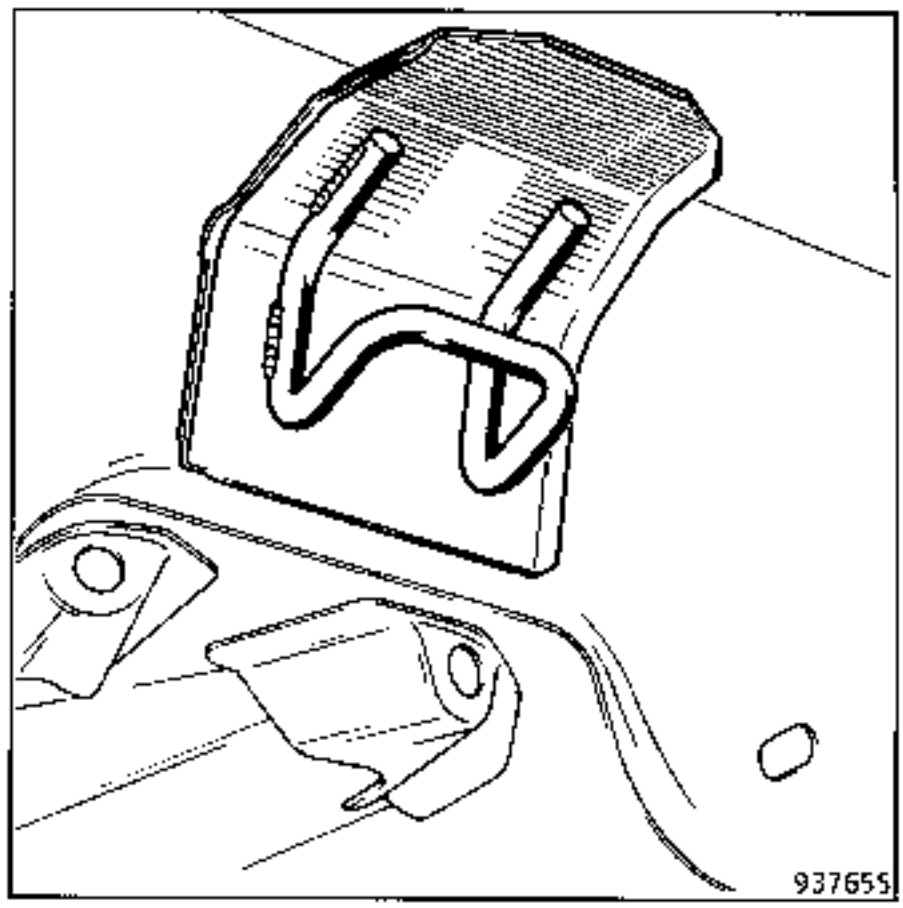
Fit the two supports (1) positioning them in relation to the bosses (2).

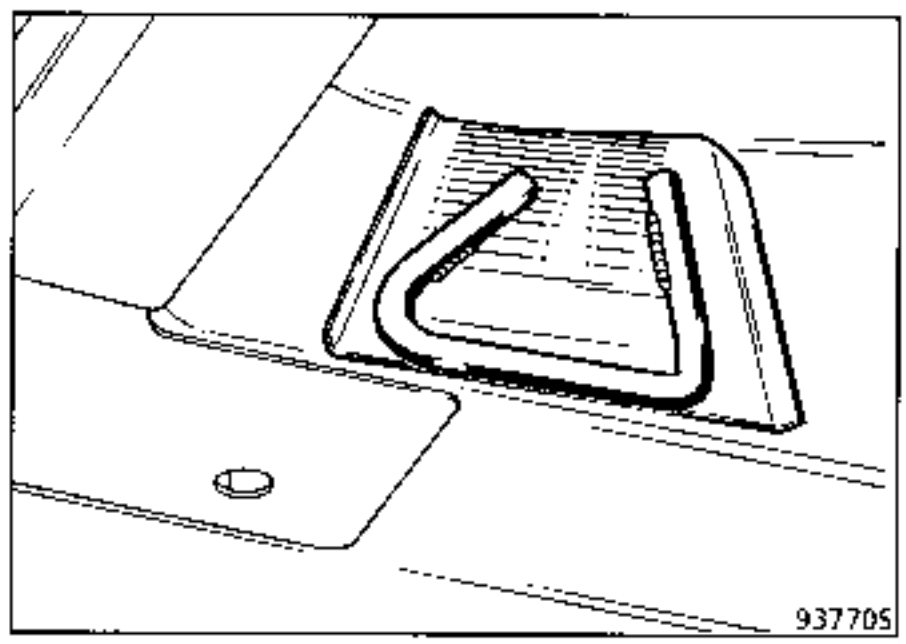


Four plug welds on each support (drill to diameter 5.5 mm).

EXHAUST MOUNTING HOOKS

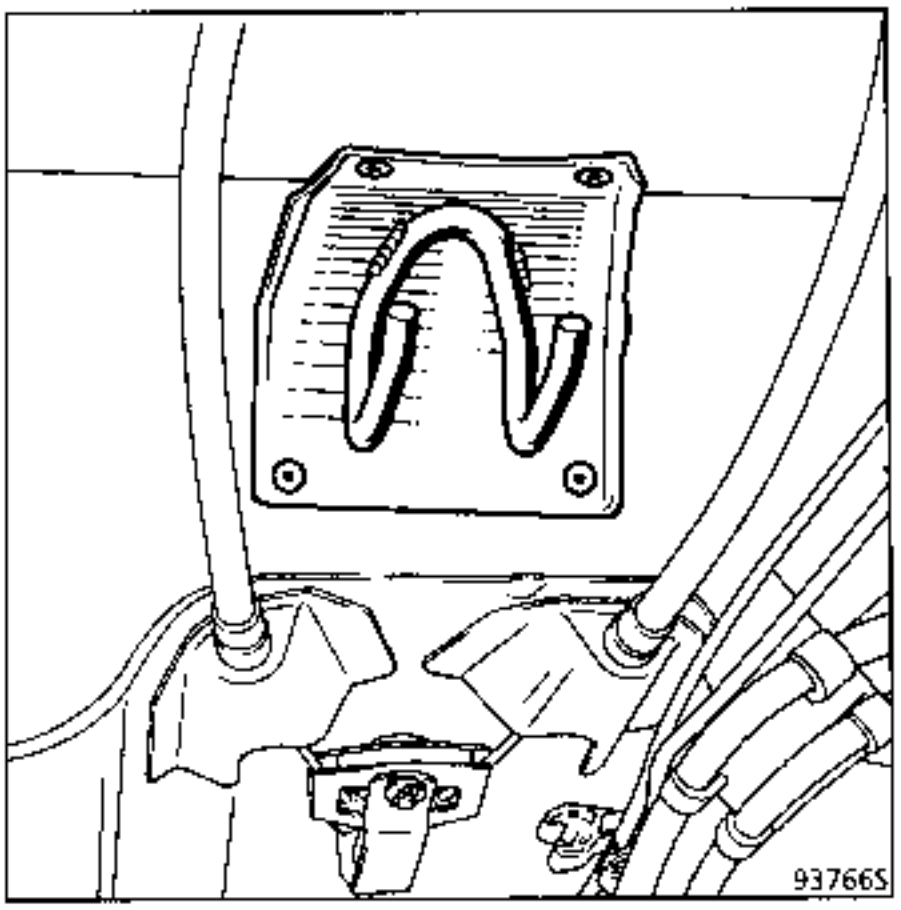
NEW MODELS

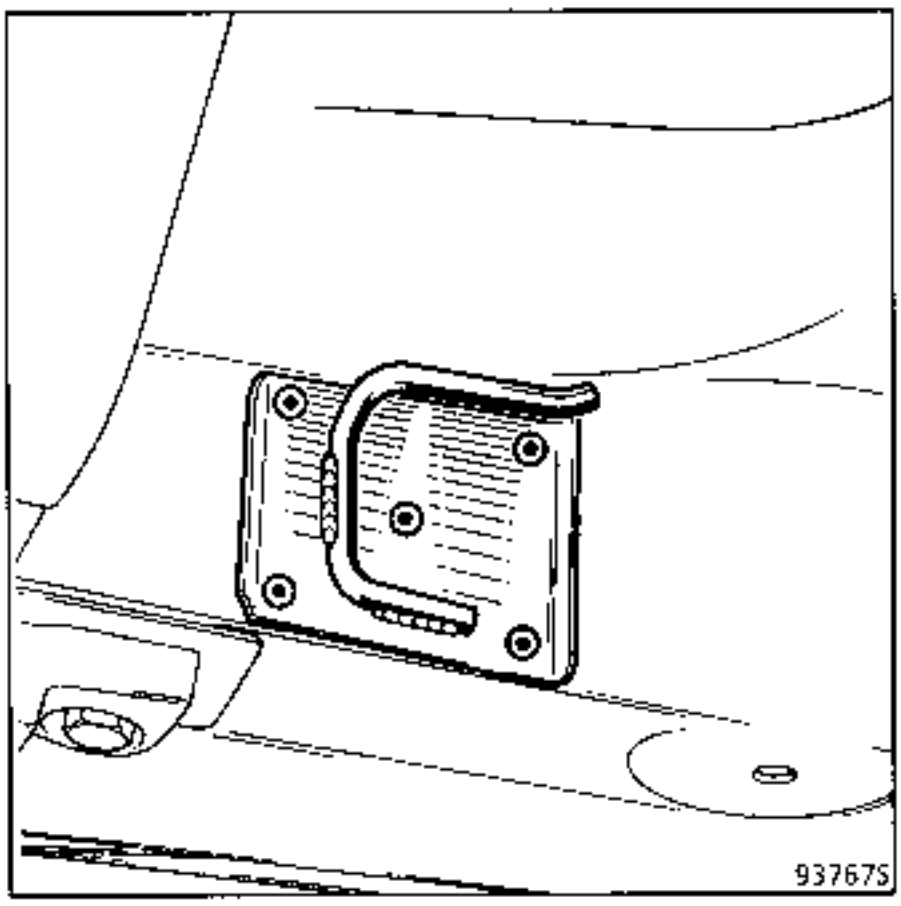




Release the two supports from the new body.

OLD MODELS



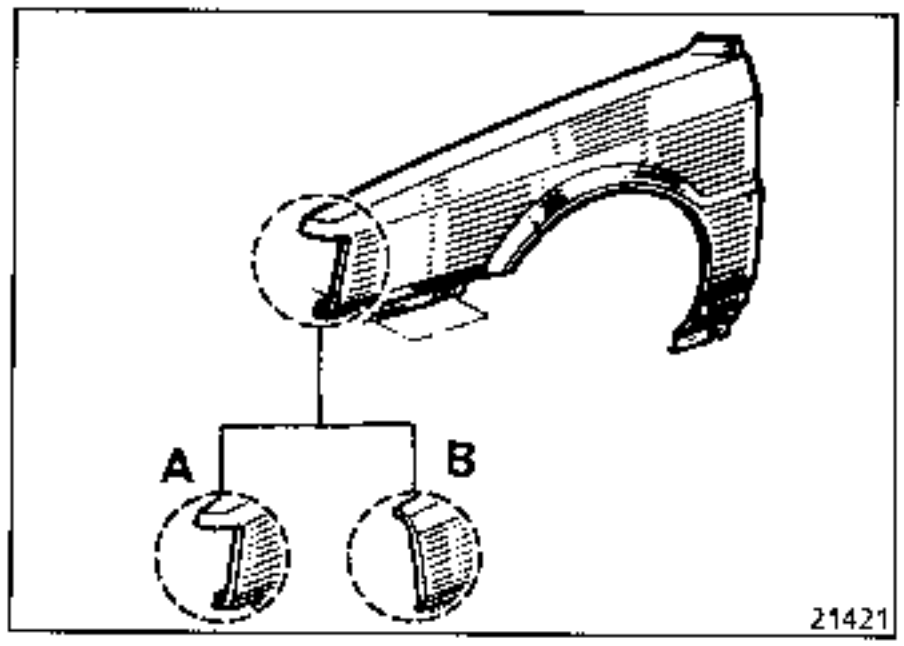


Take the two supports from the old body and weld them onto the new body.

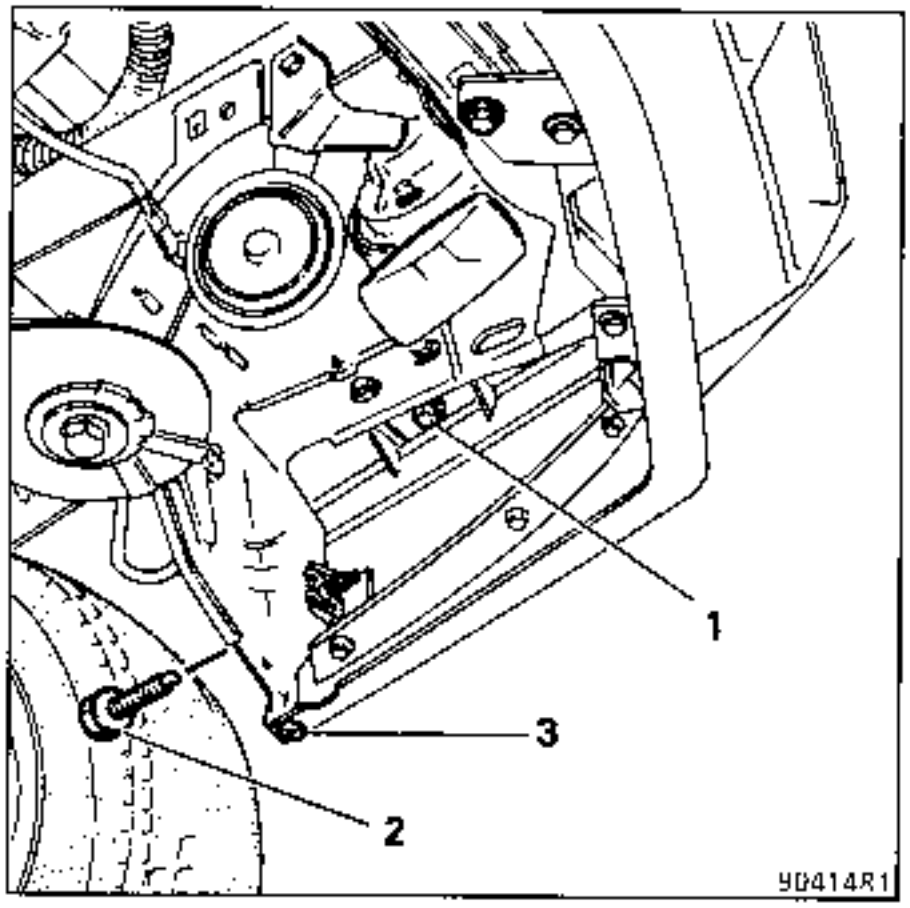


Nine plug welds (drill to diameter **6.5 mm**).



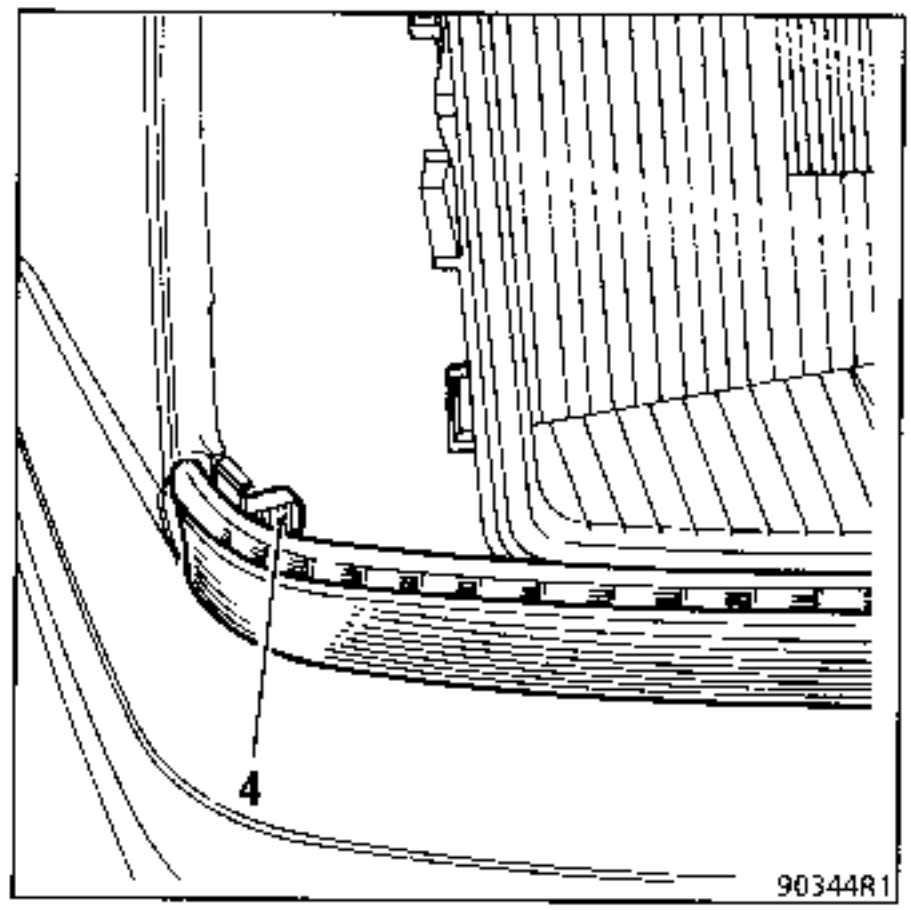


A Phase 1 vehicles
B Phase 2 and sports vehicles



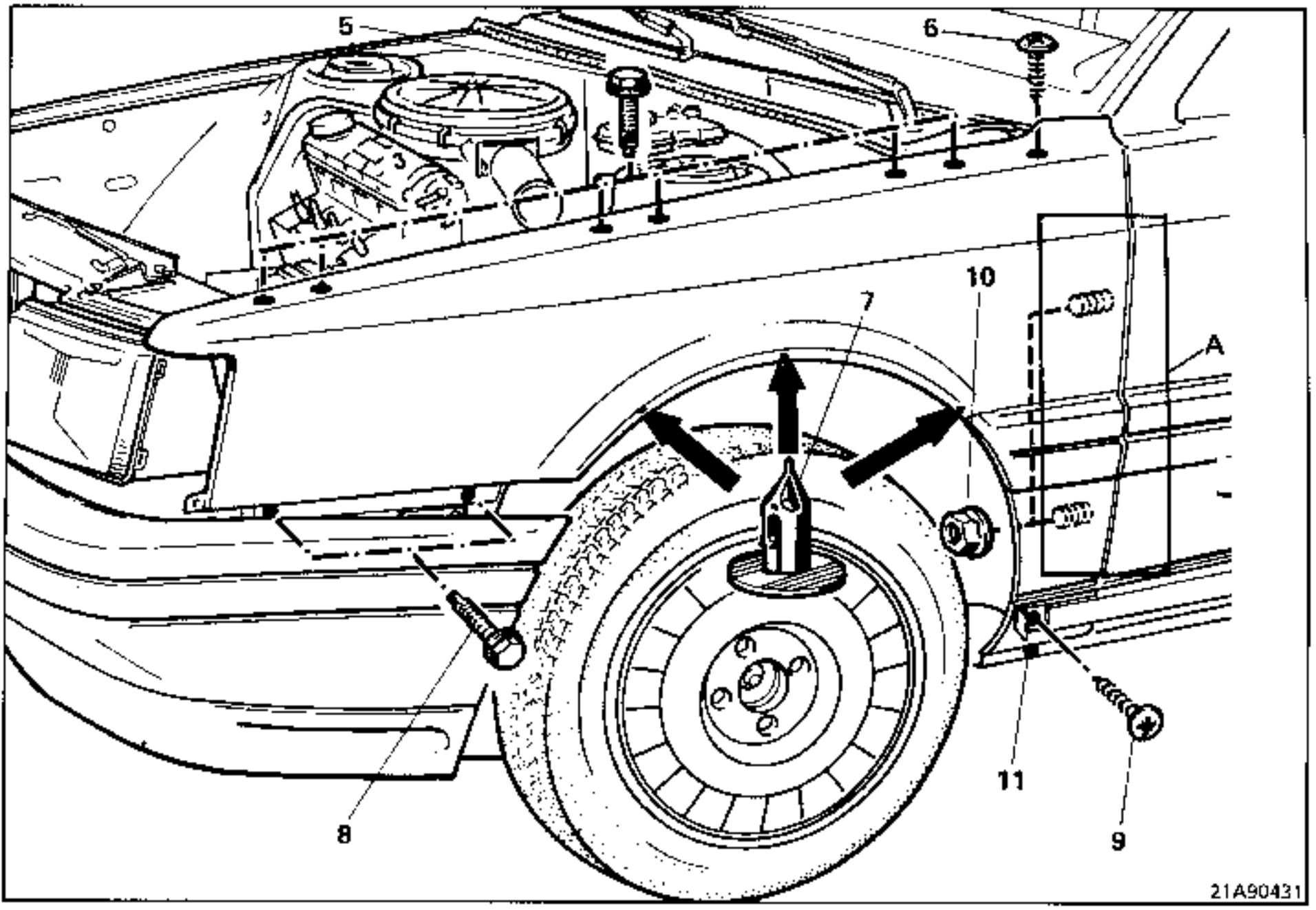
Remove bolt (3).

Remove mountings (1) and (2) for the bumper on the cowl side panel. Bolt (1) can be reached from under the vehicle.



Remove the indicator.

Slacken the front panel moulding mounting nut (4).
(Plastic manual nut).



A Remove bolt (6) mounting the scuttle panel grille. Remove the six bolts (5).

B Using a screwdriver, unclip the end of the strip to reach bolt (9).

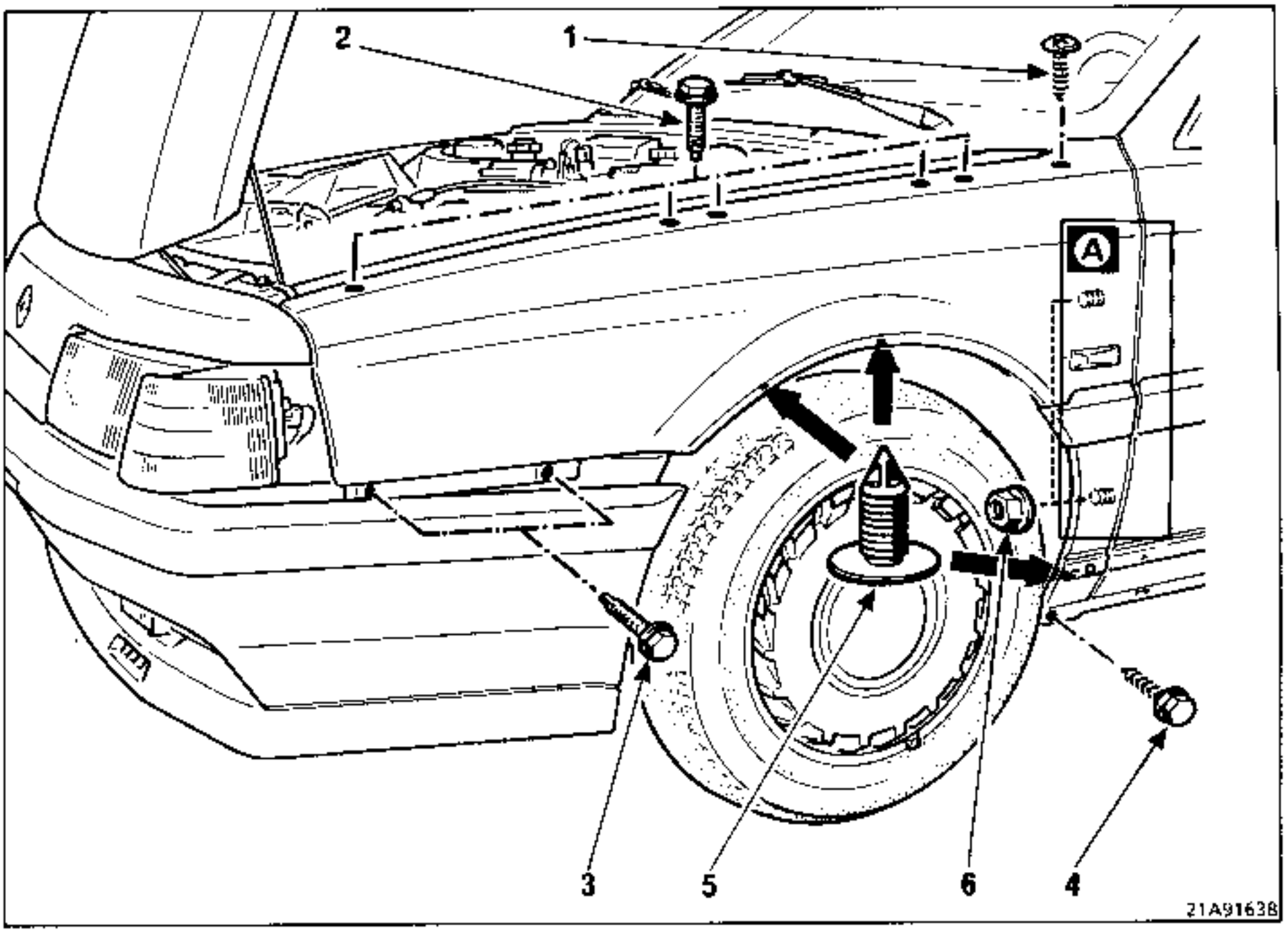
C Tilt the bumper so that bolts (8) may be reached.

D Remove bolt (11) from the sill.

E Remove the wheel arch protector (three clips (7)) and from inside the wing, remove the two mounting bolts (10) on the front pillar.

Note : the inner section (A) of the wing is coated with sealing mastic. To remove the wing, use a hot air torch to soften the mastic, taking care not to burn the paintwork if the wing is to be retained.

REMOVAL



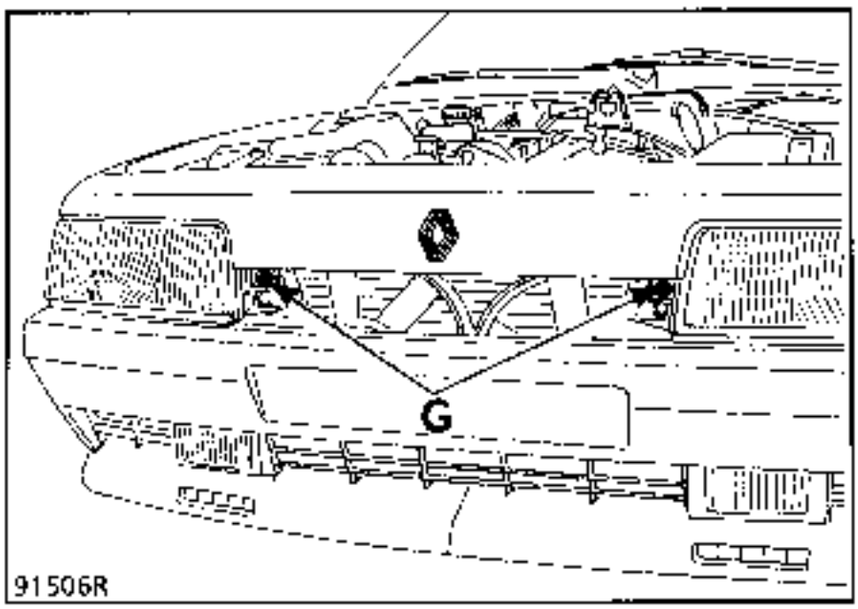
Remove:

- the sill skirt,
- mounting bolt (4) on the sill,
- the wheel arch protector, three clips (5),
- the two mounting nuts (6) on the front pillar from inside the wing,
- mounting bolt (1) from the scuttle panel grille,
- the five bolts (2).

Tilt the bumper, removing its two side mounting bolts and remove the two bolts (3).

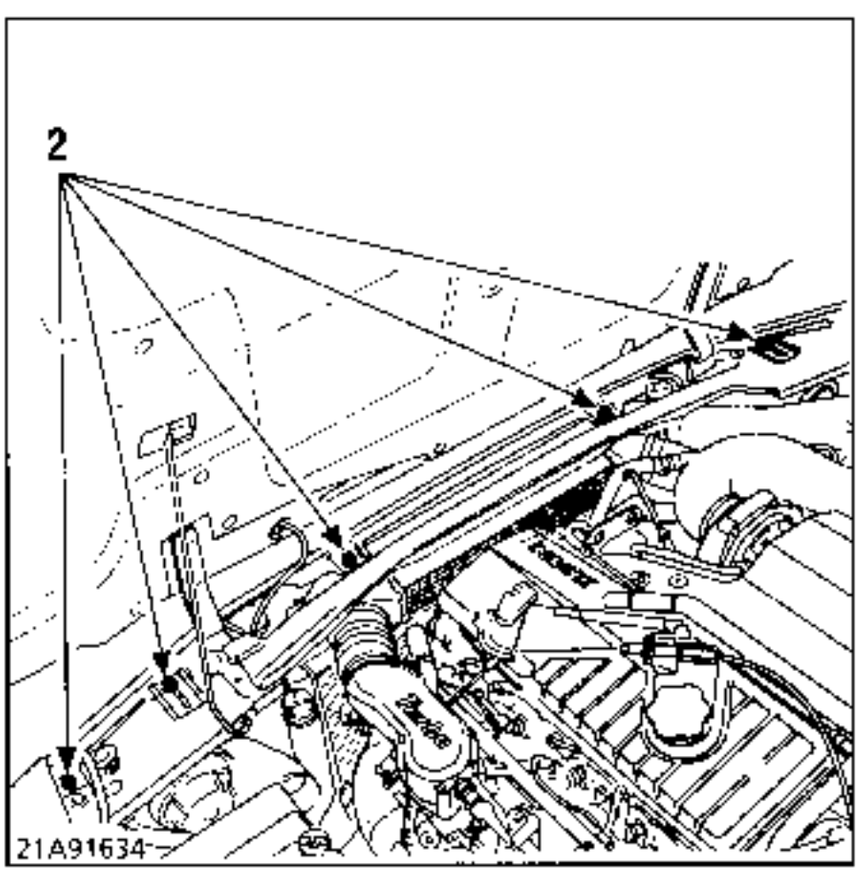
Note: the inner section (A) of the wing is coated with sealing mastic. To remove the wing, use a hot air torch to soften the mastic, taking care not to burn the paintwork if the wing is to be retained.

REMOVAL



Remove:

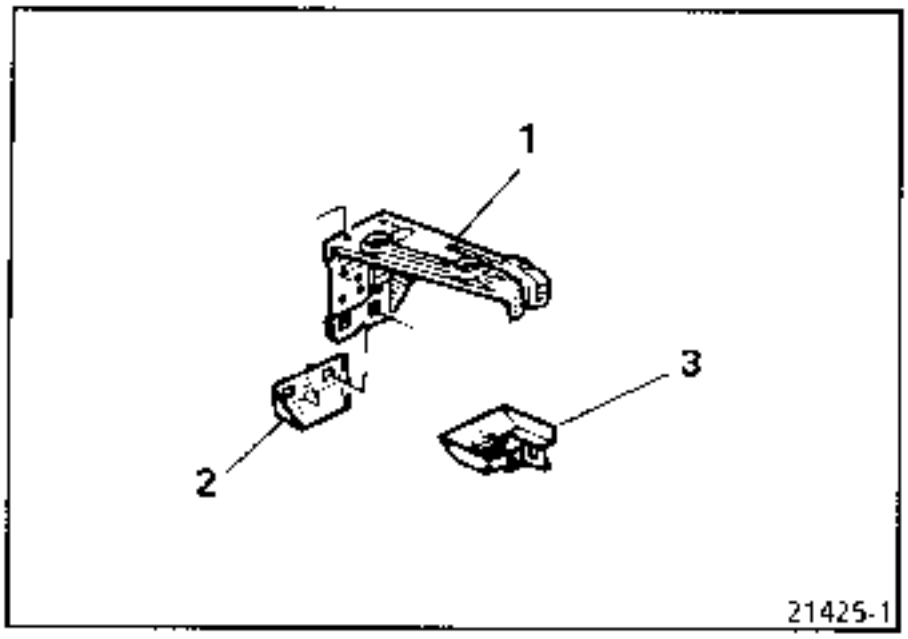
- the radiator grille,
- the two bolts (G),



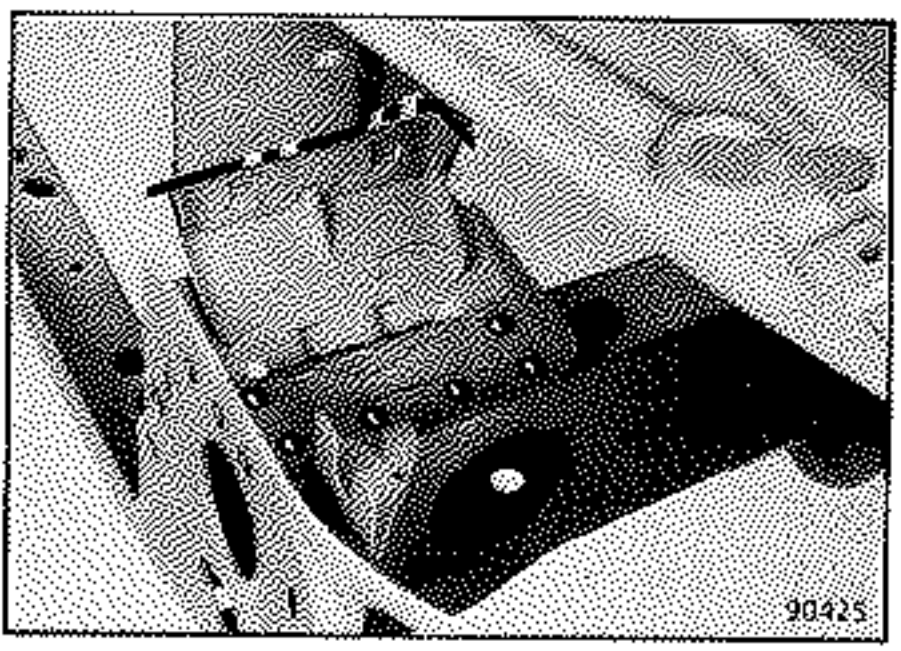
- the six upper mounting bolts (2),
- the front panel.

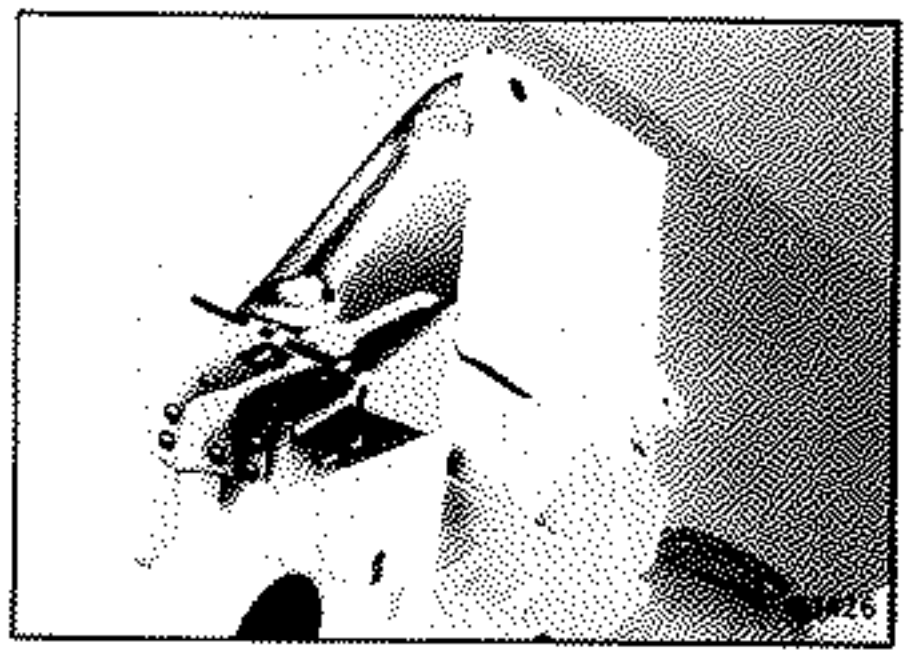
COMPOSITION OF PART FROM PARTS DEPARTMENT

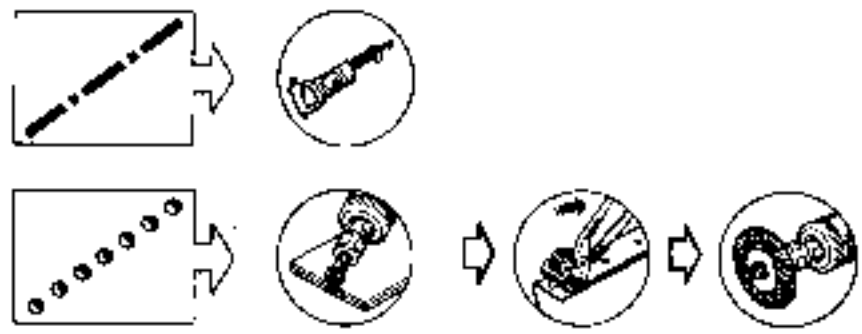
- Headlight carrier panel (1).
- Connecting bracket (2).
- Connecting gusset (3).



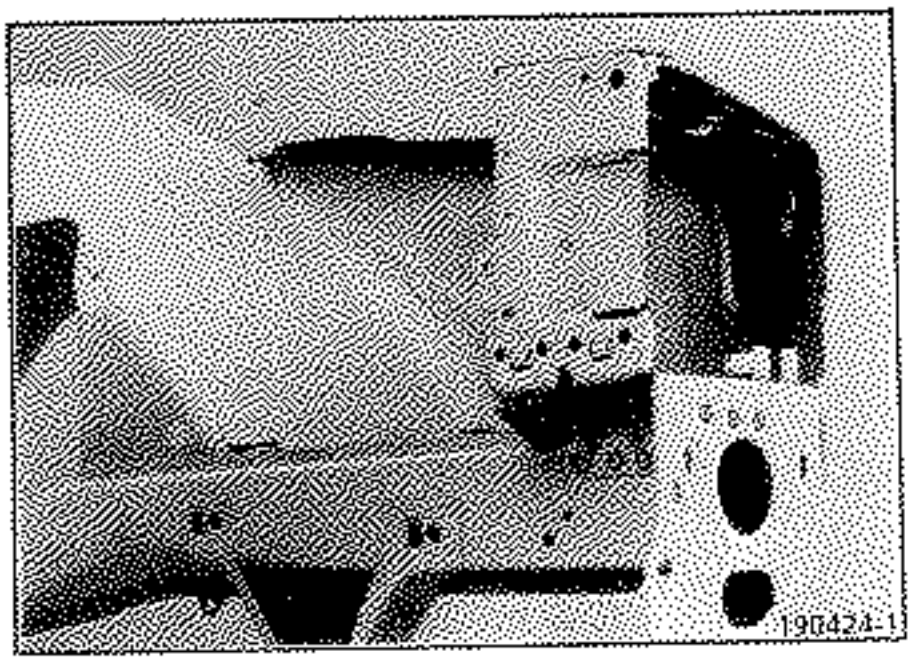
CUTTING OUT - UNPICKING

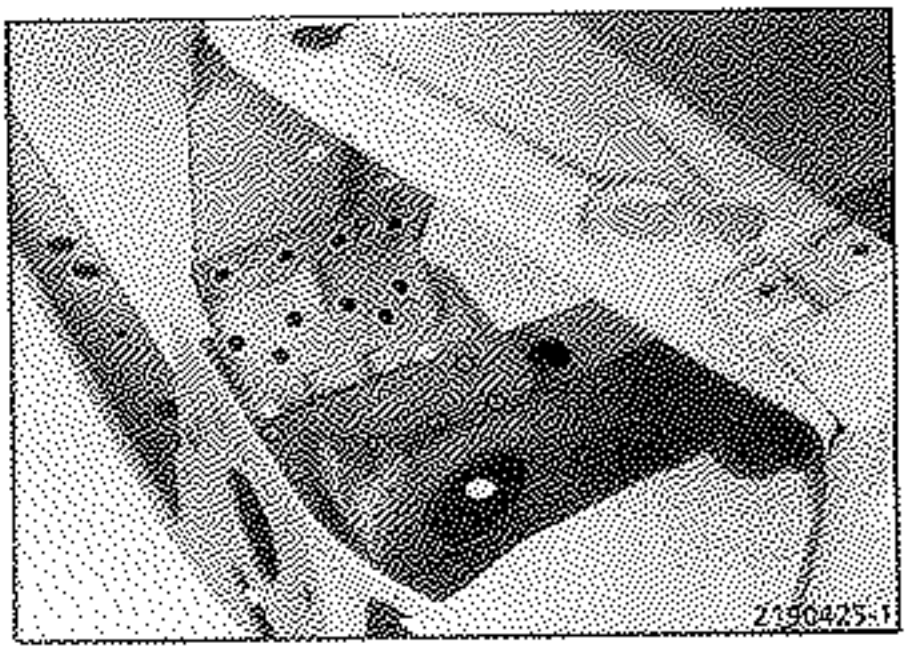




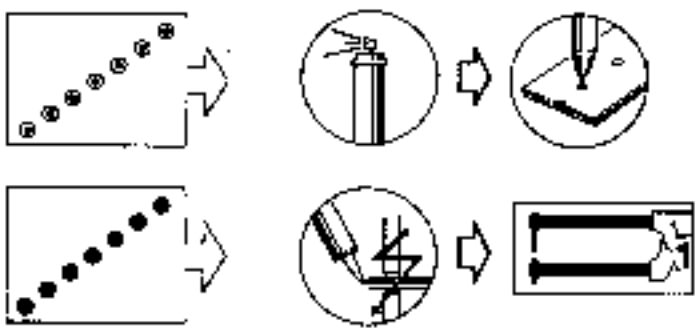


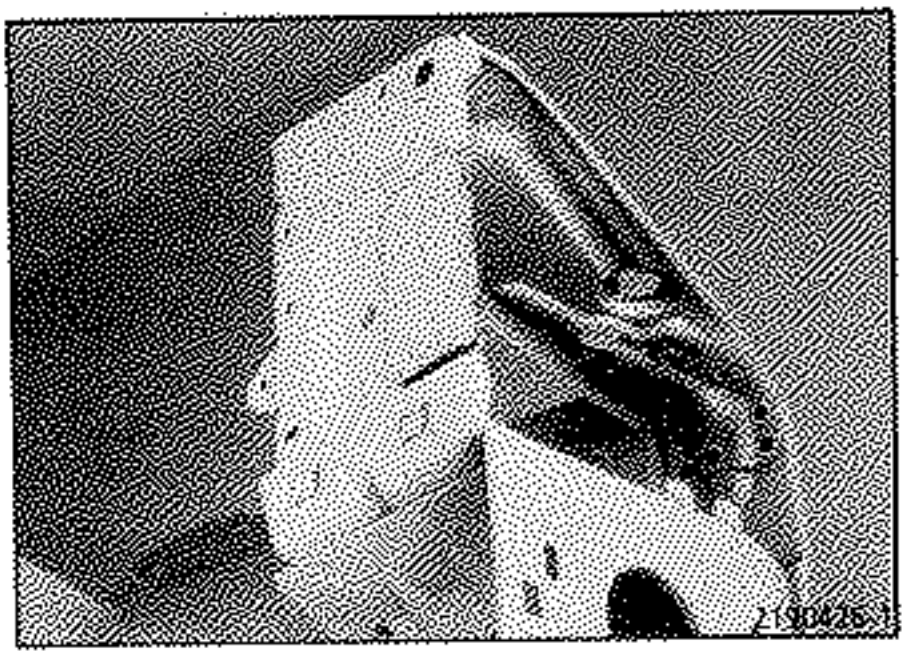
WELDING



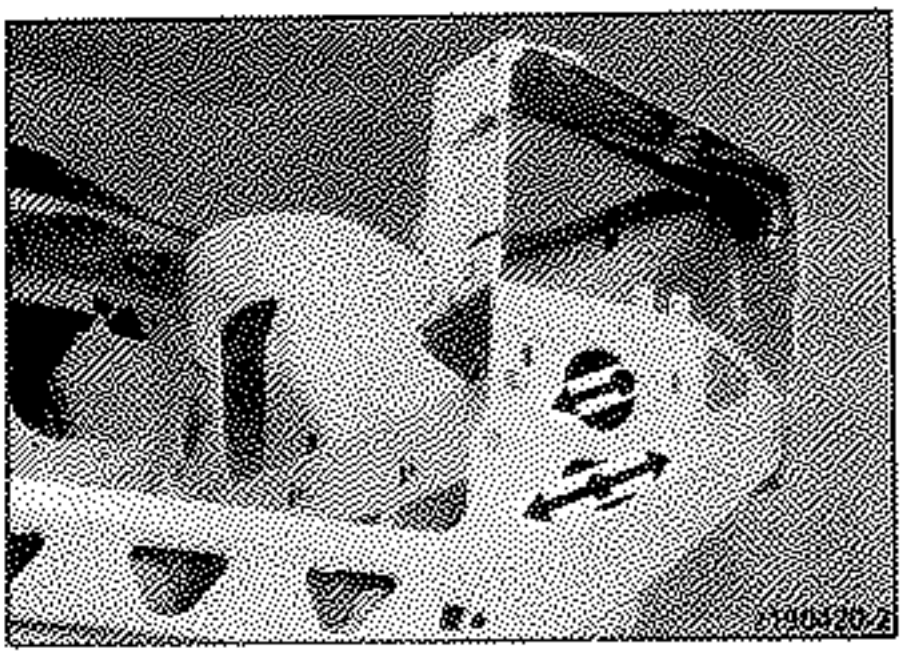


H = 55 mm e = 3 mm D = A 4.5 mm
B 6.5 mm





H = 30 mm e = 2 mm



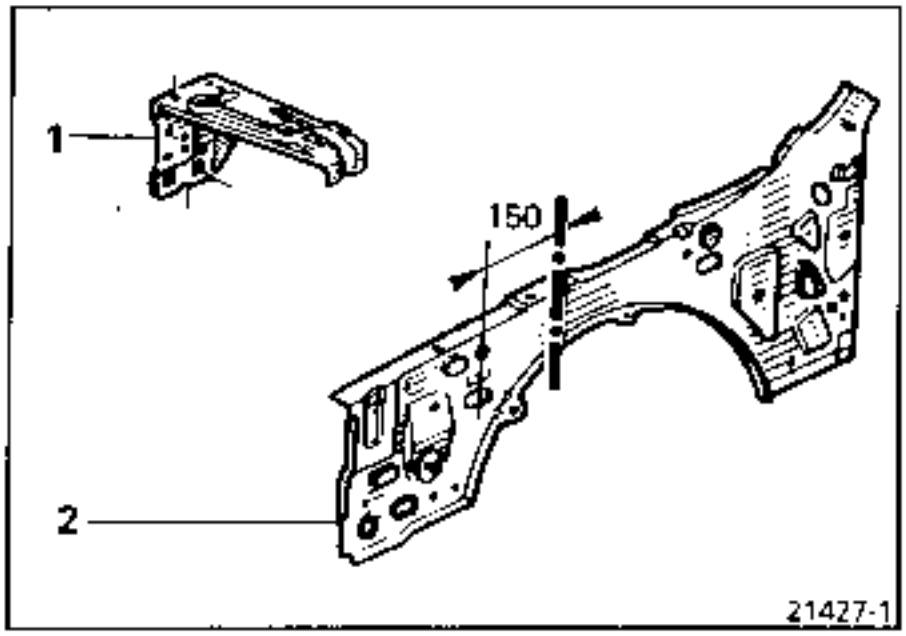
PROTECTING HOLLOW SECTIONS

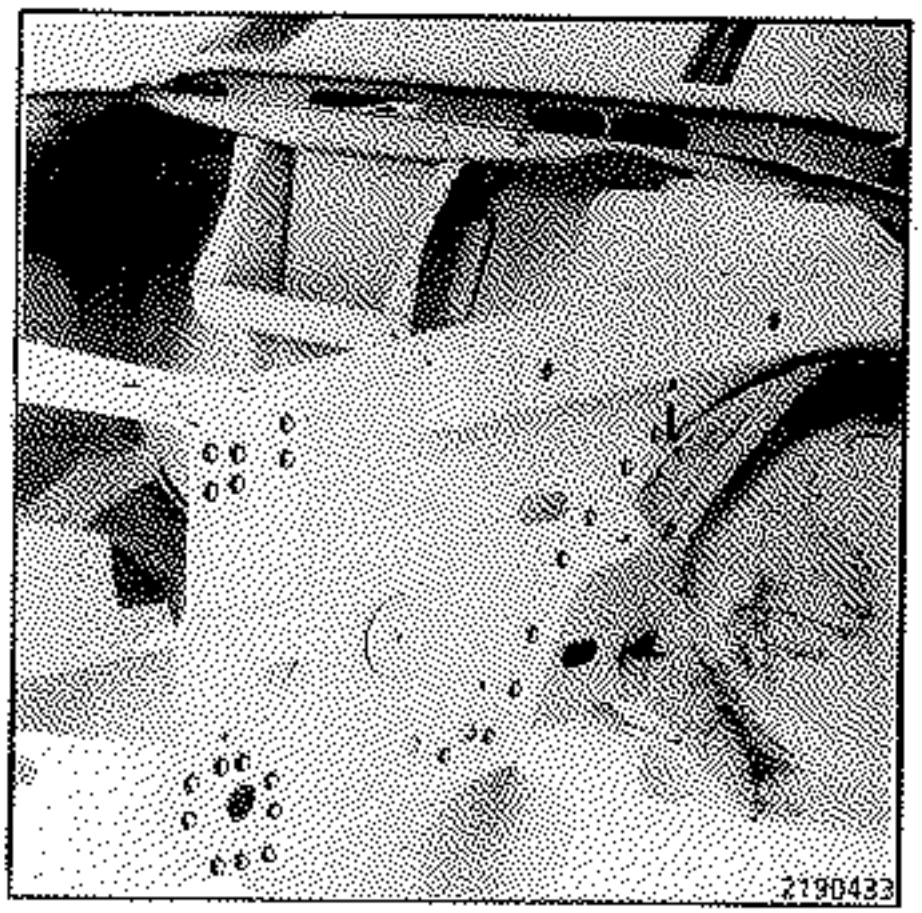


This is performed after painting and before the trim is refitted.

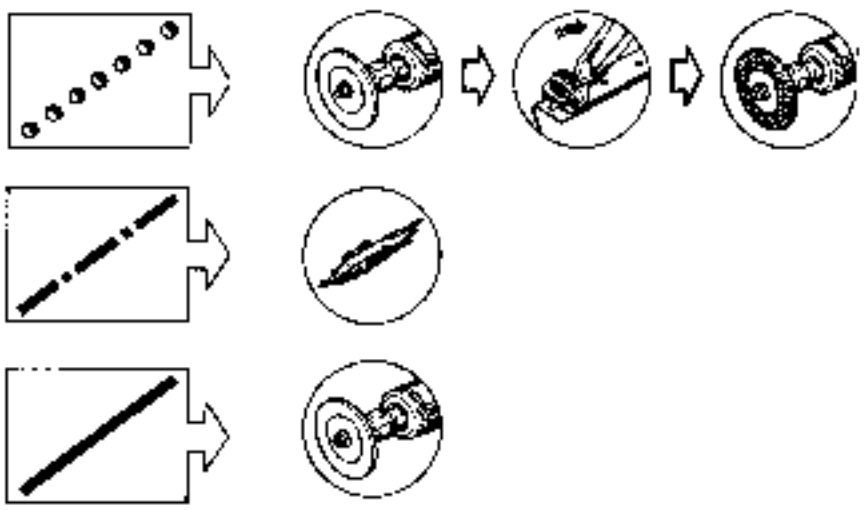
COMPOSITION OF PART FROM PARTS DEPARTMENT

- Assembled headlight carrier panel (1).
- Bare inner wheel flange panel (2).

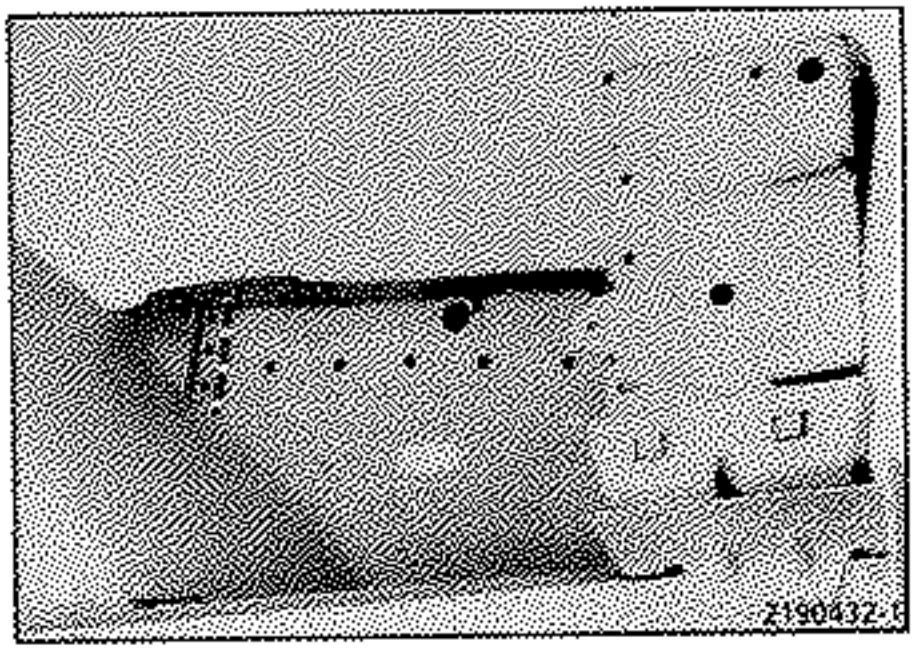


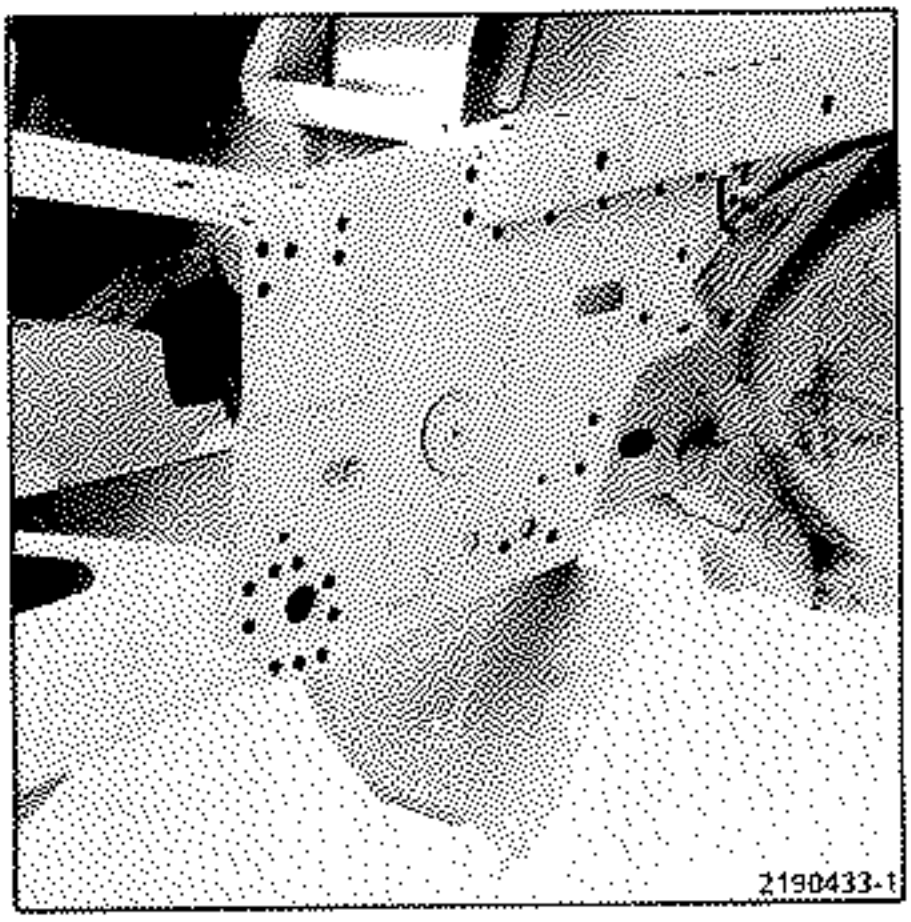


CUTTING OUT - UNPICKING



WELDING

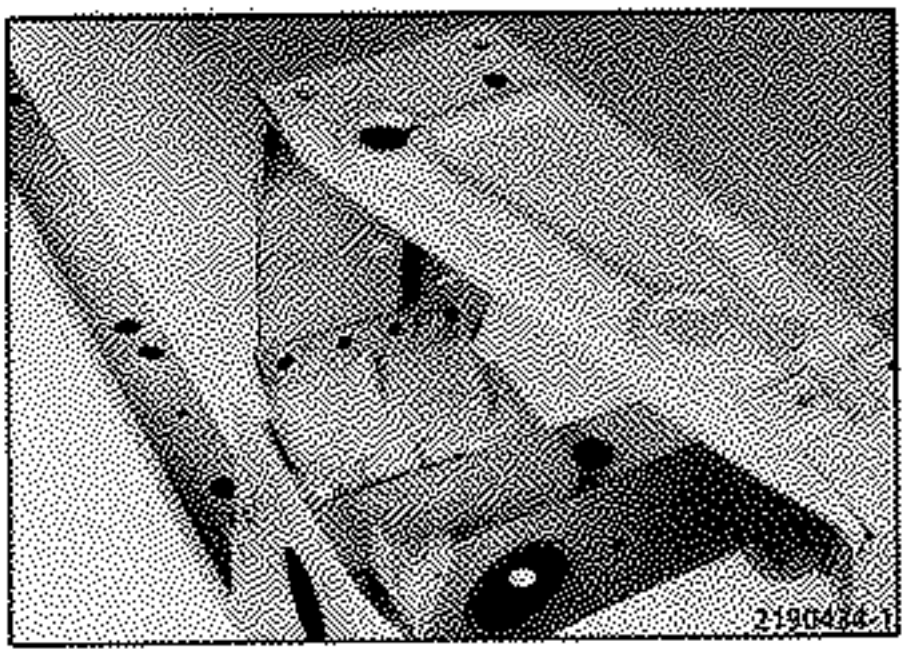


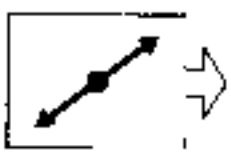


E = 1.5 mm

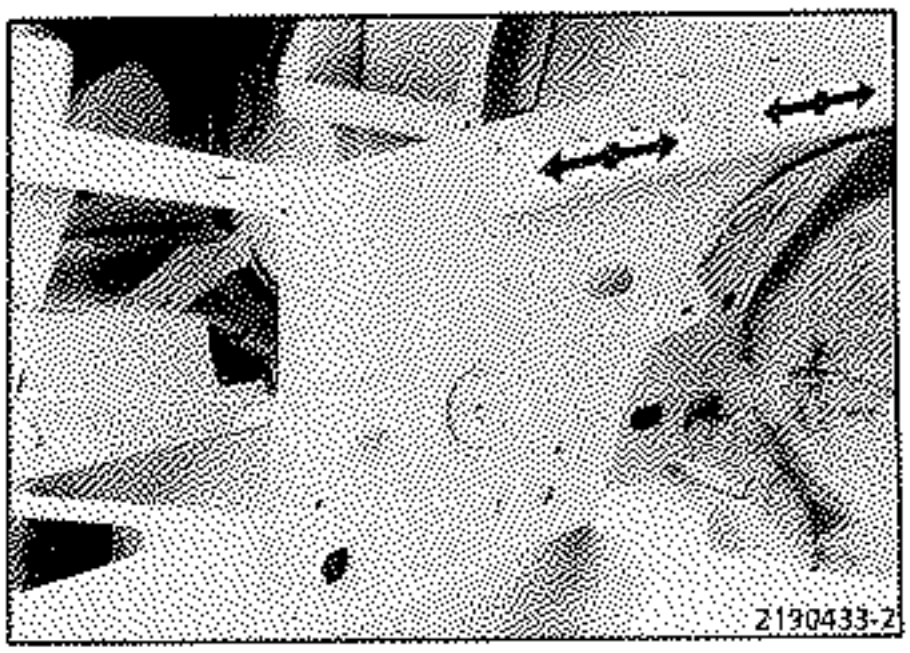
H = 35 mm











This operation is to be performed on the repair bench. Refer to sub-section **40** for the positioning of the components.

The replacement of the wheel arch is additional to the replacement of the cowl side panel and its reinforcement.

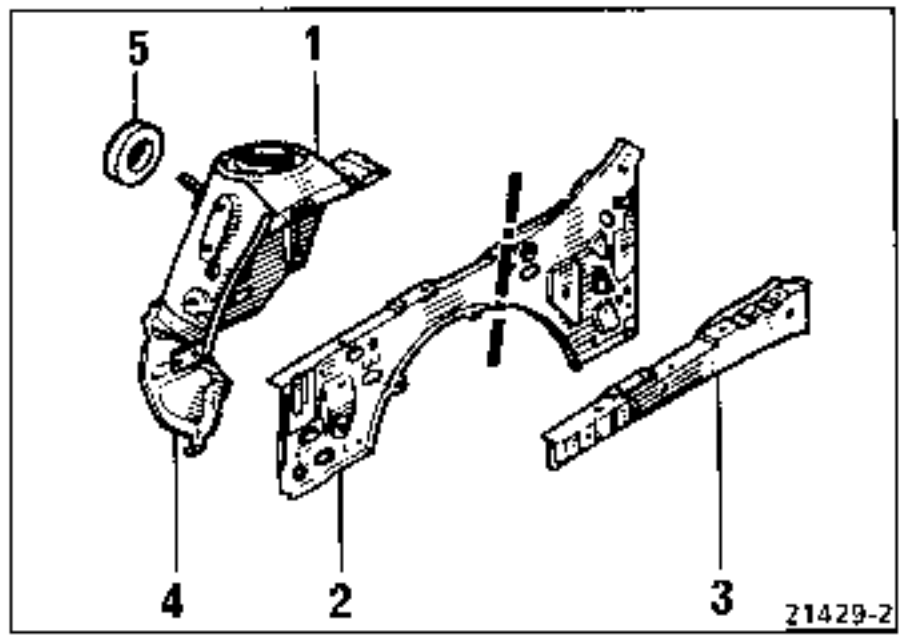
COMPOSITION OF PART FROM PARTS DEPARTMENT

- Wheel arch (1) supplied with :
  - . Upper shock absorber cup,
  - . Extension (4) with reinforcement.
  - . Electrical component mounting brackets.

- Inner wheel flange panel (2) (pillar lining) with reinforcements and various mountings.

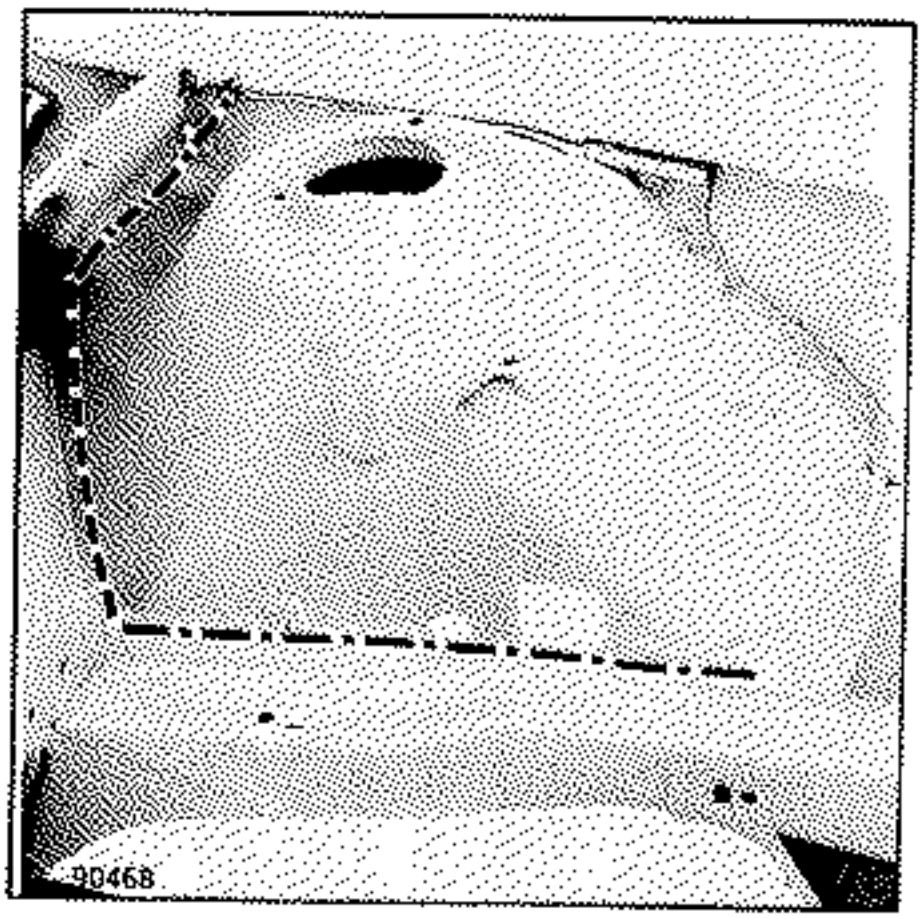
- Bare upper reinforcement (3).

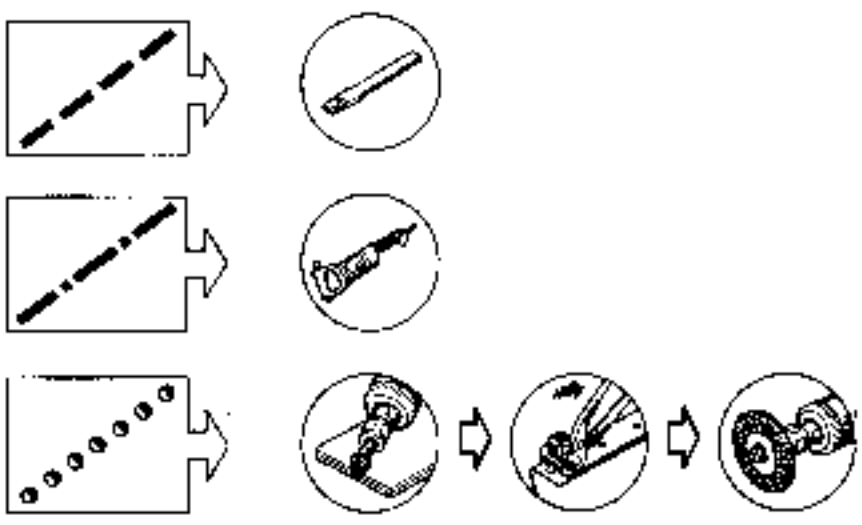
- Steering mounting cup (5) (to be welded on refitting).

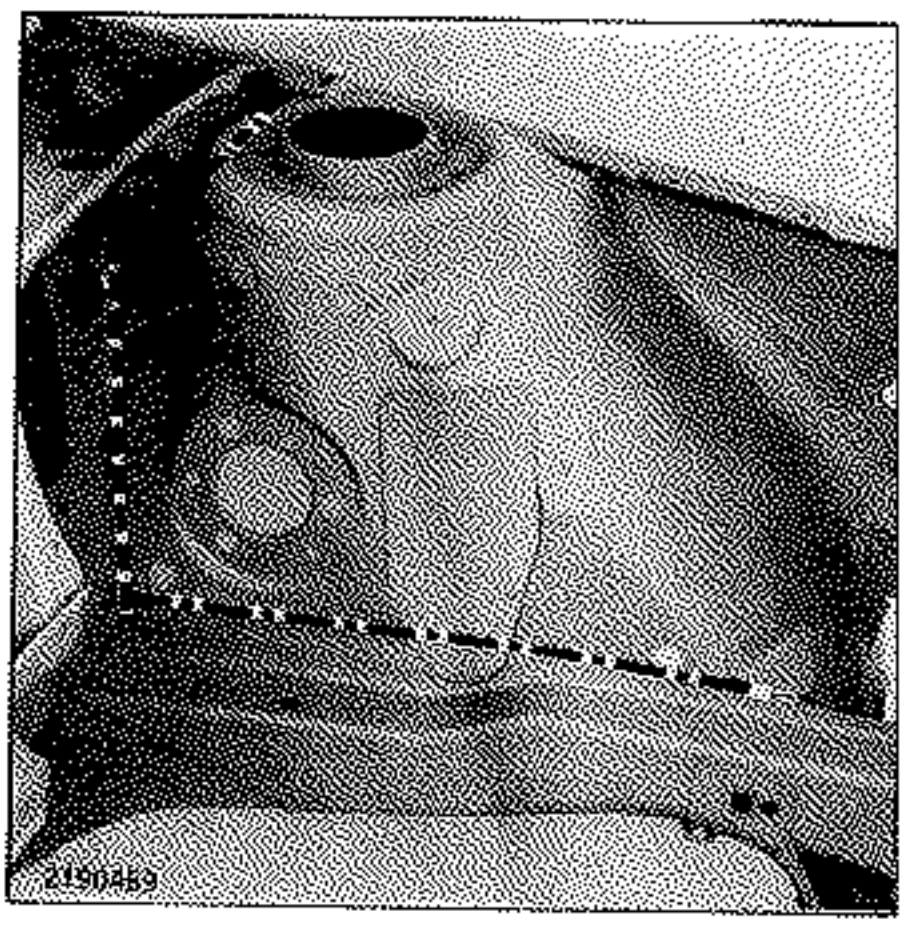


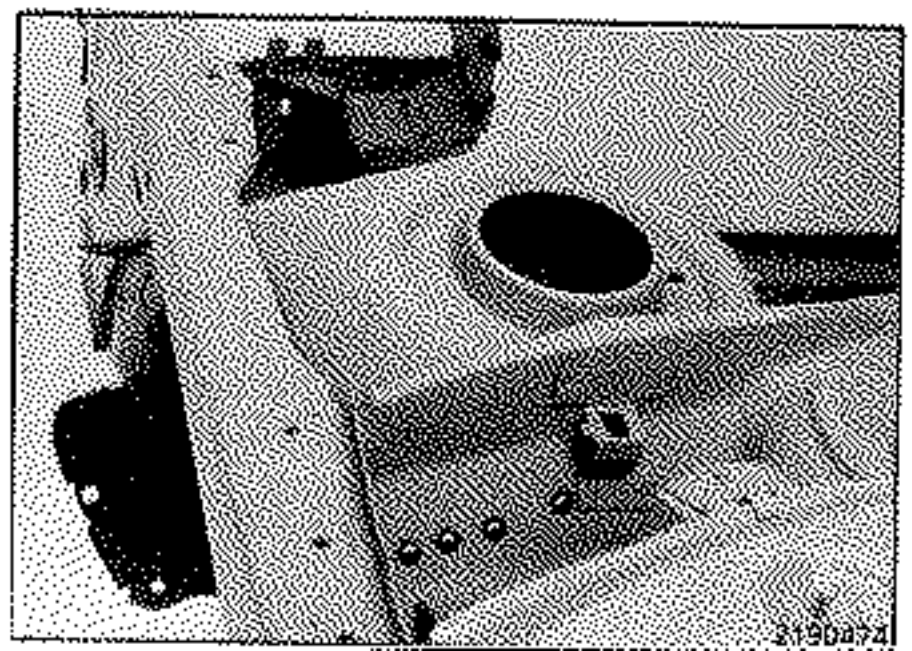
CUTTING OUT - UNPICKING

Transverse engine.

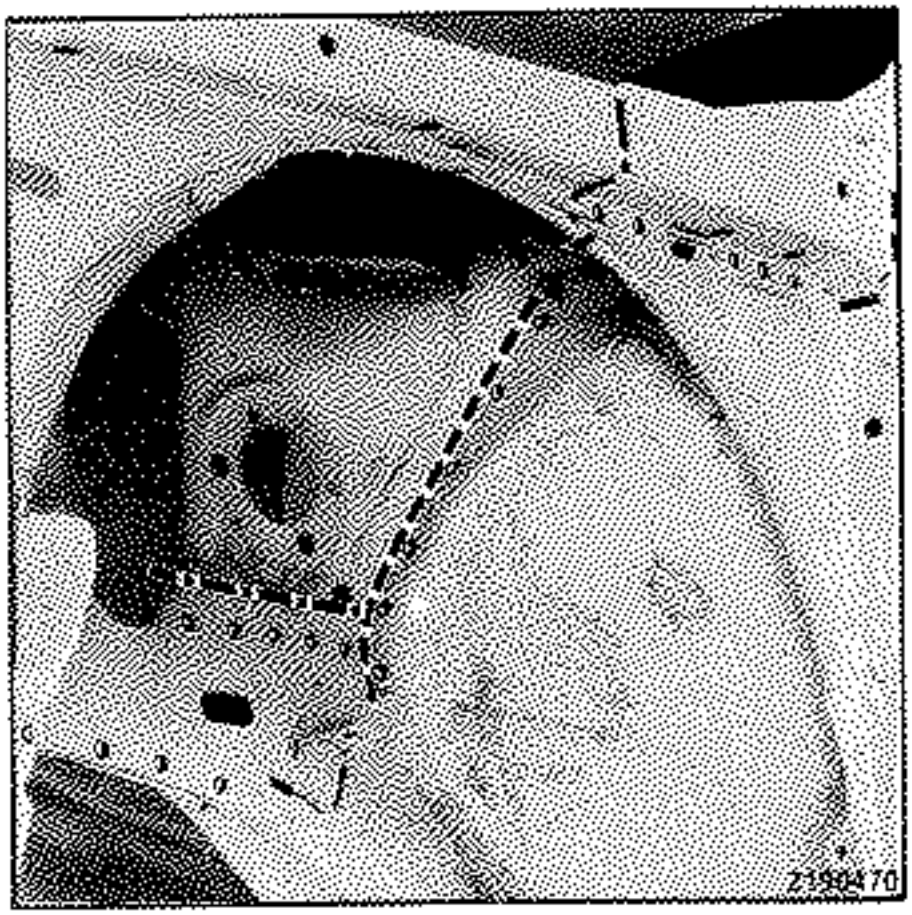


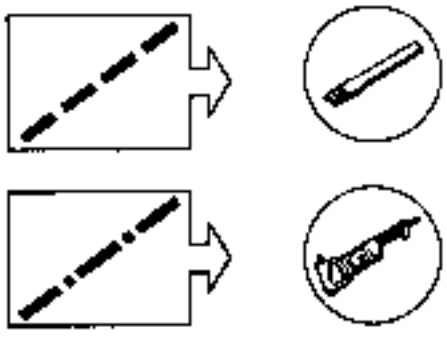


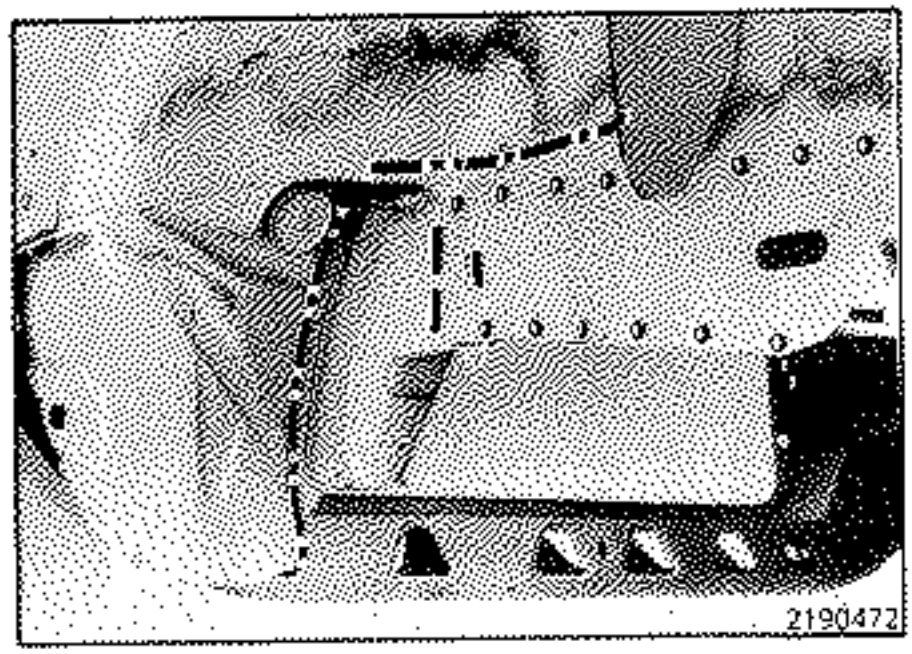




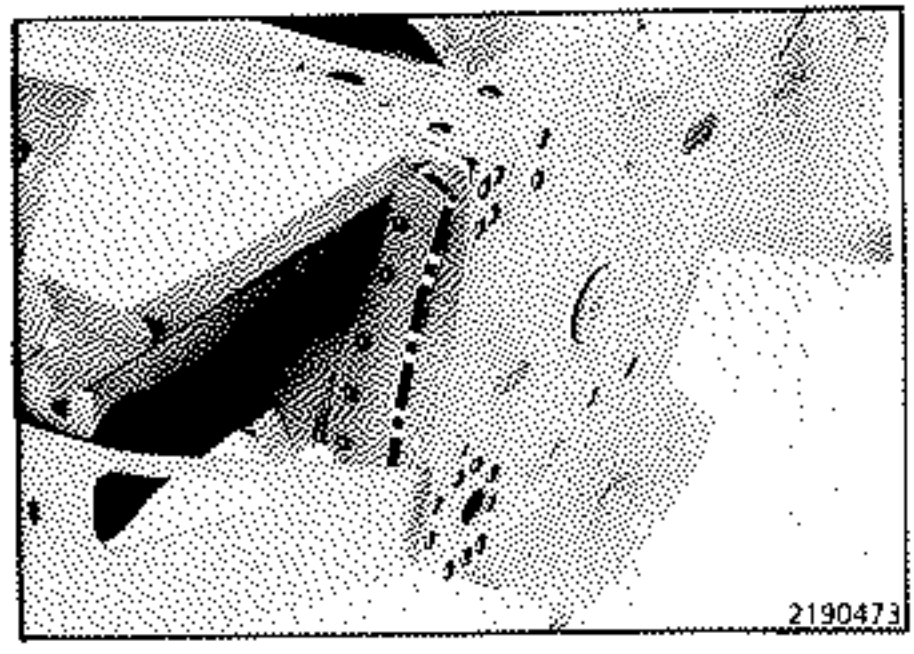
CUTTING OUT - UNPICKING (cont)

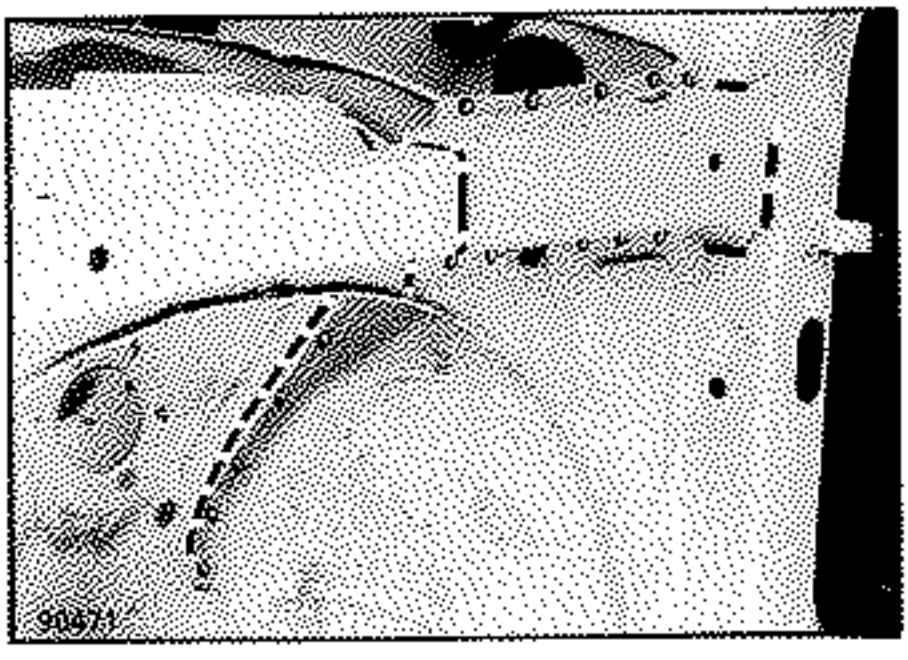


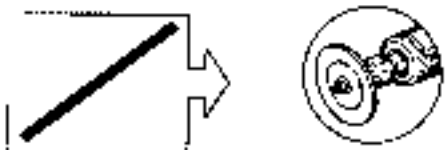




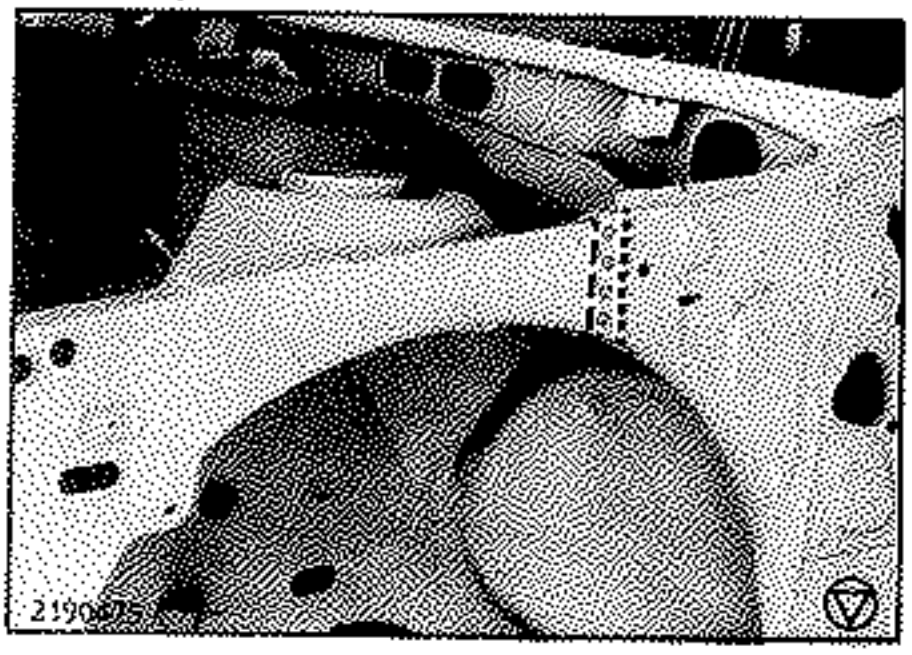




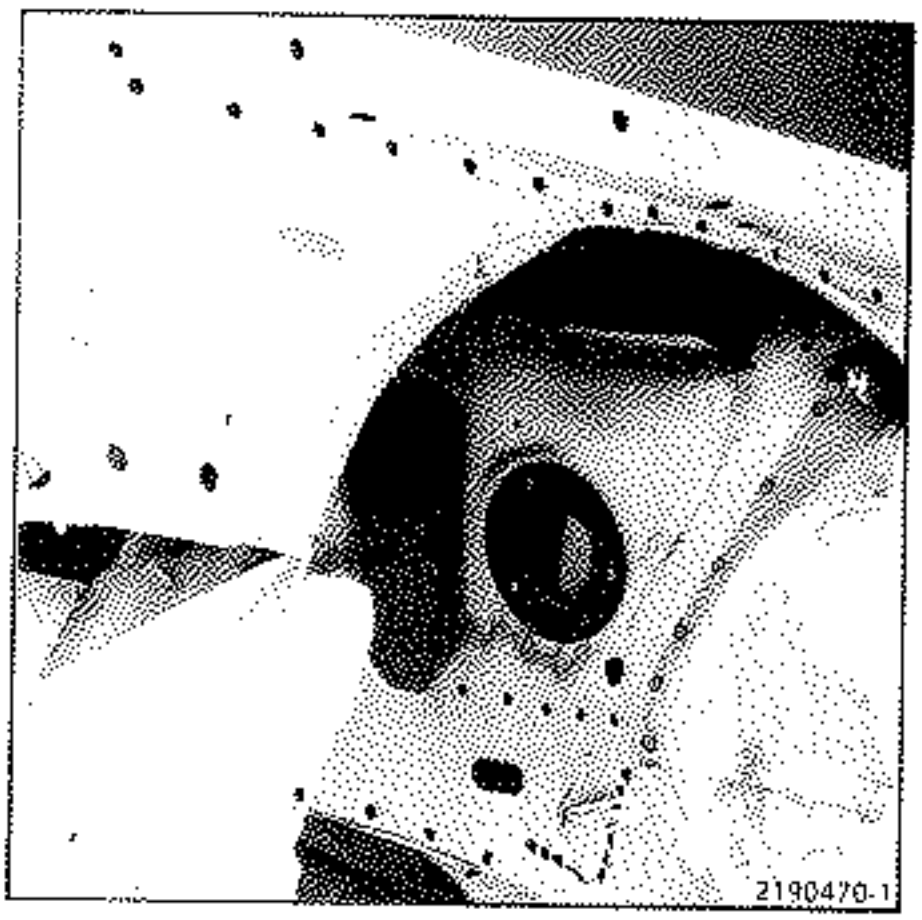




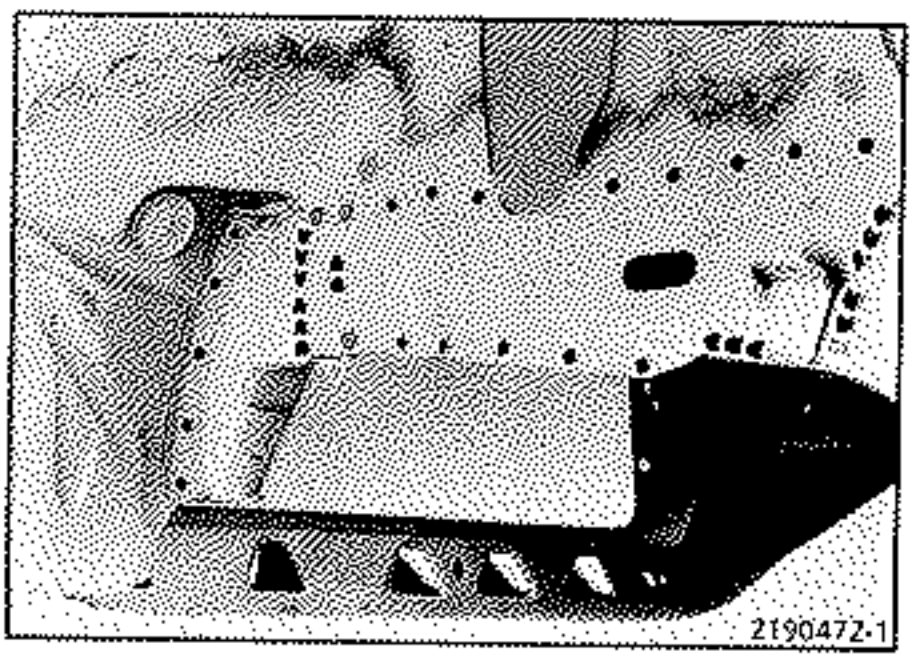
WELDING

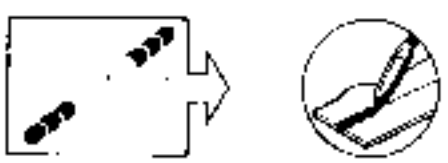


D = 5 mm

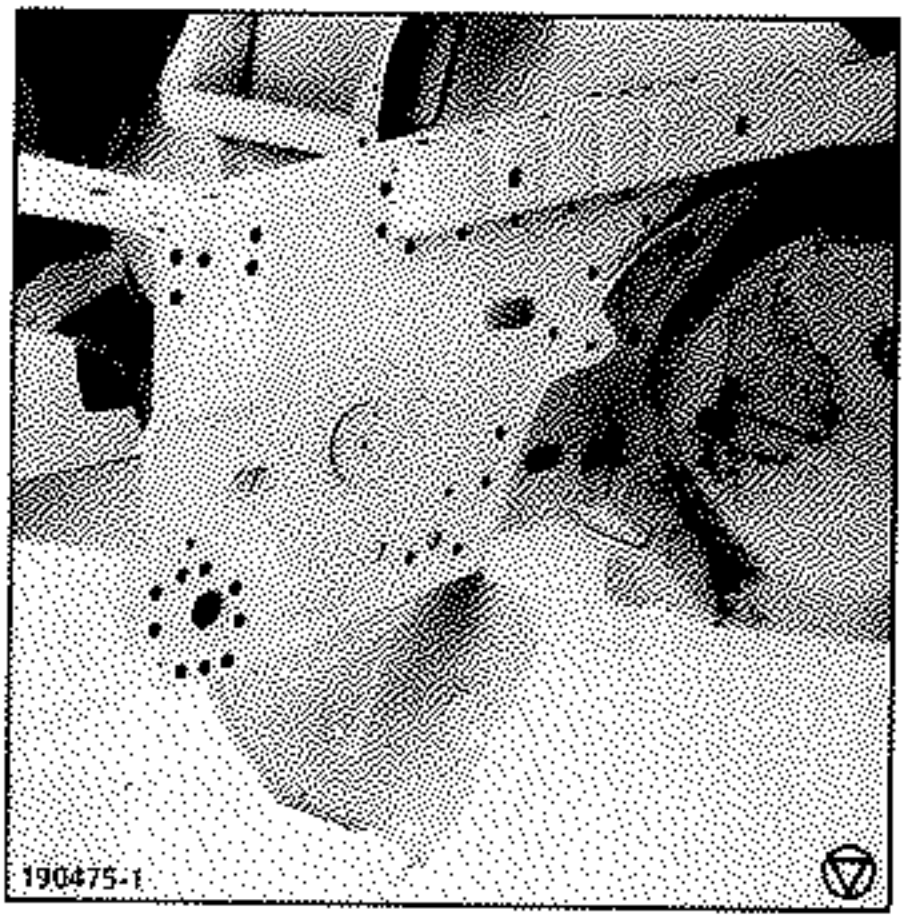


D = 5 mm

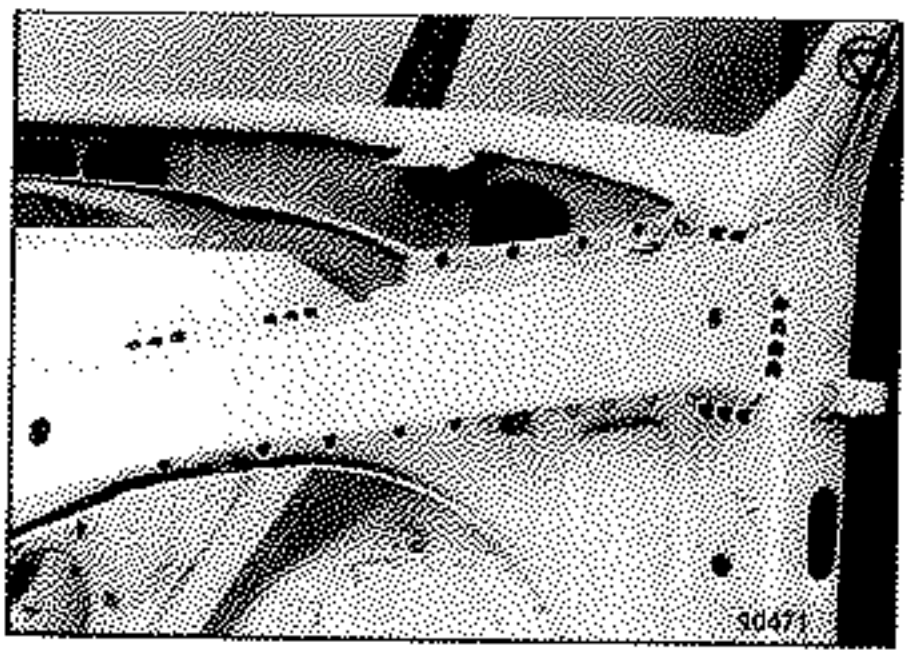




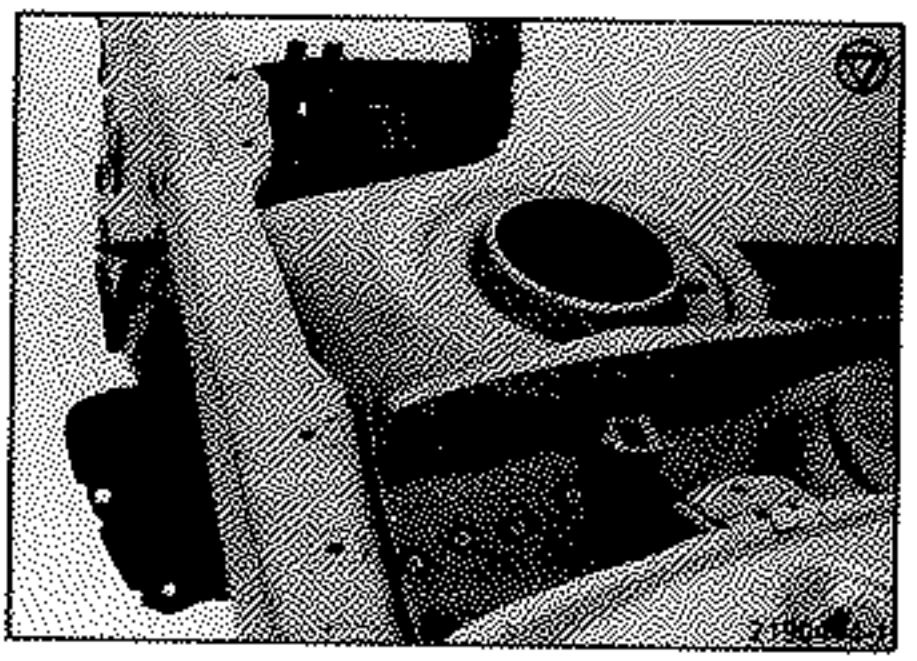
E = 1.7 mm
H = 30 mm



D = 5 mm e = 1,7 mm H = 30 mm



e = 1,7 mm H = 30 mm A;D = 6 mm



IN-LINE ENGINE

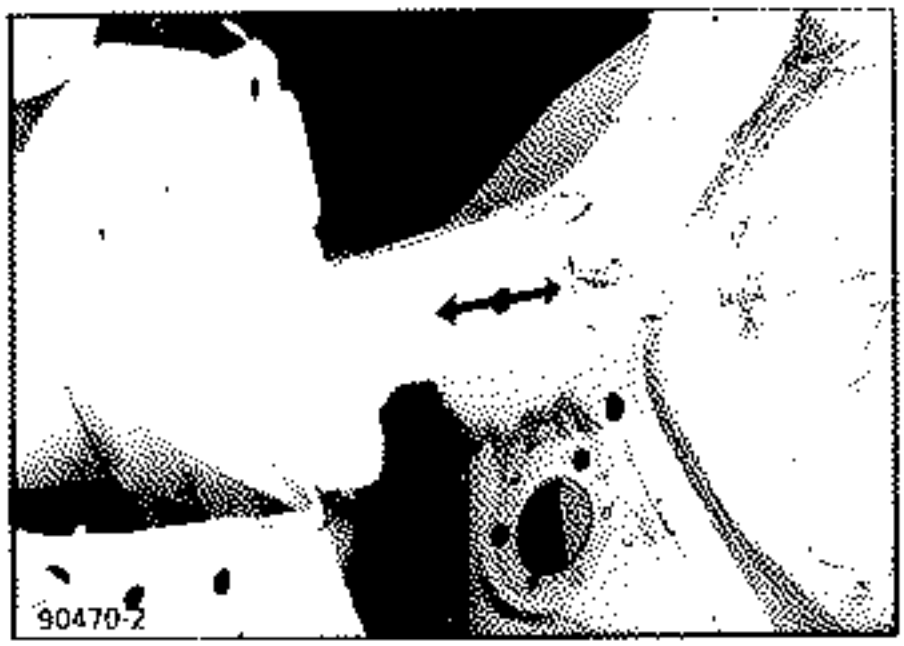
WELDING (cont)



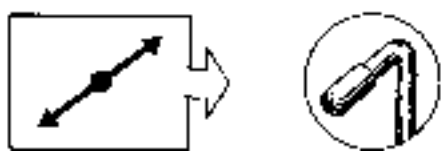




Apply the electric spot welds. The corresponding values for e and H are given under each diagram.



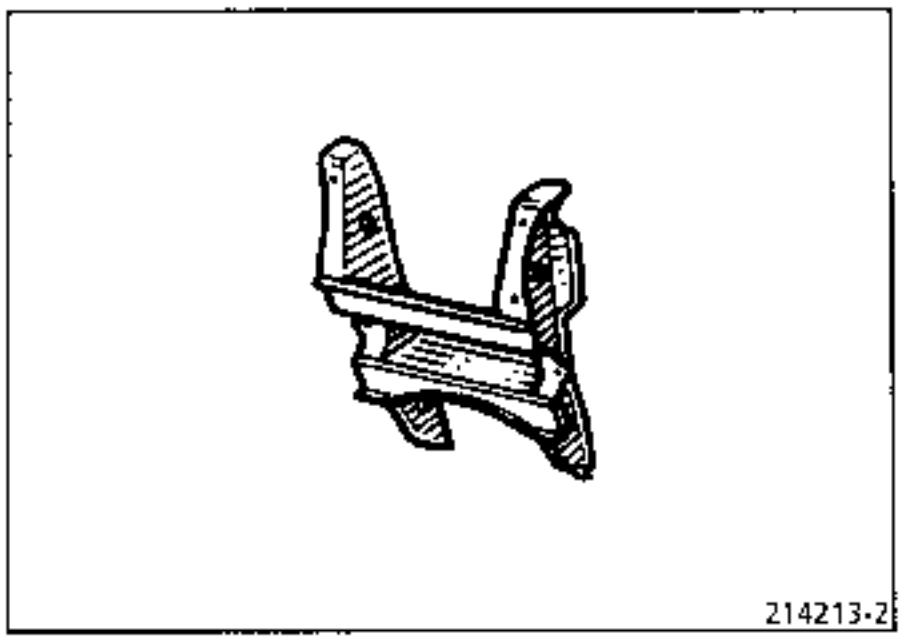
PROTECTING HOLLOW SECTIONS



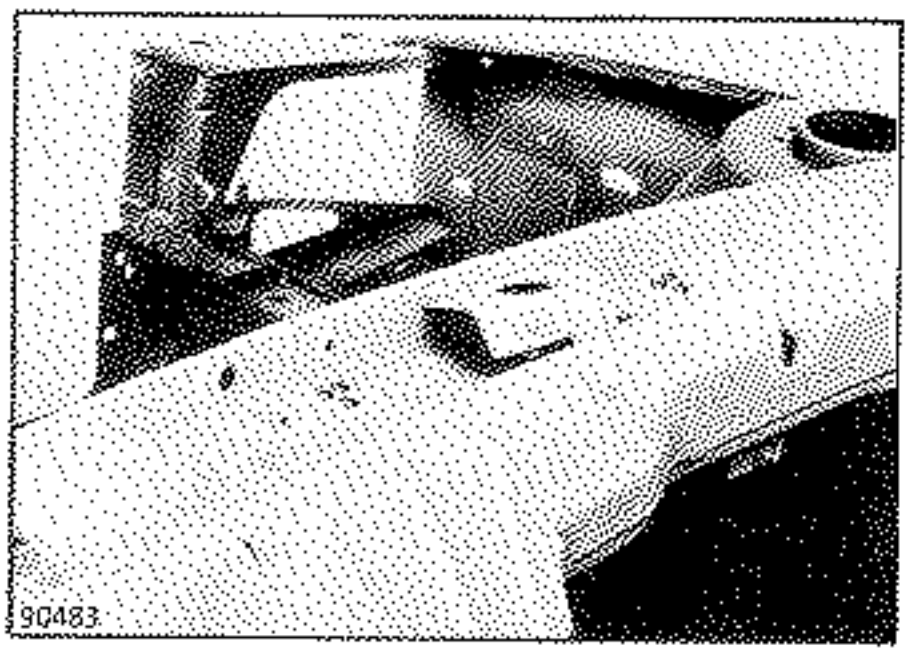
This operation is to be performed on the repair bench. Refer to sub-section **40** for the positioning of the components.

COMPOSITION OF PART FROM PARTS DEPARTMENT

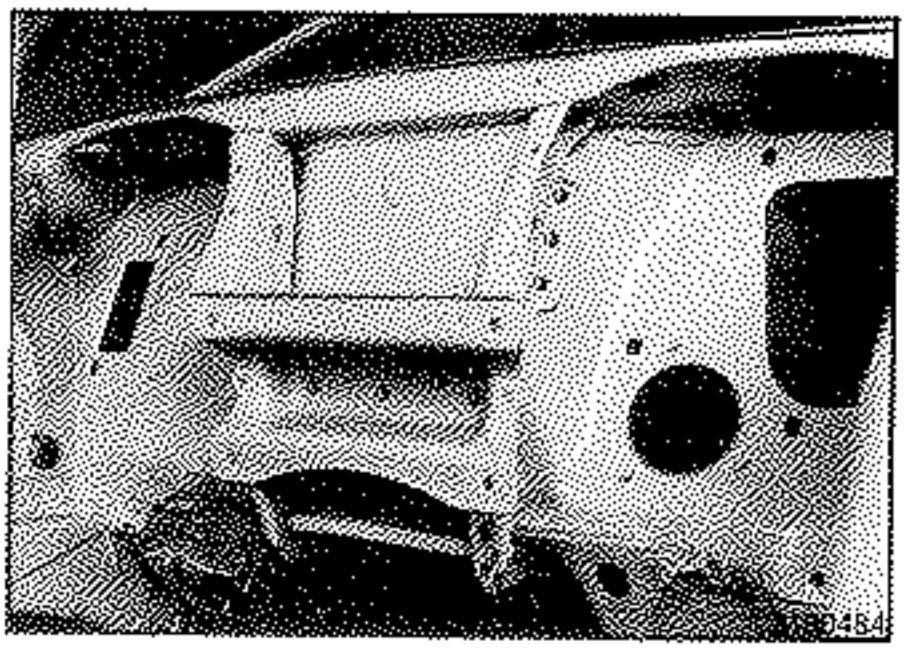
Part supplied undrilled (drill using bracket **N° 4** on the repair bench).



CUTTING OUT - UNPICKING

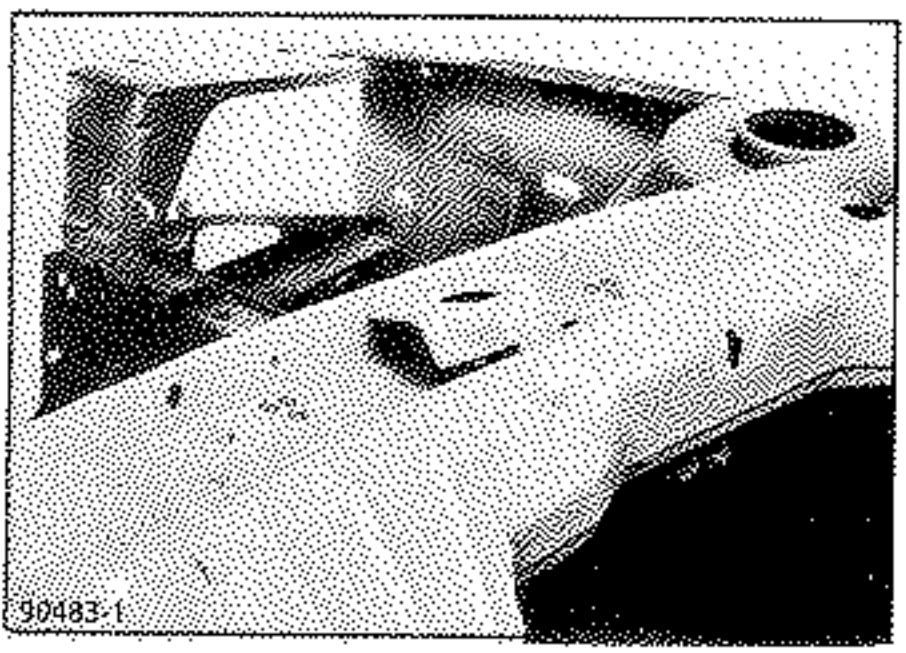


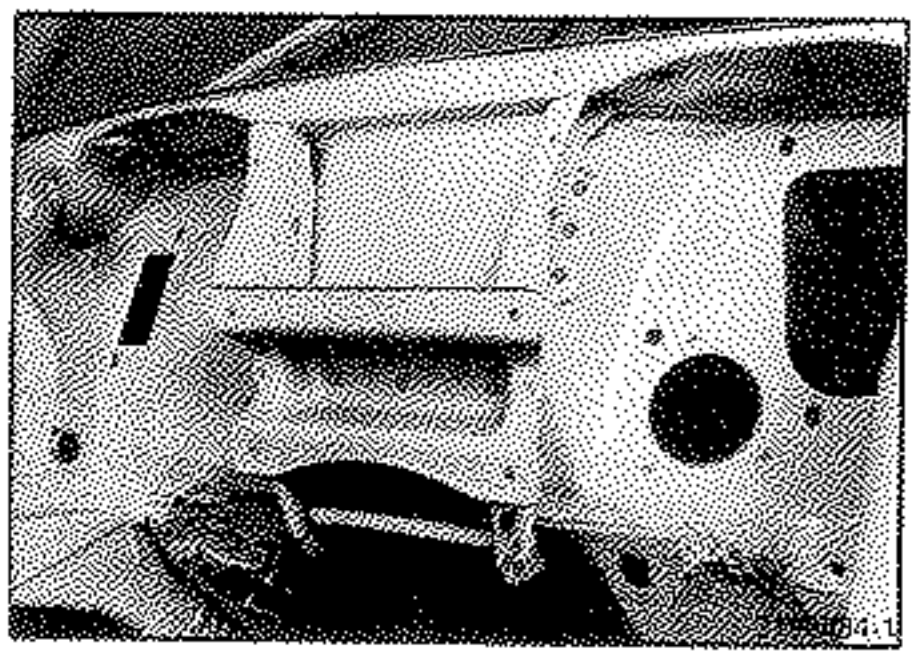






SOUDURE



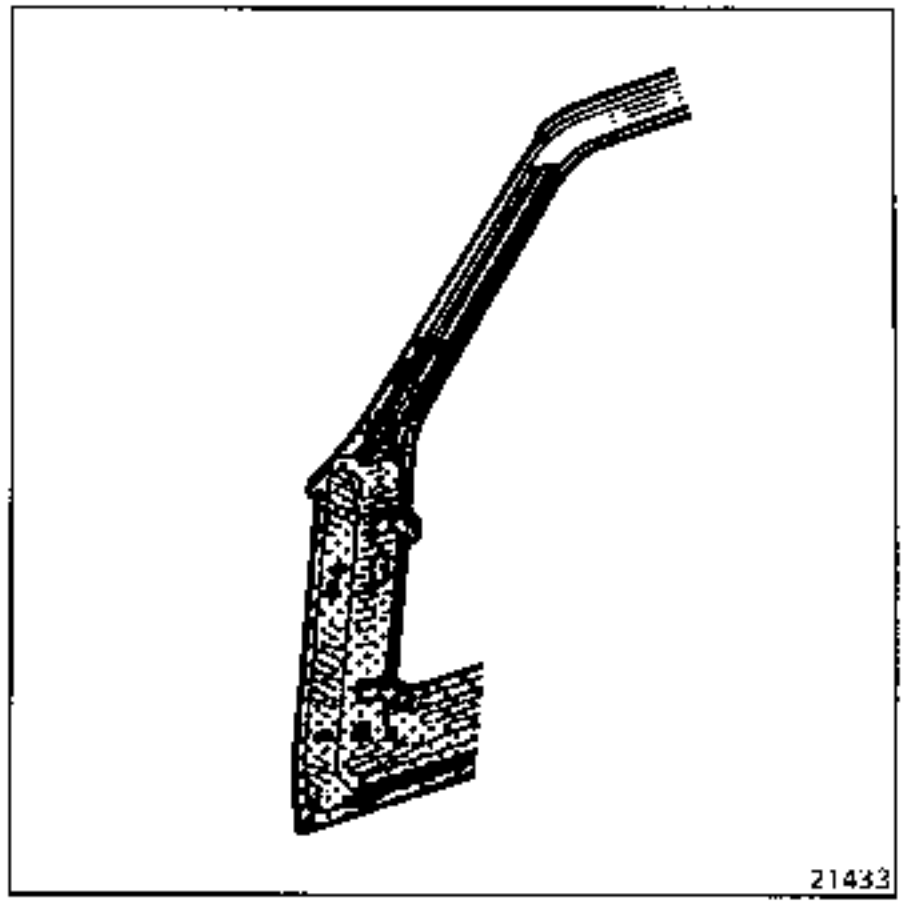


D = 6 mm

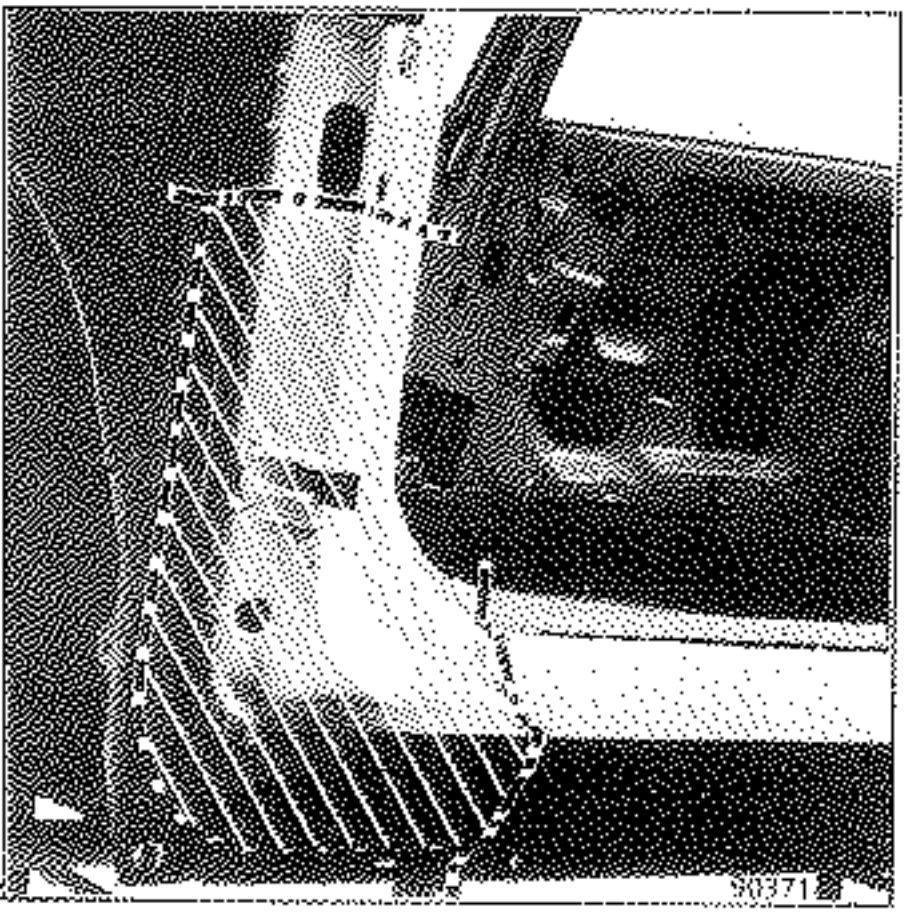


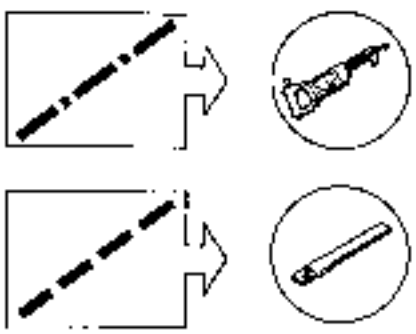
COMPOSITION OF FRONT PILLAR FROM PARTS DEPARTMENT

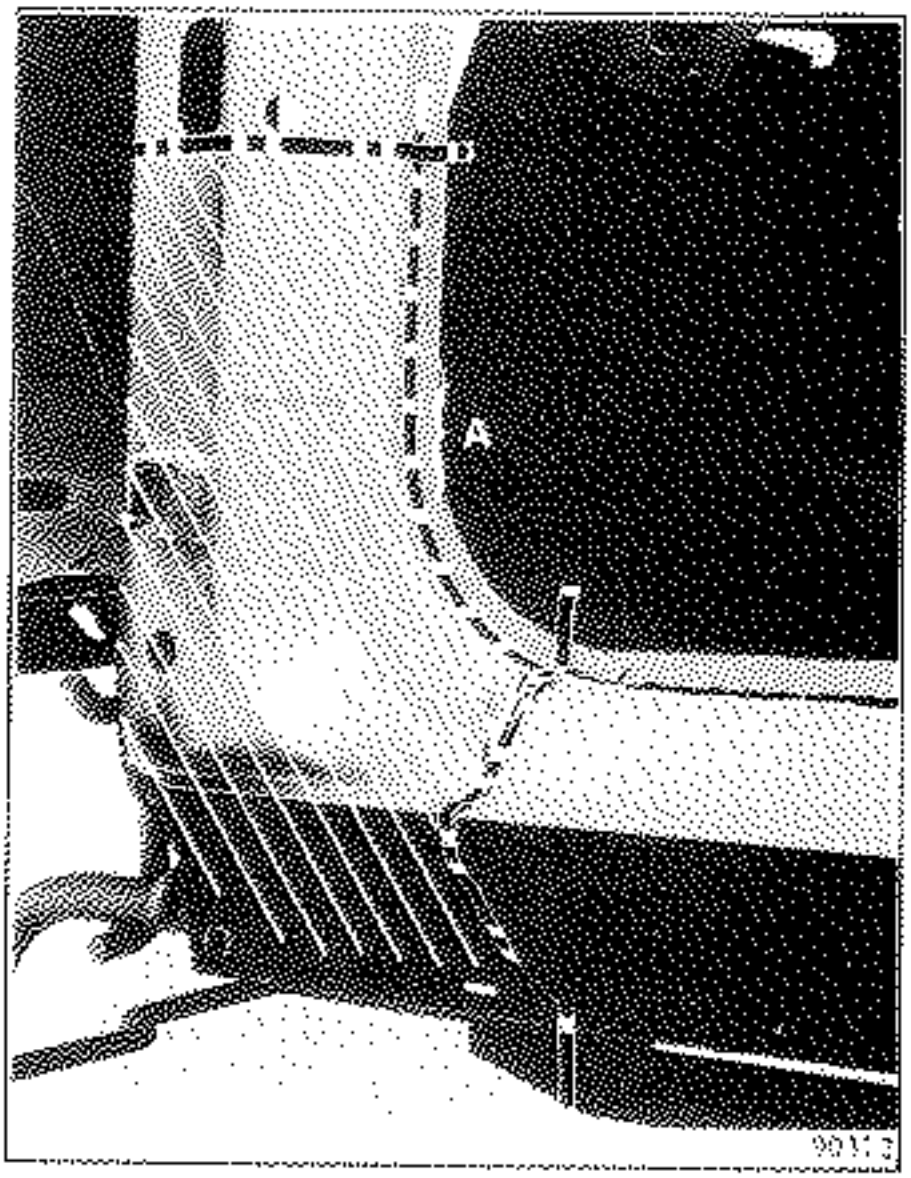
- Front pillar.
- Upper hinge reinforcement.
- Lower hinge reinforcement.
- Door check mounting.
- Wing mounting stud.
- Rain channel moulding mounting support.
- Upper hinge.
- Lower hinge.

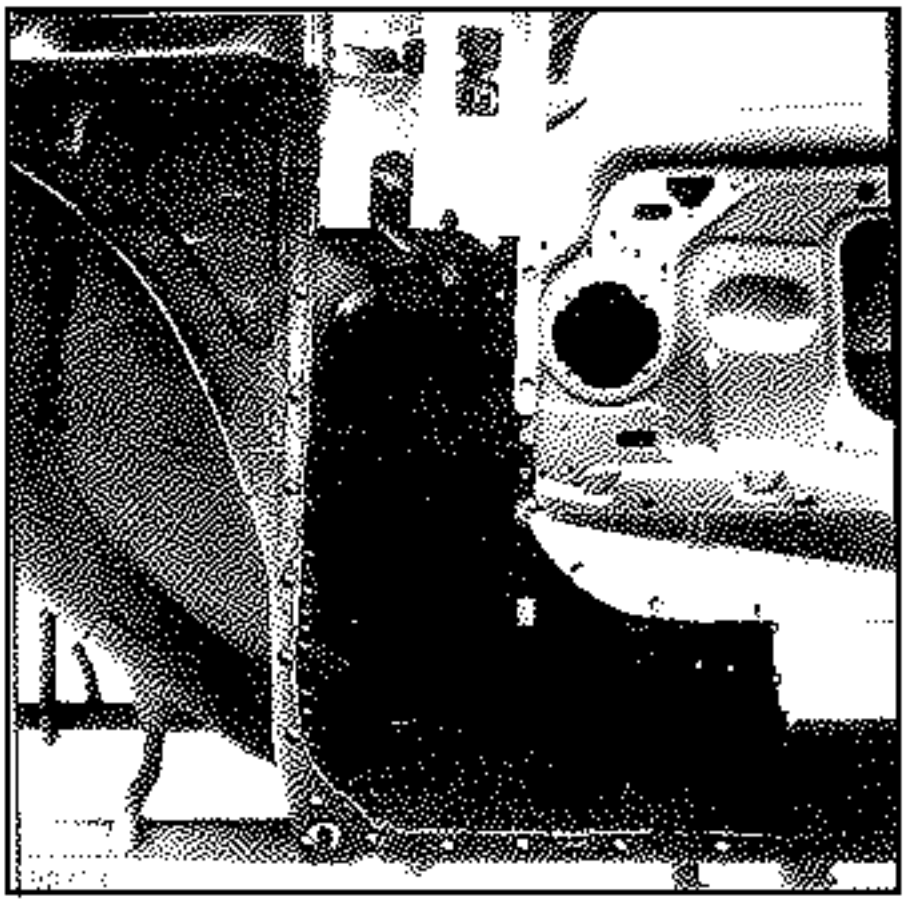


CUTTING OUT - UNPICKING



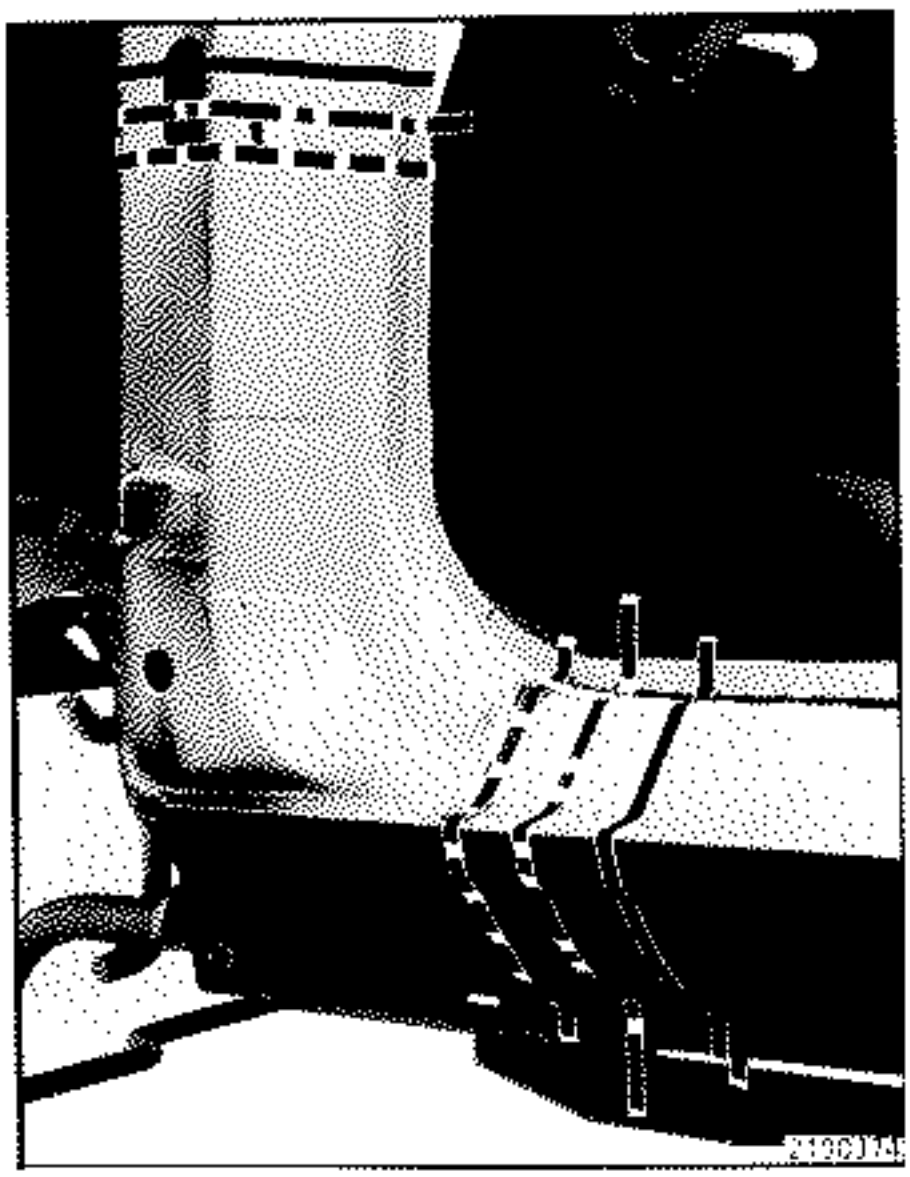


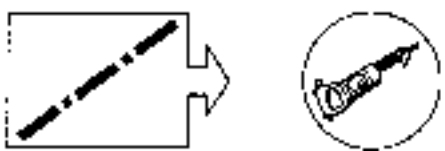




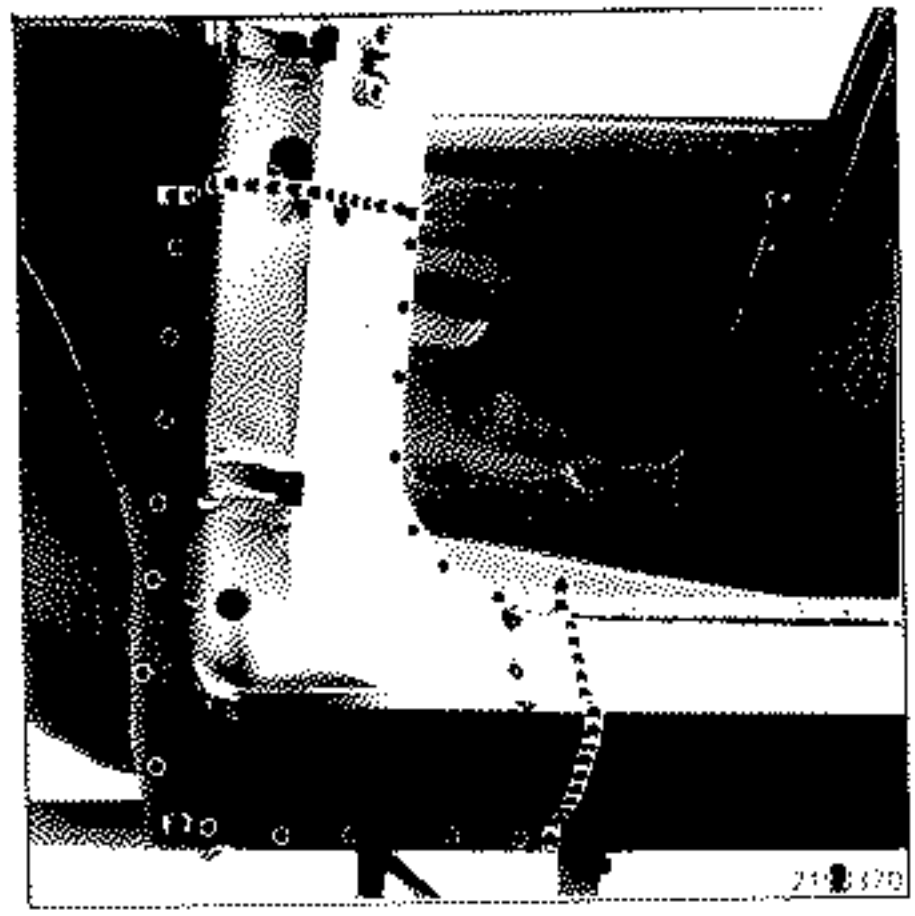


PREPARATION BEFORE WELDING





WELDING

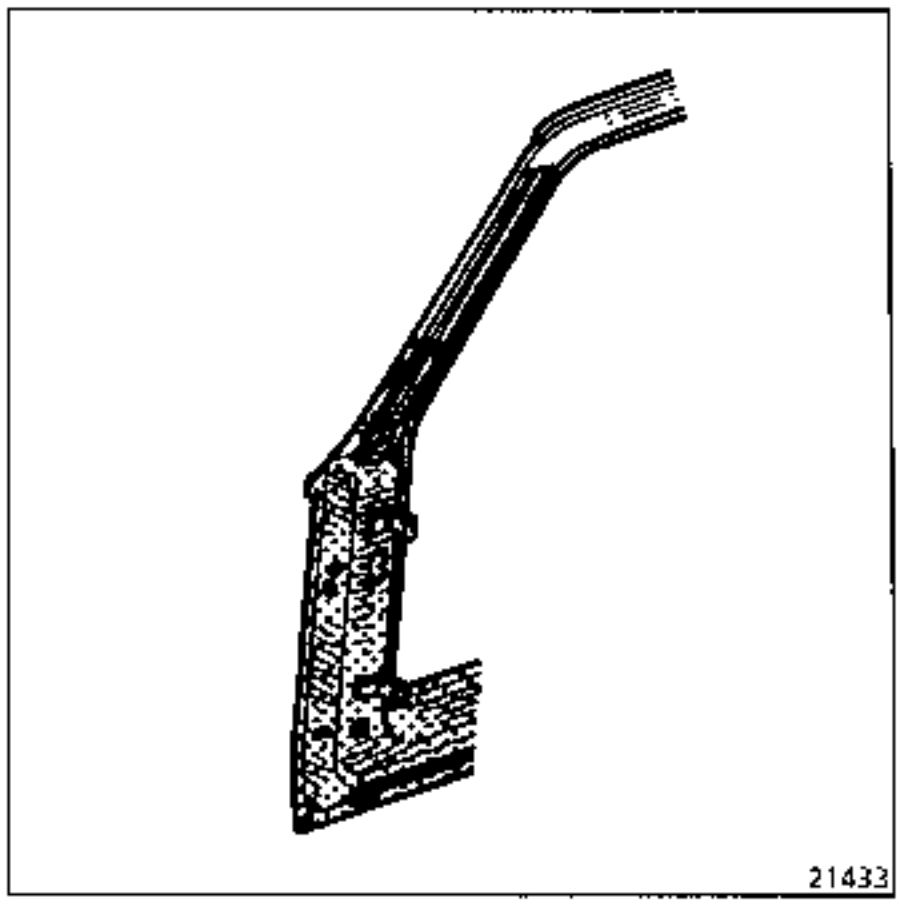




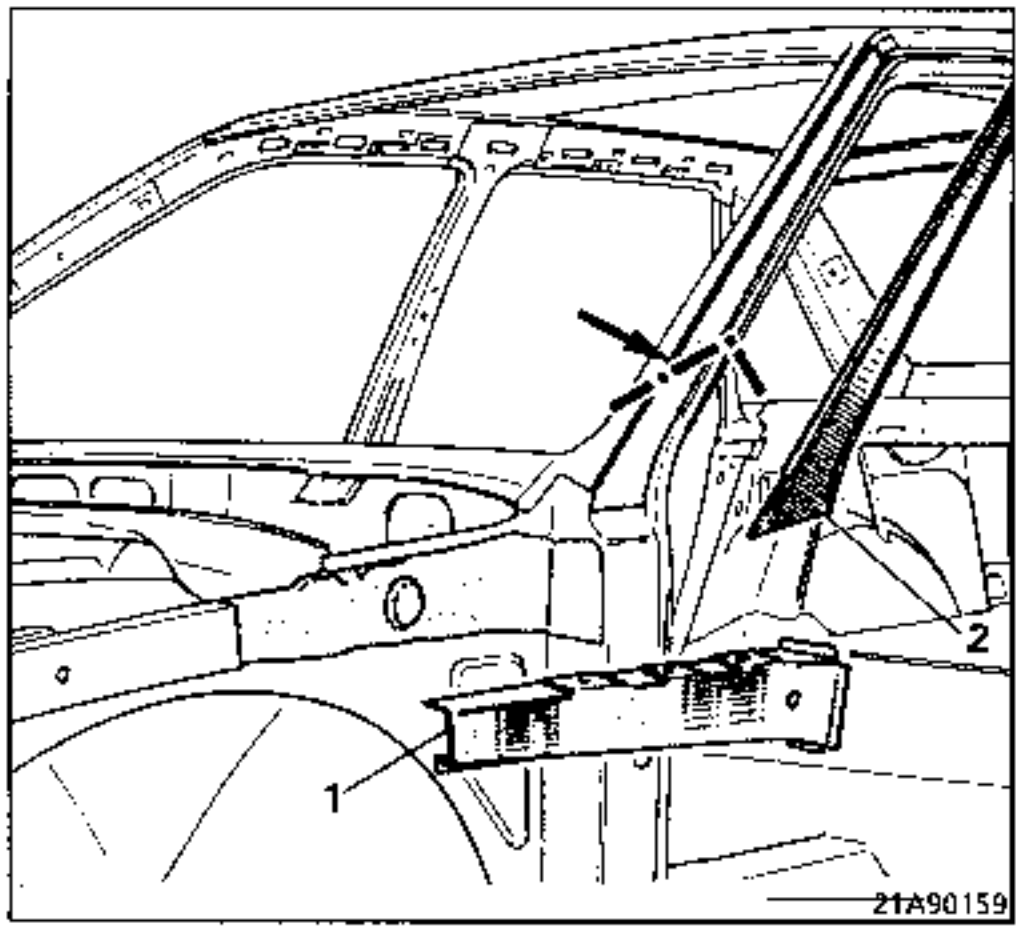
e = 1.4 mm
H = 75 mm

COMPOSITION OF FRONT PILLAR FROM PARTS DEPARTMENT

- Front pillar.
- Upper hinge reinforcement - door check mounting.
- Lower hinge reinforcement.
- Upper hinge.
- Lower hinge.
- Wing mounting stud.
- Rain channel moulding mounting support.



The method described below requires the windscreen to be removed and possibly the dashboard if the lining has been damaged. If the dashboard is not to be removed, it must be protected.



The following components must be replaced when the pillar upright is cut:

1 side members and (partial replacement),
2 rain channel moulding mounting support.

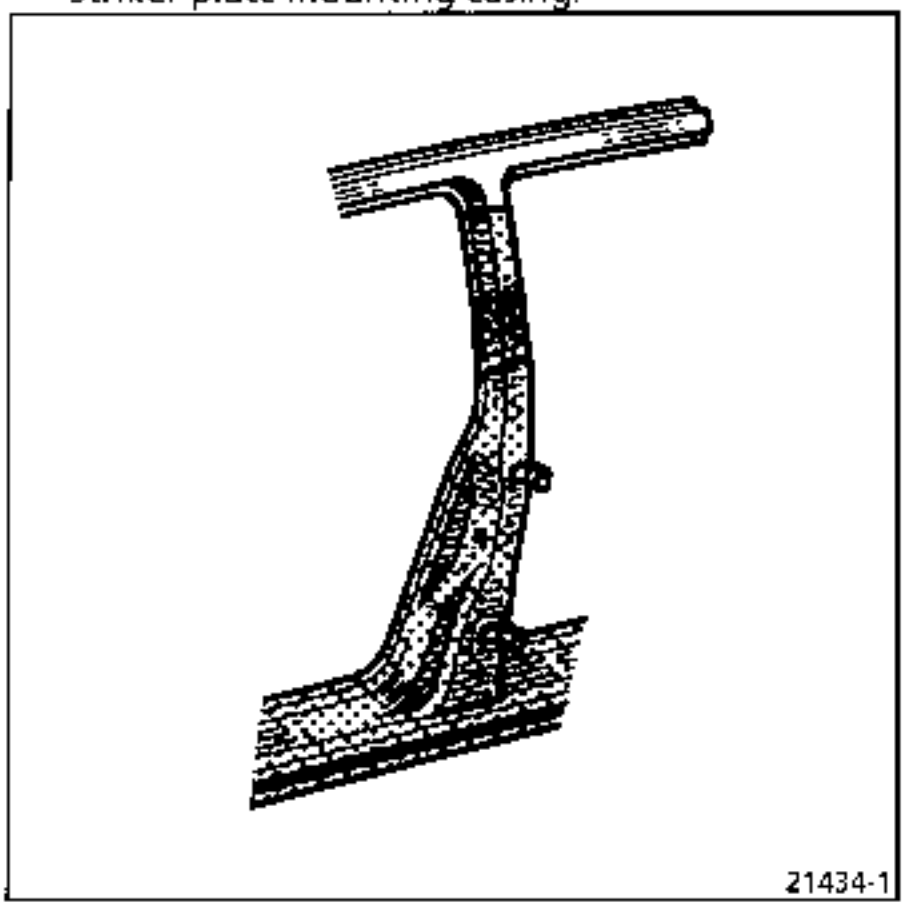
Firstly: remove these components to give access to the front pillar upper section.

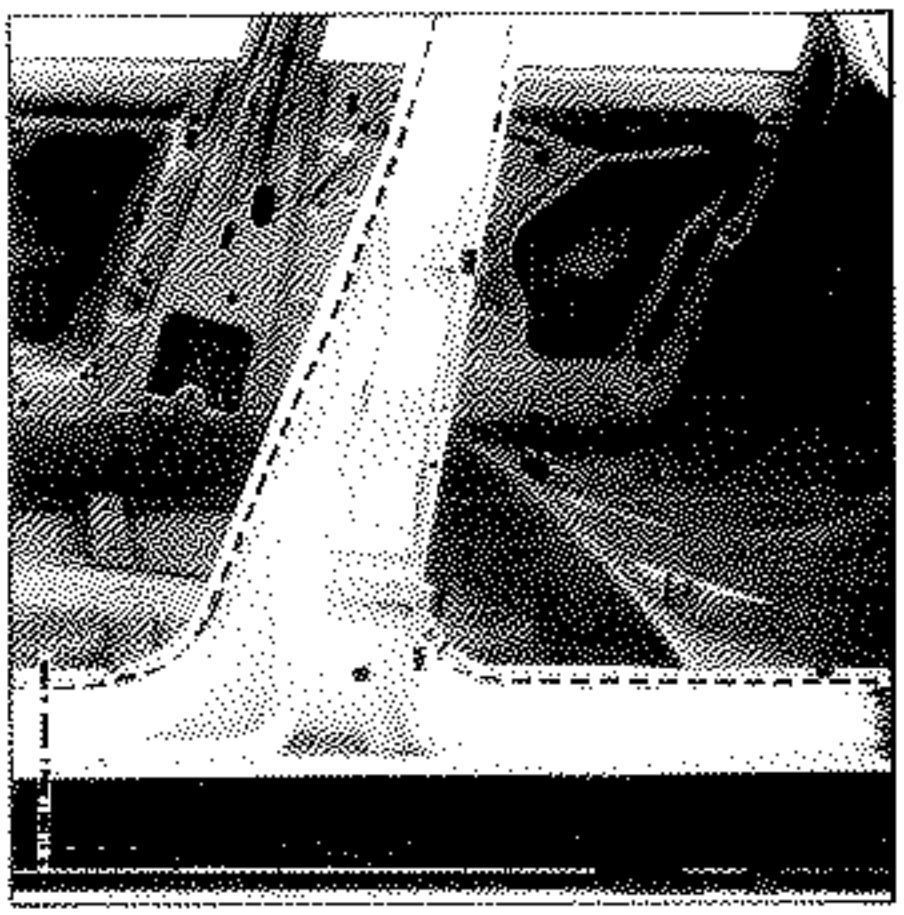
Mark the cutting line along the pillar upright; the operating method is the same as for replacement of the lower section of the pillar (see the corresponding section).

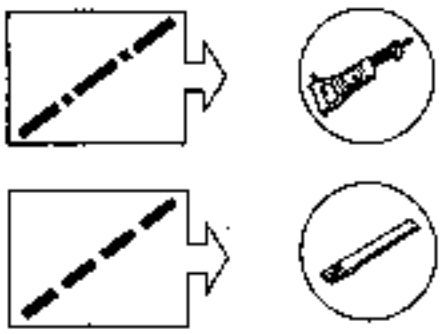
In order to facilitate positioning of the pillar, the rain channel moulding mounting support must be removed from the new component supplied by the Parts Department.

COMPOSITION OF CENTRE PILLAR FROM PARTS DEPARTMENT

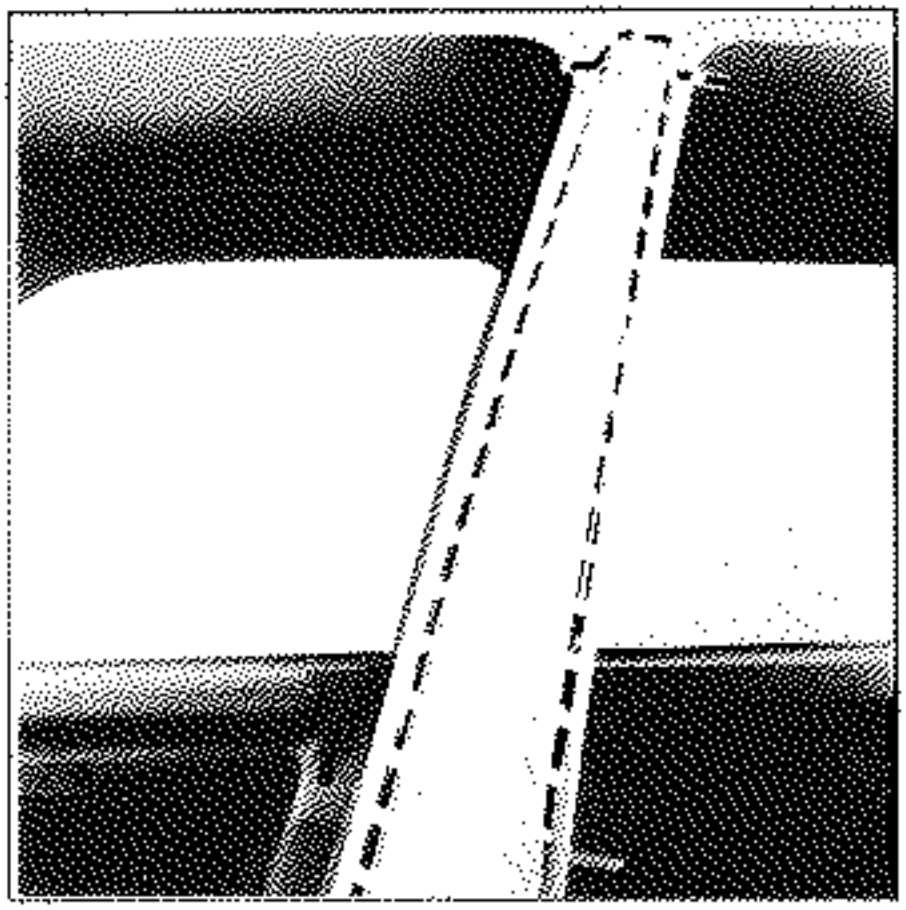
- Centre pillar.
- Seat belt mounting.
- Upper hinge.
- Lower hinge.
- Hinge reinforcement.
- Striker plate mounting casing.

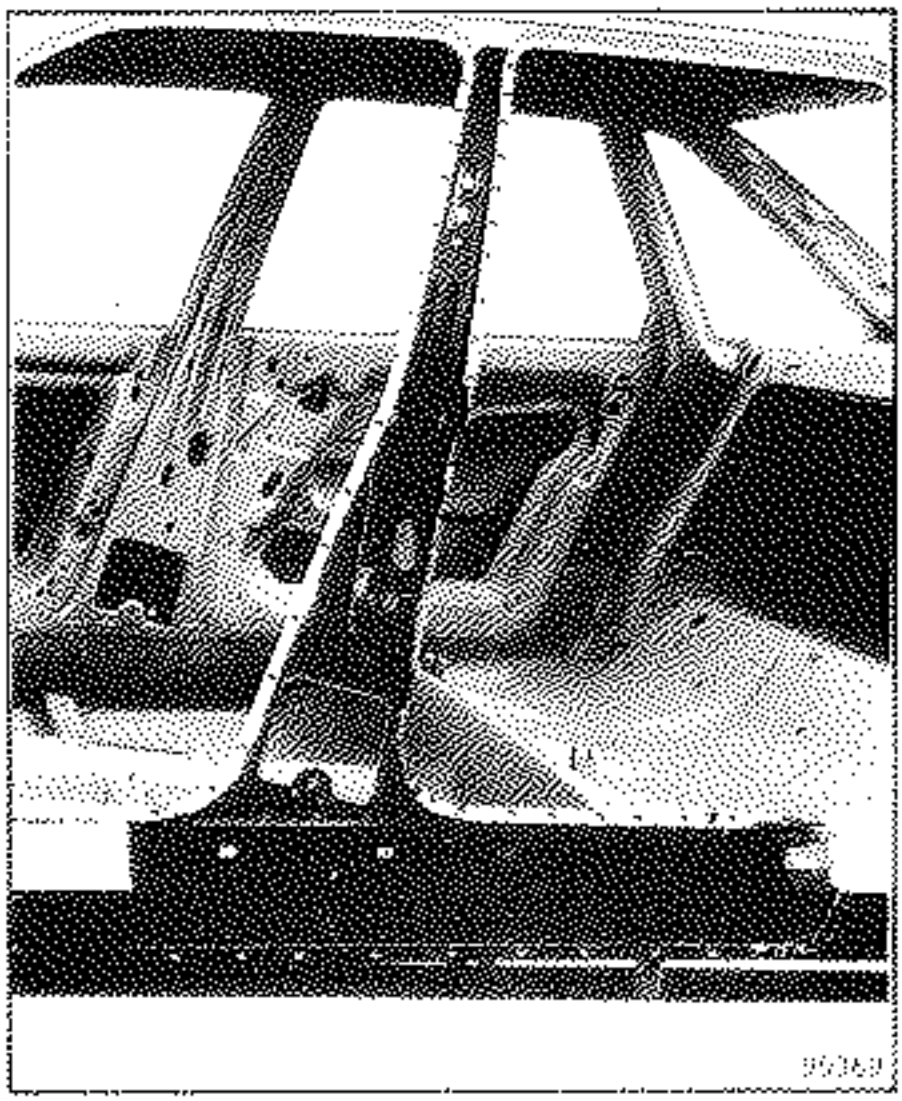






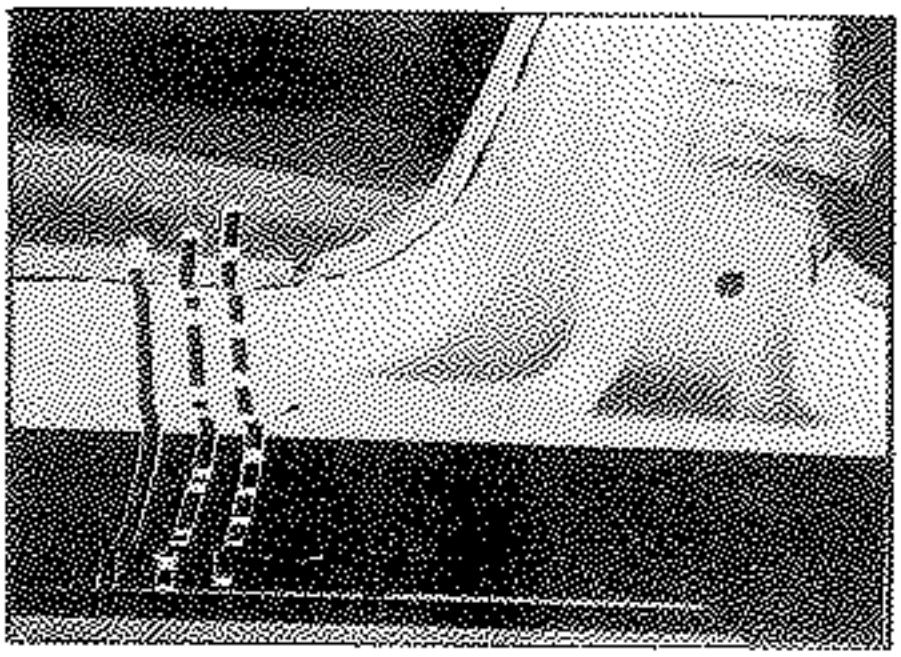
CUTTING OUT - UNPICKING

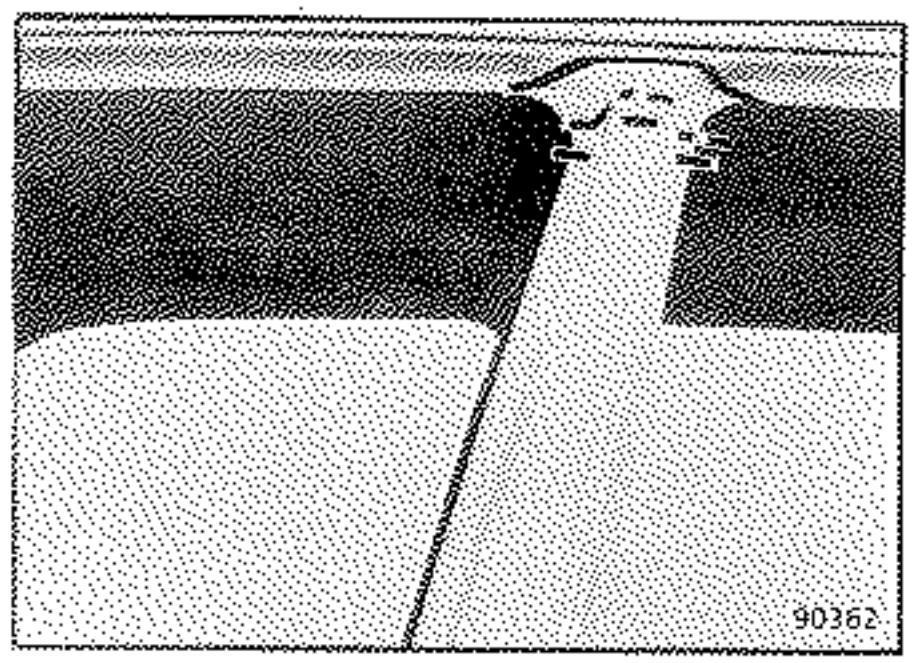




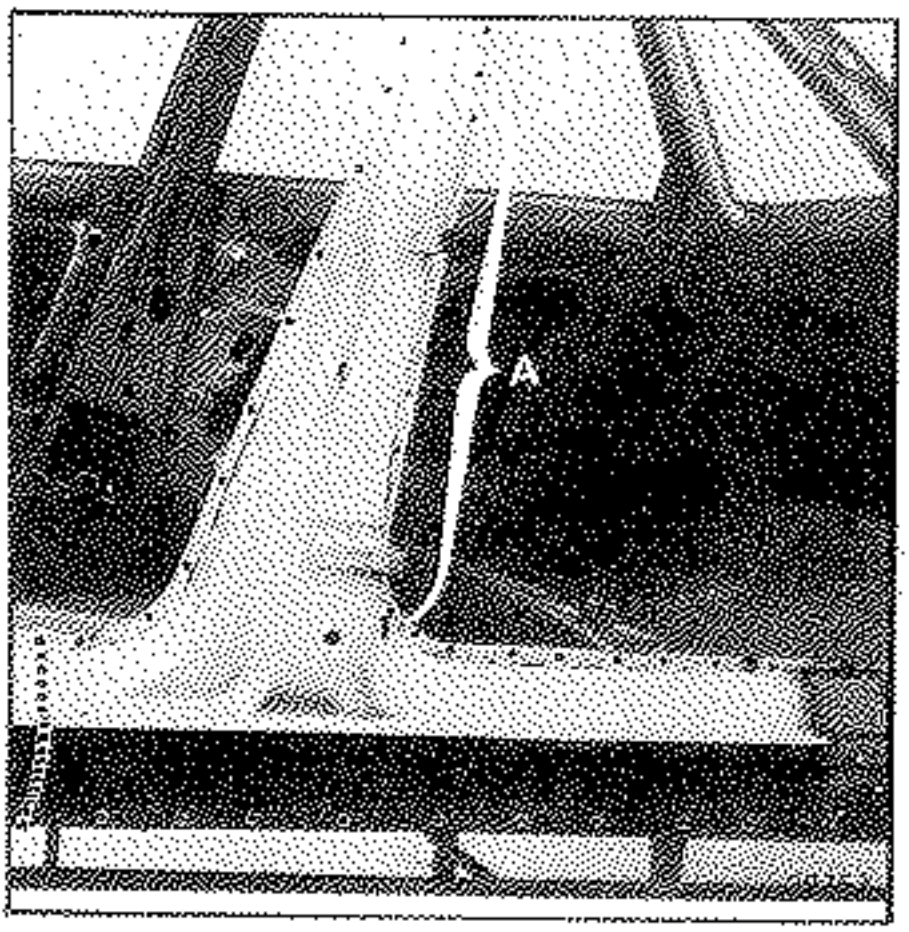


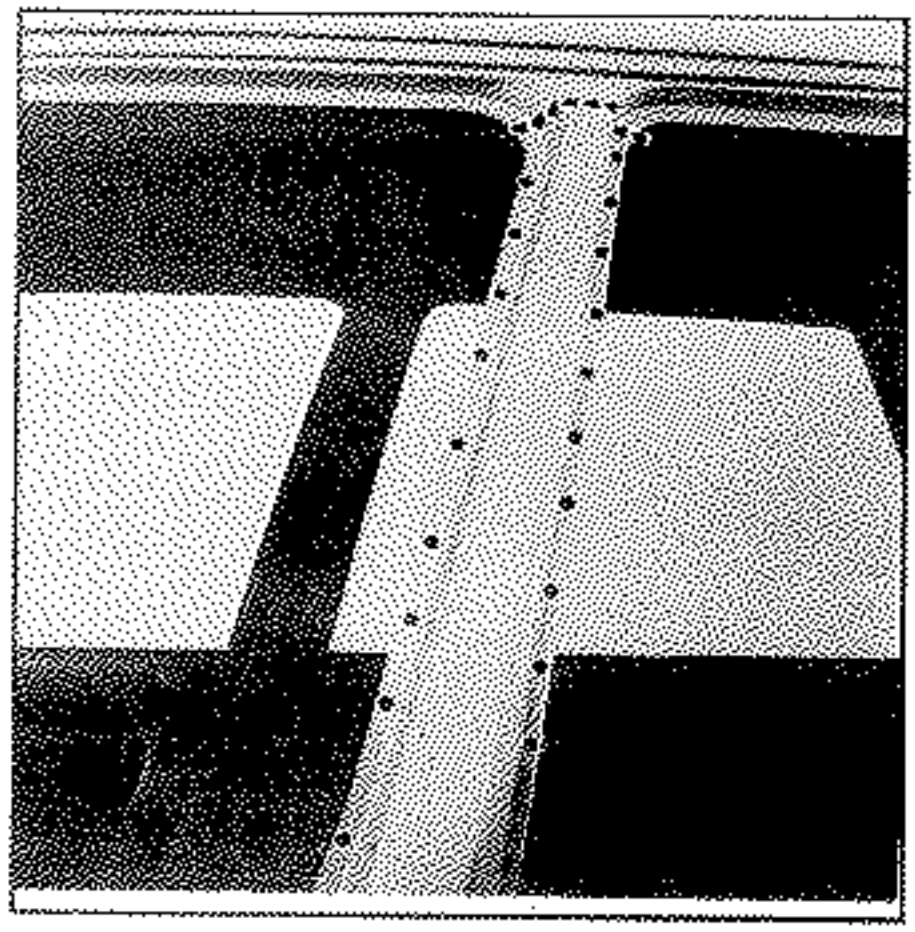
PREPARATION BEFORE WELDING

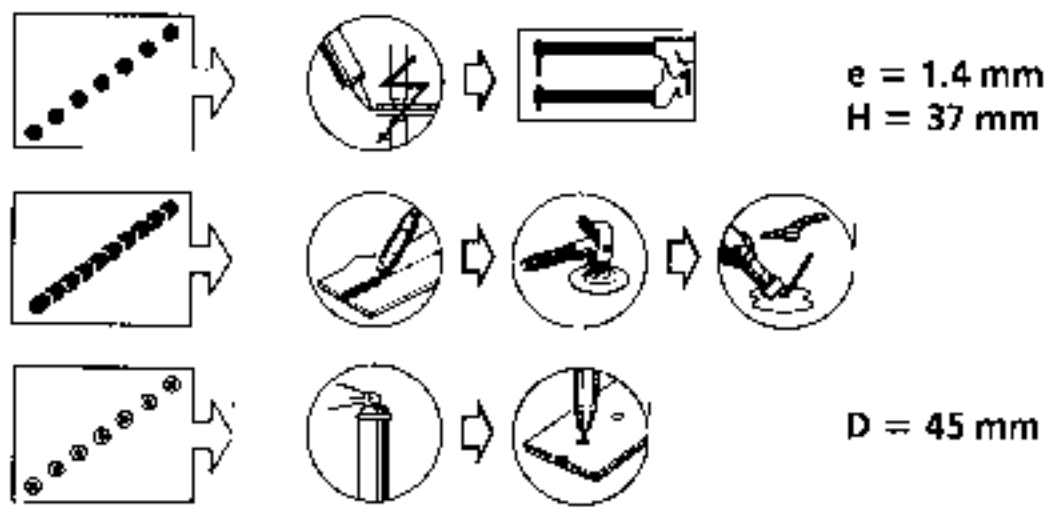




WELDING







e = 1.4 mm
H = 37 mm

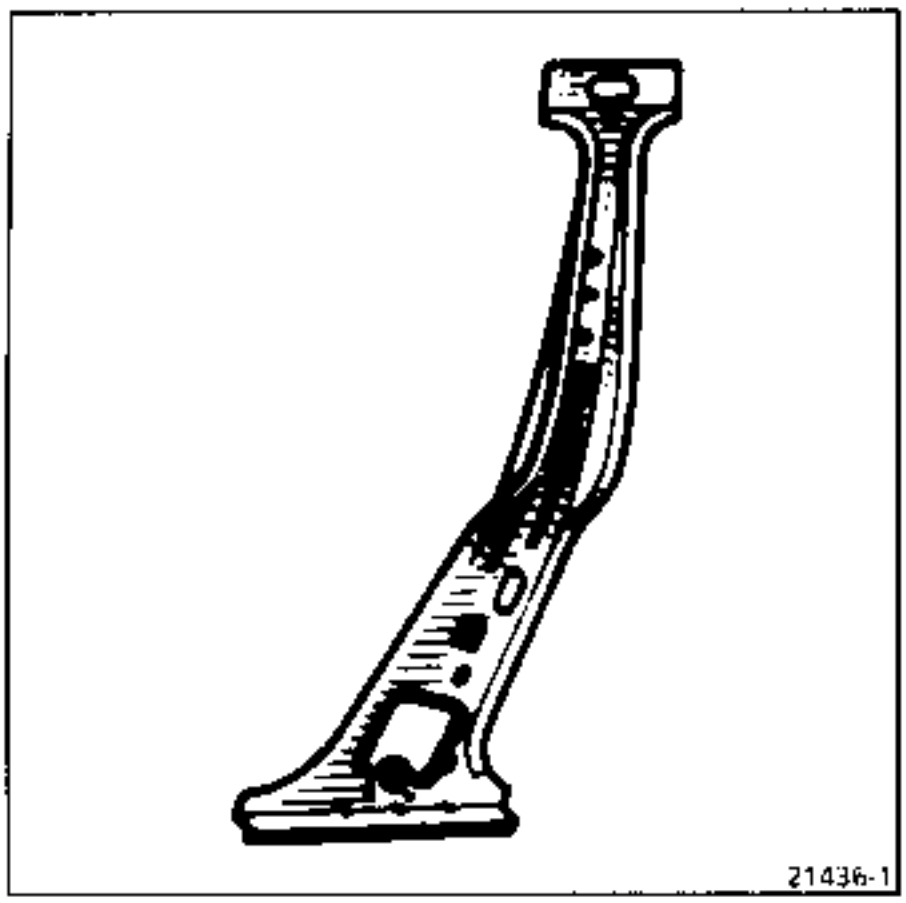
D = 45 mm

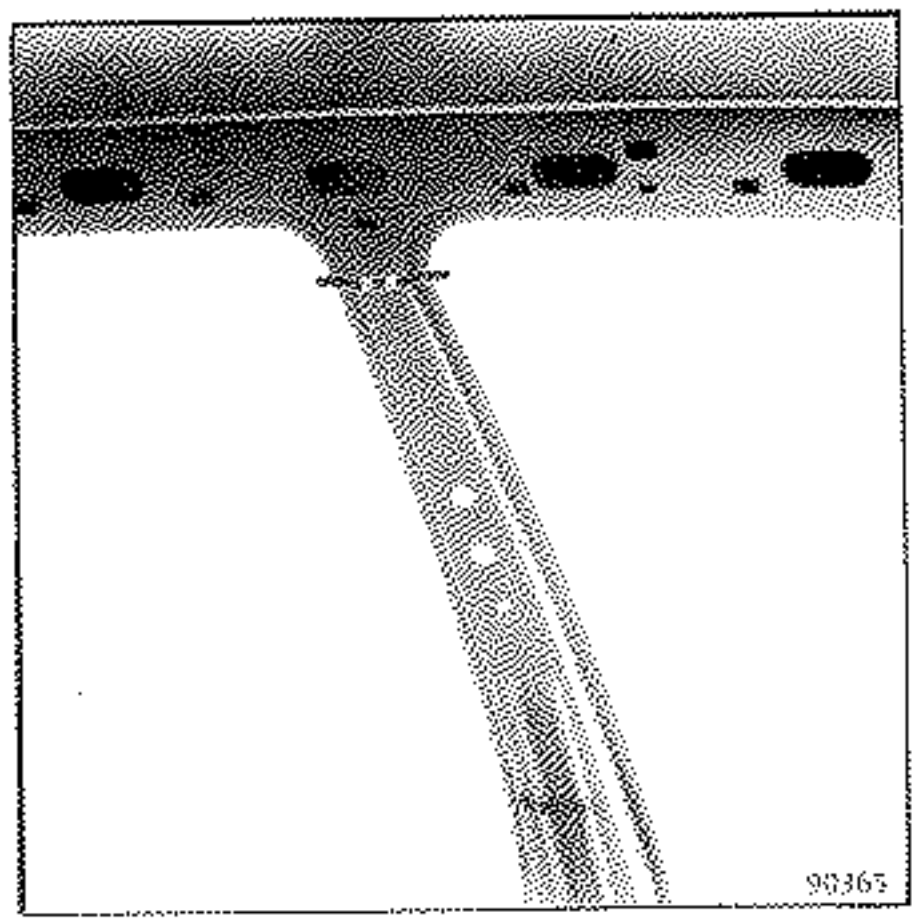
At (A) apply plug welds under a protective gas envelope to the following connections:
Centre pillar lining - Hinge reinforcement.

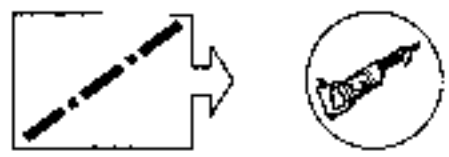
This operation is additional to the replacement of the centre pillar.

COMPOSITION OF CENTRE PILLAR LINING

Centre pillar lining.
Seat belt mounting nut.

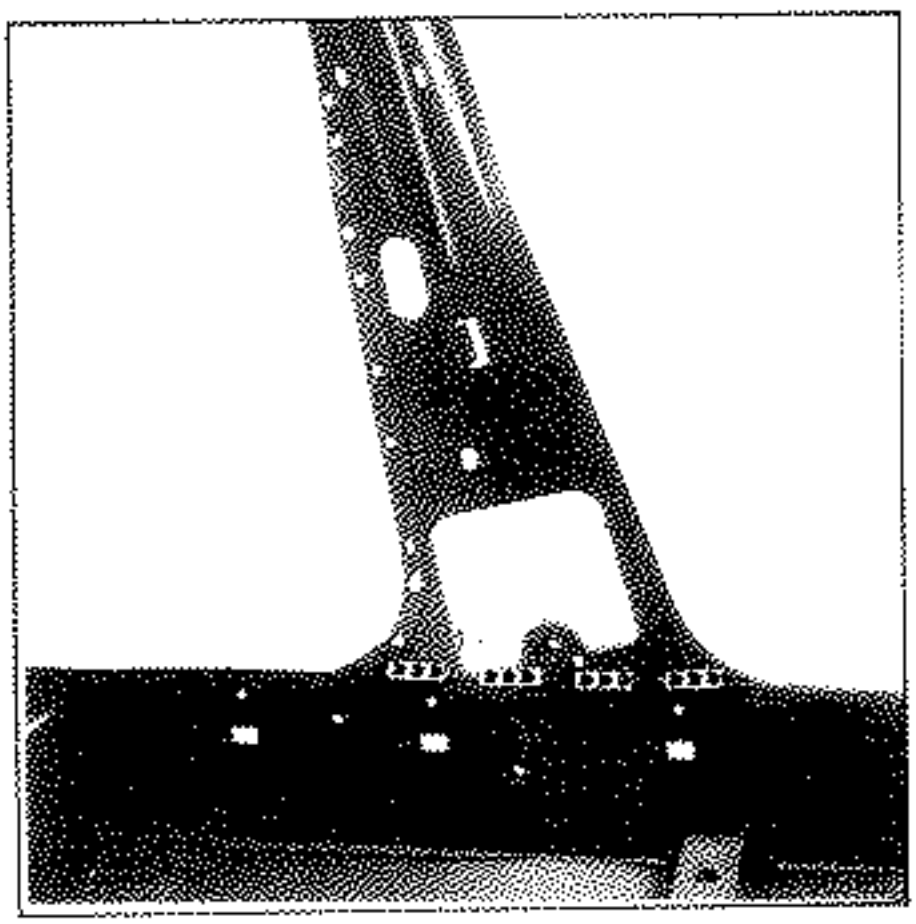


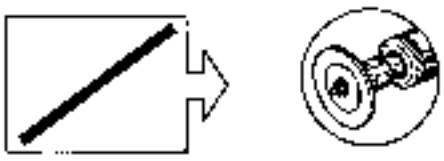




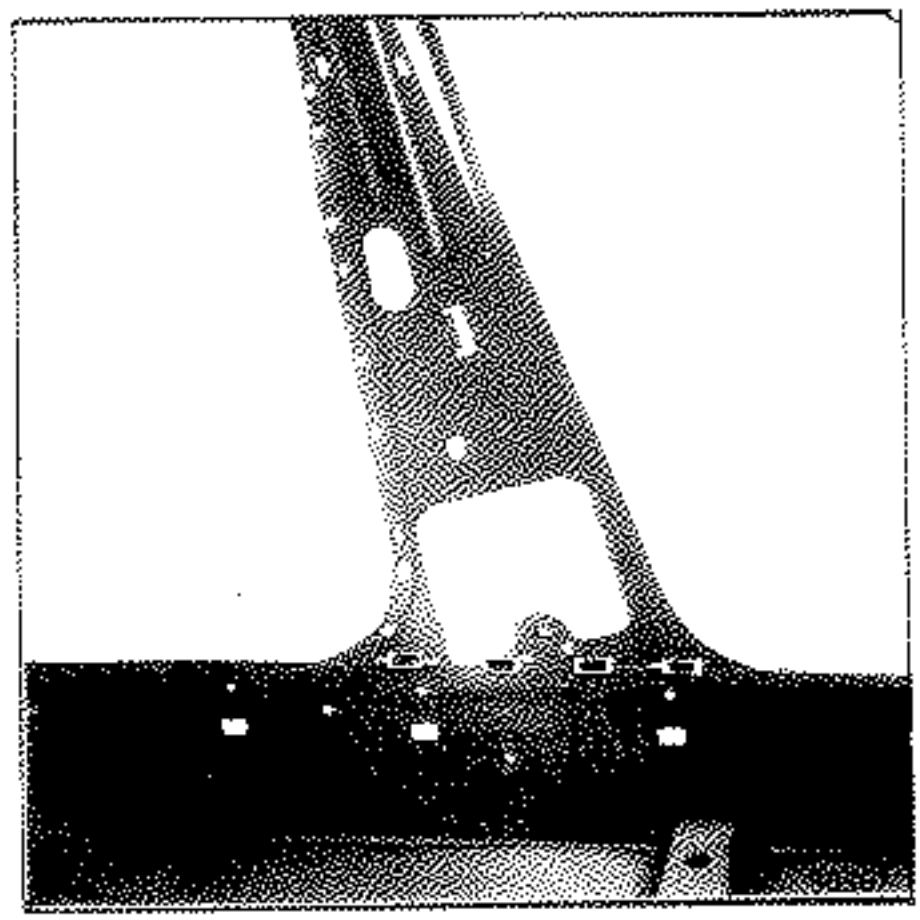
Cut the lining and the centre pillar simultaneously.

CUTTING OUT - UNPICKING

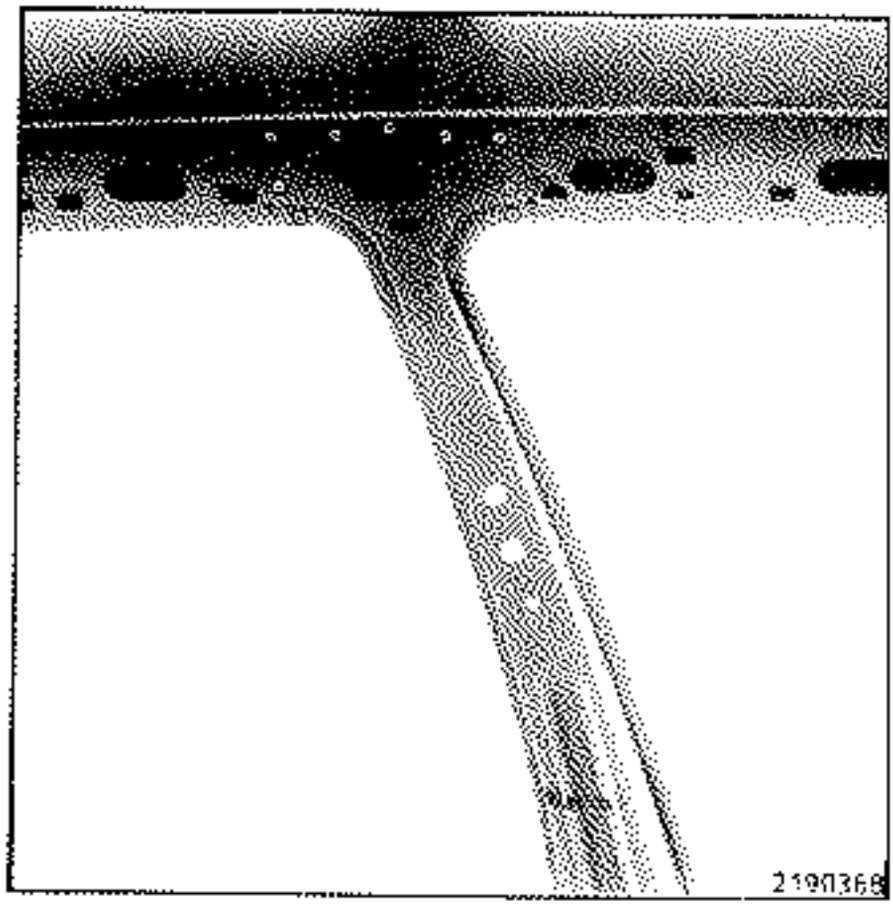




WELDING







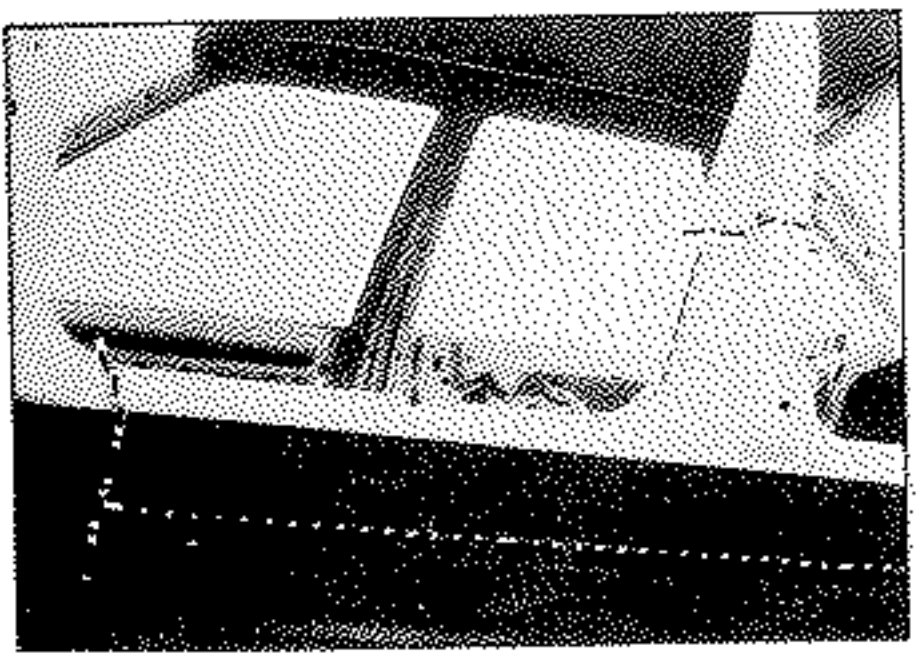


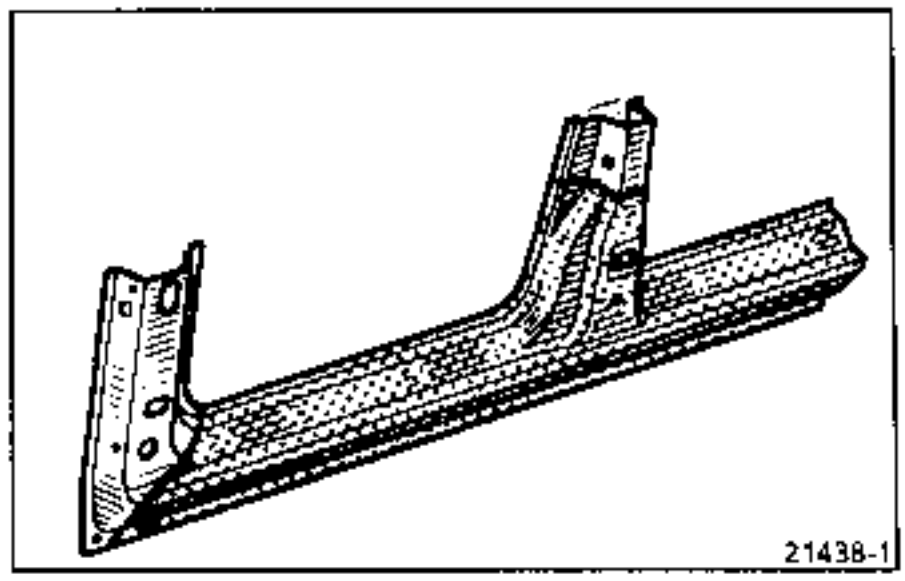
D = 5 mm

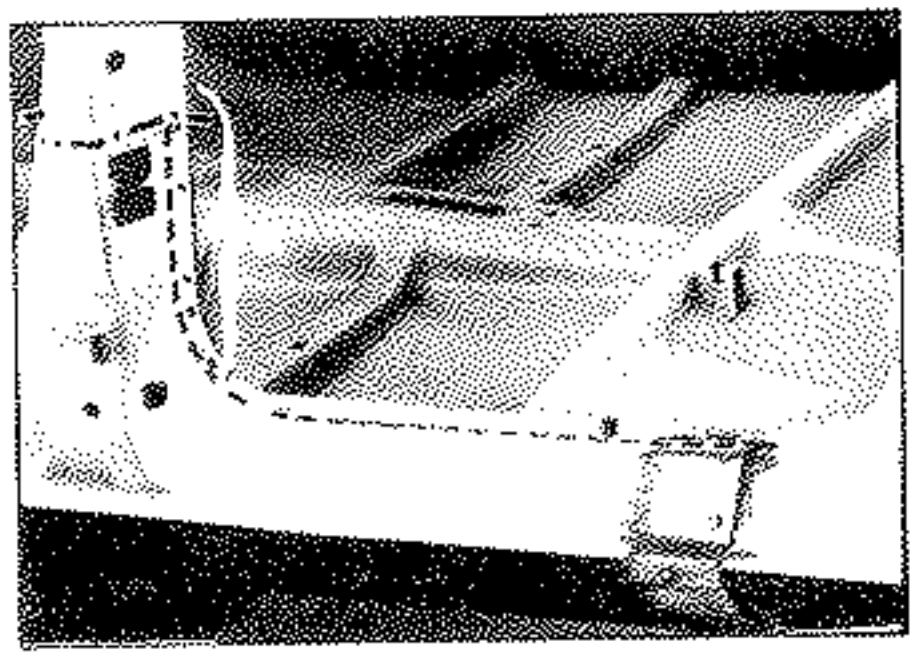
COMPOSITION OF SILL PANEL FROM PARTS DEPARTMENT

- Sill panel.
- Front pillar hinge reinforcement.
- Centre pillar hinge reinforcement. (without lower hinge).

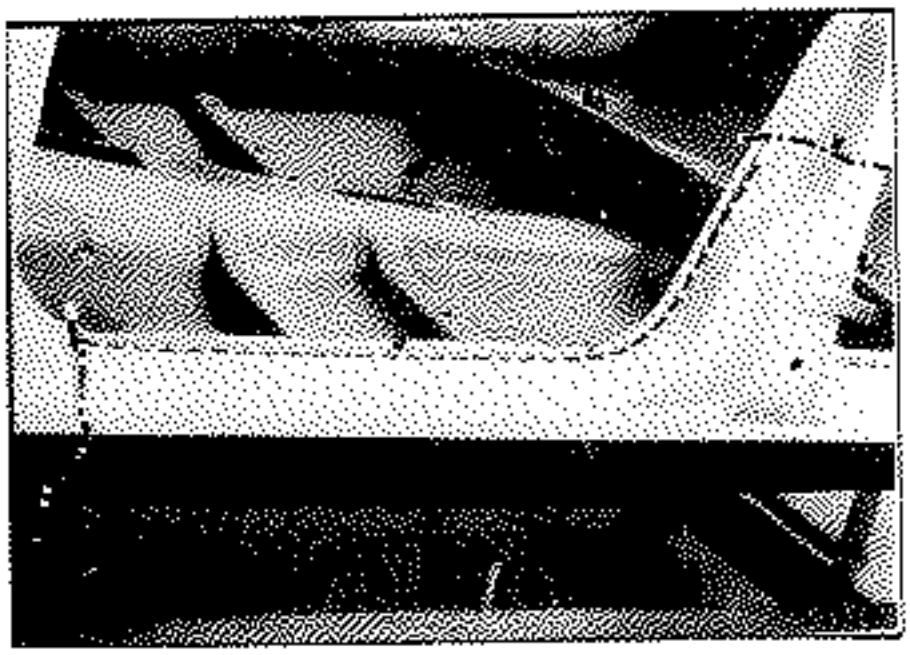
CUTTING OUT - UNPICKING

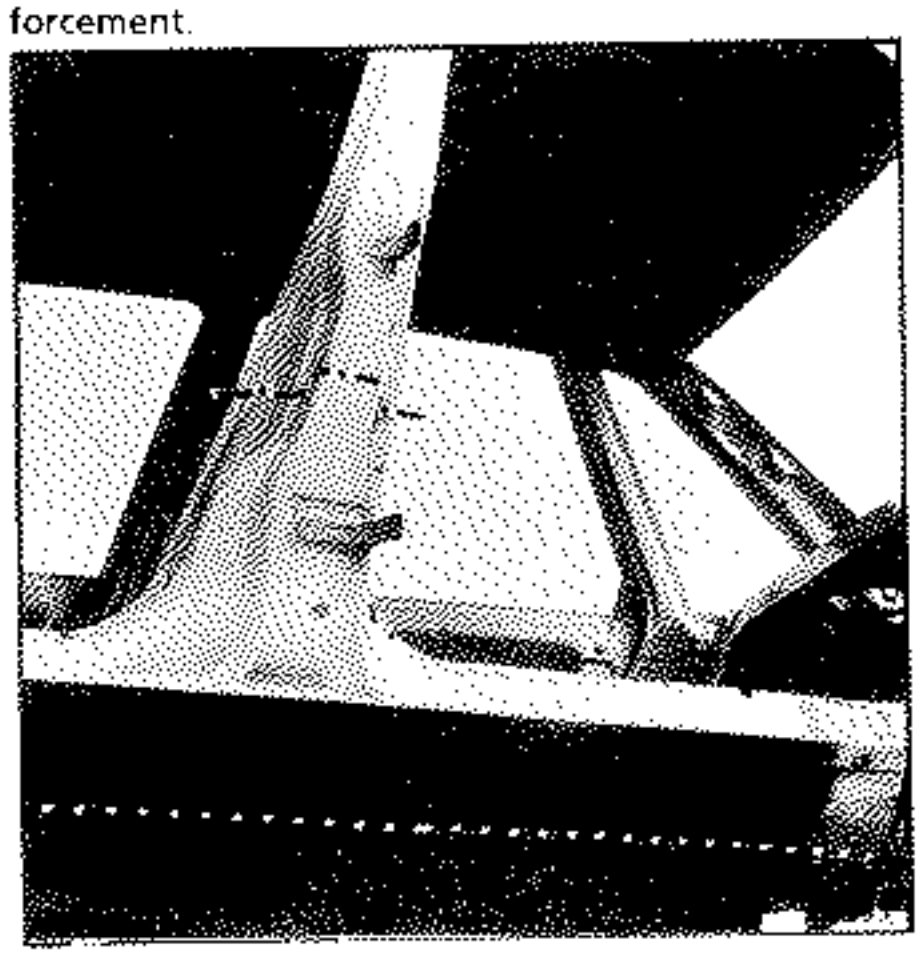


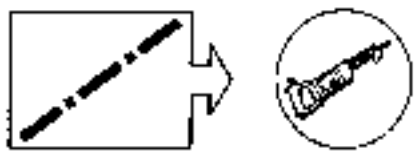


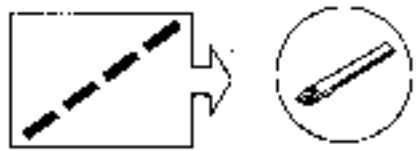


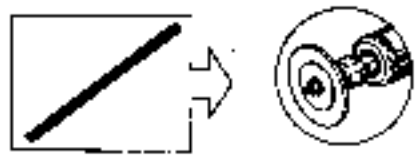
(A) drill the welding spots at the connections between the centre pillar lining and the hinge reinforcement.

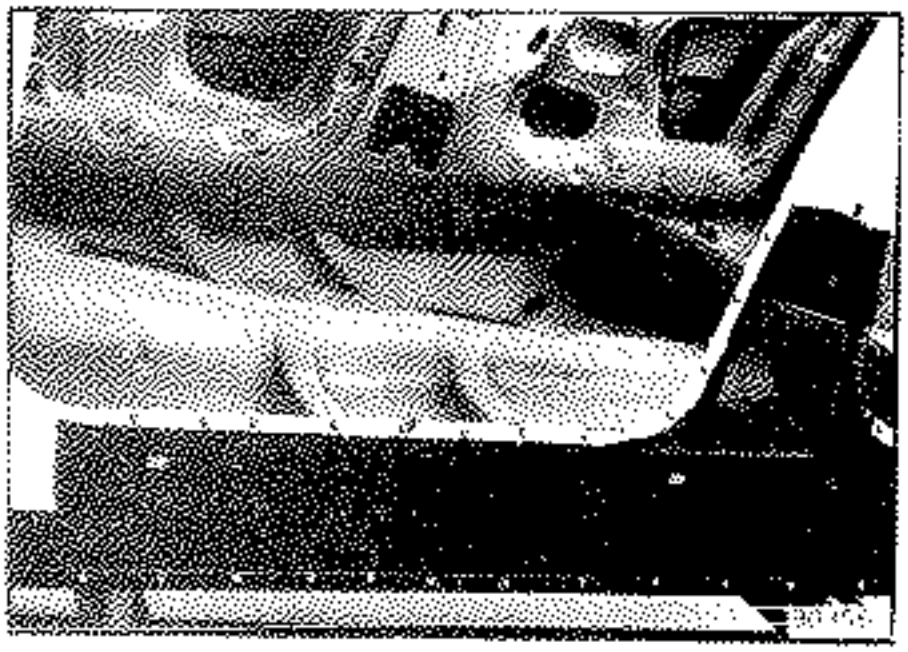


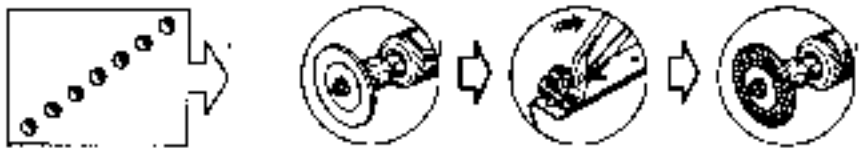




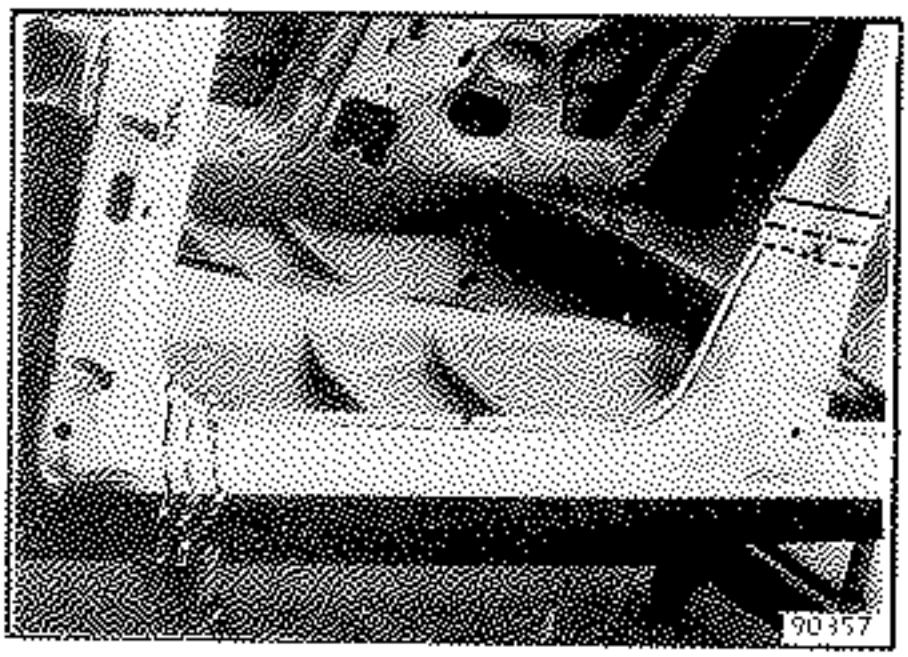


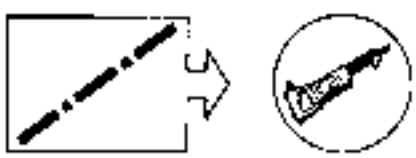






PREPARATION BEFORE WELDING

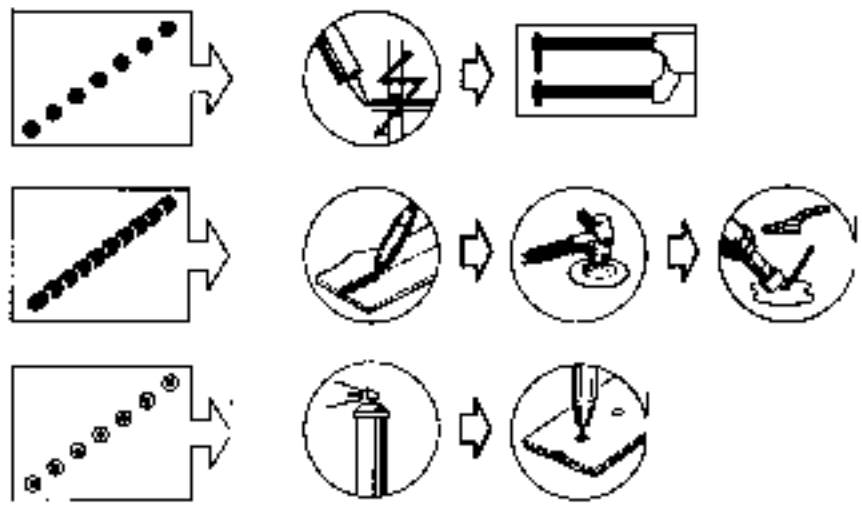




WELDING

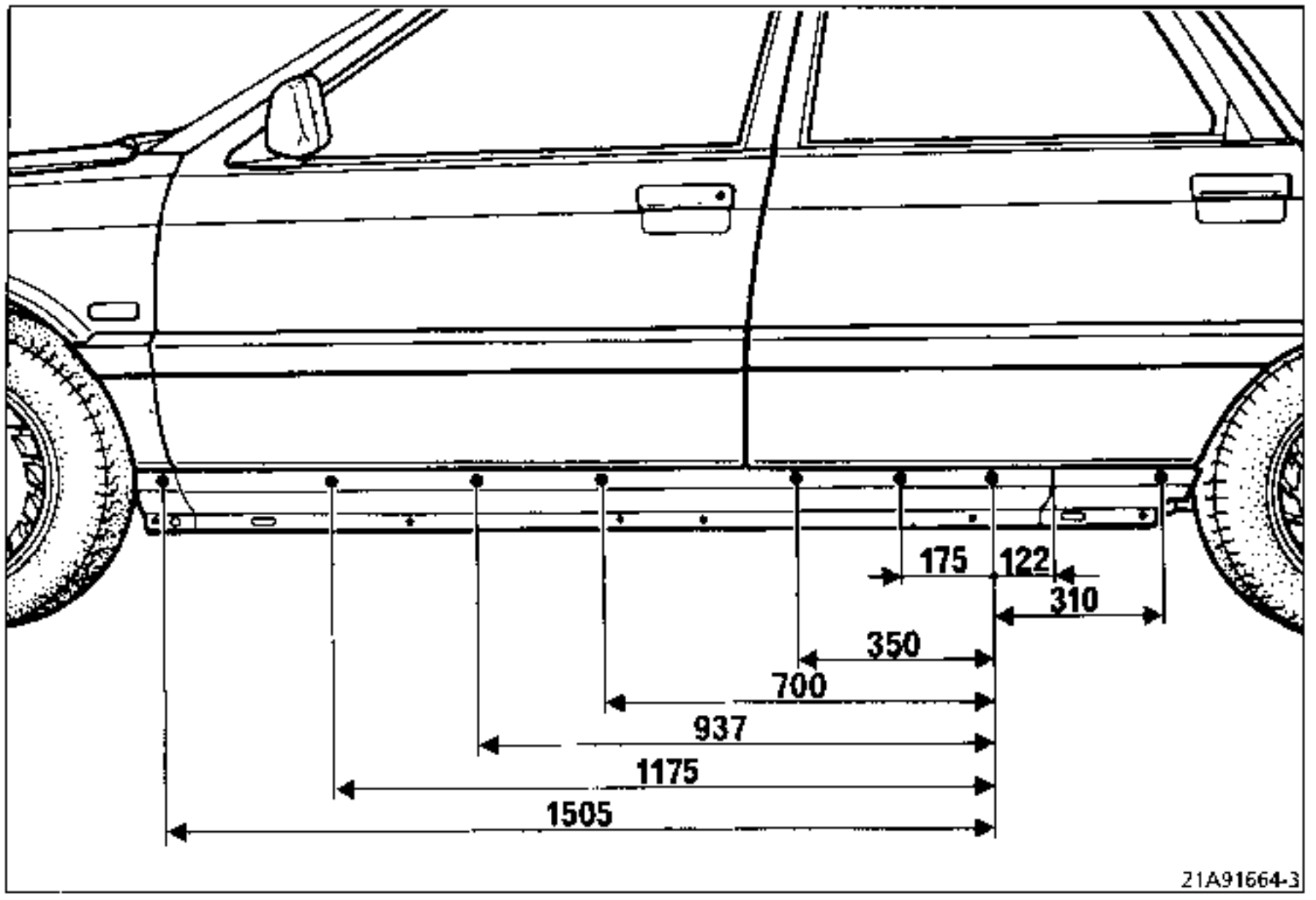


e = 16 mm
H = 37 mm
D = 4.5 mm

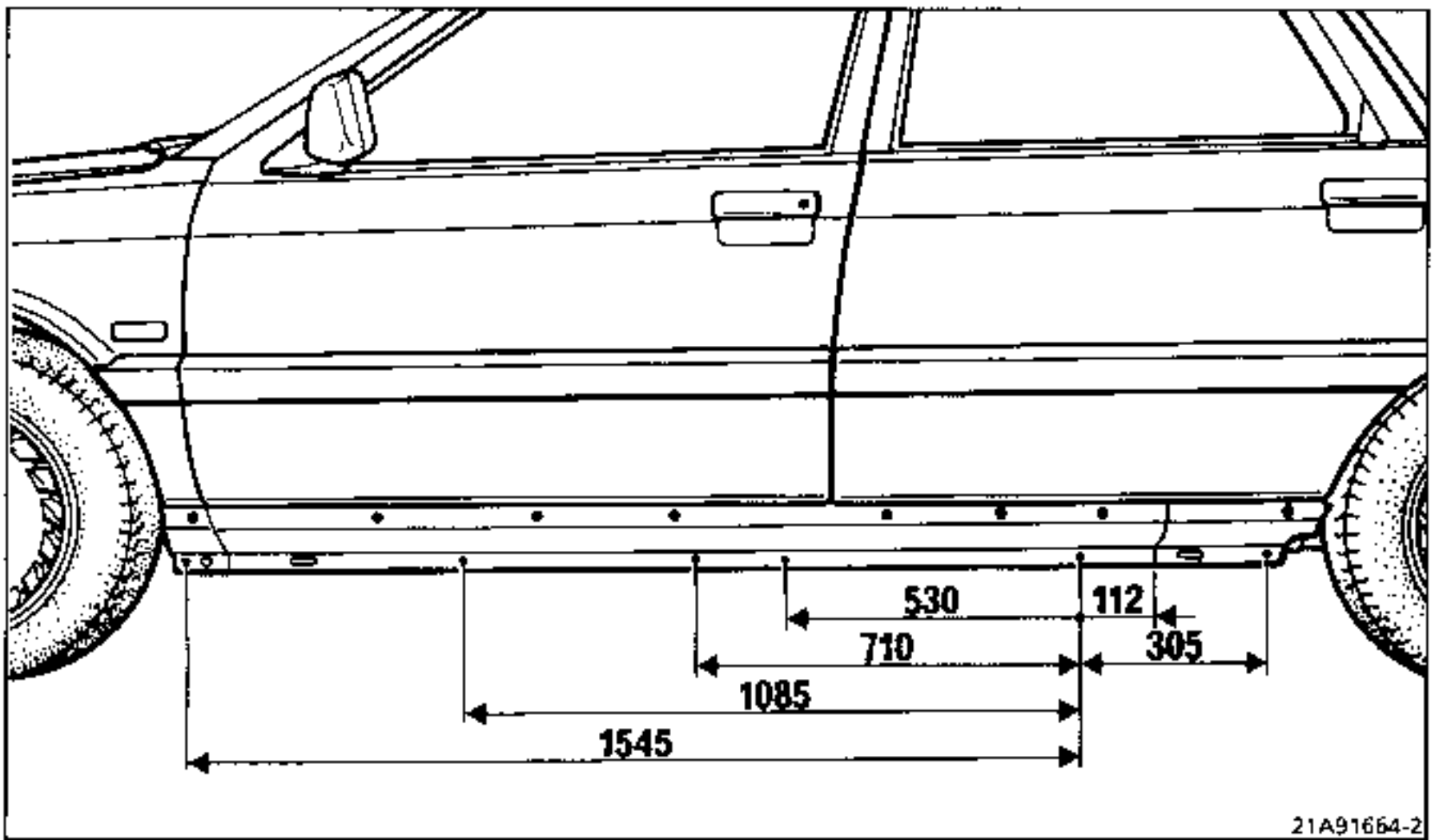


DRILLING DIAGRAMS (to be performed before painting)

Drilling diameter **6.5 mm.**

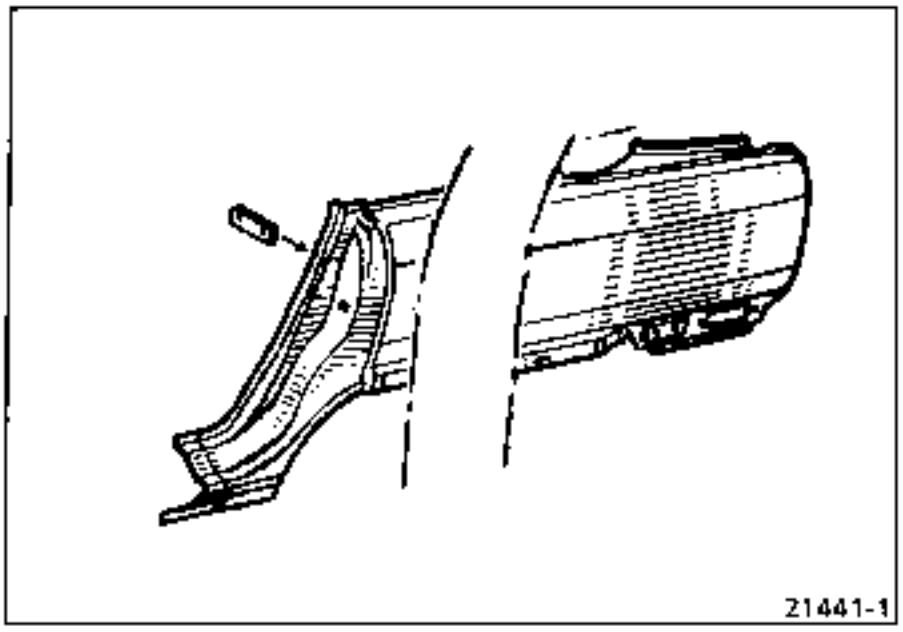


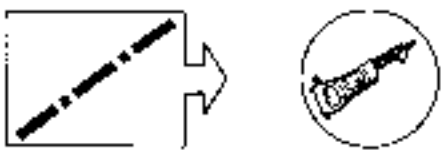
Drilling diameter **5.5 mm.**

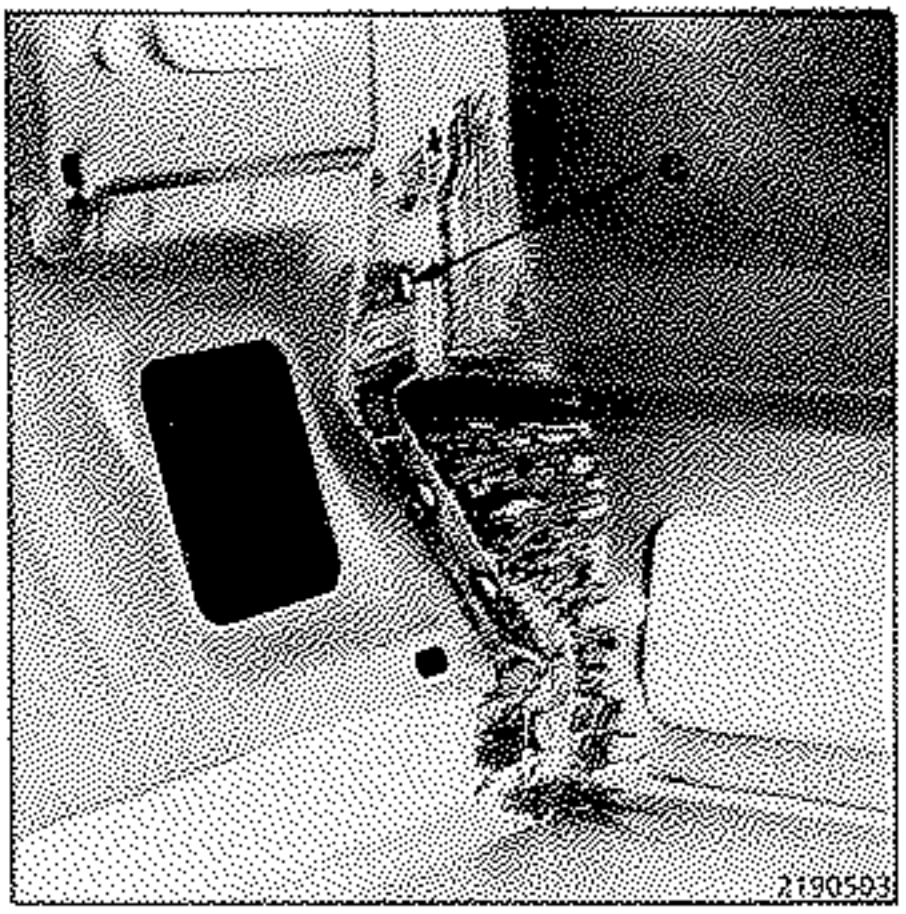


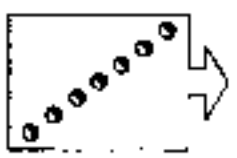
COMPOSITION OF PART FROM PARTS DEPARTMENT

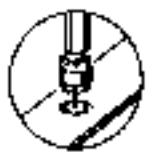
Assembled part comprising:
- Side panel.
- Bumper mounting reinforcement.
- Striker plate reinforcement.



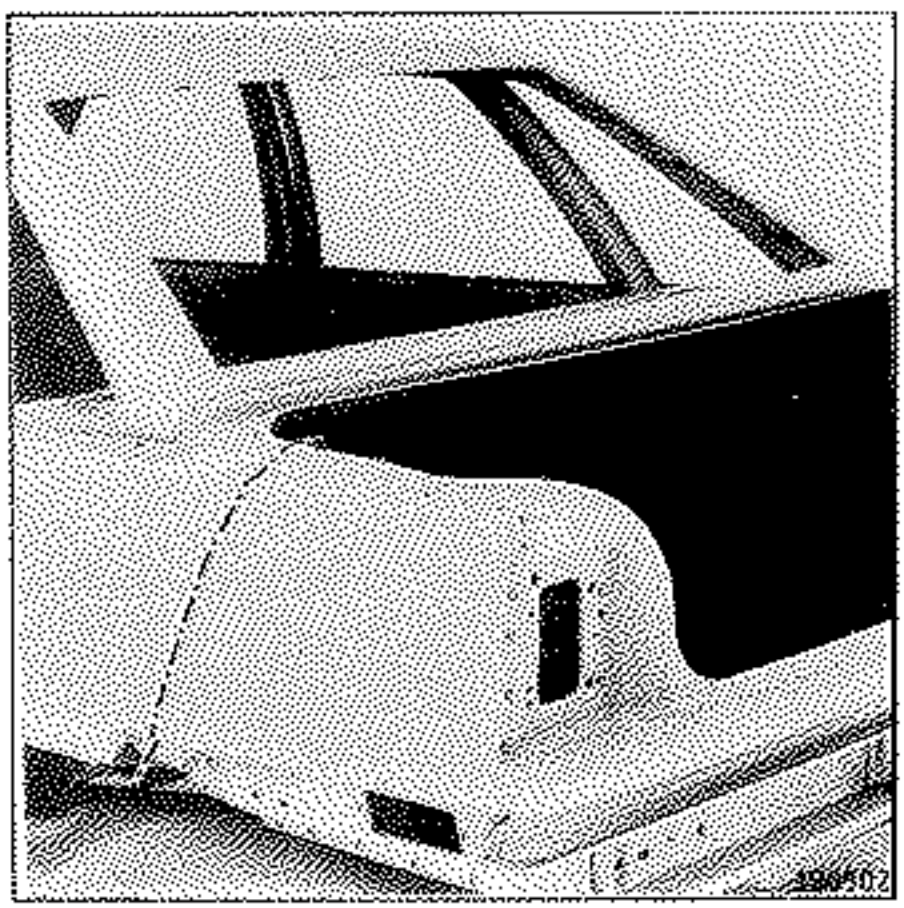


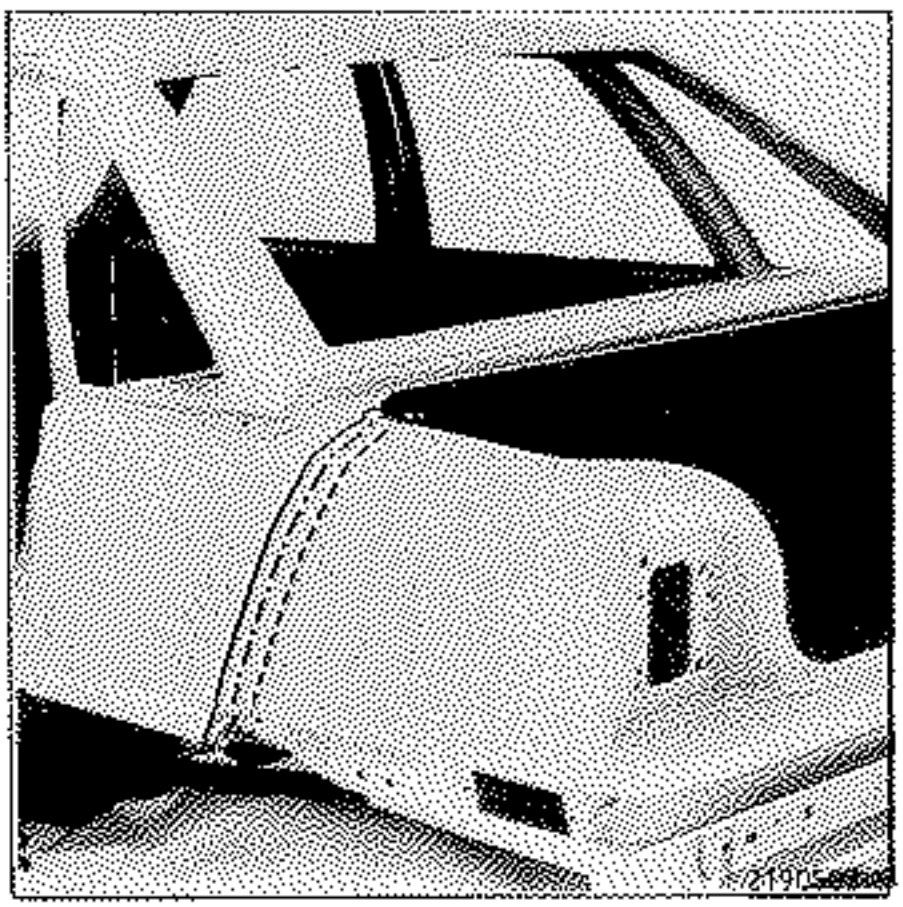






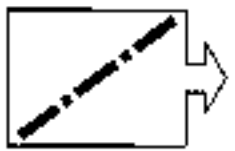
CUTTING OUT - UNPICKING





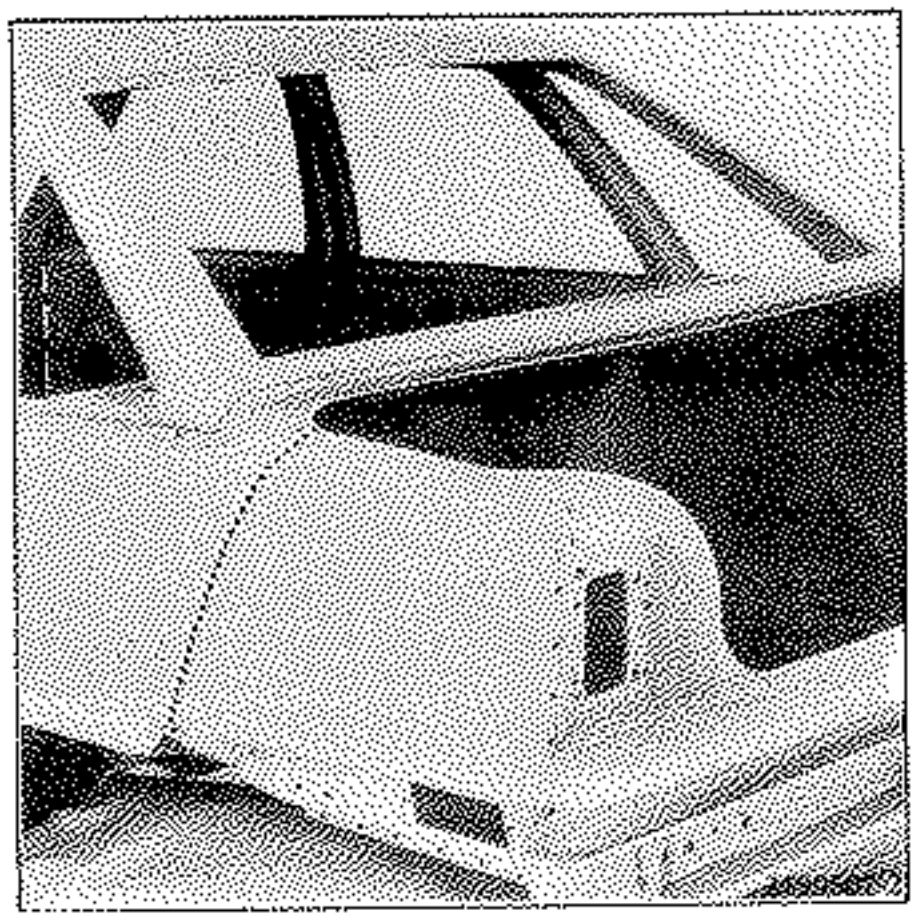




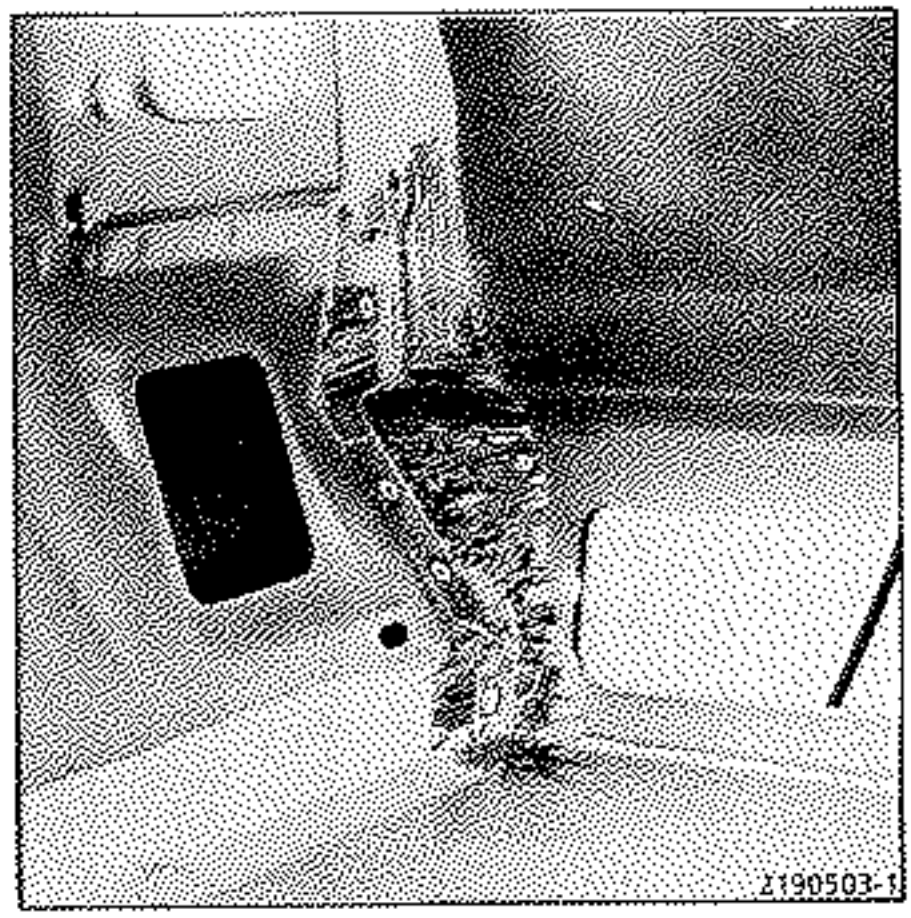




WELDING

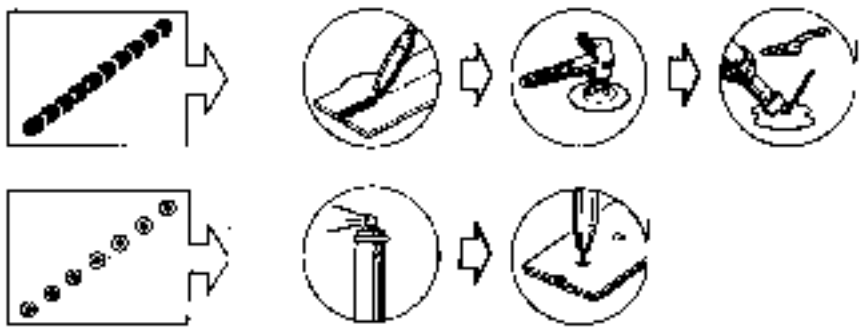






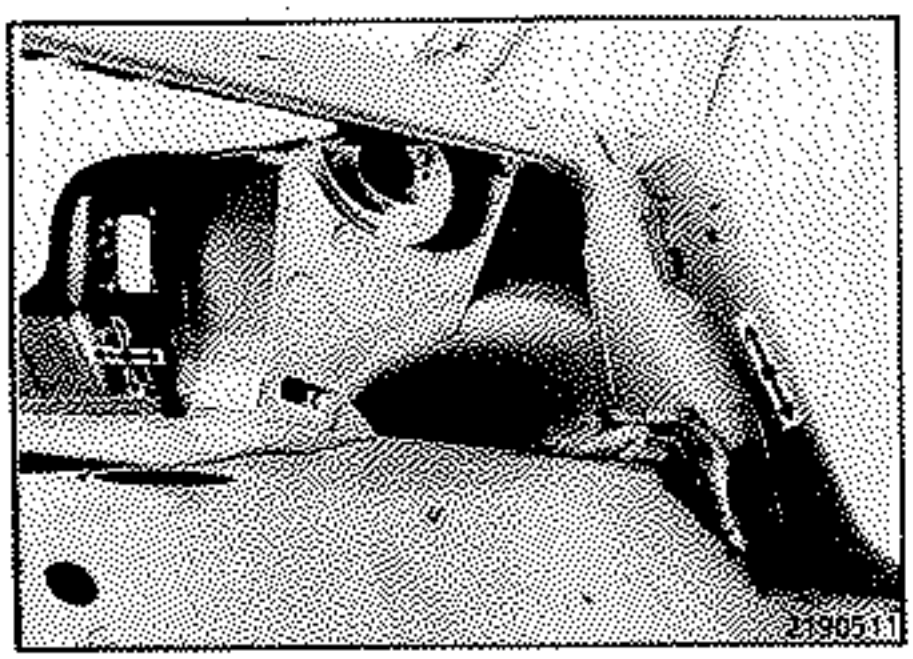


L = 330 or 350 mm
e = 1.4 mm
H = 60 mm



D = 4.5 mm

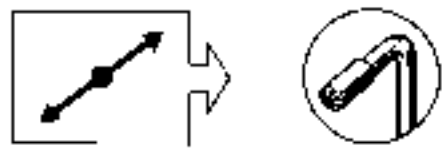
ANTICORROSION PROTECTION



L = 330 or 350 mm
e = 1.4 mm
H = 60 mm

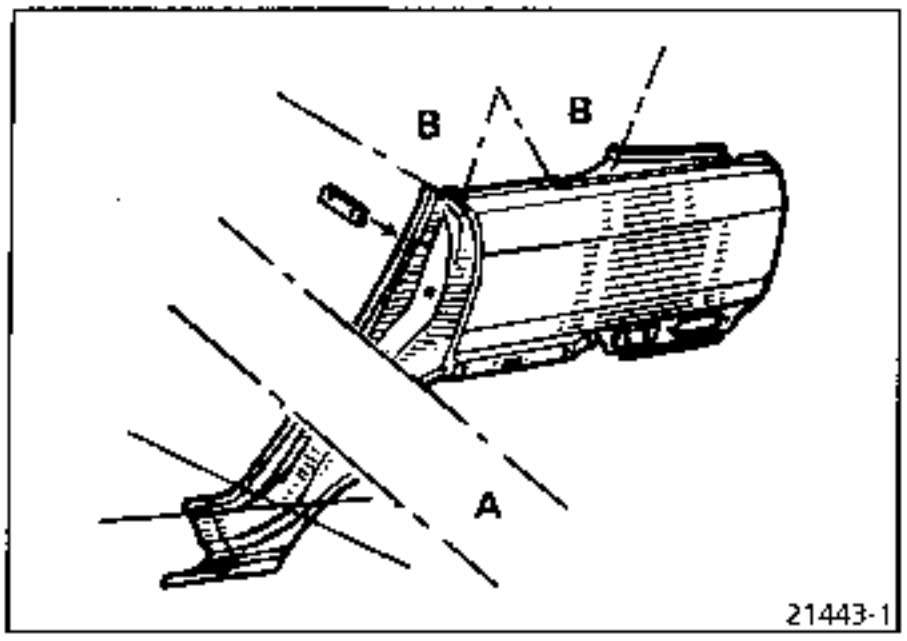


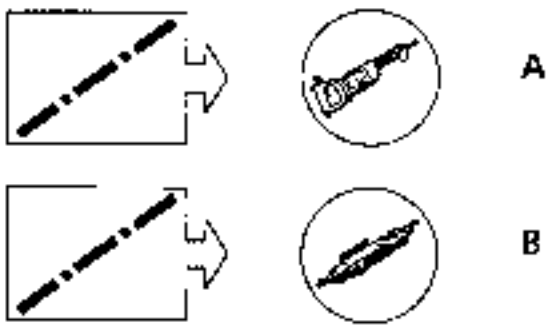
D = 4.5 mm



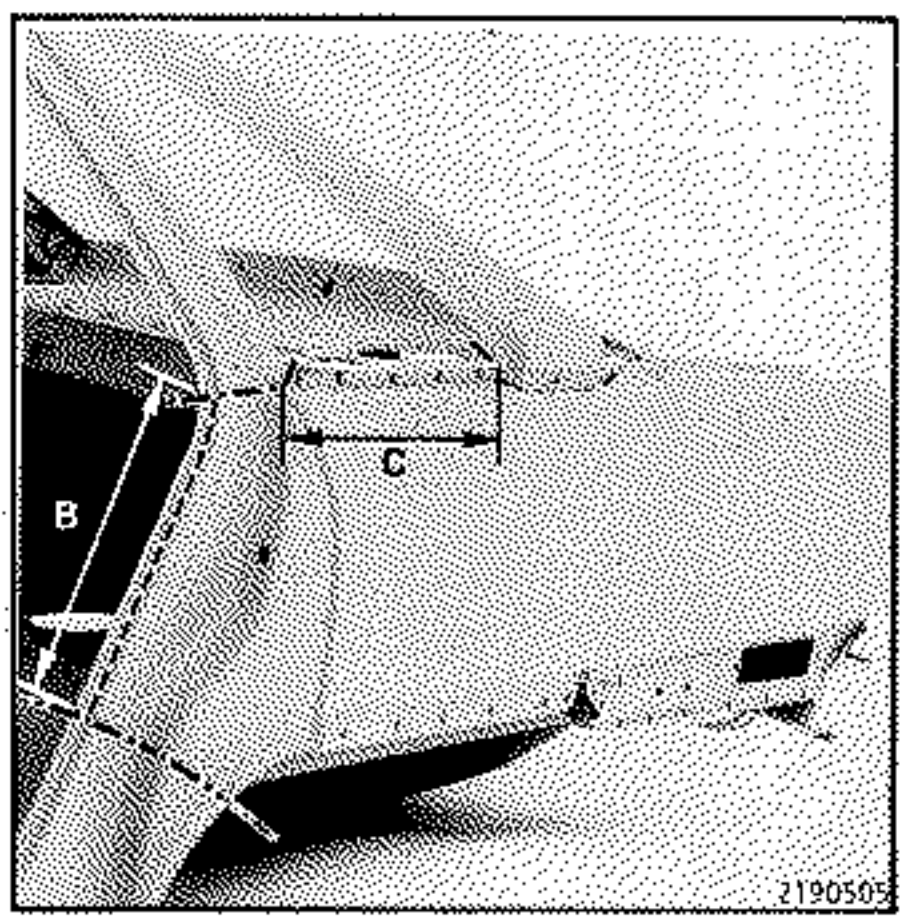
COMPOSITION OF PART FROM PARTS DEPARTMENT

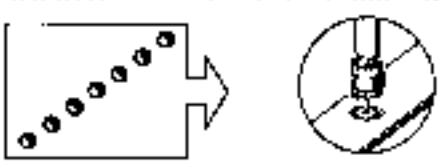
Assembled part comprising:
- Side panel.
- Bumper mounting reinforcement.
- Striker plate reinforcement.

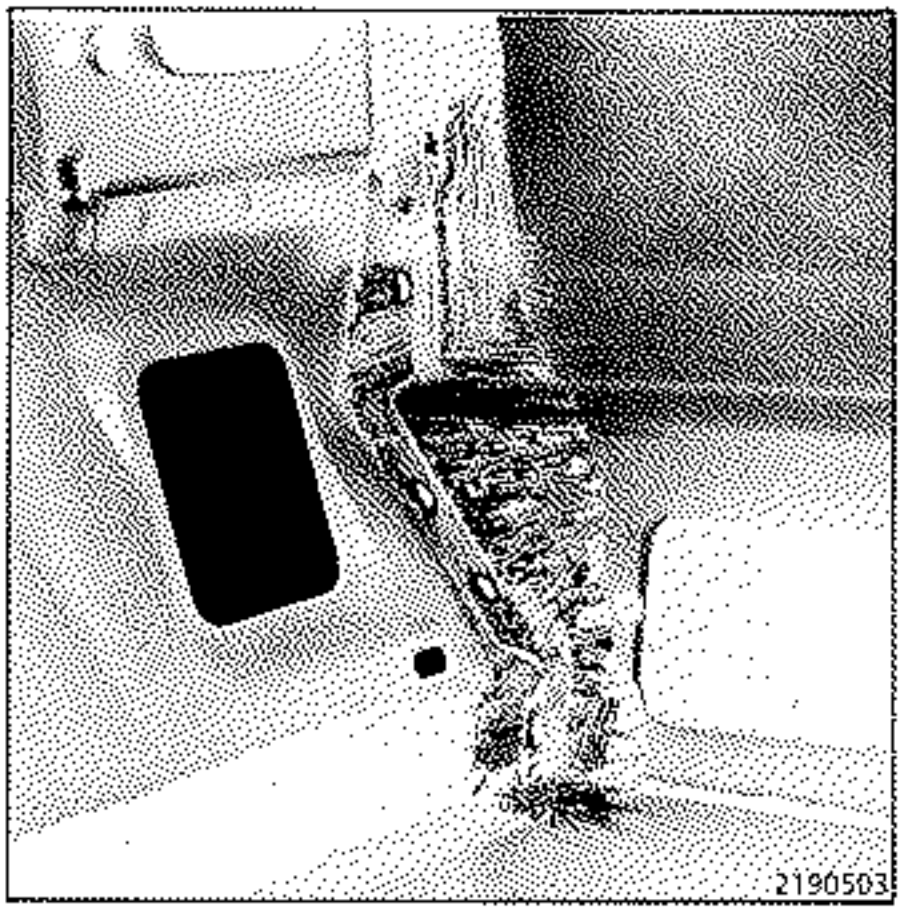


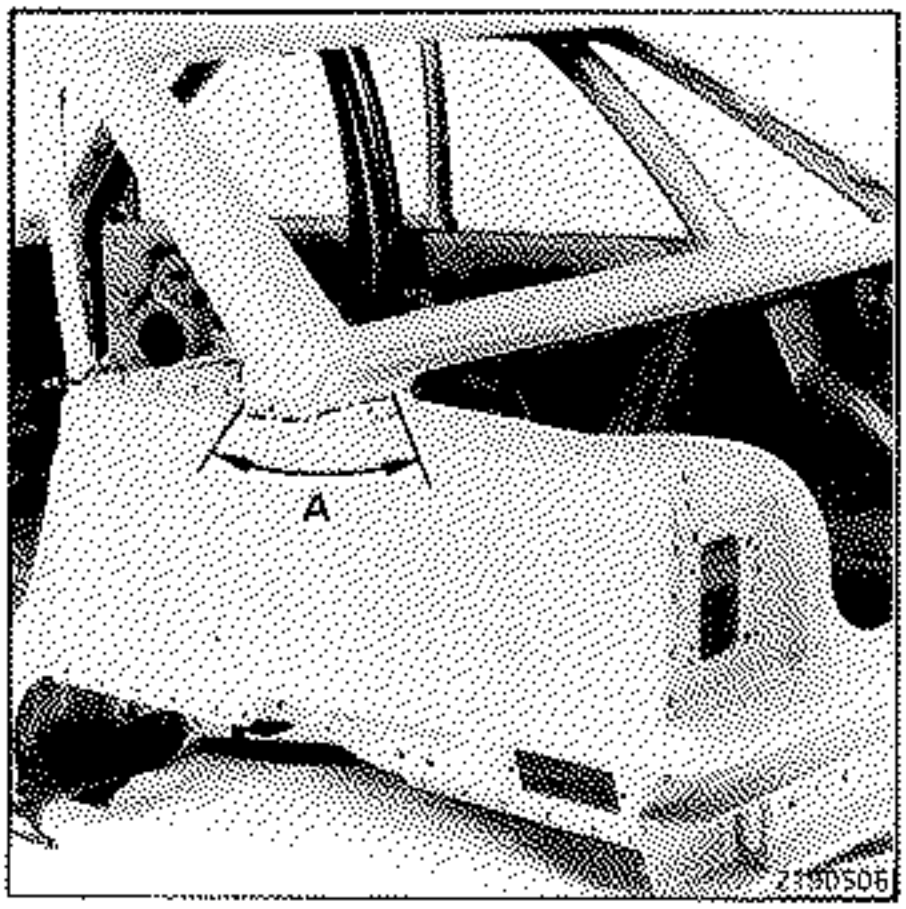


CUTTING OUT - UNPICKING

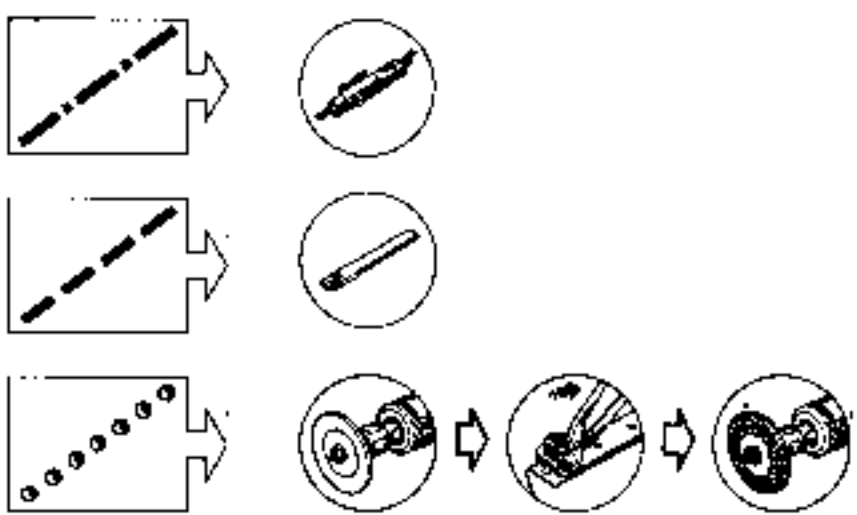




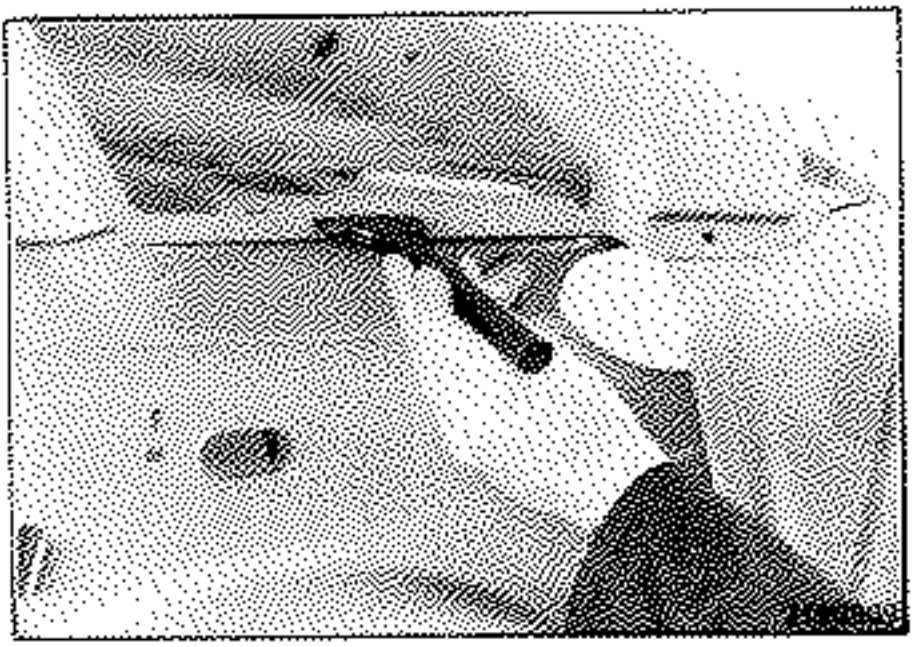




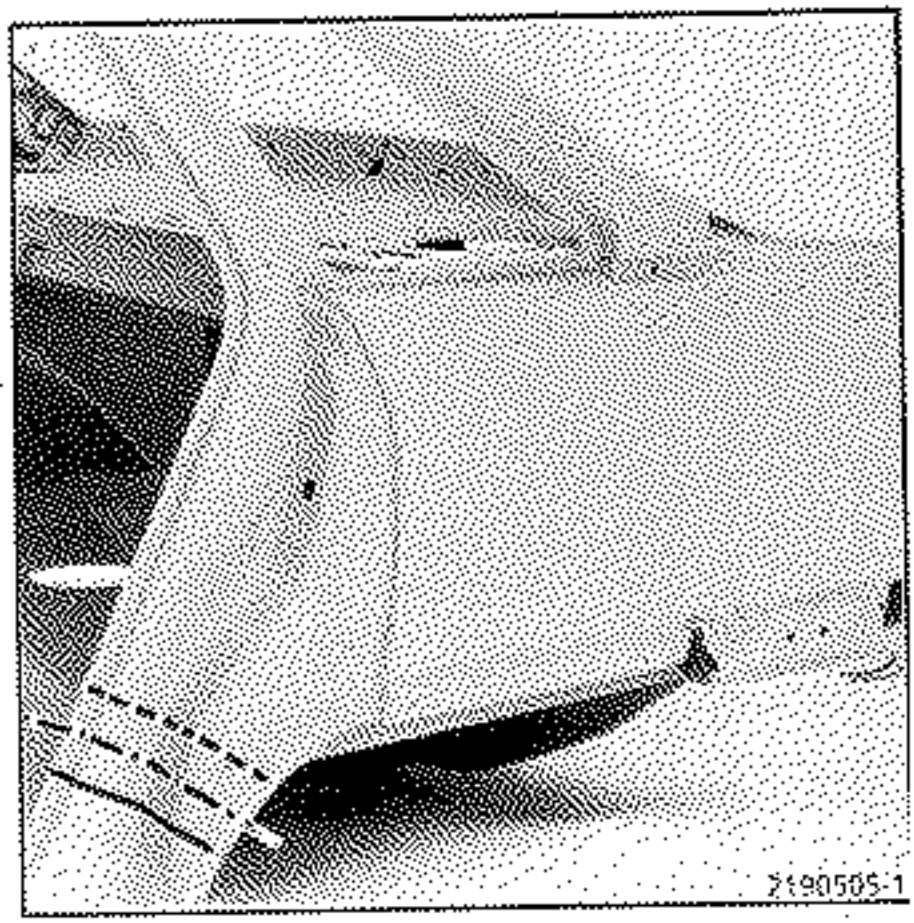
A : Take care not to damage wing panel reinforcement.
B : = 400 mm

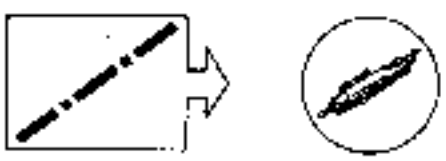


PREPARATION BEFORE WELDING

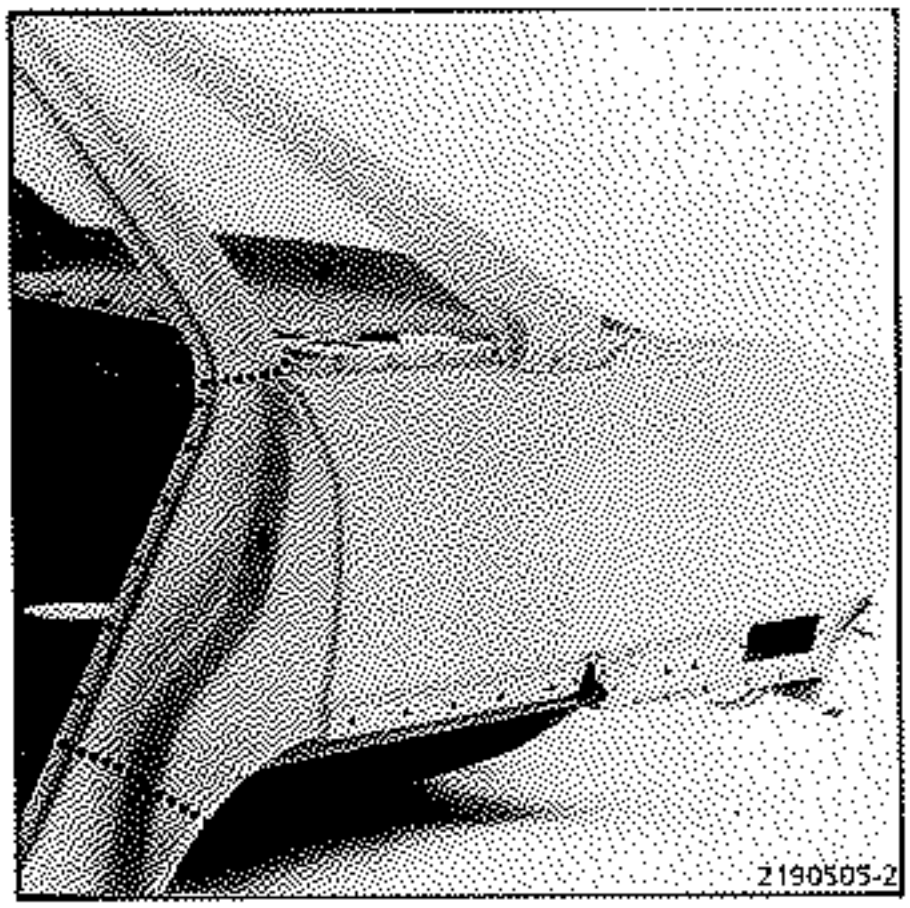


Using a drift, fold over the lower edge of the rear quarter panel onto the quarter panel lining to compensate for the excess thickness of the wing panel which is to be welded so that it covers the edge.



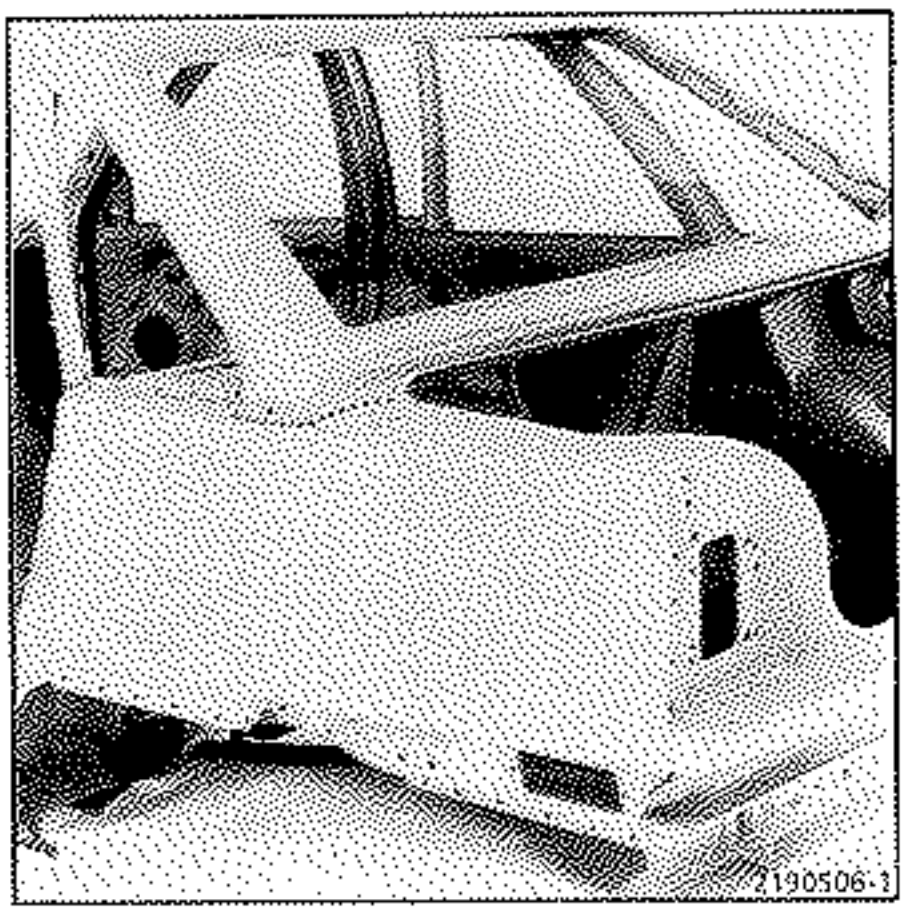


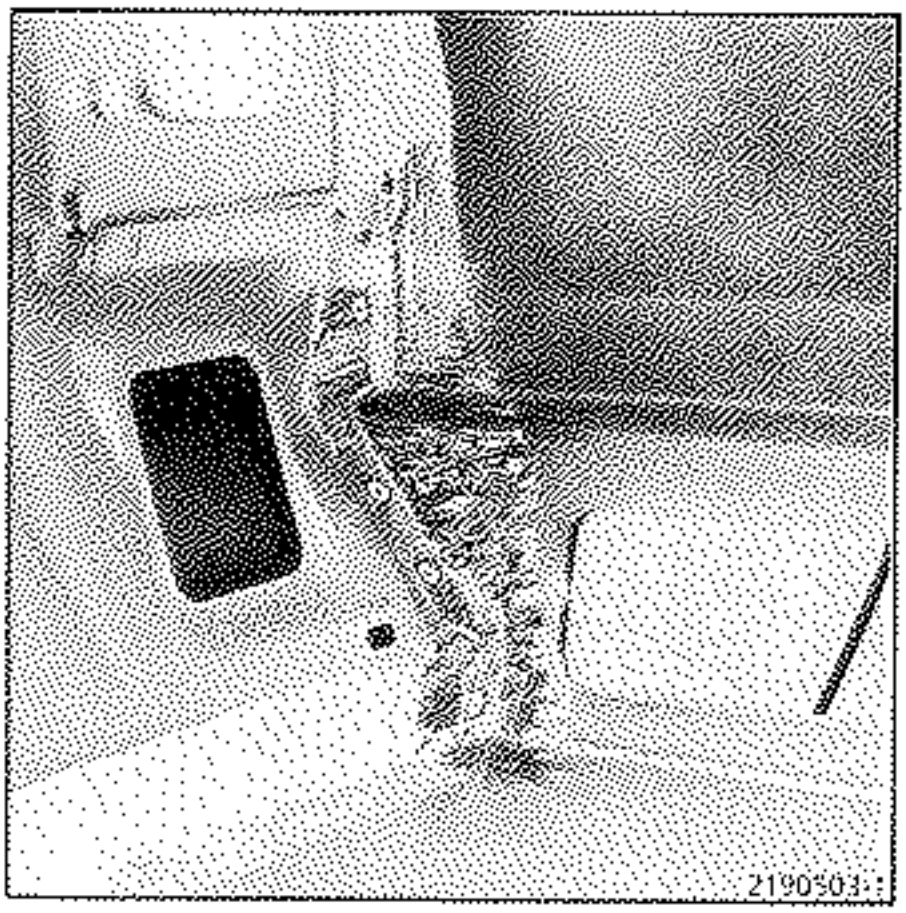
WELDING





L = 330 ou 350 mm
e = 1,4 mm
H = 60 mm

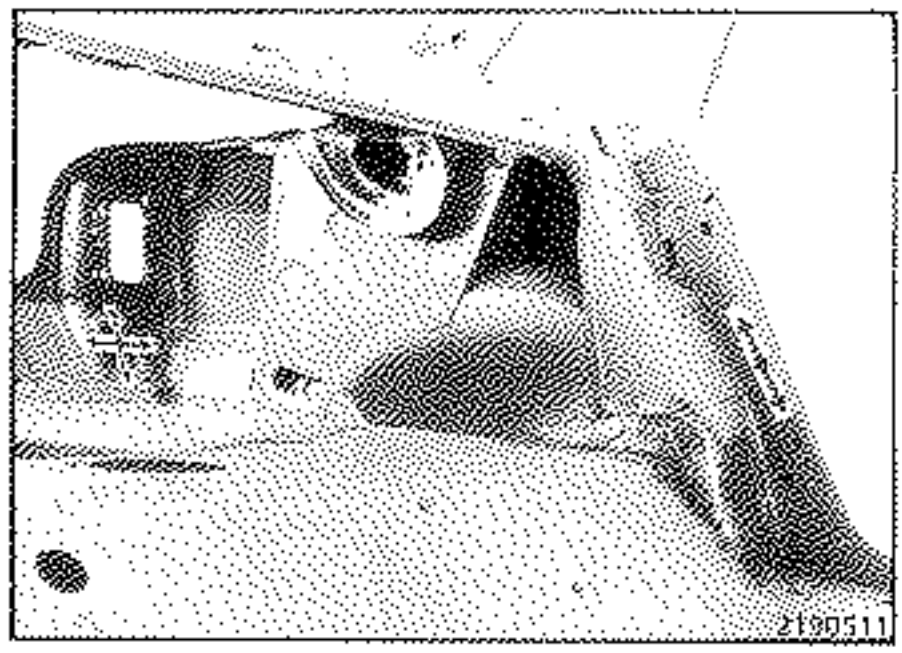


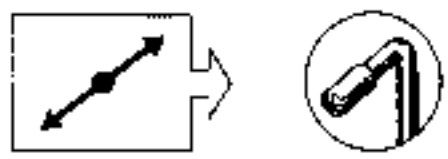




D = 4.5 mm

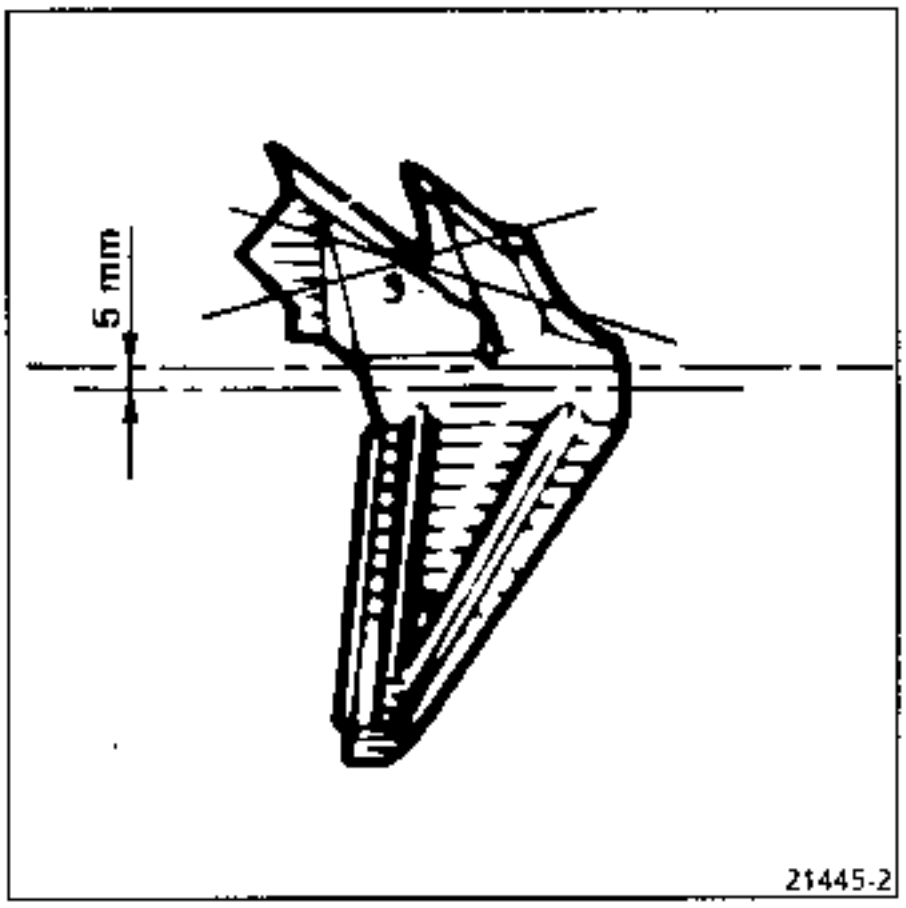
PROTECTING HOLLOW SECTIONS

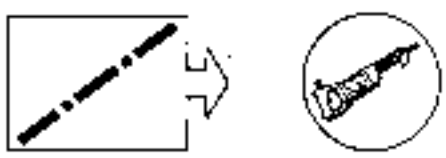




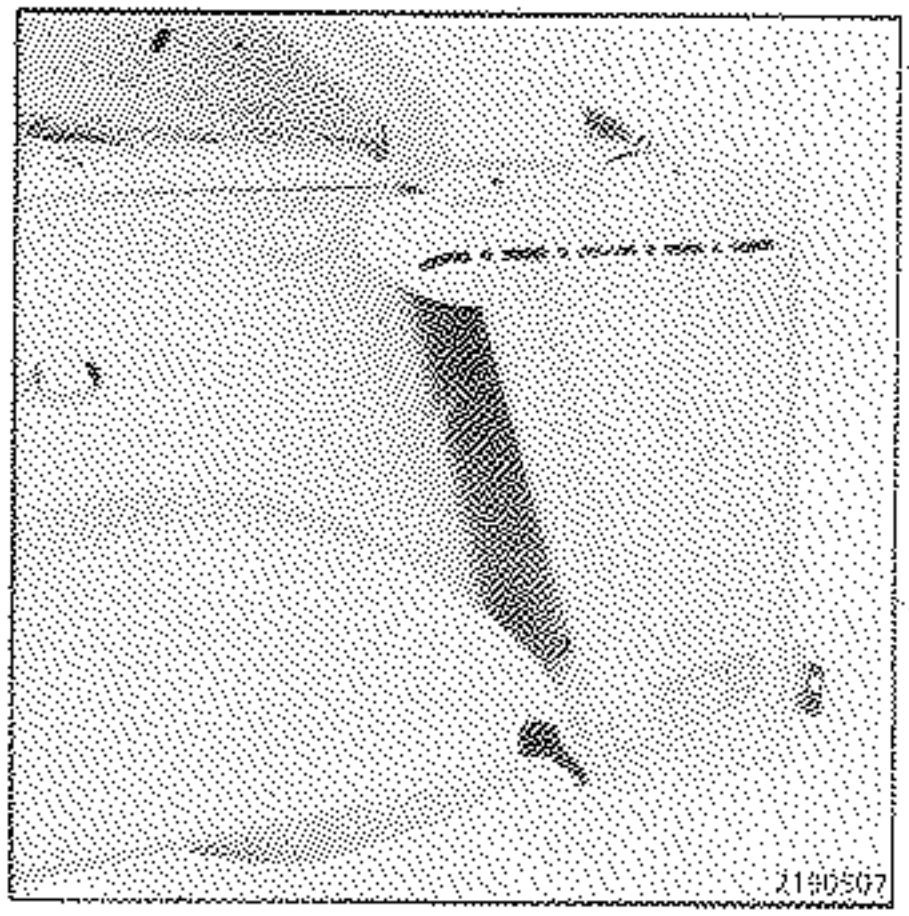
Wing panel reinforcement

Additional to preceding operation.



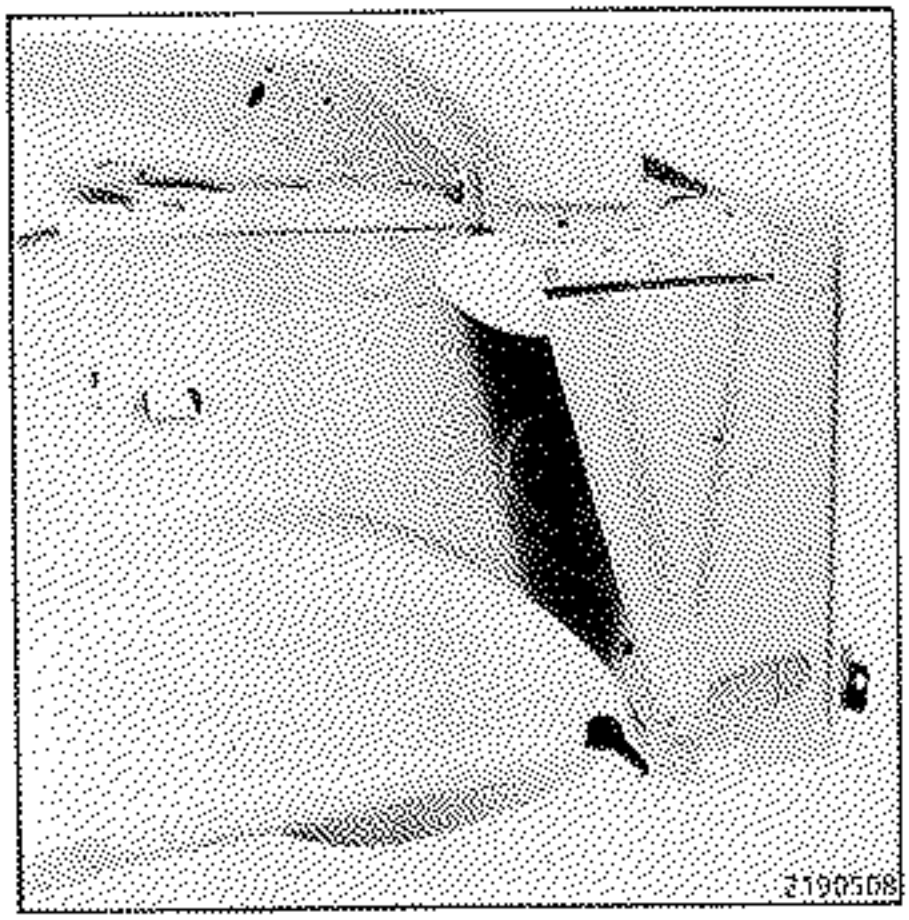


CUTTING OUT





WELDING





D = 5.5 mm

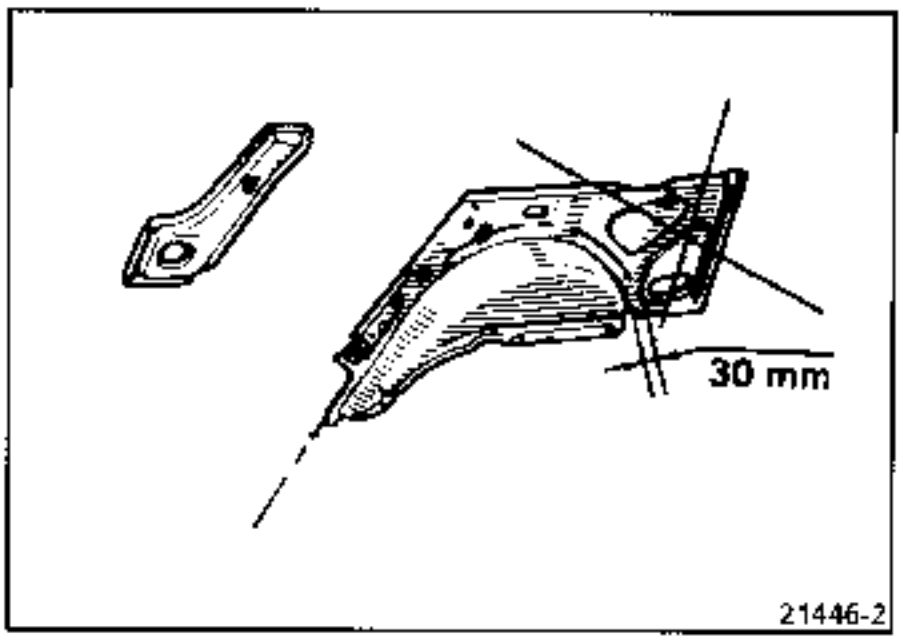
Outer wheel arch

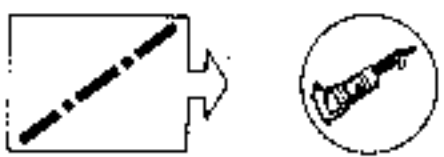
Additional to preceding operation.

COMPOSITION OF PART FROM PARTS DEPARTMENT

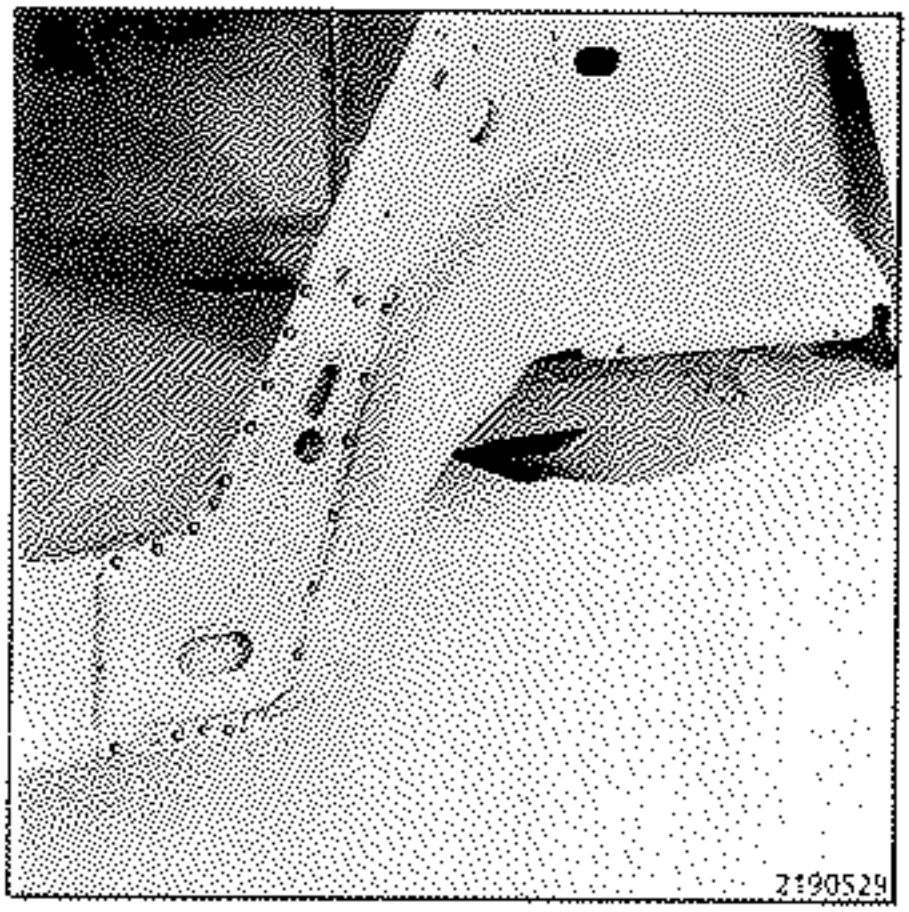
Assembled part comprising:

- Bare outer wheel arch with seat belt mounting reinforcement.
- Bare rear pillar reinforcement.

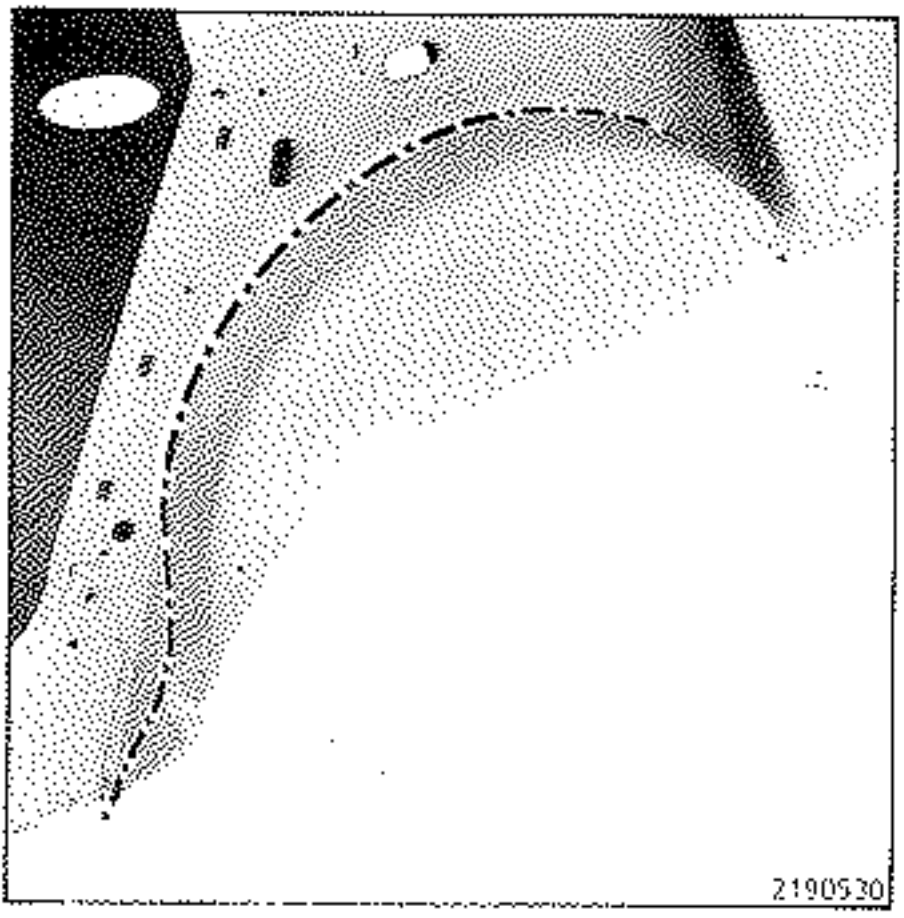




CUTTING OUT - UNPICKING

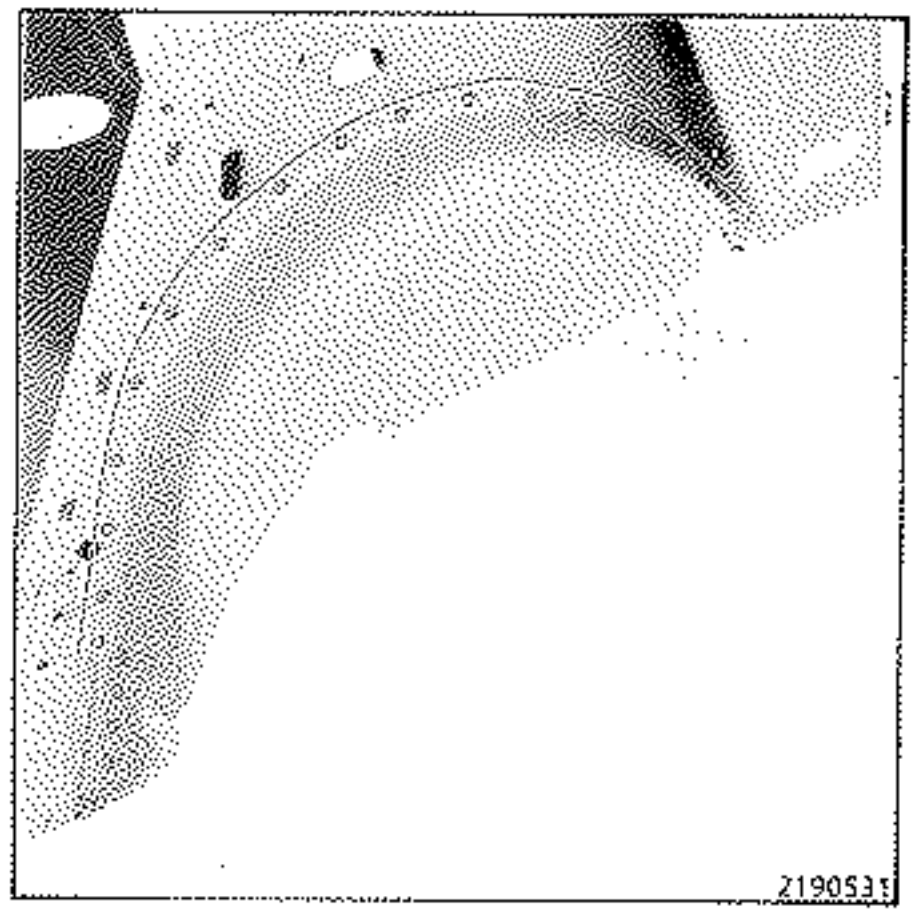






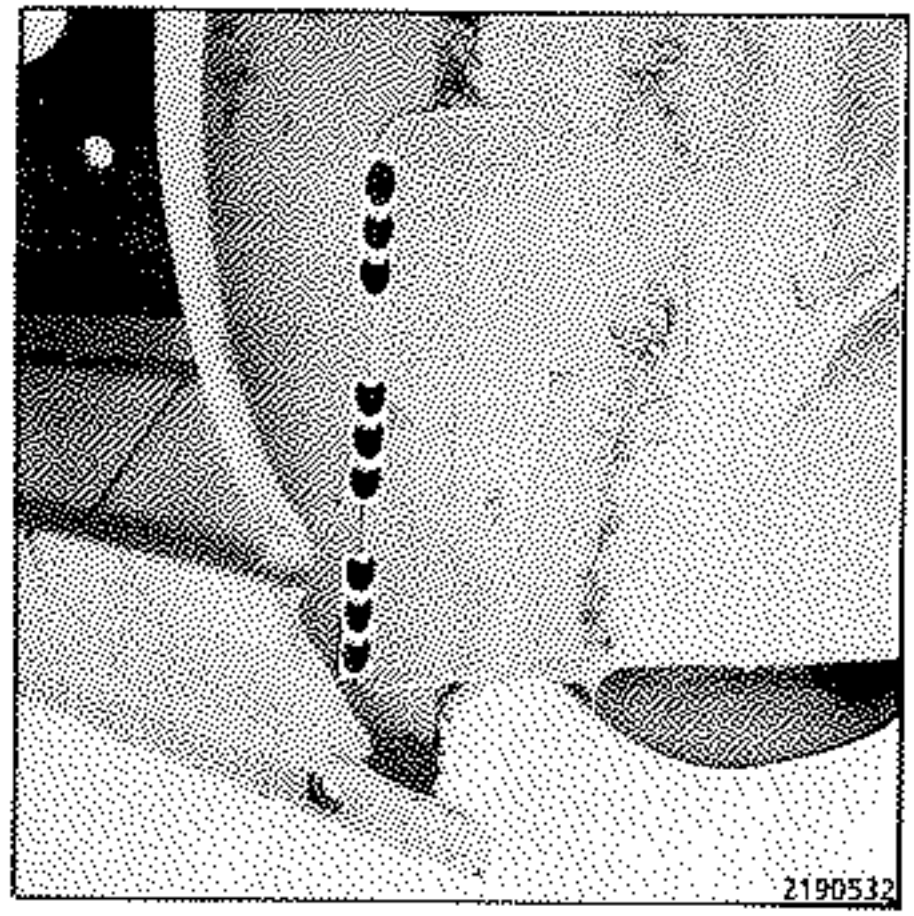


WELDING



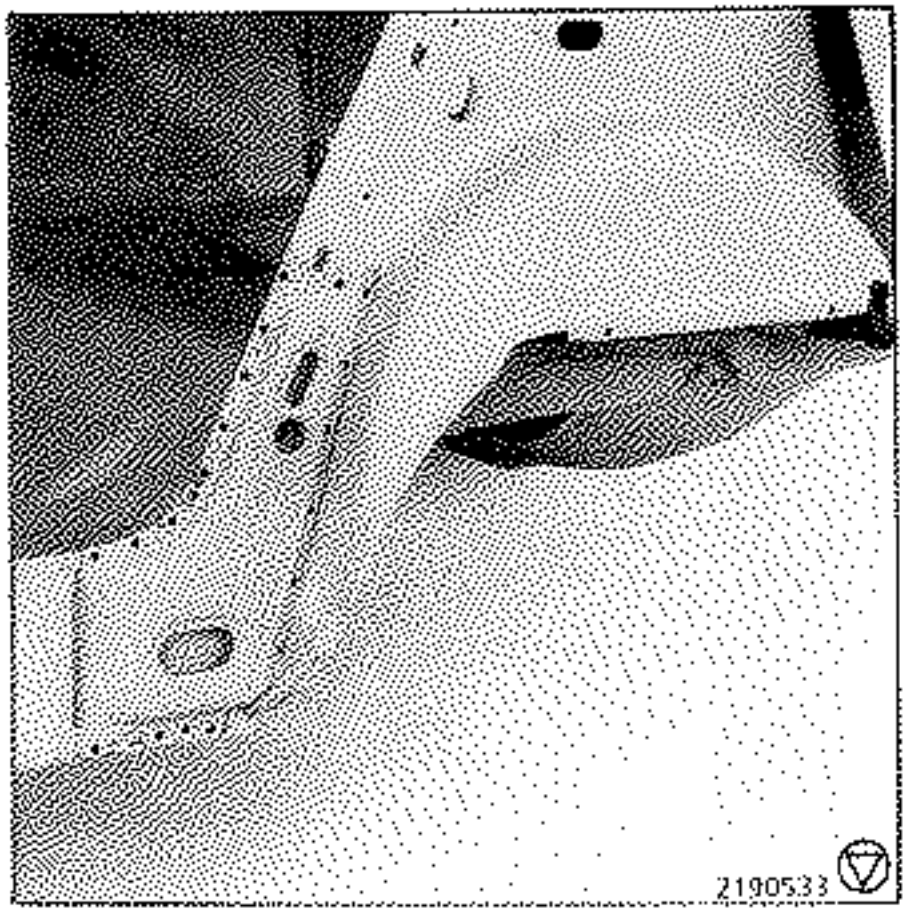


D = 4,5 mm





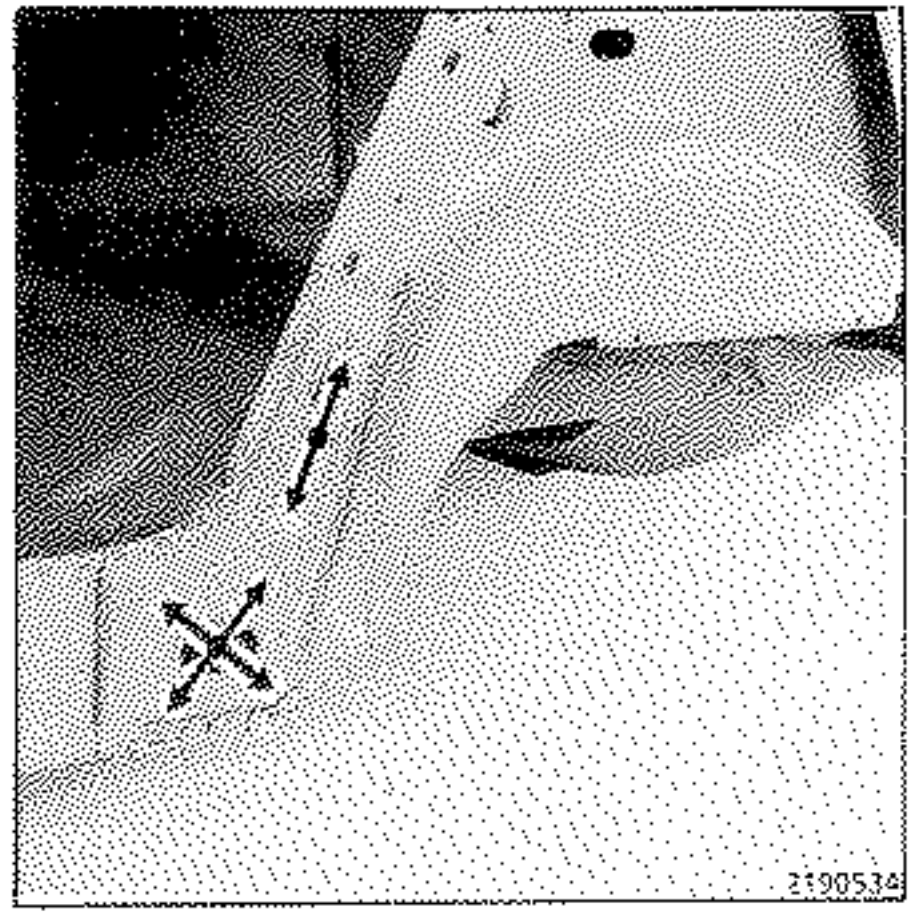
WELDING (cont)

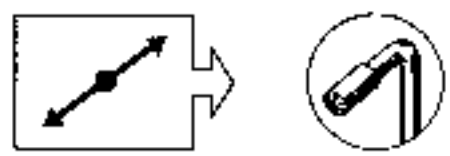




L = 250 mm
e = 1.5 mm
H = 50 mm
e = 2.2 mm A

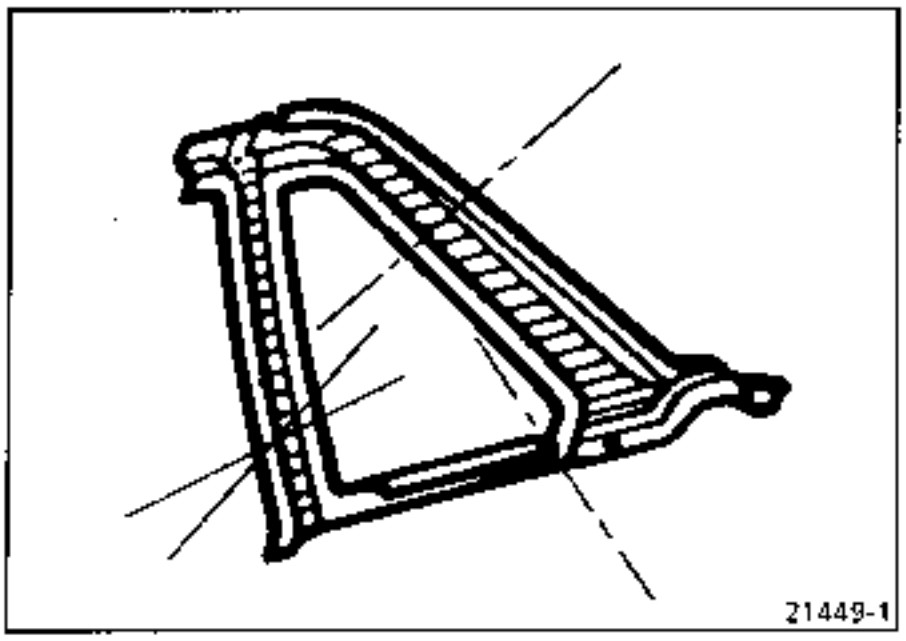
PROTECTING HOLLOW SECTIONS

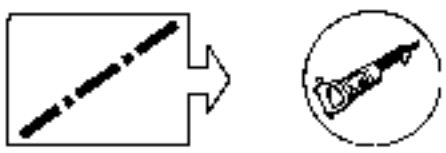


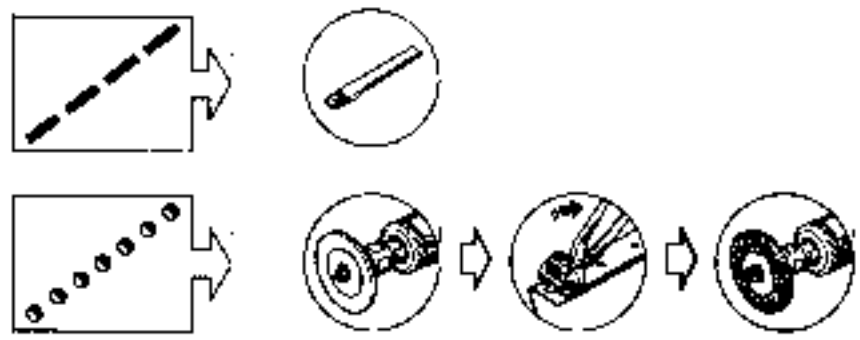


COMPOSITION OF PART FROM PARTS DEPARTMENT

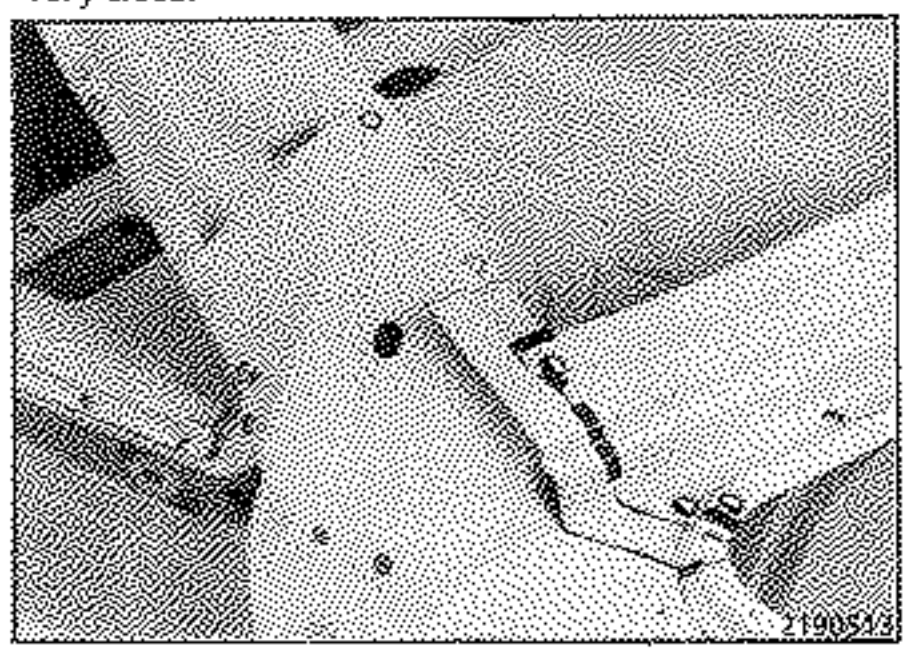
Bare rear quarter panel.





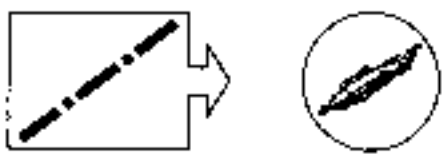


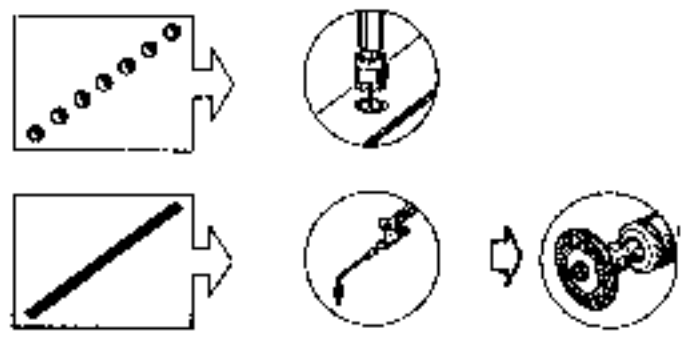
Note : when cutting with the chisel, take care not to damage the wing panel reinforcement as it is very close.

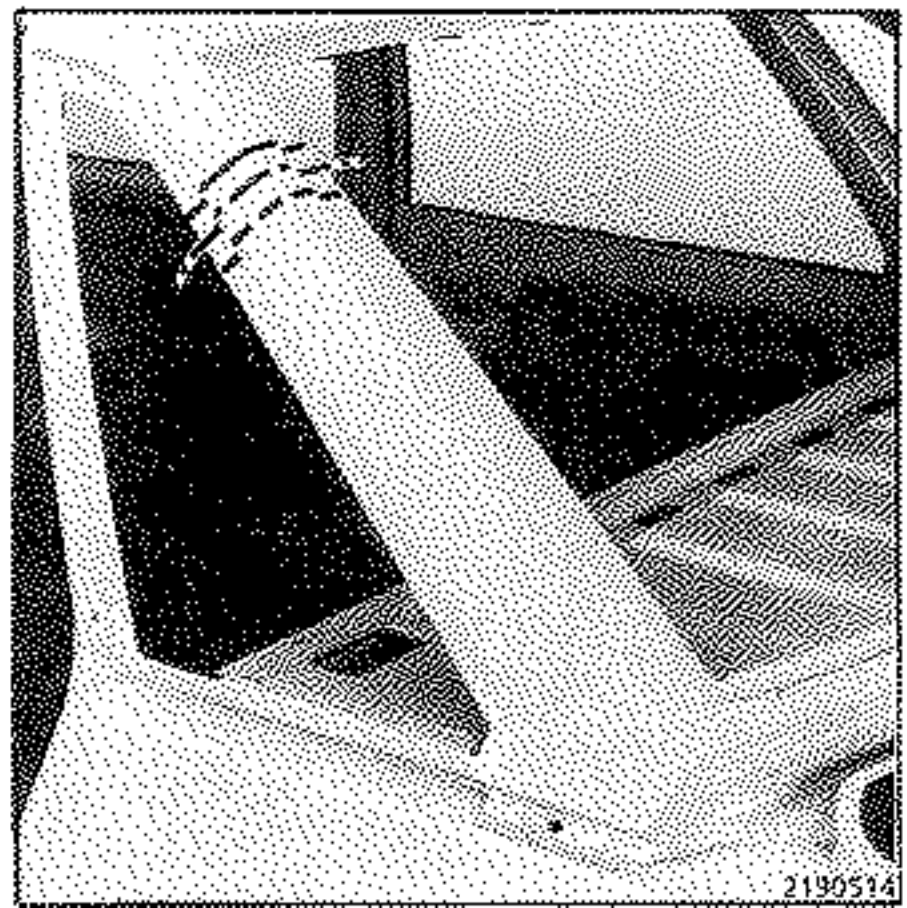


CUTTING OUT - UNPICKING

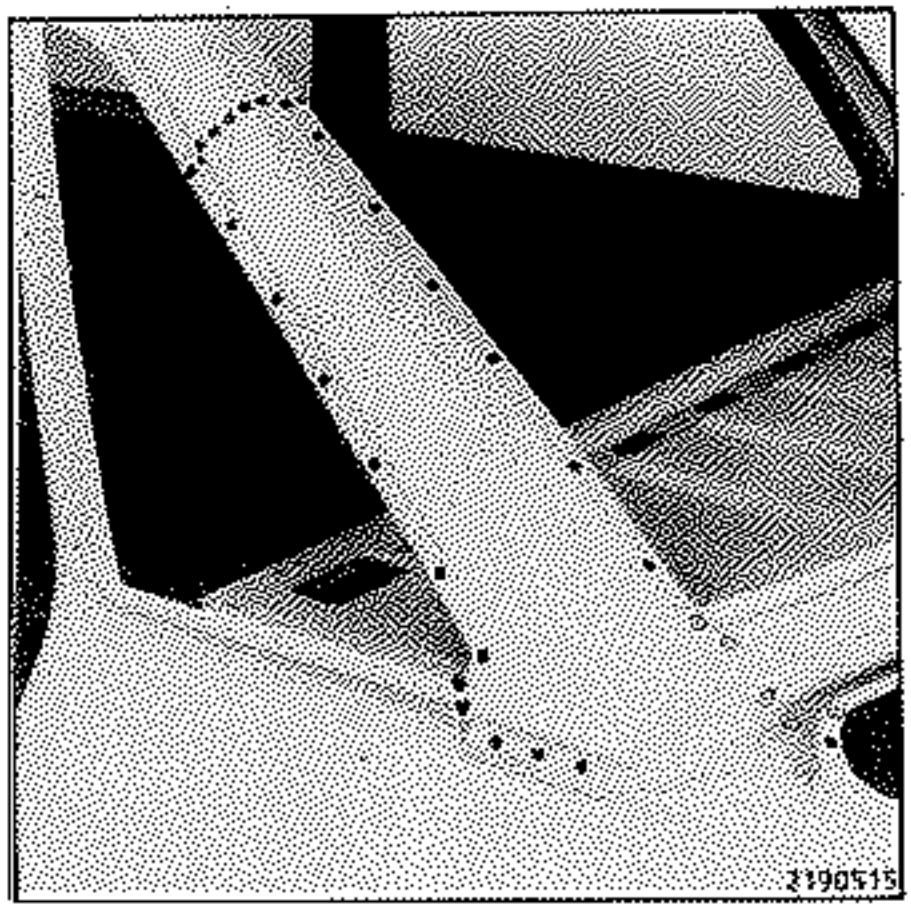


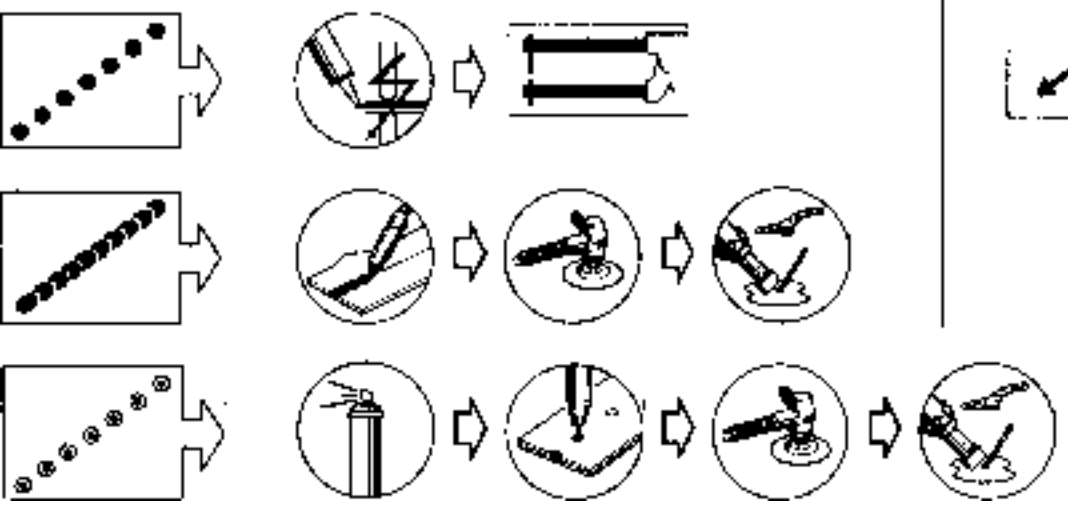




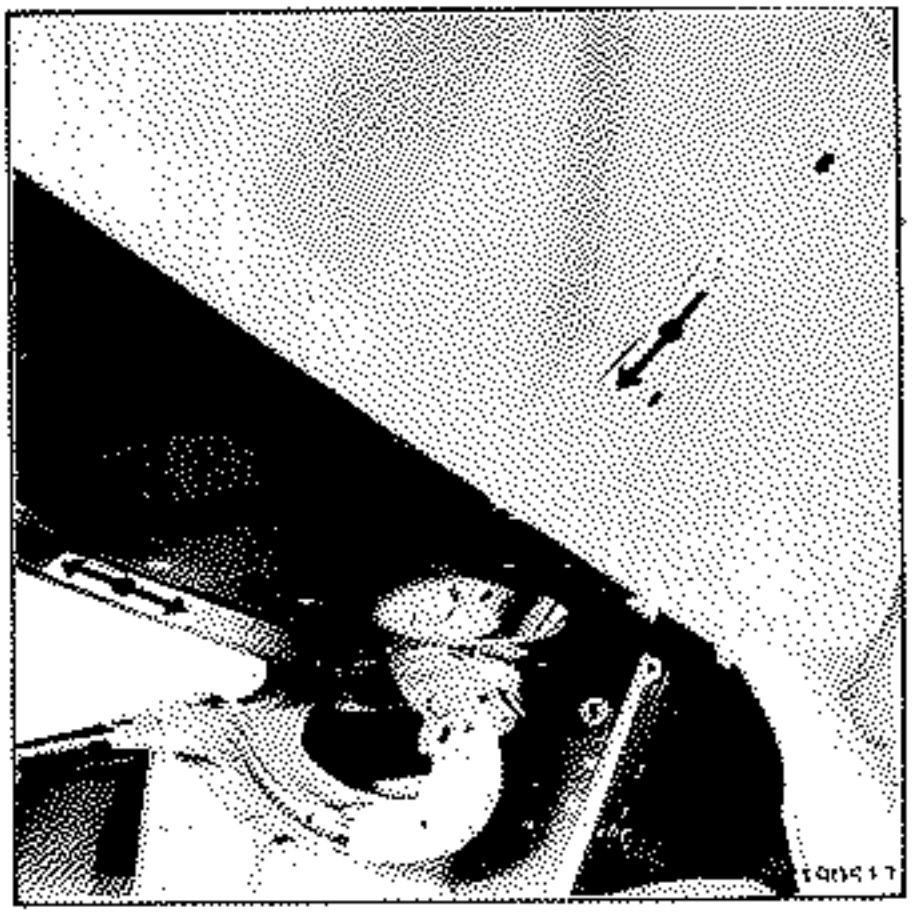


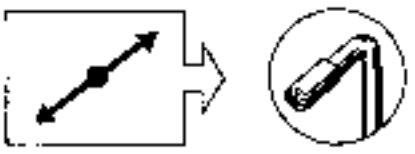
WELDING





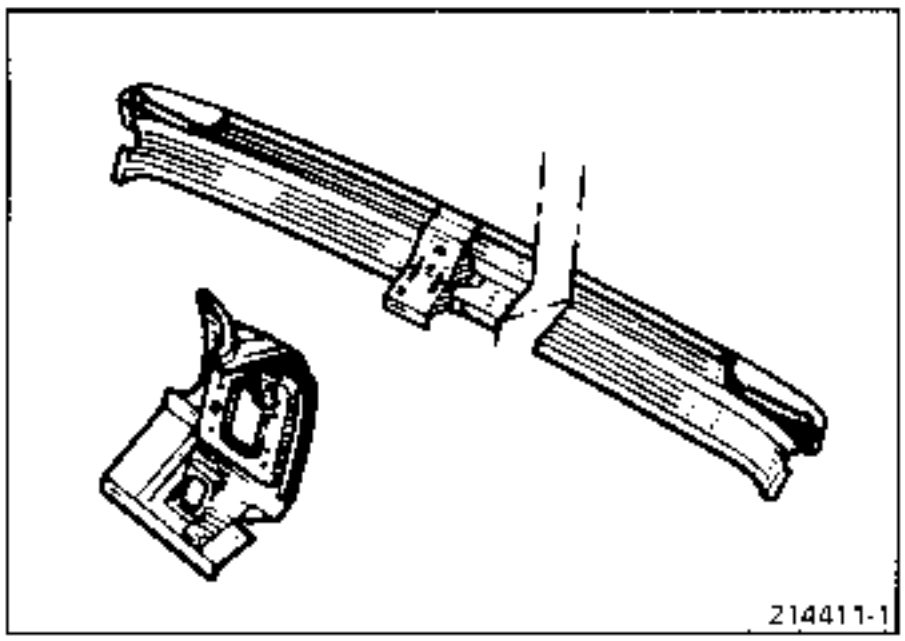
PROTECTING HOLLOW SECTIONS

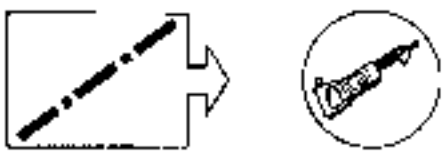


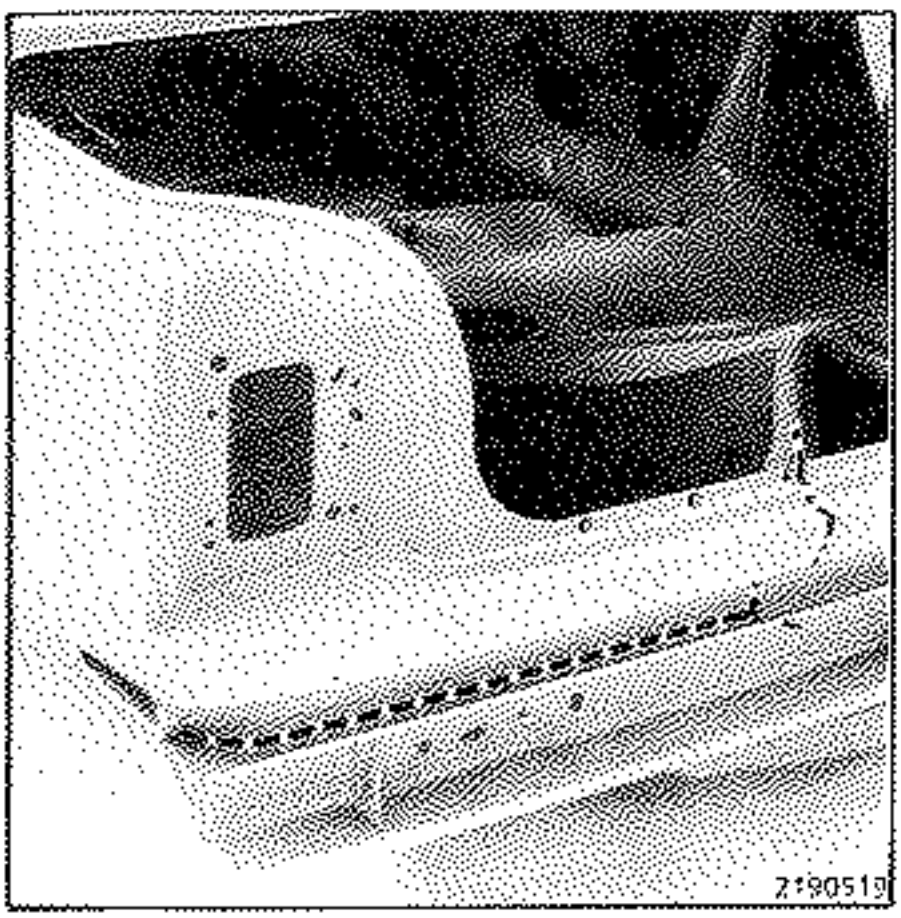


COMPOSITION OF PARTS FROM PARTS DEPARTMENT

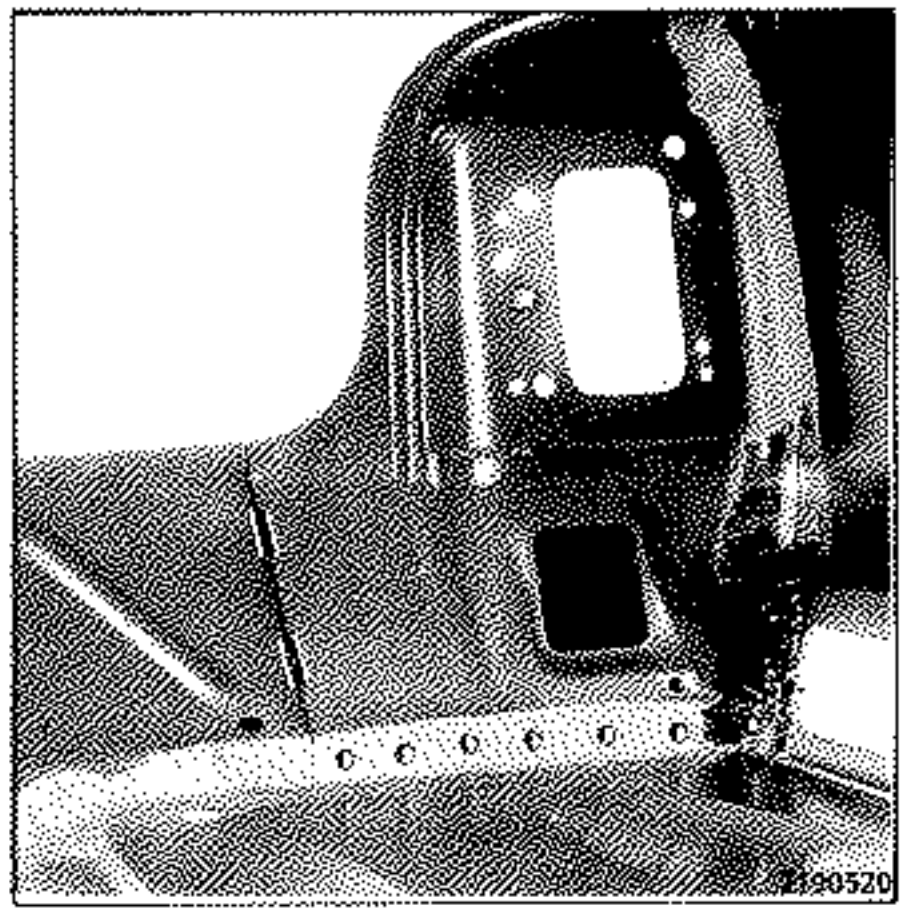
Assembled parts comprising:
- Rear end panel with striker plate mounting reinforcement.
- Light carrier panel with compensator spring retaining hook.



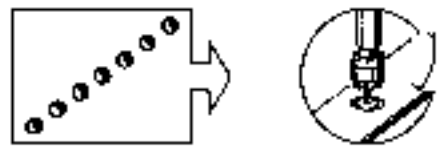




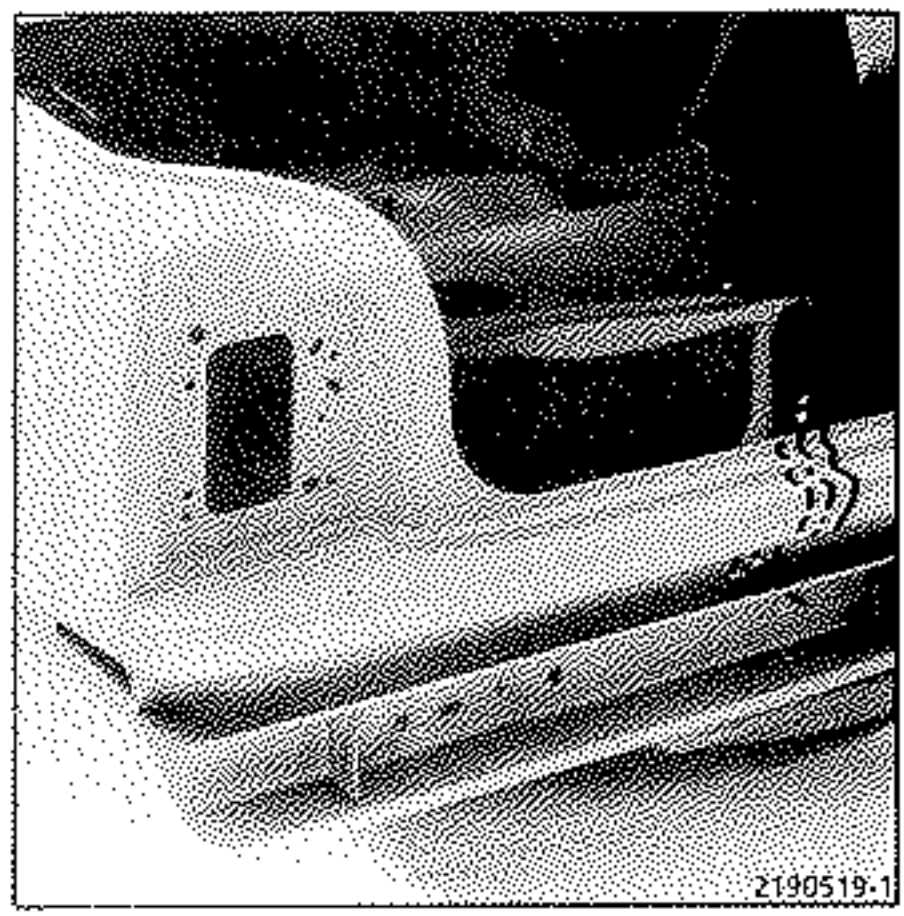






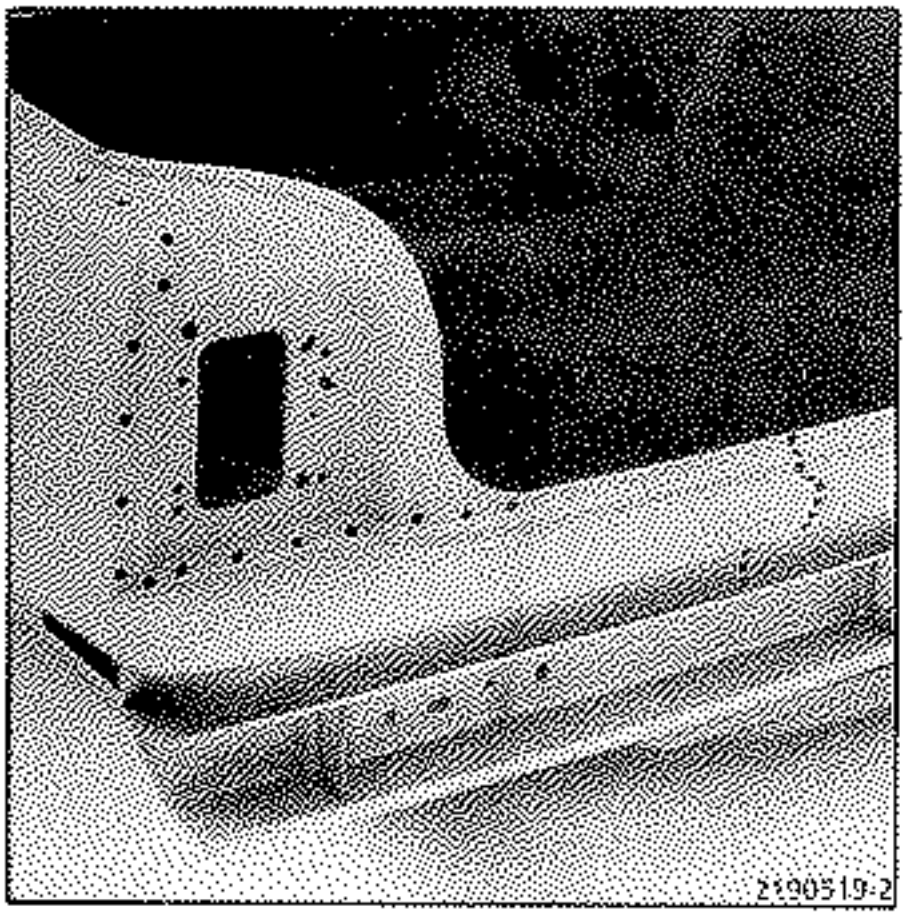


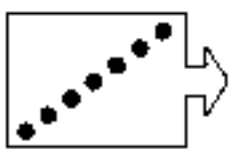
CUTTING OUT - UNPICKING





WELDING

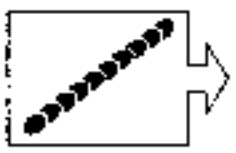




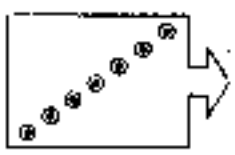
L = 330 mm
e = 1.4 mm
H = 60 mm



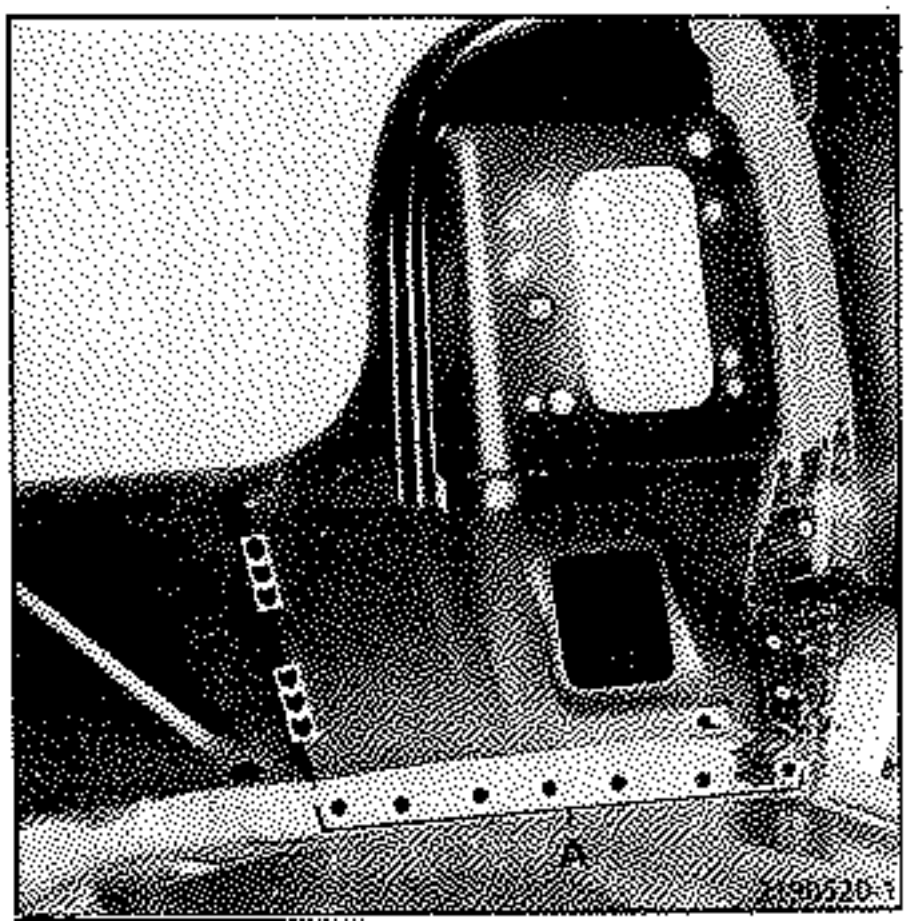
Zone A
e = 2 mm
H = 54 mm



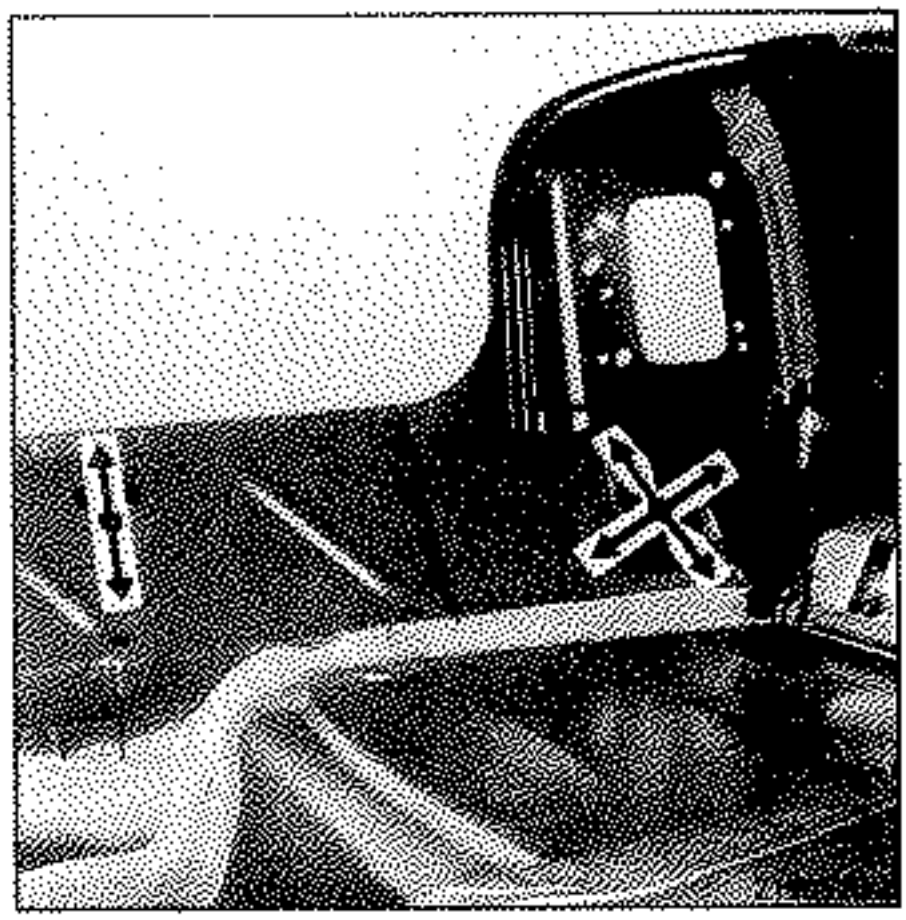




D = 4.5 mm



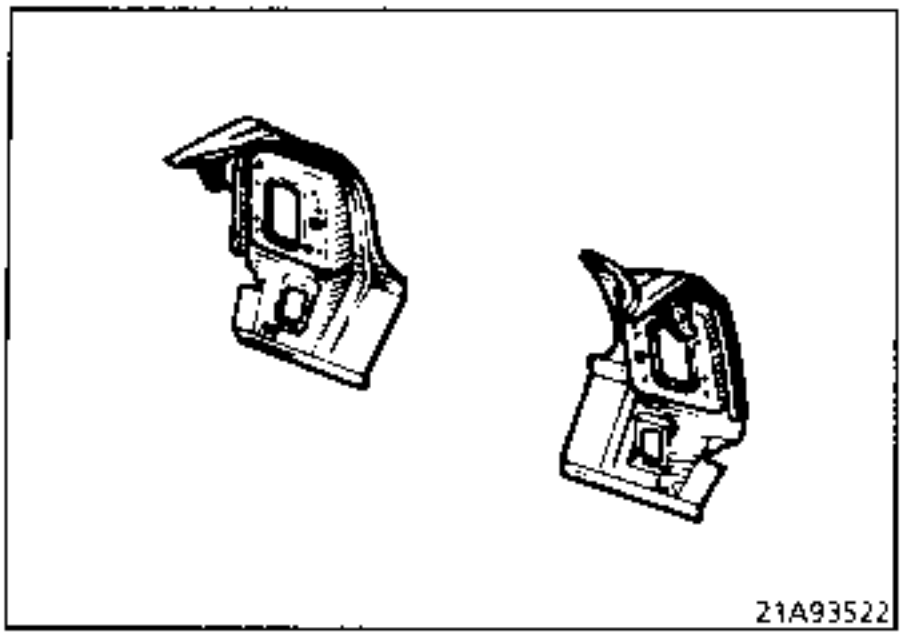
ANTICORROSION PROTECTION



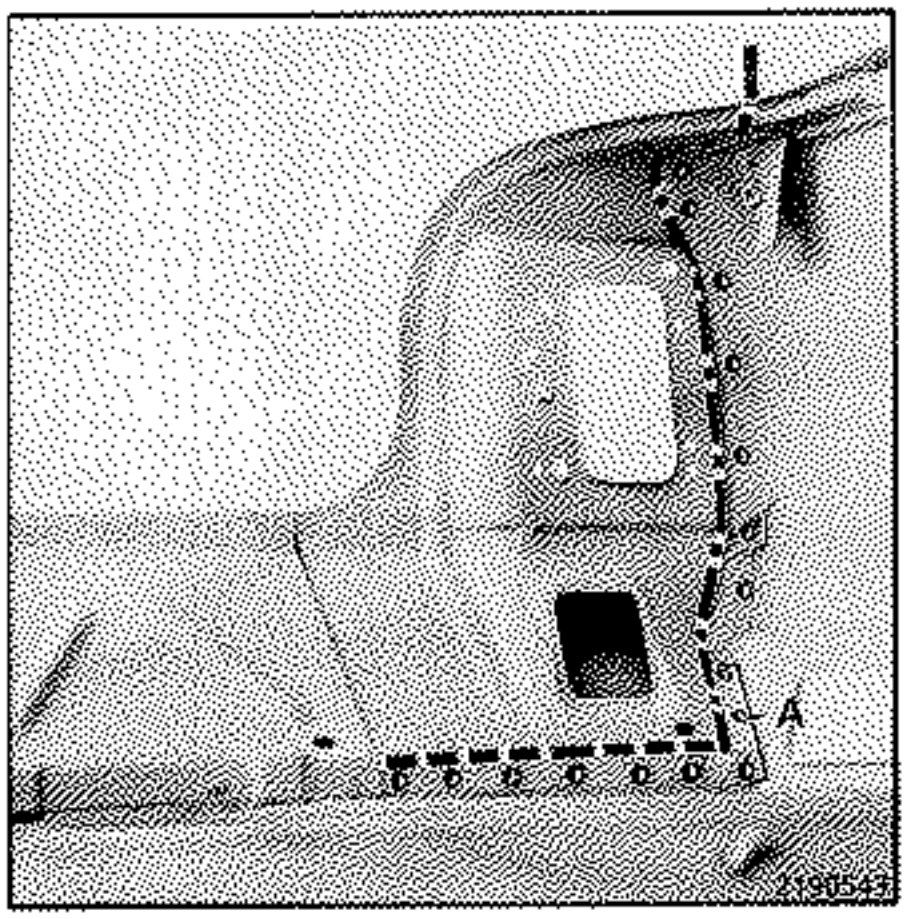


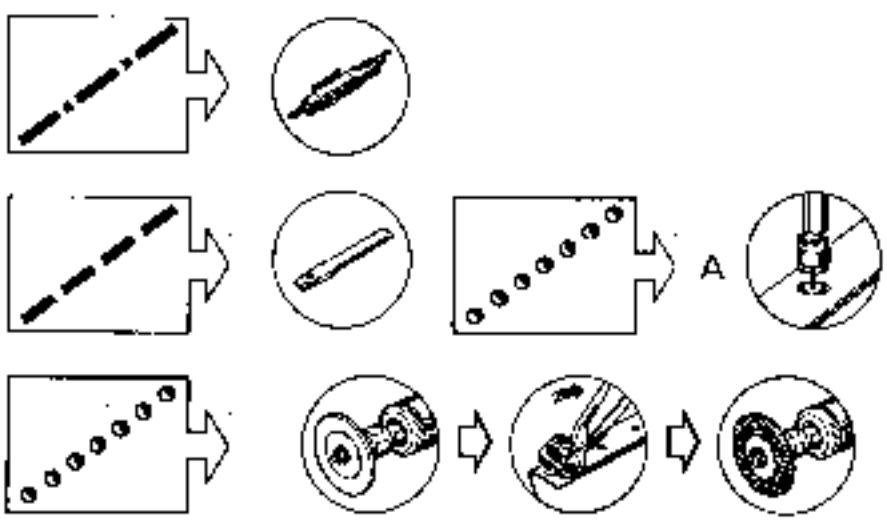
COMPOSITION OF PART FROM PARTS DEPARTMENT

Assembled part comprising:
- Light carrier panel with compensator spring retaining hook.

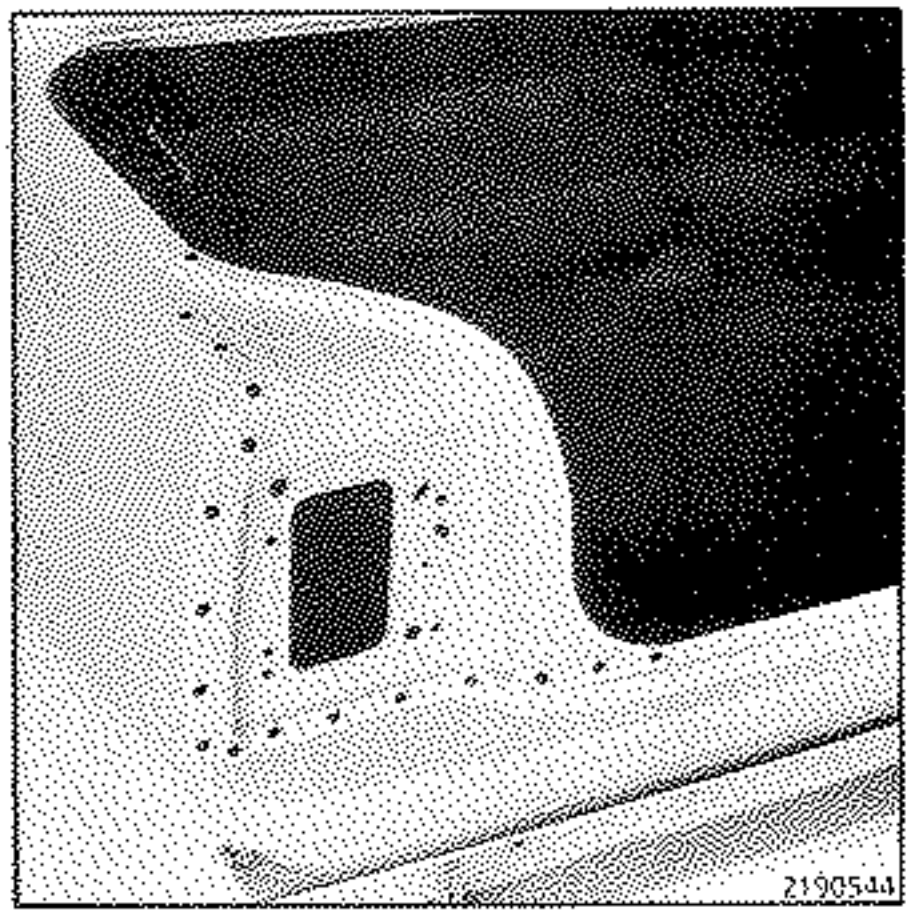


CUTTING OUT - UNPICKING





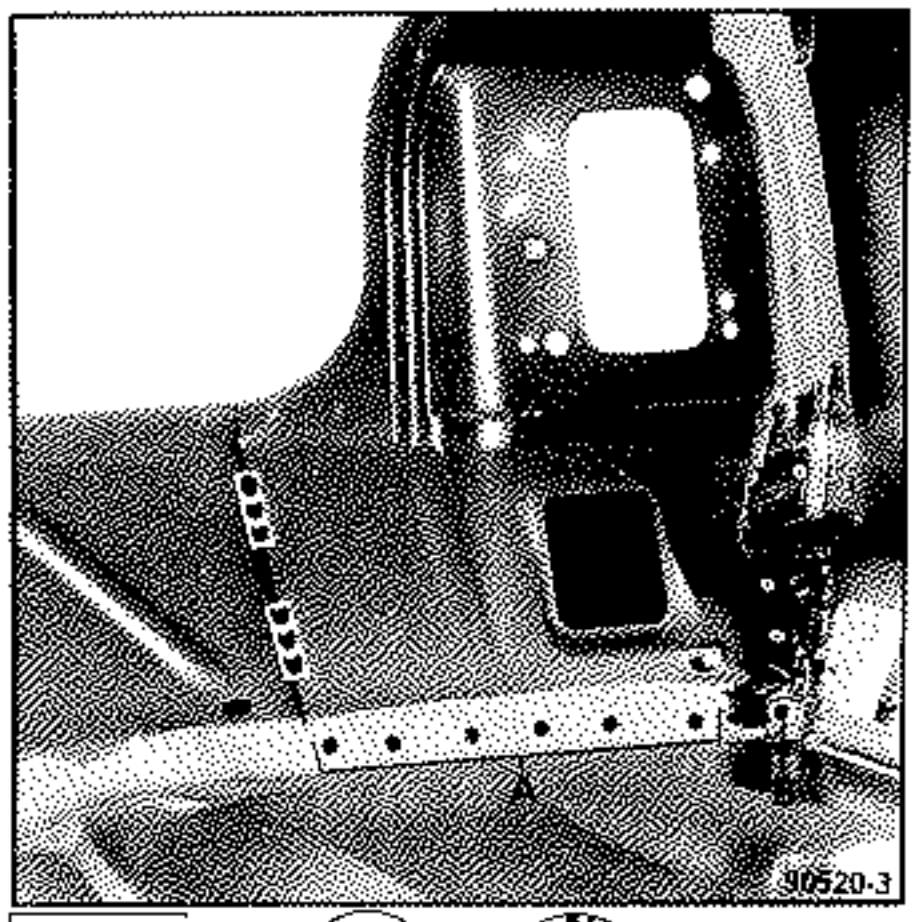
WELDING





L = 310 mm
e = 1.5 mm
H = 60 mm

e = 2 mm
H = 54 mm A



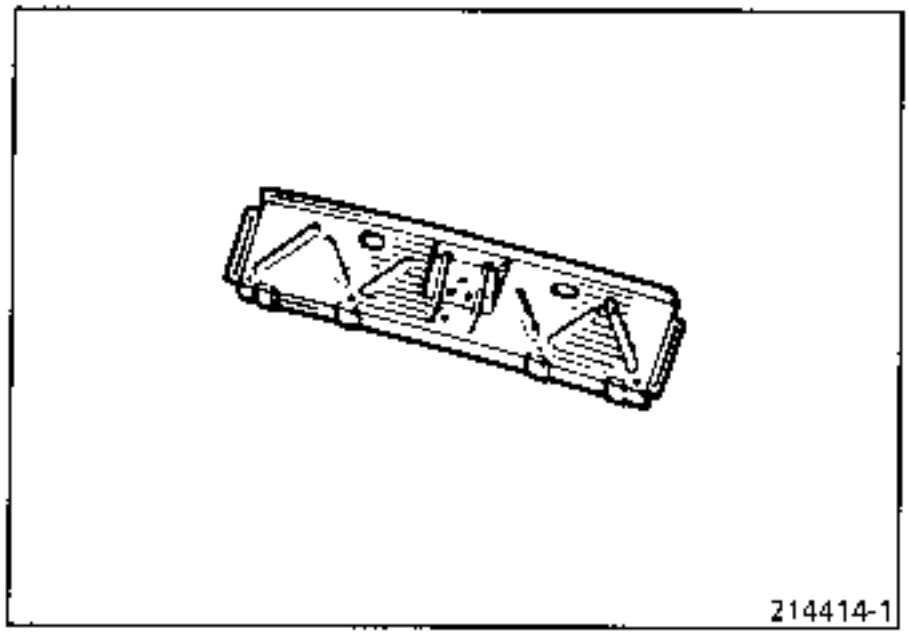


and B

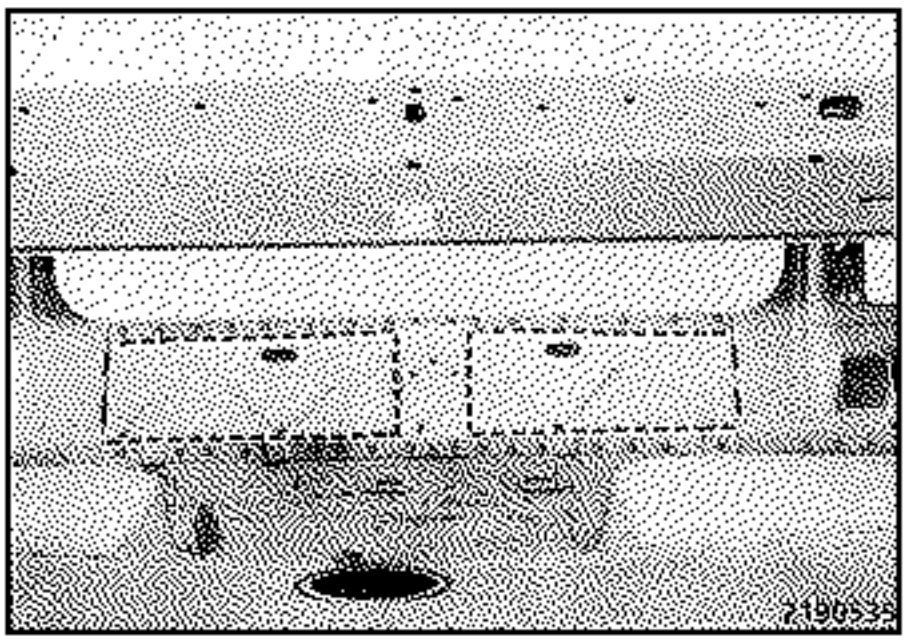


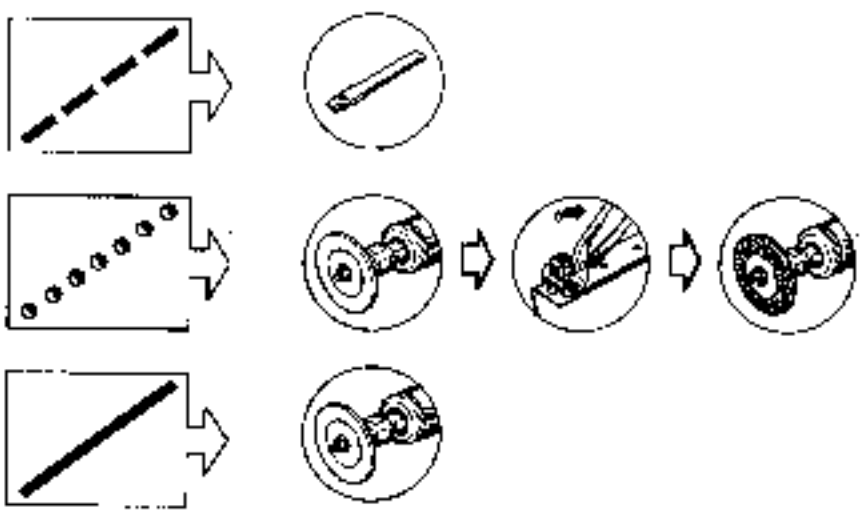
COMPOSITION OF PART FROM PARTS DEPARTMENT

Rear end panel lining.

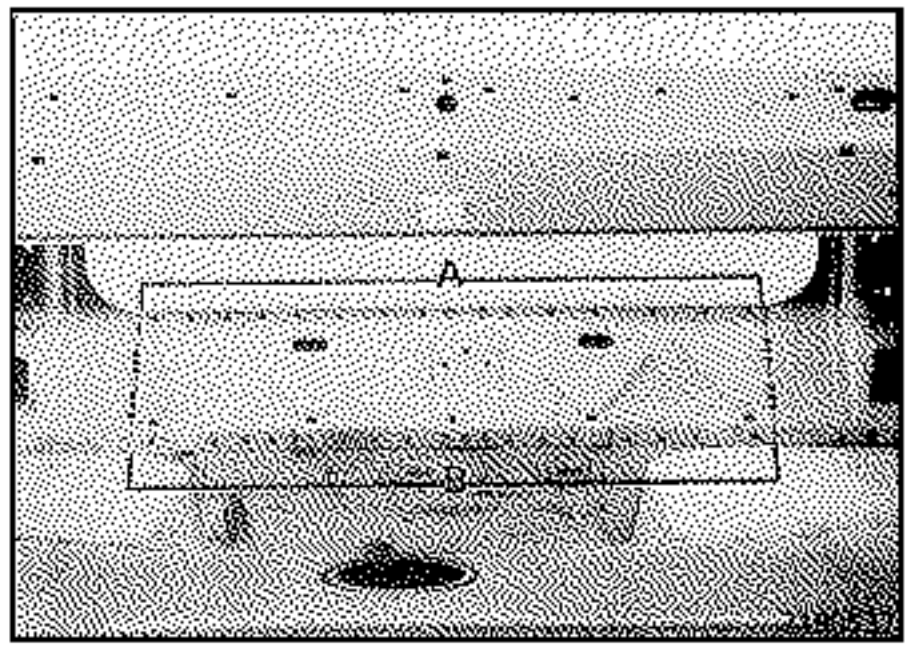


CUTTING OUT - UNPICKING





WELDING





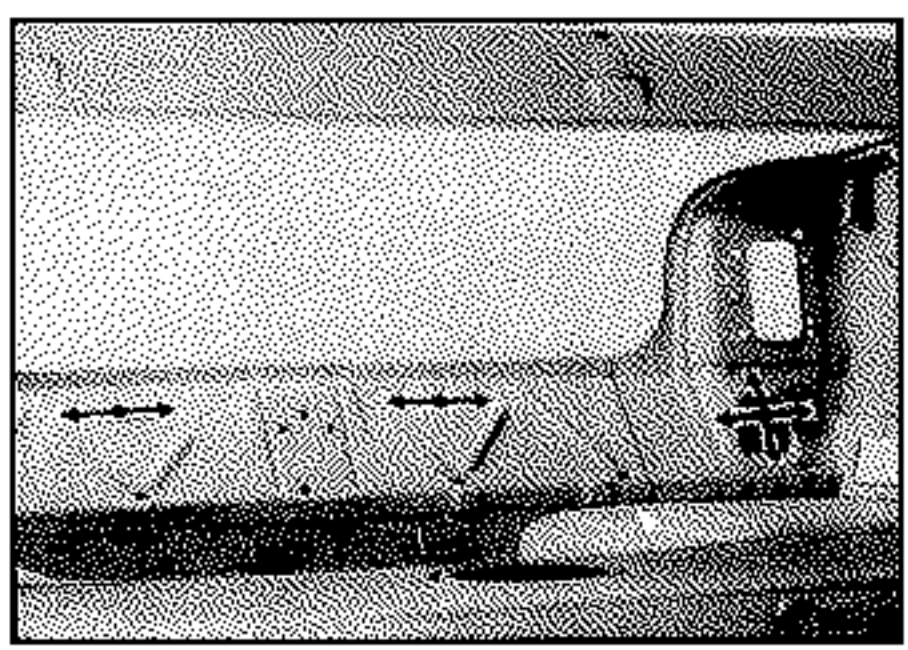
L = 310 mm
e = 1.5 mm A e = 2 mm B
H = 60 mm



D = 4.5 mm



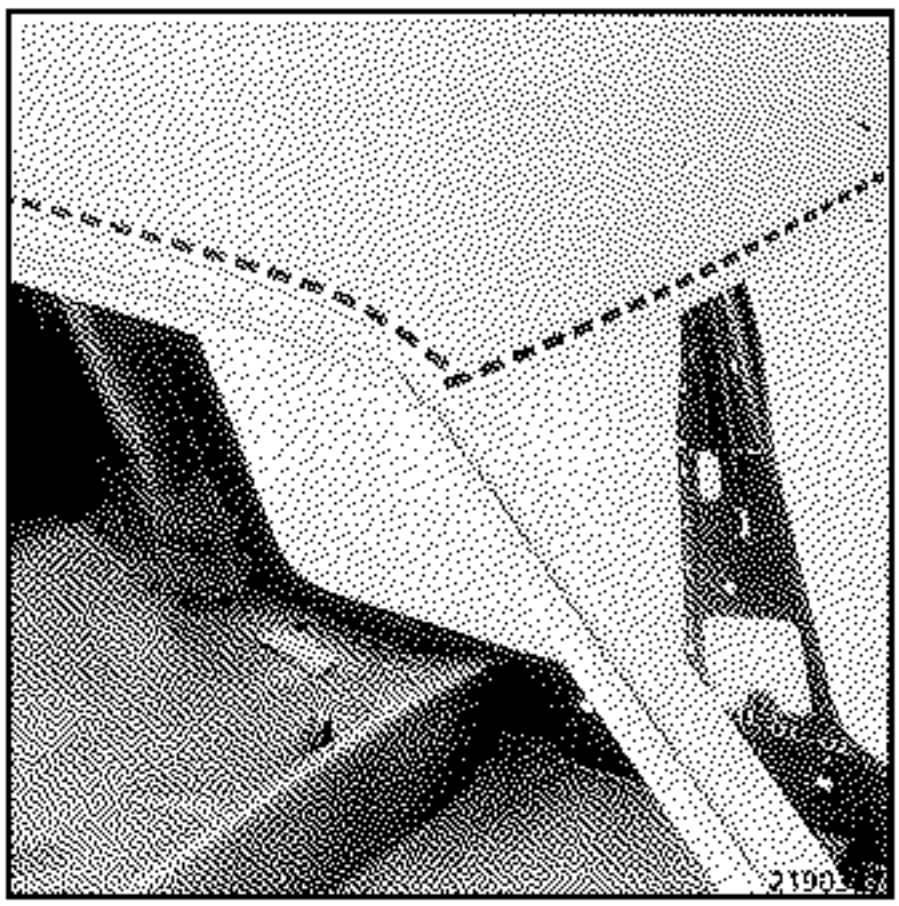
PROTECTING HOLLOW SECTIONS

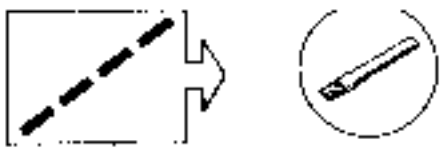


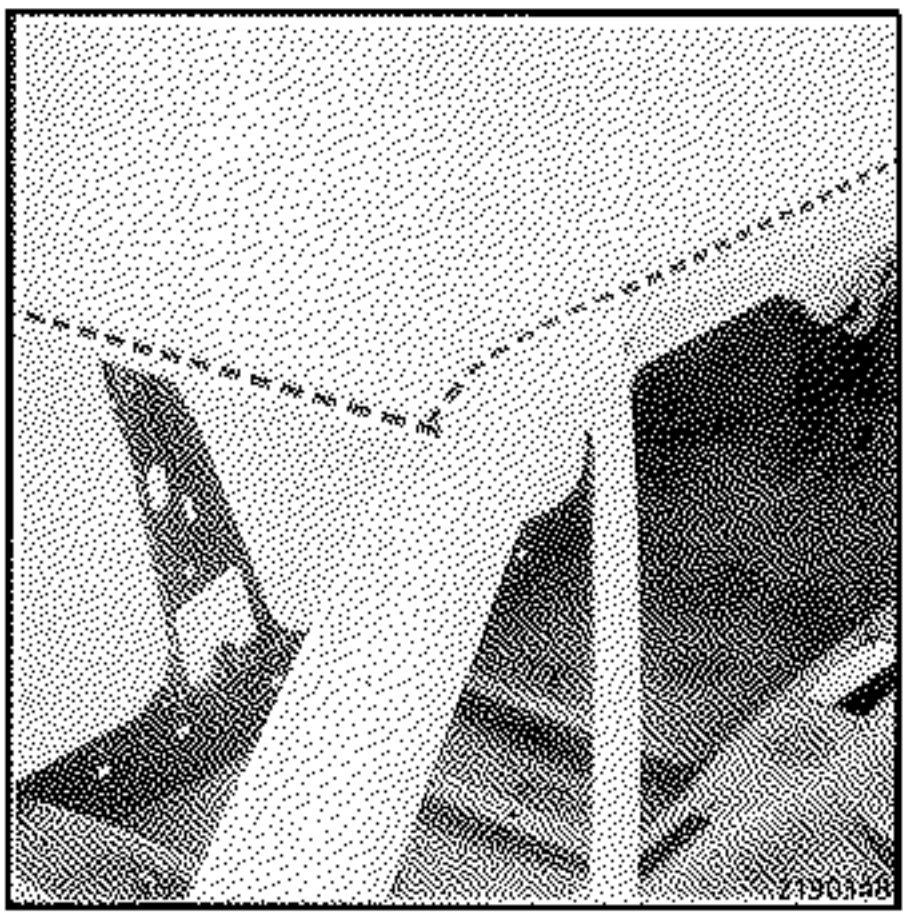
COMPOSITION OF ROOF PANEL FROM PARTS DEPARTMENT

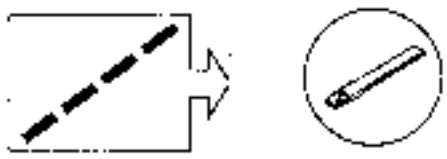
The roof panel is supplied bare; without a cross member and stretcher.

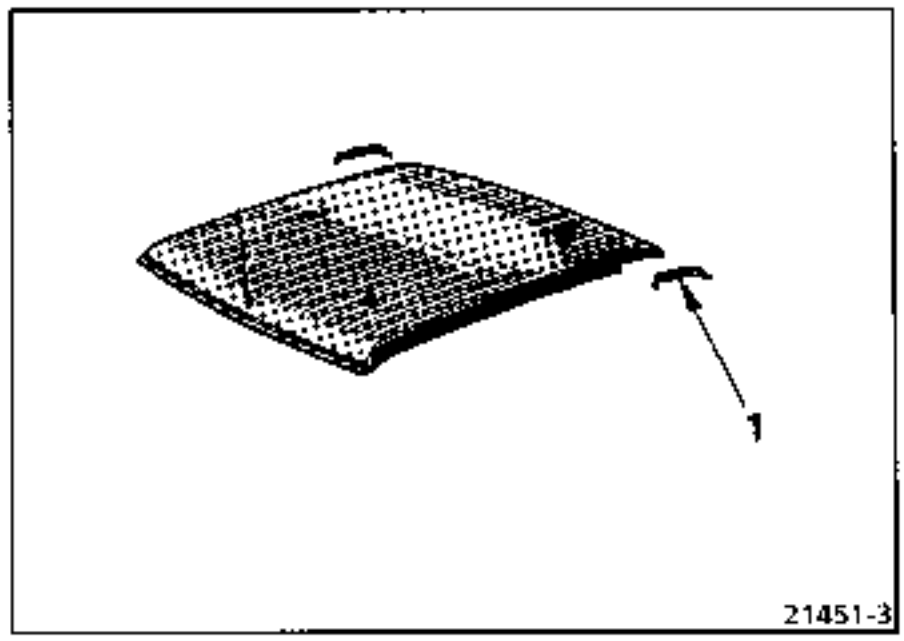
CUTTING OUT - UNPICKING

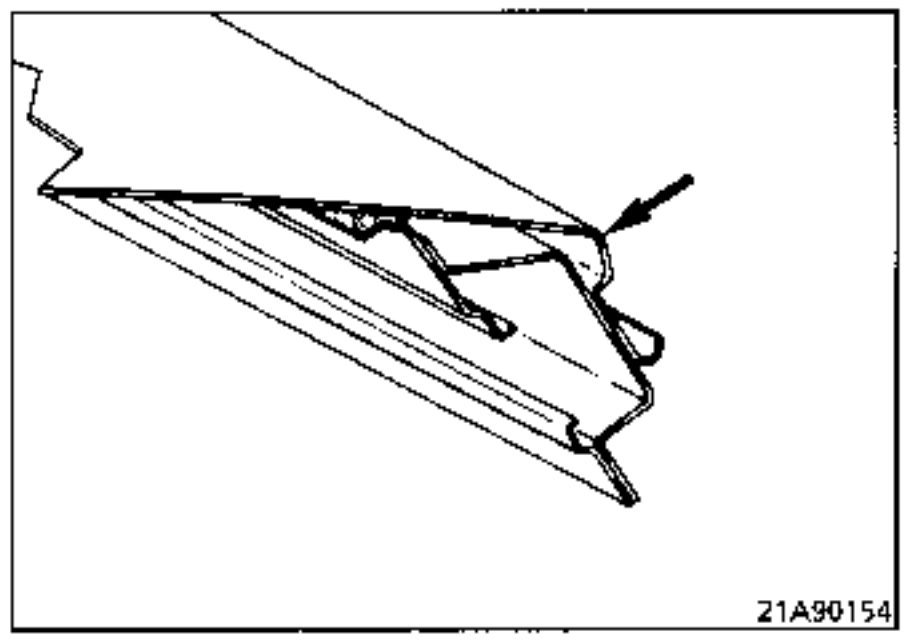


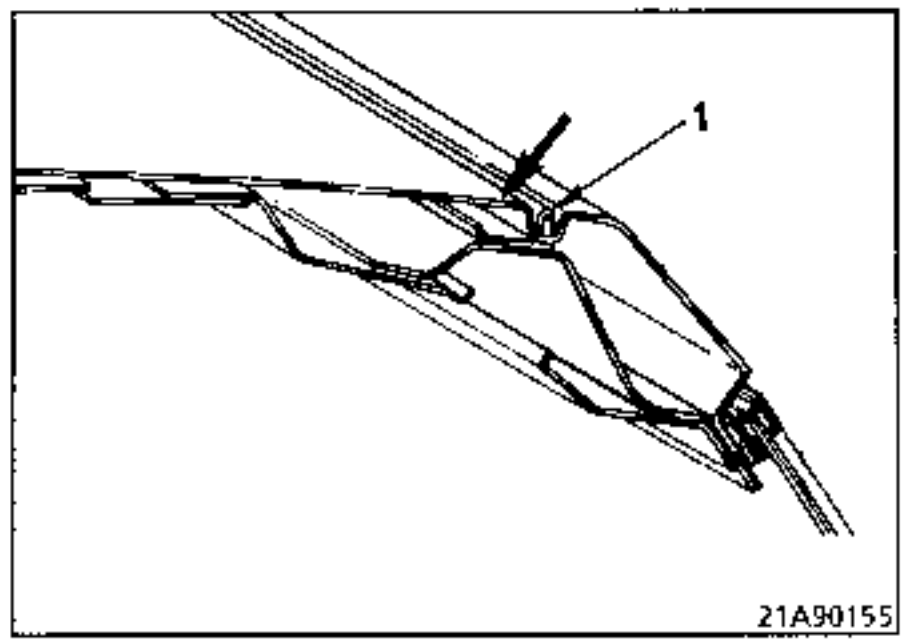




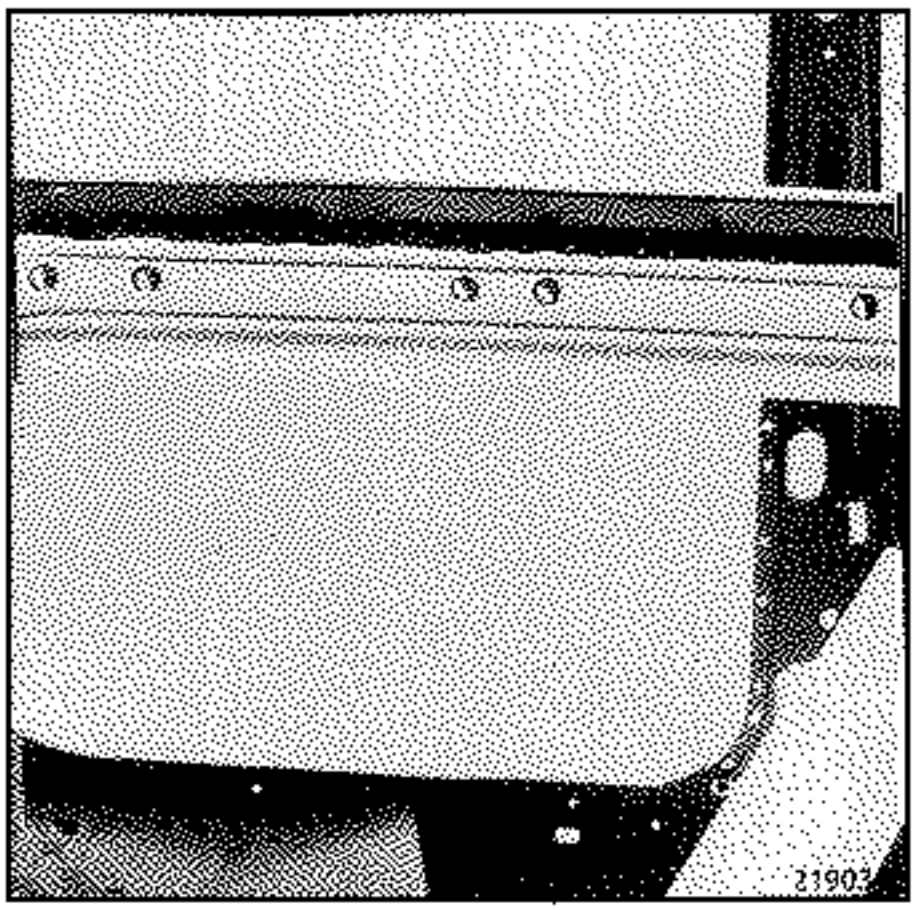


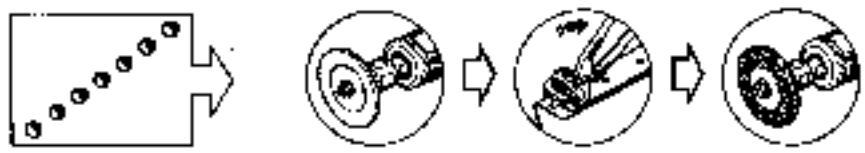






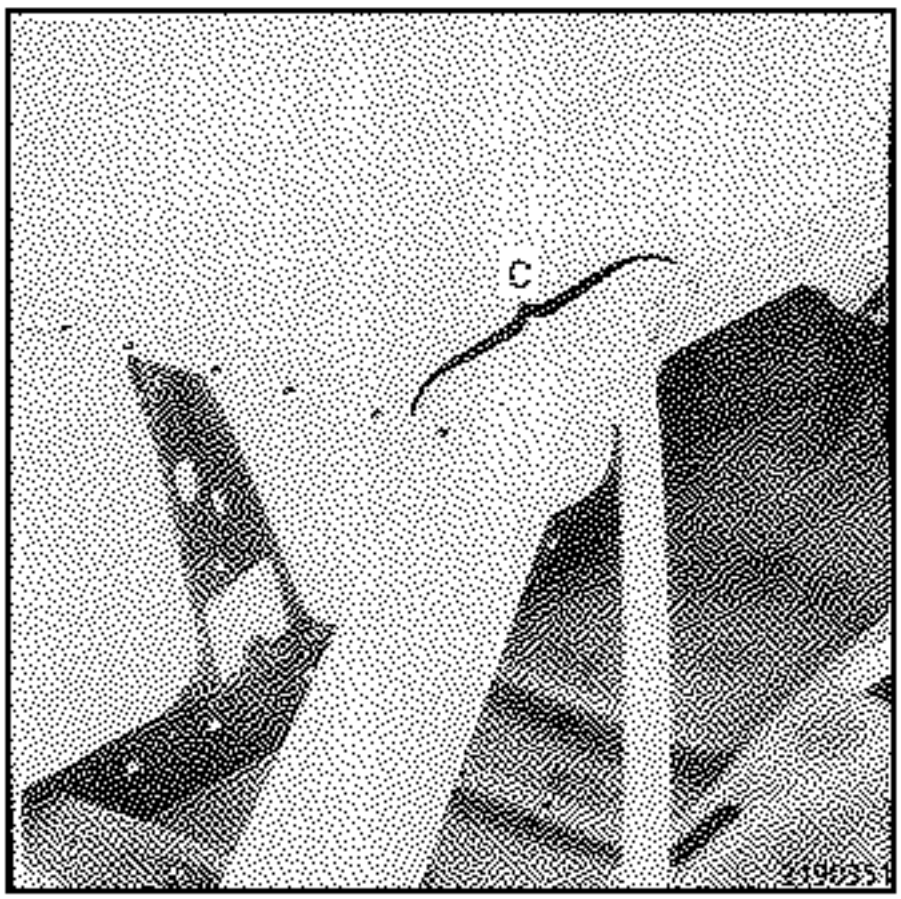
1 metal strip.





C apply MCT metal-to-metal bonding mastic before welding.

WELDING







D = 4.5 mm

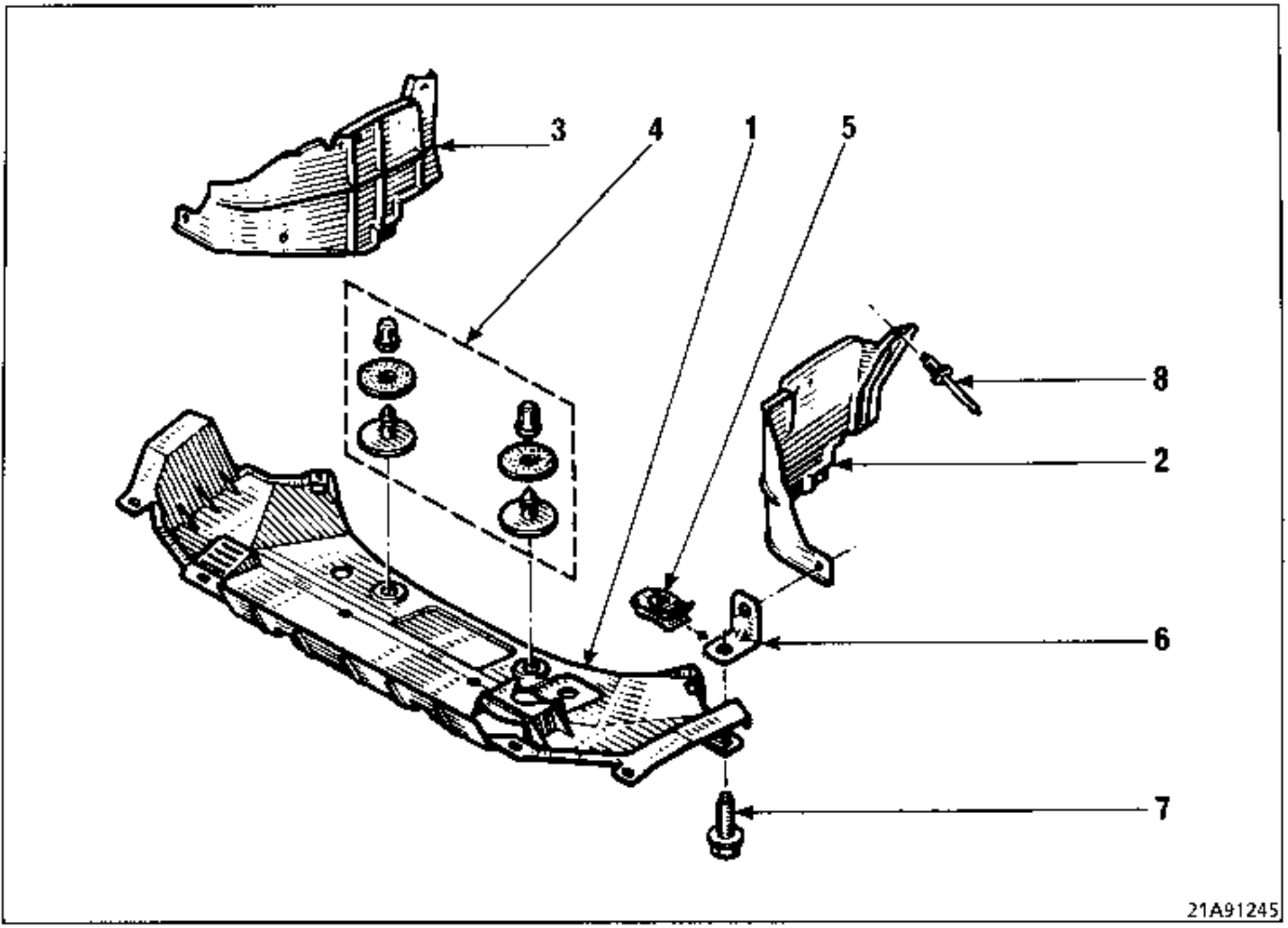


e = 1.4 mm
H = 37 mm

After welding, apply a bead of bonding mastic to the following connections: roof - stretchers,
roof - cross members.

After painting and before refitting the trim, inject the product for hollow sections.

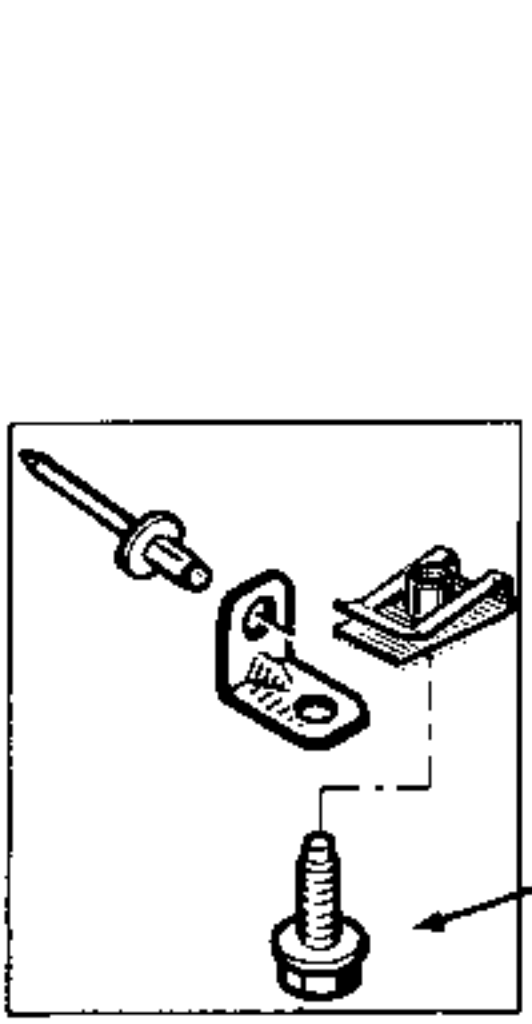
Parts required for mounting the protective skid.

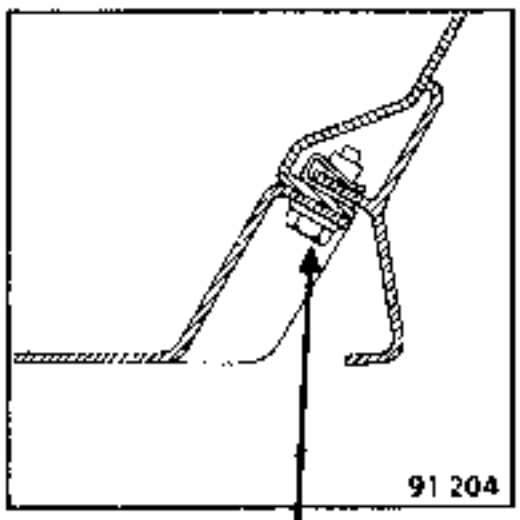


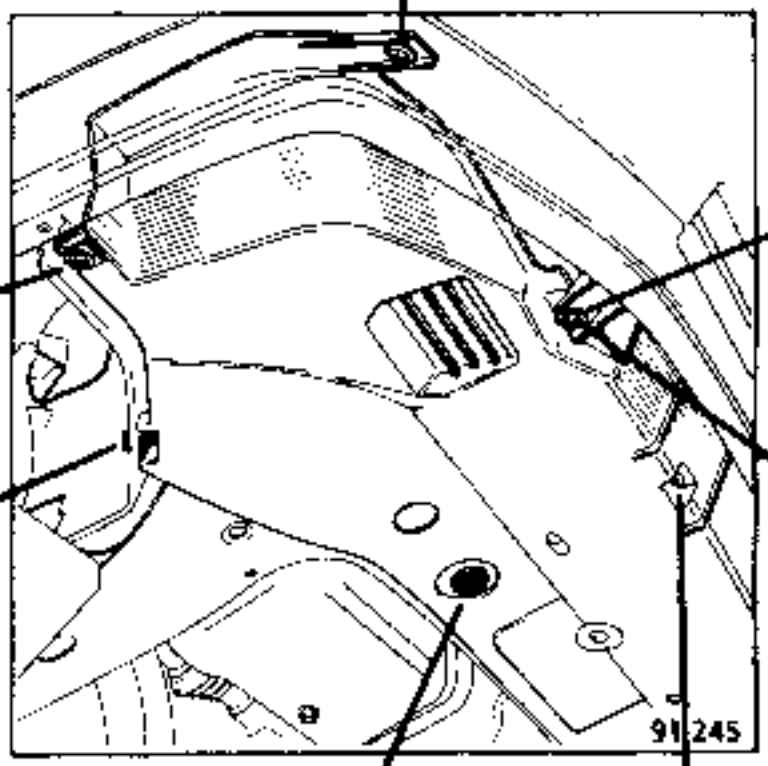
				Quantity
1.	Transverse engine	77 00 780 633		1
	In-line engine	77 00 780 134		1
2.	Transverse engine	77 00 779 769	G	1
	In-line engine	77 00 777 437	G	1
3.	Transverse engine	77 00 779 770	D	1
	In-line engine	77 00 777 438	D	1

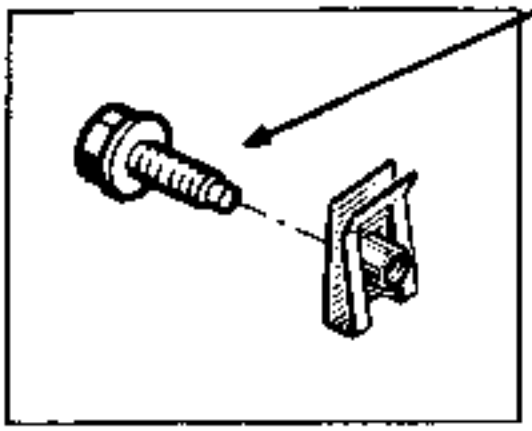
(*) Plus 2 if fitting parts 2 and 3.

		Quantity
4.	77 01 464 452	1
5.	77 03 046 048	5
6.	77 05 028 074	2
7.	77 03 001 904	6
8.	77 03 072 182	2*

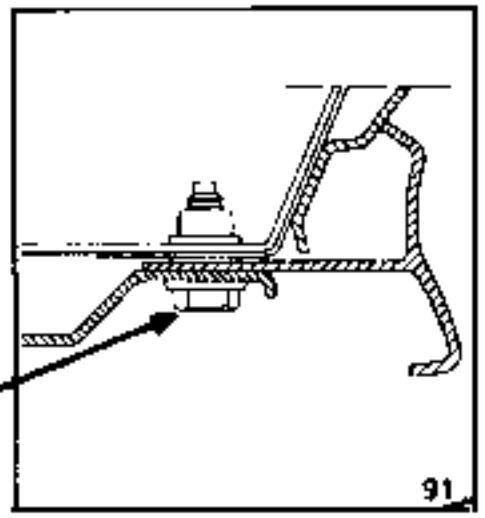


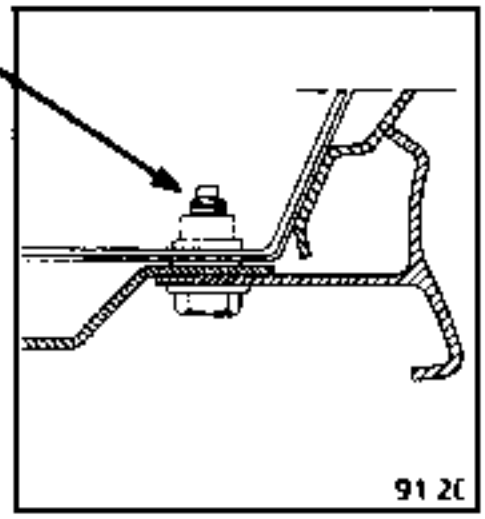




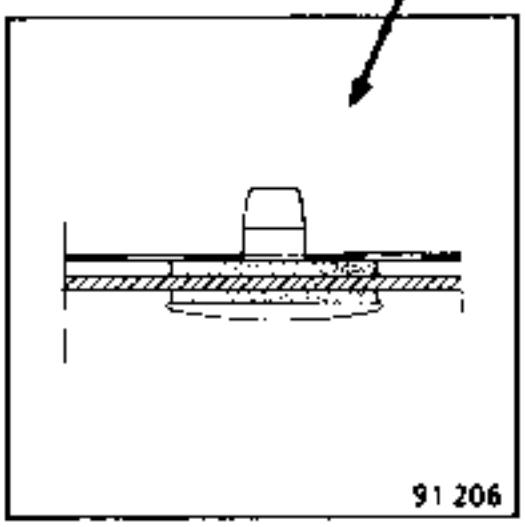


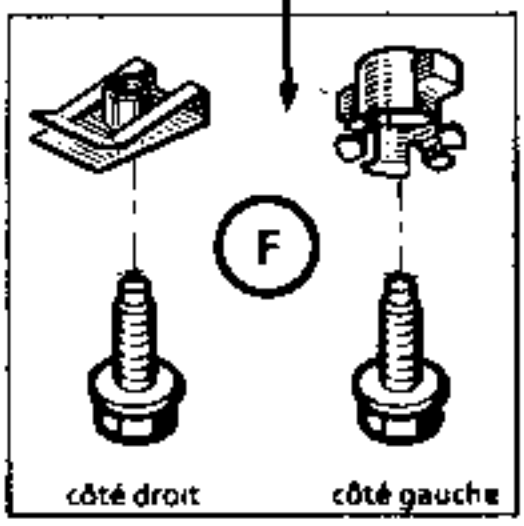
Version longitudinale





Version transversale

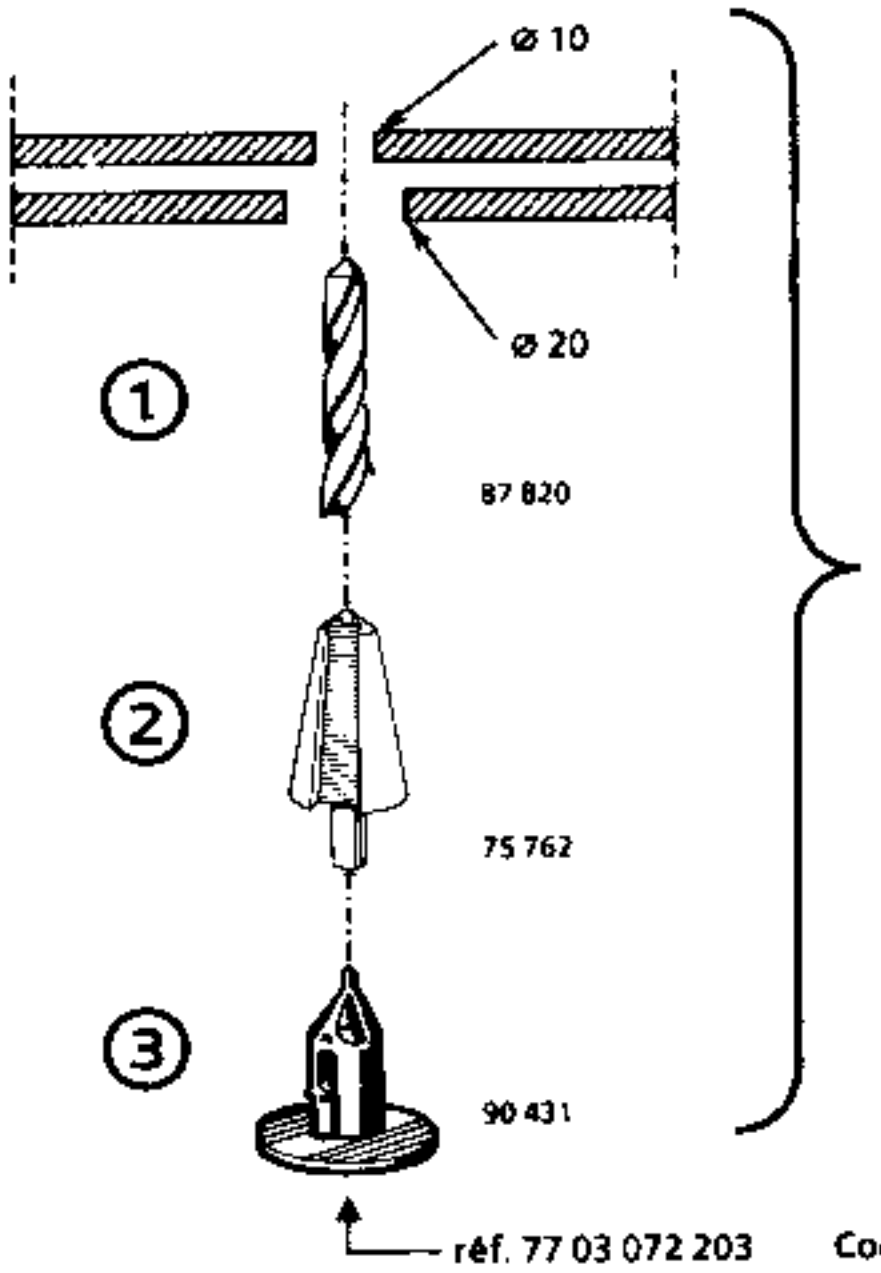


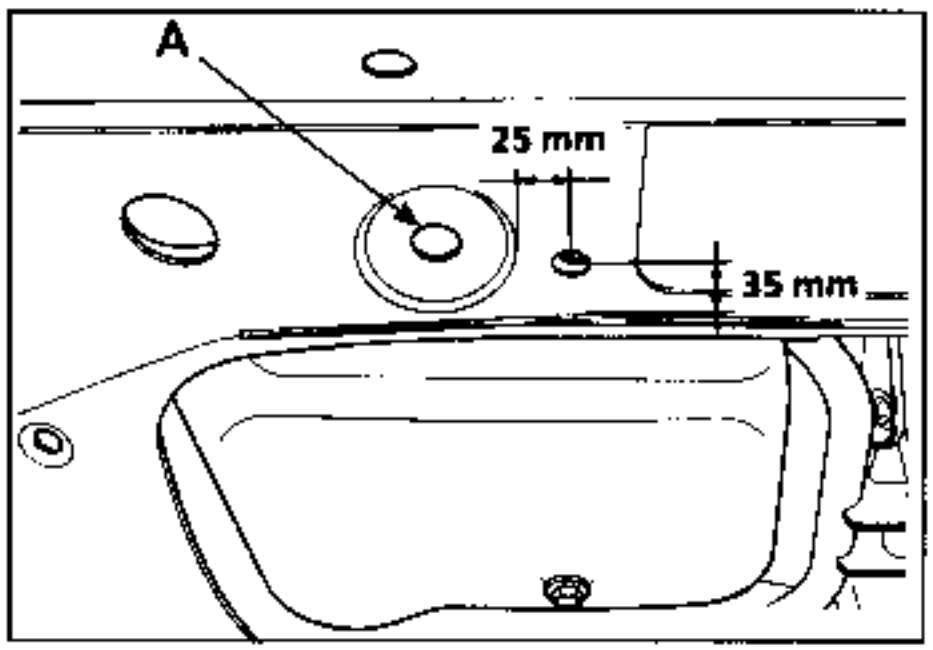


21A91206

Note : mountings (F) are optional - only use them if the cross member is drilled.

Fitting the mounting to the earlier model engine sub-frame (mounting "A" for the protective skid cannot be used).





21A91223

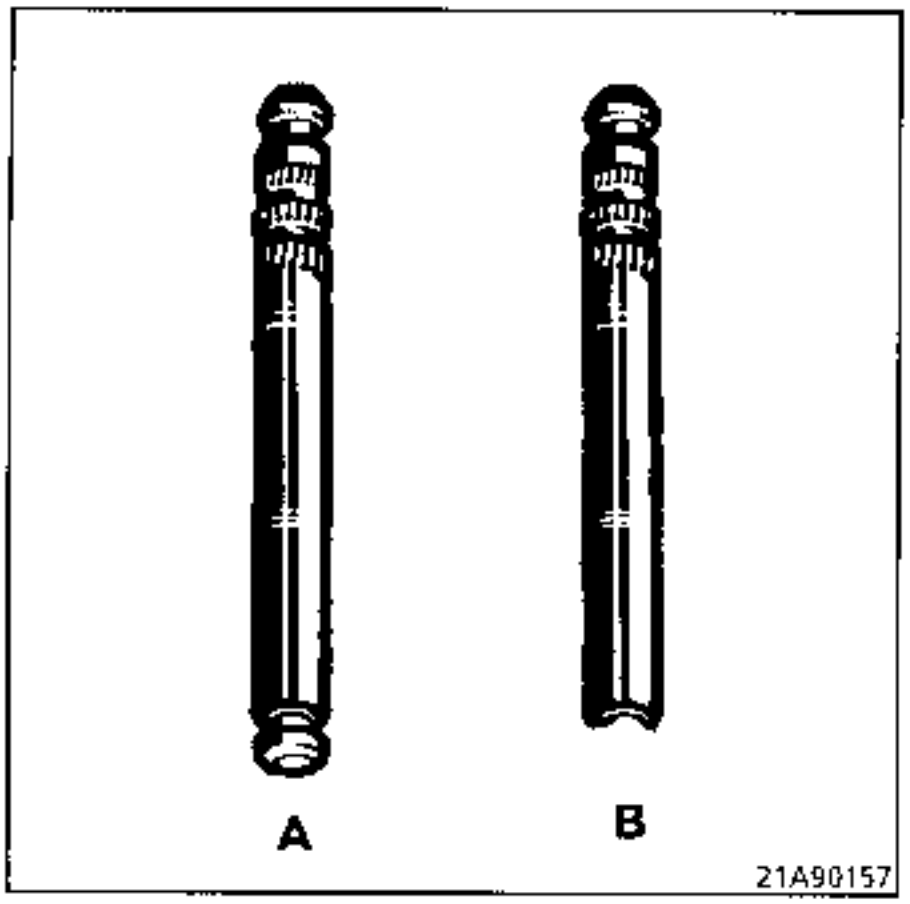
Note : Apply anticorrosion protection using electro-weldable mastic Part Number **77 01 394 679**.

There are two types of hinge:

Pin A : fitted on phase I vehicles.

Pin B : fitted on phase II vehicles.

Note : pins of type B may be fitted to all vehicles.

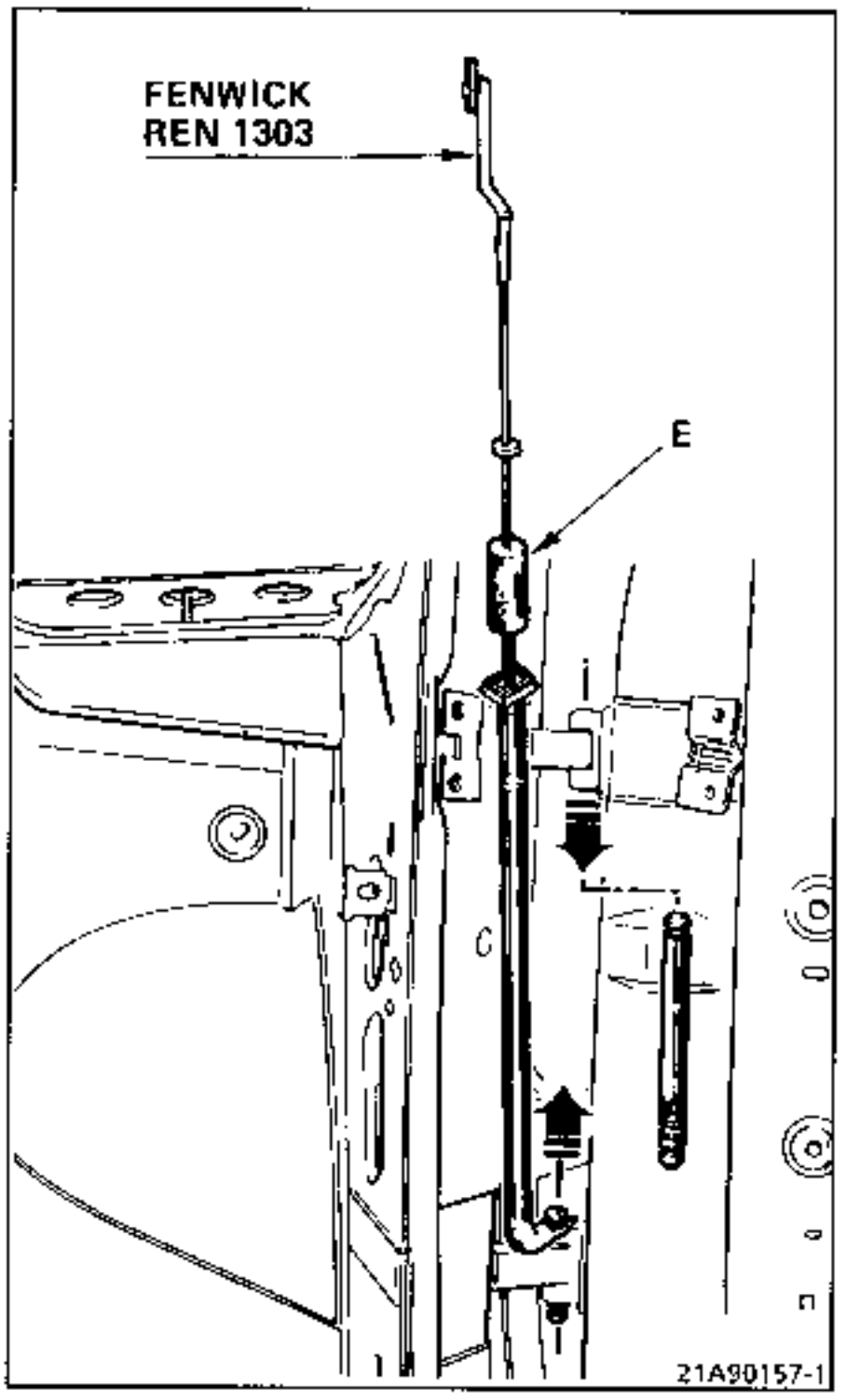


Note: the pins are always removed between the hinges.

When a door is removed and refitted, the pins and bushes must always be renewed.

When replacing a door, the Parts Department supplies a special service exchange door equipped with hinges bolted at the door side and a set of hinges is provided for this purpose.

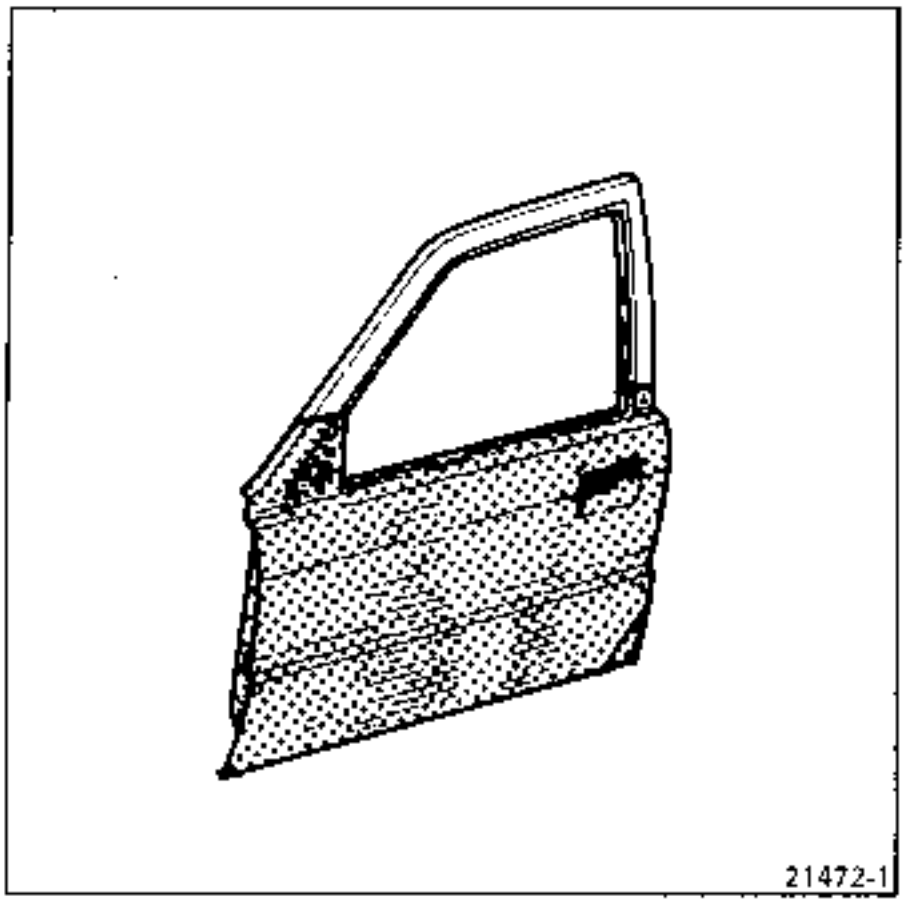
When removing the door from a first model vehicle, it is advisable to replace the hinge pins with the new type.

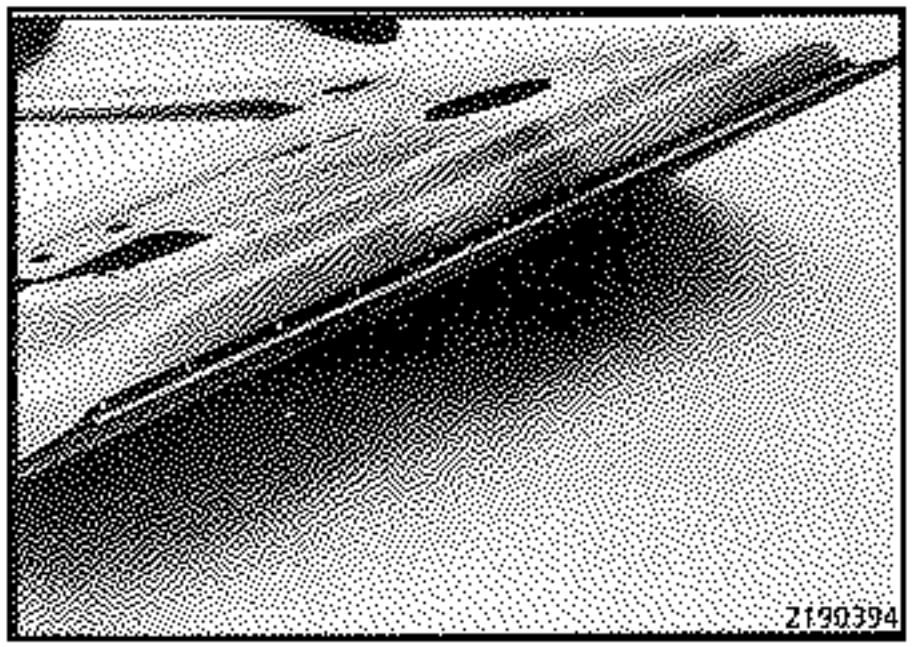


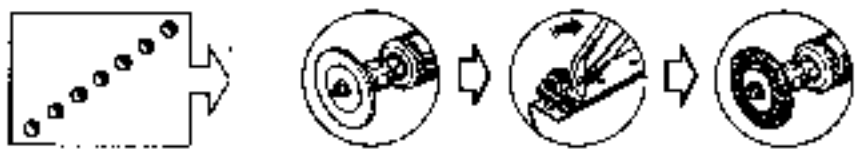
Tool **Car. 1055**,Part Number **00 00 105 500**.

COMPOSITION OF DOOR PANEL FROM PARTS DEPARTMENT

Outer panel.
Panel stiffener.
Soundproofing.

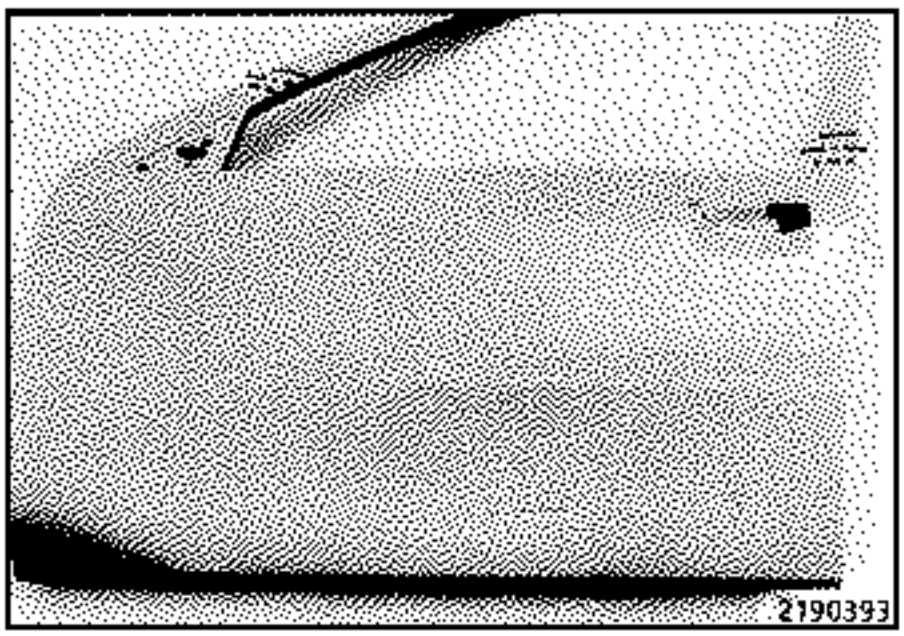


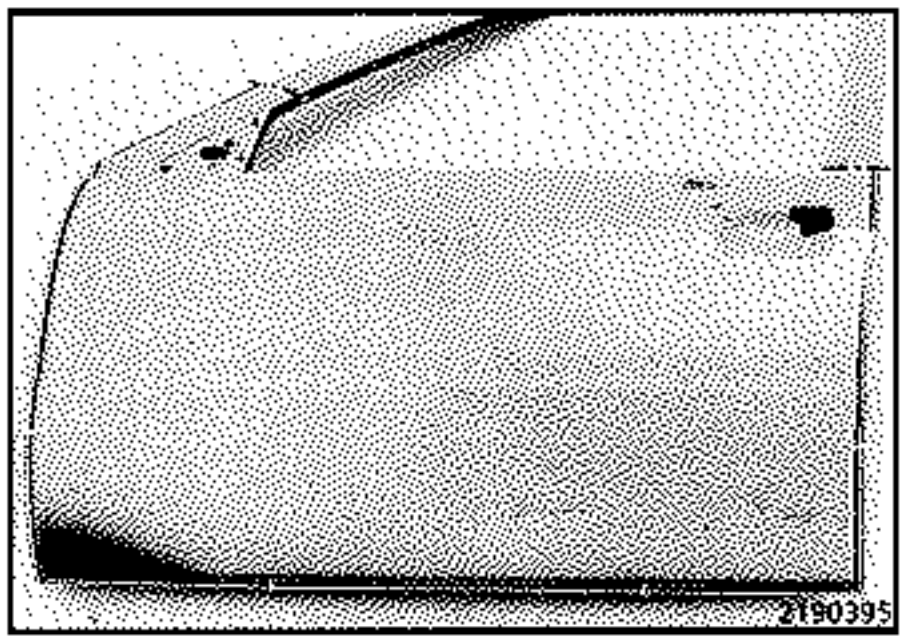


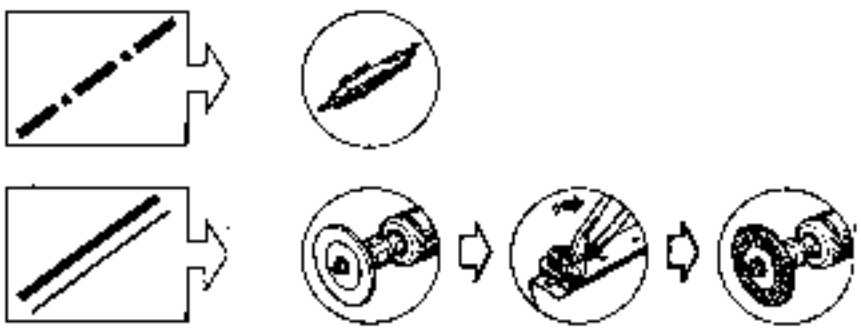


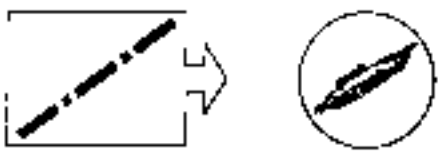
In order to facilitate removal of the panel after cutting out, use a hot air torch to release the panel from the door.

CUTTING OUT - UNPICKING

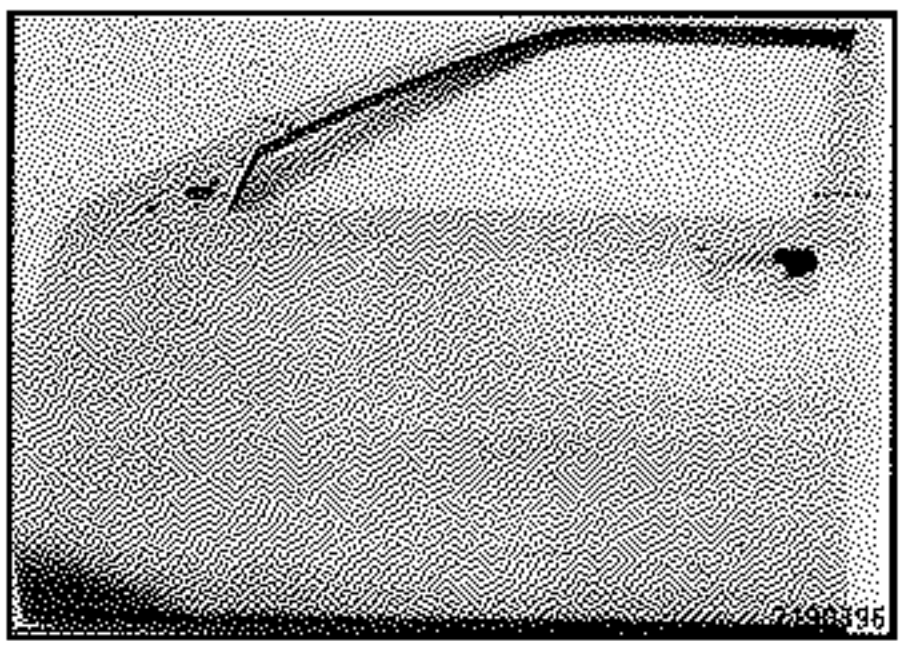




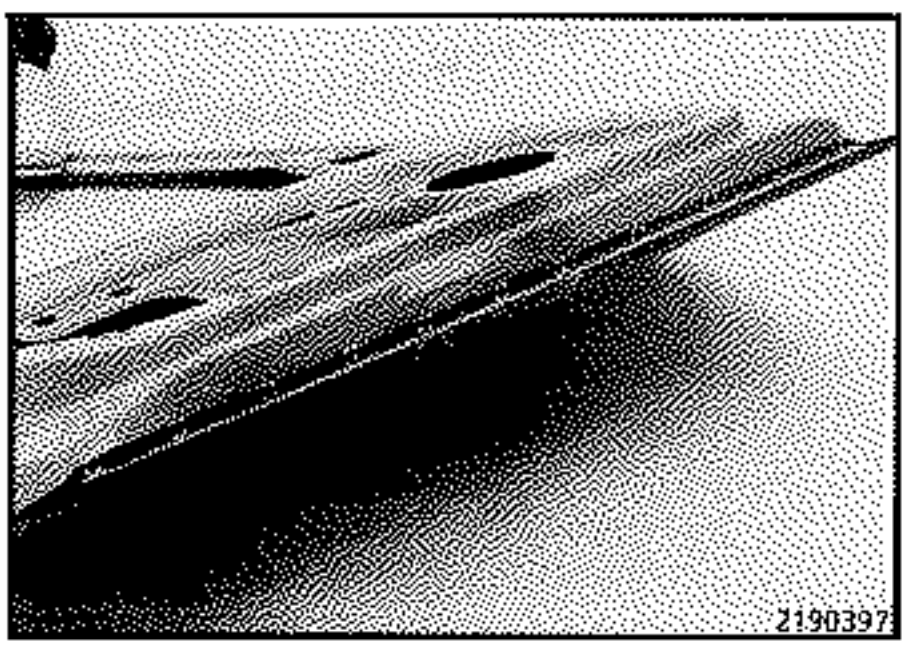




WELDING









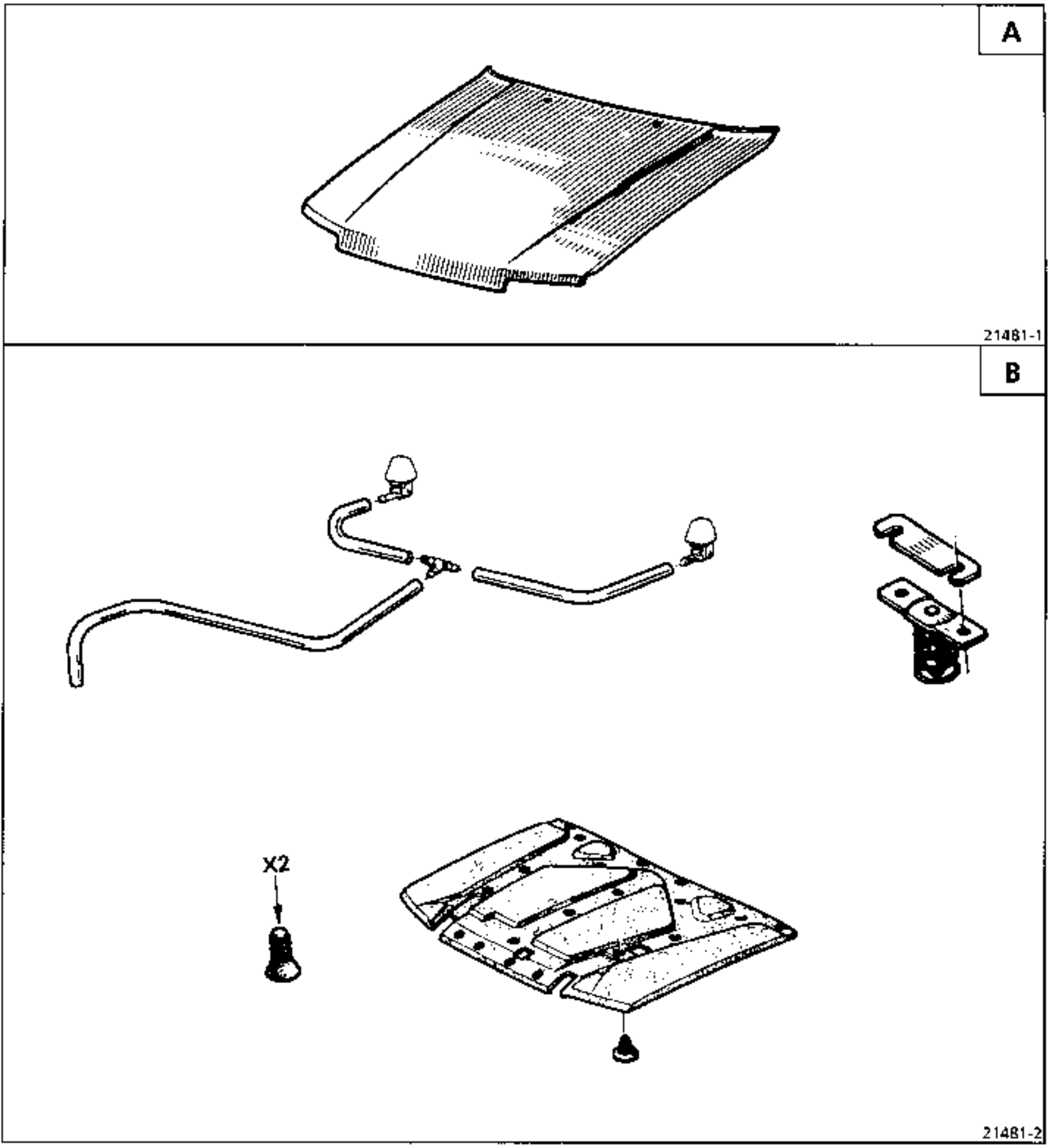
E = 1.34 mm
H = 40 mm

After painting, inject a product for protecting hollow sections into the door, especially in the welded areas.

Rear door panel

The operation is identical to that for the front door.

REPLACEMENT



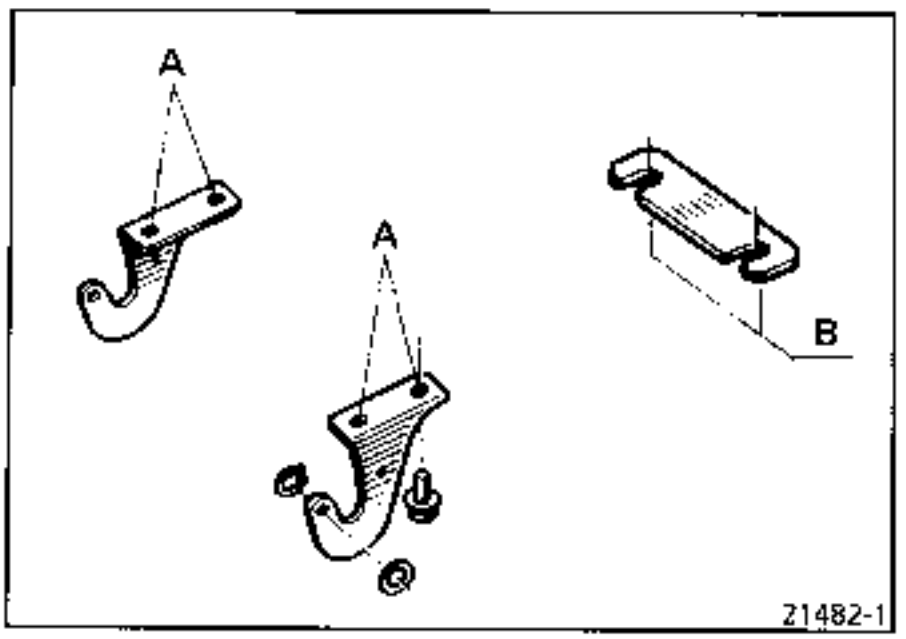
A : Replaced part

B : Retained part

The bonnet is removed by removing the four mounting bolts (A) from the stays (see diagram below).

ADJUSTMENT

The peripheral clearance of the bonnet is adjusted by the play in the four mountings (A) for the stays on the bonnet.



After adjustment, align the lock by the play in its mounting (B).

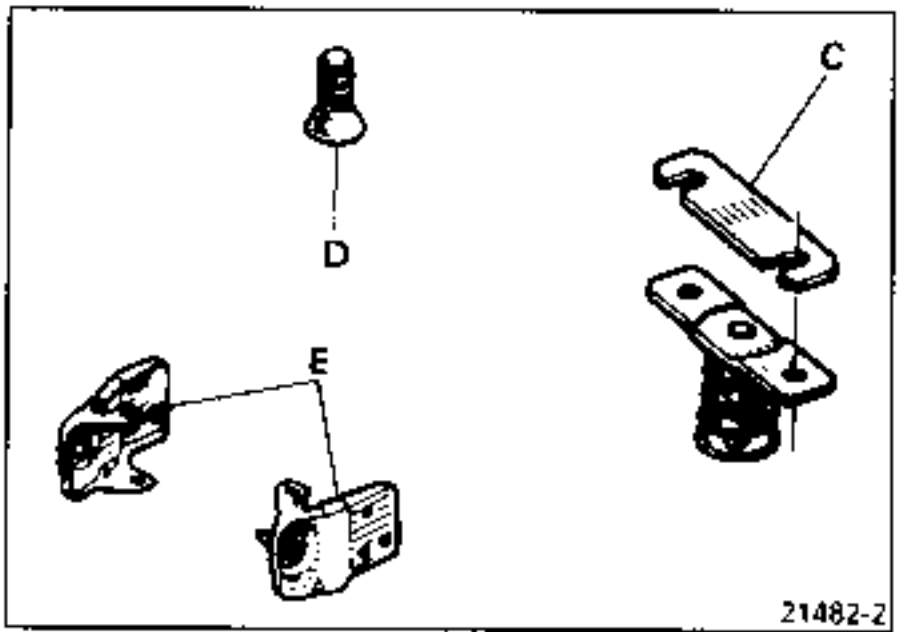
The alignment is adjusted:

At the front by the play in mountings (E) for the stay supports.

At the rear by shims (C) between the locking finger and the bonnet.

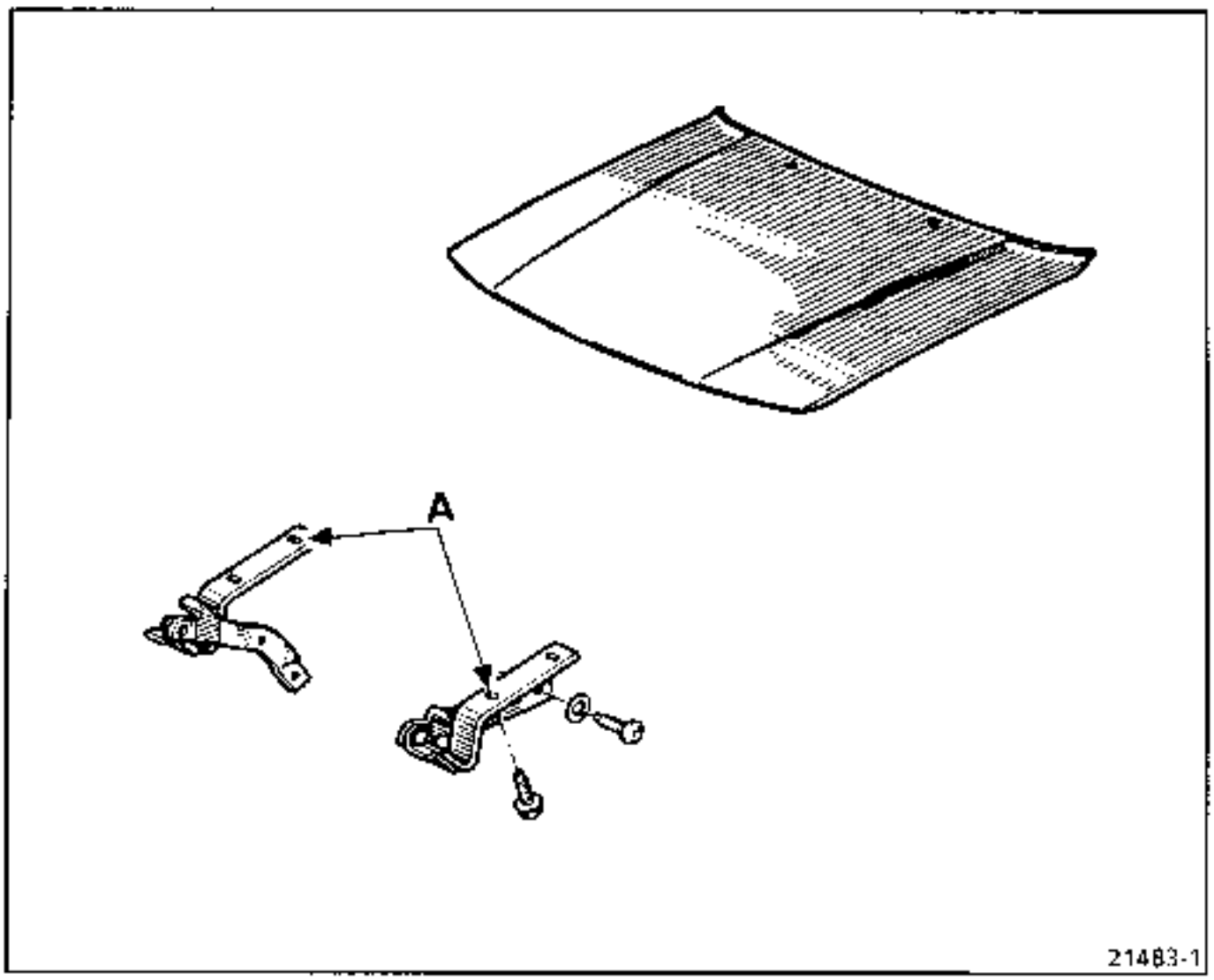
Shim thickness: 1 mm.

On each side, adjust the rubber stops (D) to make fine adjustments to the lateral clearance.

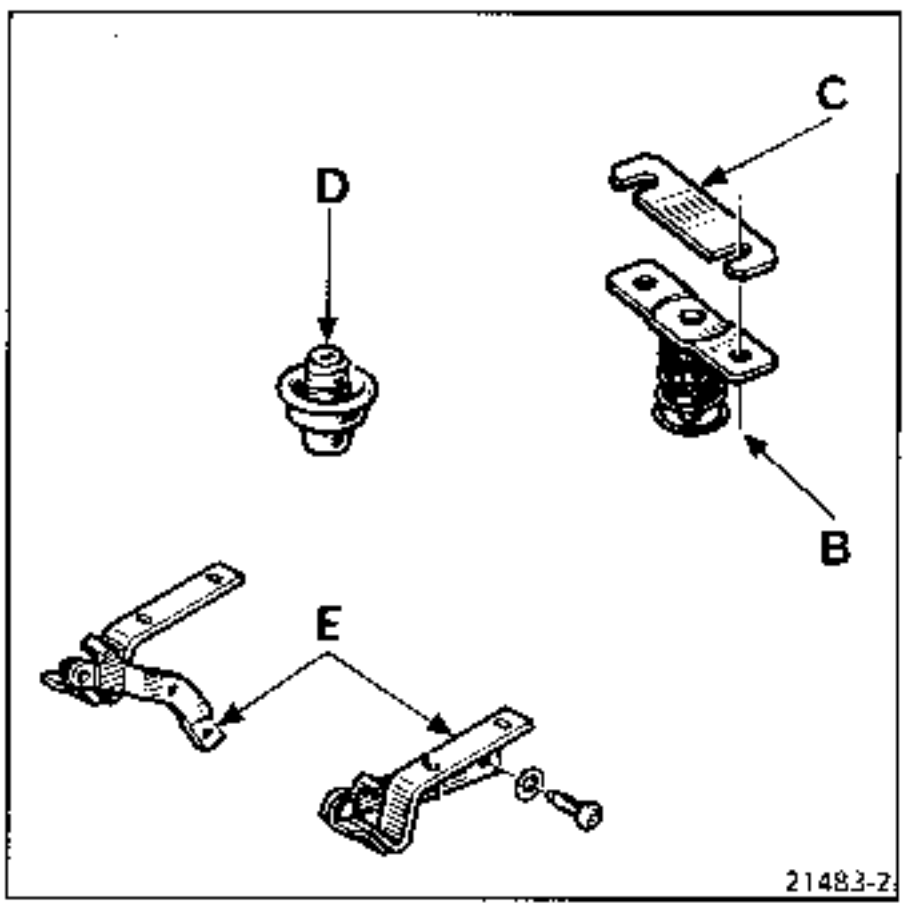


REMOVAL

The bonnet is removed by removing the four mounting bolts (A) from the stays.



ADJUSTMENT



Peripheral adjustment:

By the play in mountings (A) and (B).

Alignment adjustment:

At the front by the play in mountings (E) for the stays.

At the rear by shims (C) slid between the locking finger and the bonnet.

Shim thickness : **1 mm**.

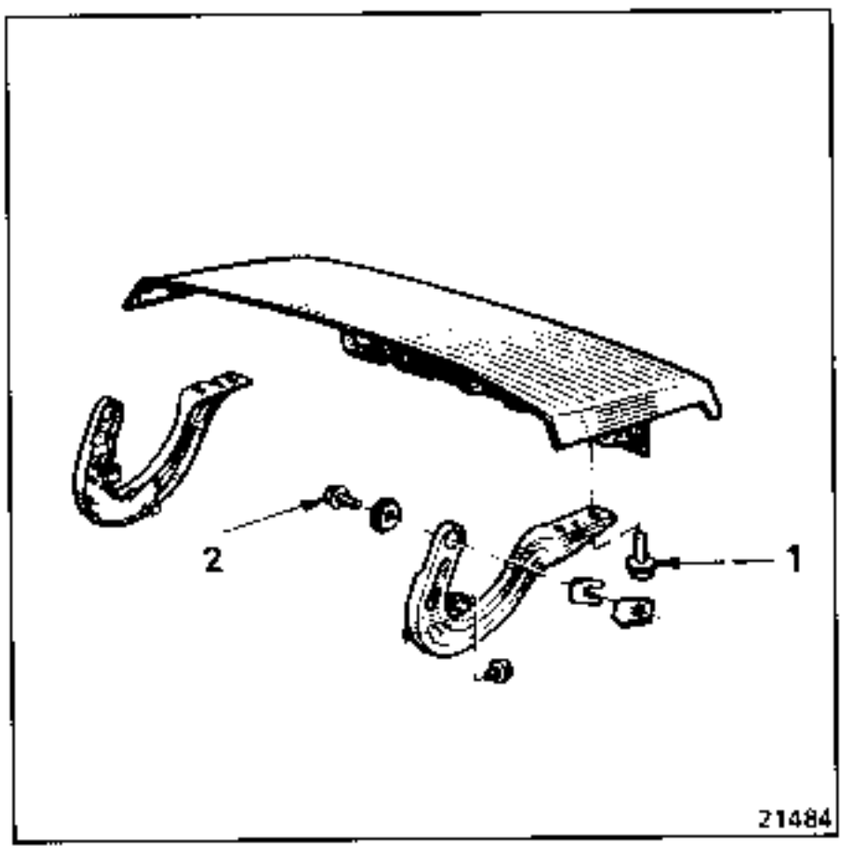
On each side, at the rear of the bonnet, adjust the rubber stops (D) to make fine adjustments to the lateral clearance.

REMOVING THE TRIM

Remove in the following order:

- the number plate,
- the number plate mounting moulding,
- the lights,
- the catch,
- the locking motor,
- the lock,
- the rubber stops.

Remove the wiring from the boot lid.



Remove the four mounting bolts (1) securing the boot lid to the hinges.

NOTE : if possible, do not remove bolts (2), as they are difficult to refit owing to the shims.

Refitting is the reverse of removal.

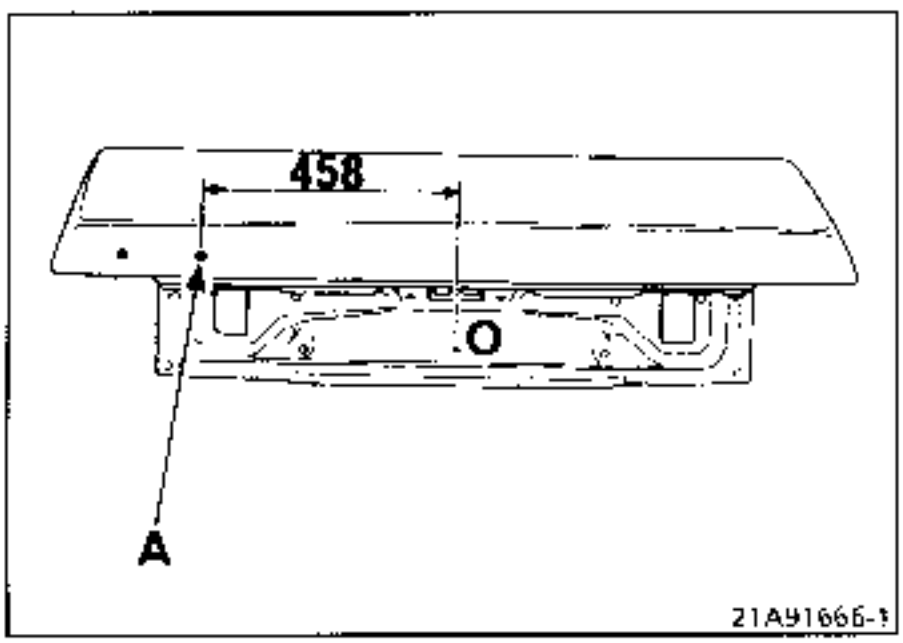
ADJUSTMENT

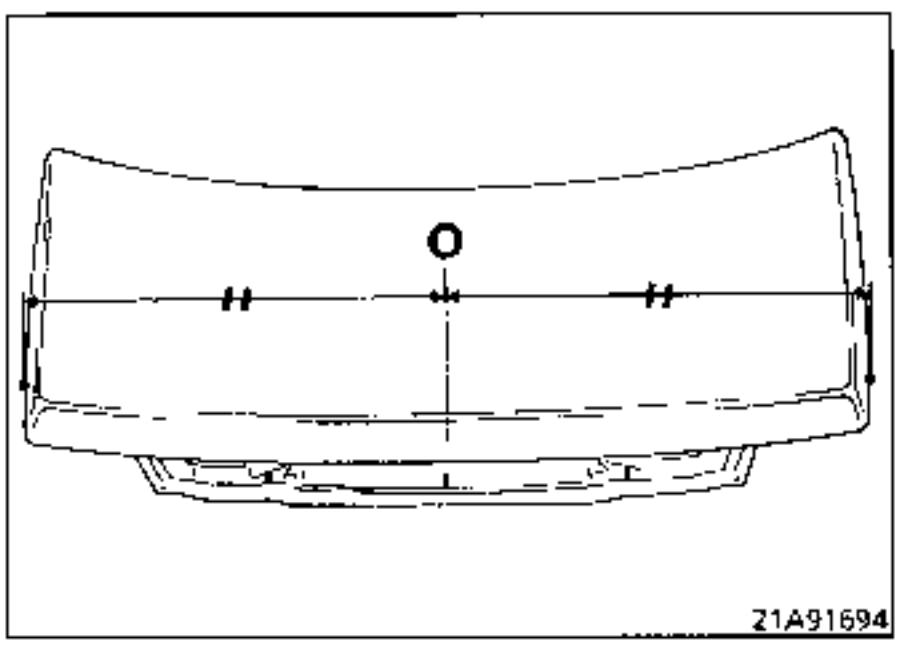
The boot lid is centred by using the four mounting bolts on the hinges.
The boot lid is aligned using the striker plate. To do this, remove the rear end panel trim.

DRILLING MOUNTING HOLES FOR A SPOILER ON A NEW BOOT LID (to be performed before painting)

Trace the longitudinal axis (O) of the boot lid on the front section, **458 mm** away from the centre line of the right hand hole (A) mounting the monogramme.

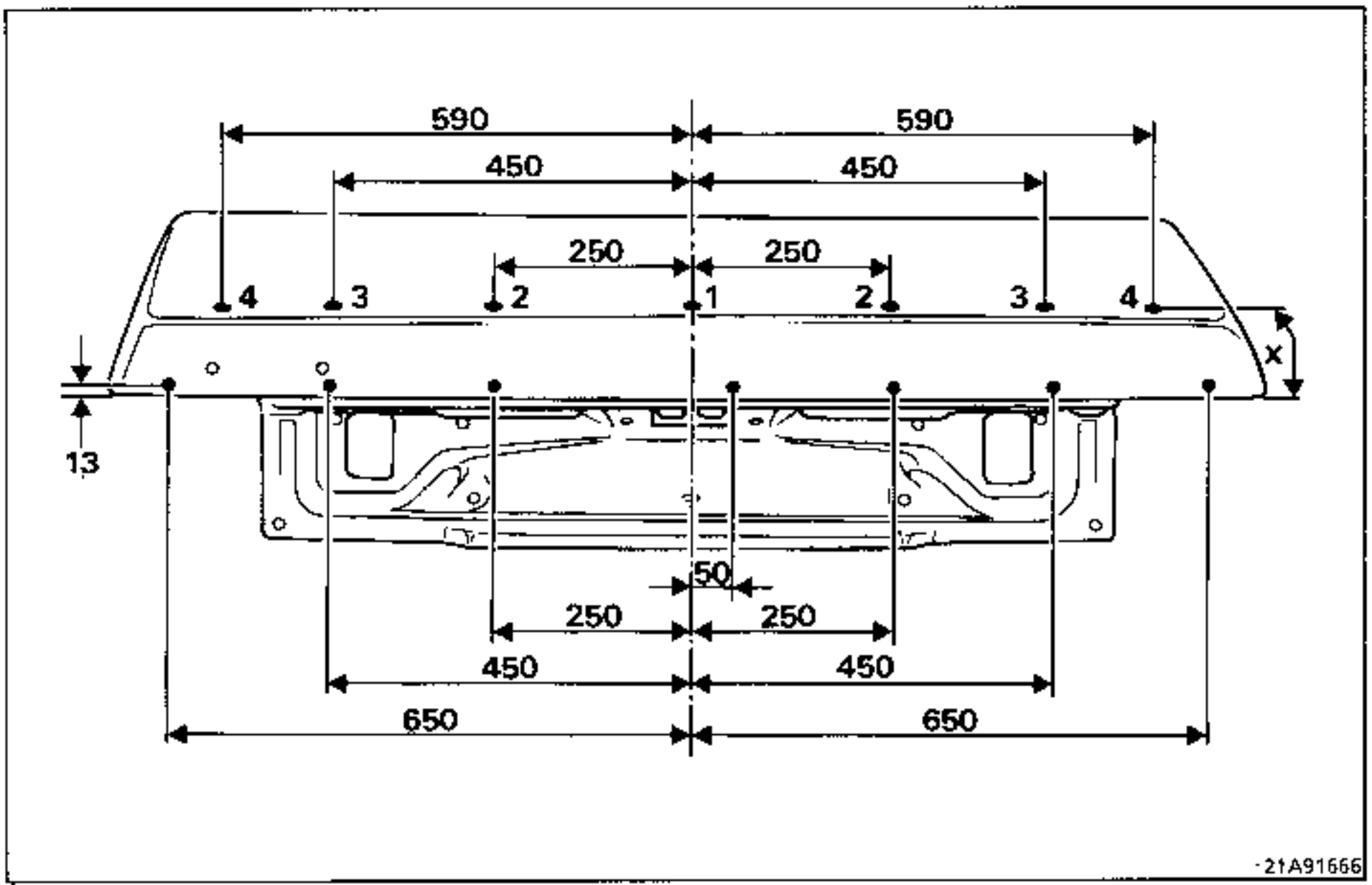
Using a tape measure, mark the centre line on the upper part.





Mark the centre lines of the drilling points according to the diagram below:

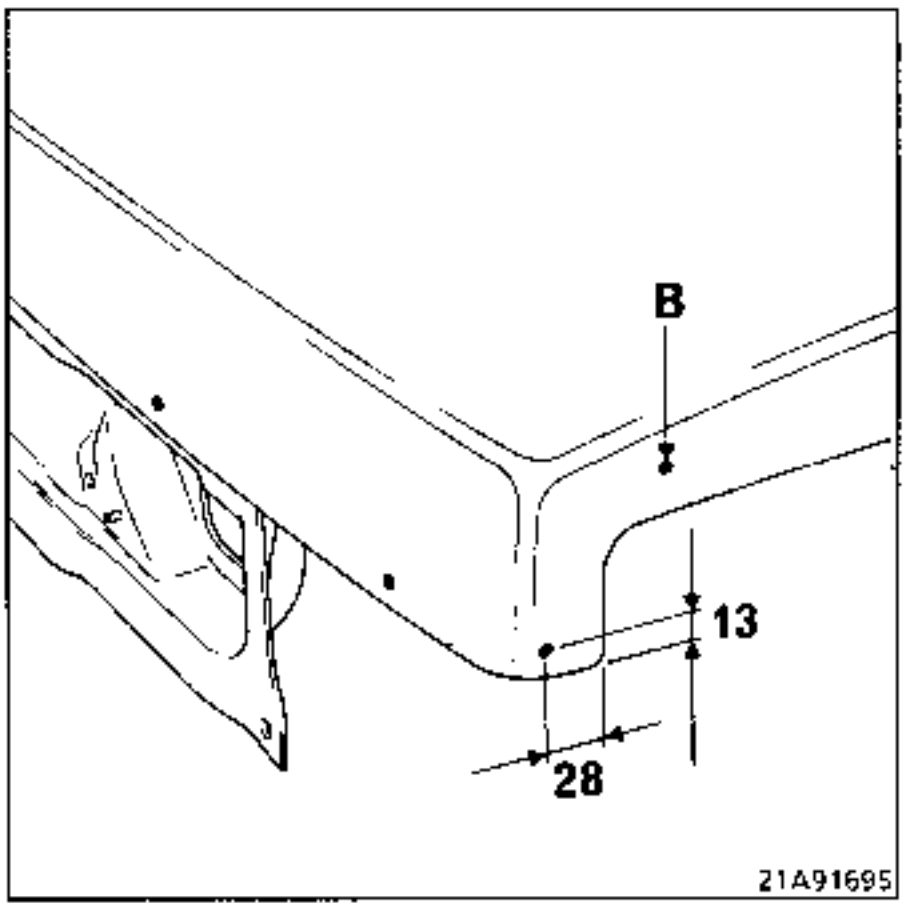
1 x = 135 mm
2 x = 135 mm
3 x = 134 mm
4 x = 132 mm



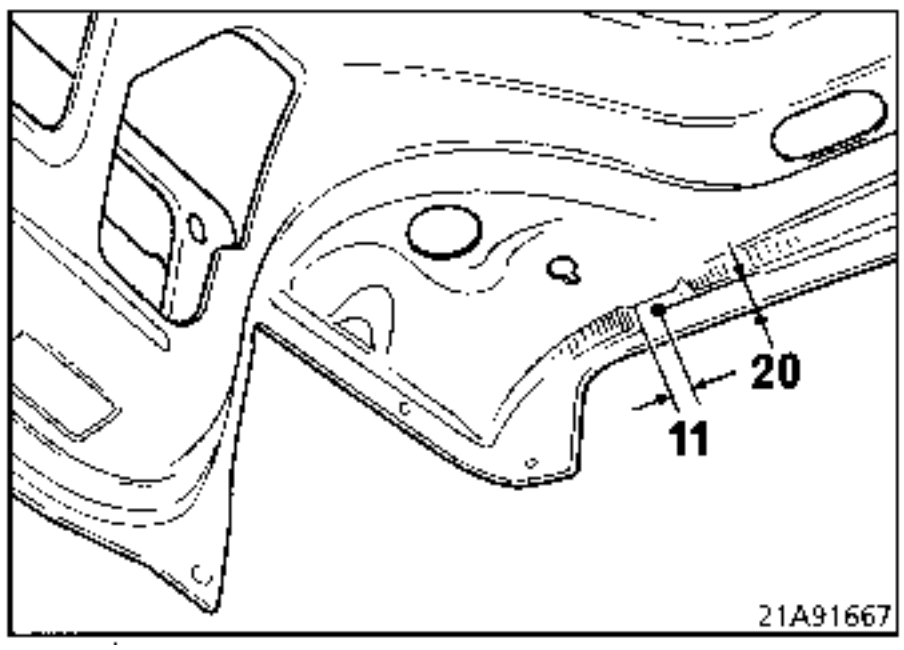
After marking the centre lines, drill the points (1), (2), (3) and (4) using a drill of diameter **5.5 mm**.

Deburr the holes and blow out the inside of the boot lid with compressed air.

Using the spoiler, check the front holes drilled are correct before painting the boot lid.

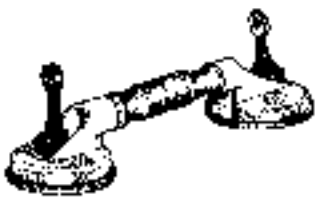
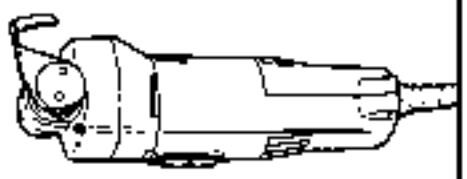


The dimension for point (B) is determined from inside.



Recommended tooling for replacing the windscreen or rear screen.

EQUIPMENT

	Description	Supplier's Reference	Approval N° M.R. 500**
 8727051	Pulling handle	STAHLWILLE STW 10351	55 70 00
 8727052	Retaining tool*		
 8727053	Roll of cutting wire (piano wire)		
 8727451	Pair of suction pads for handling windscreens and rear screens	STOKVIS VALOREM BF 802 STAHLWILLE STW 10352	58 23 00 55 70 01
 9252951	Electric knife for removing window glass	FEIN	600 500
 9252352	Windscreen blade : X60 Part No : 63 903 107 016 X95 Part No : 63 903 111 019 X36 Part No : 63 903 079 012 rear quarter panel		
Suction pad (for rear quarter light) 		STAHLWILLE STW 6090	57 21 00

SPECIAL TOOLING

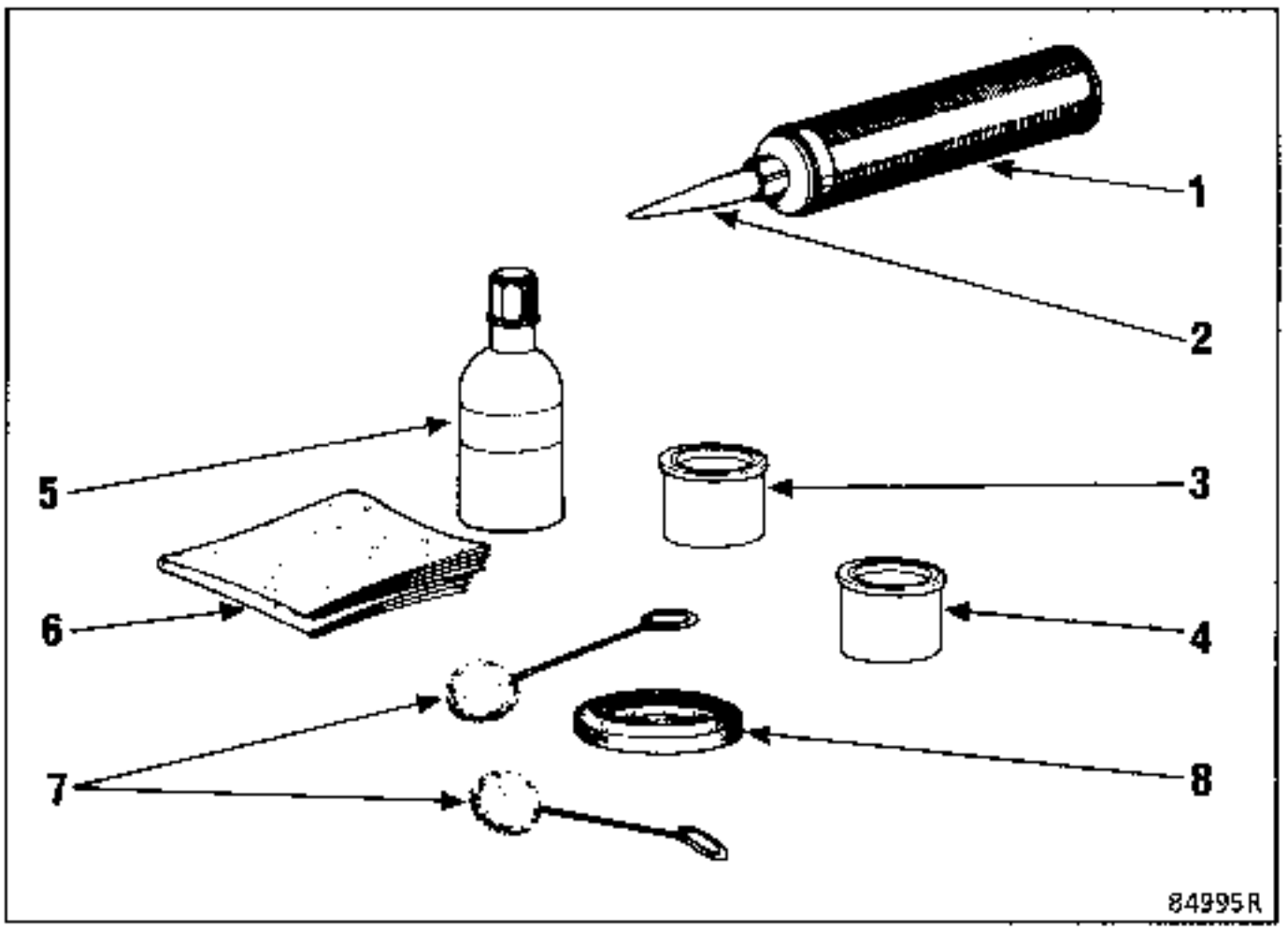
	Description	RENAULT Reference No	Part No
 8840051	Dashboard protector	Car. 1137	00 00 113 700
 8870051	Wire insertion needle	Car. 1033	00 00 103 300

BONDING THE WINDOWS (See the section entitled "**Glass and Screens - Windscreen and Rear Screen**".

Bonding Kit: **Part No : 77 01 202 273**.

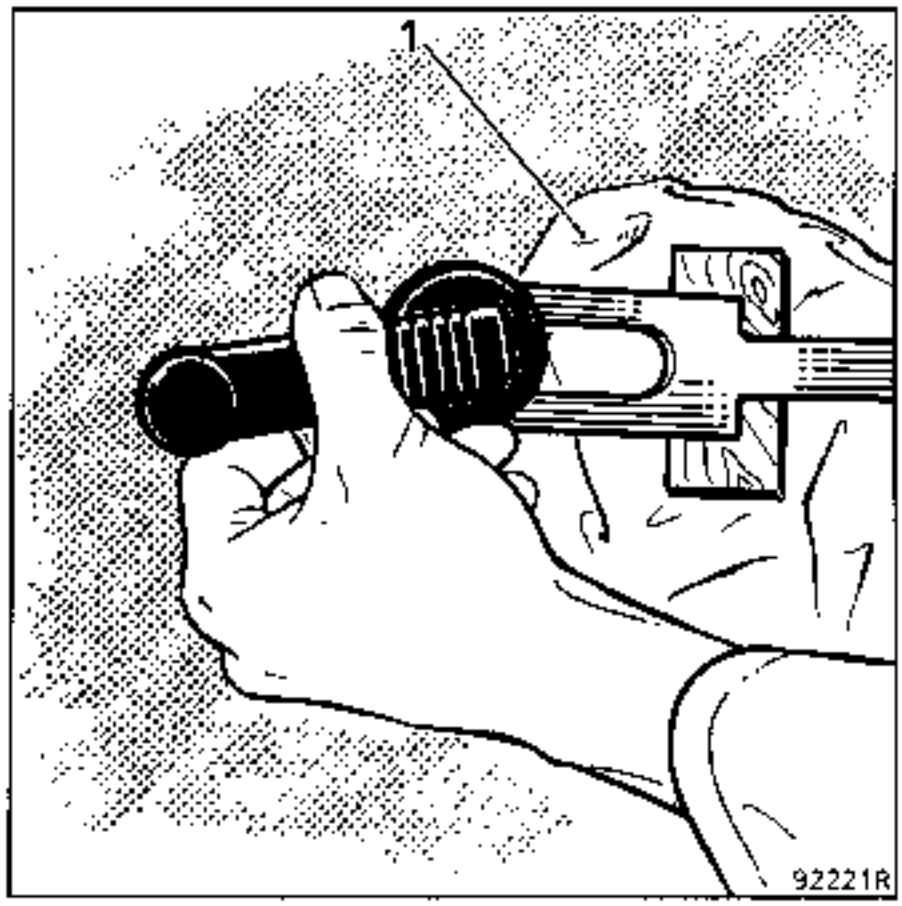
Consisting of :

1 Cartridge of mastic **Part No : GURIT BETASEAL 71 904HV3**
2 Nozzle previously cut to give a triangular cross-section
3 Bottle of primer for glass **Part No : GURIT 84 132 11**
4 Bottle of primer for metal **Part No : GURIT 435-46**
5 Bottle of degreasing agent **Part No : GURIT VP 04 604**
6 Special degreasing cloth
7 Primer pads
8 Cutting wire (piano wire)



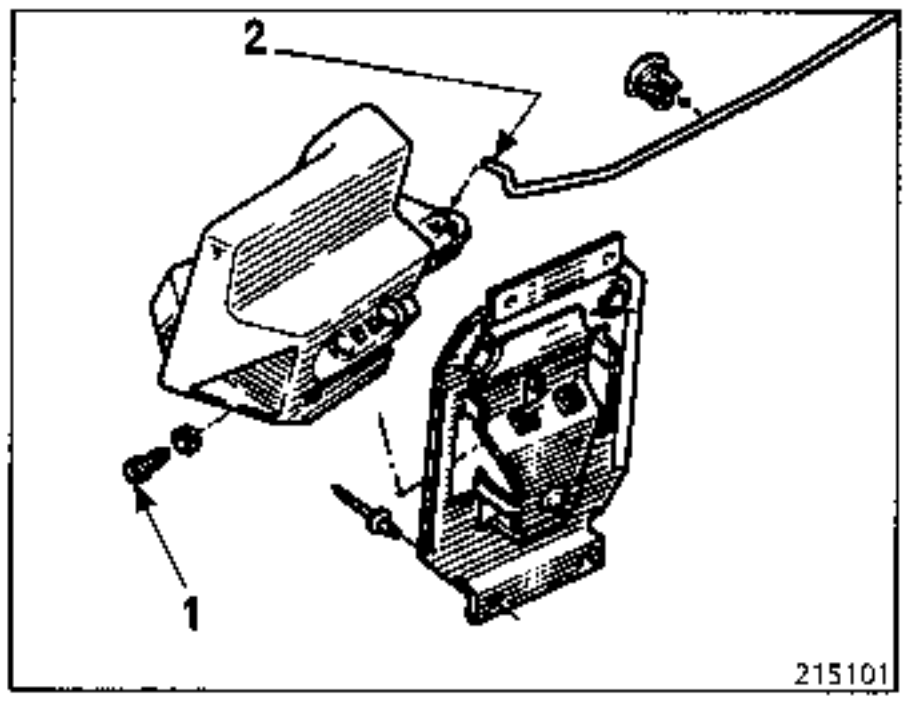
IMPORTANT : For any operation requiring the replacement of the windscreen or rear screen, it is advisable to have available a second cartridge of mastic. This may be necessary owing to the width of the bead to be extruded..

Single mastic cartridge **Part No : 77 01 202 234**.



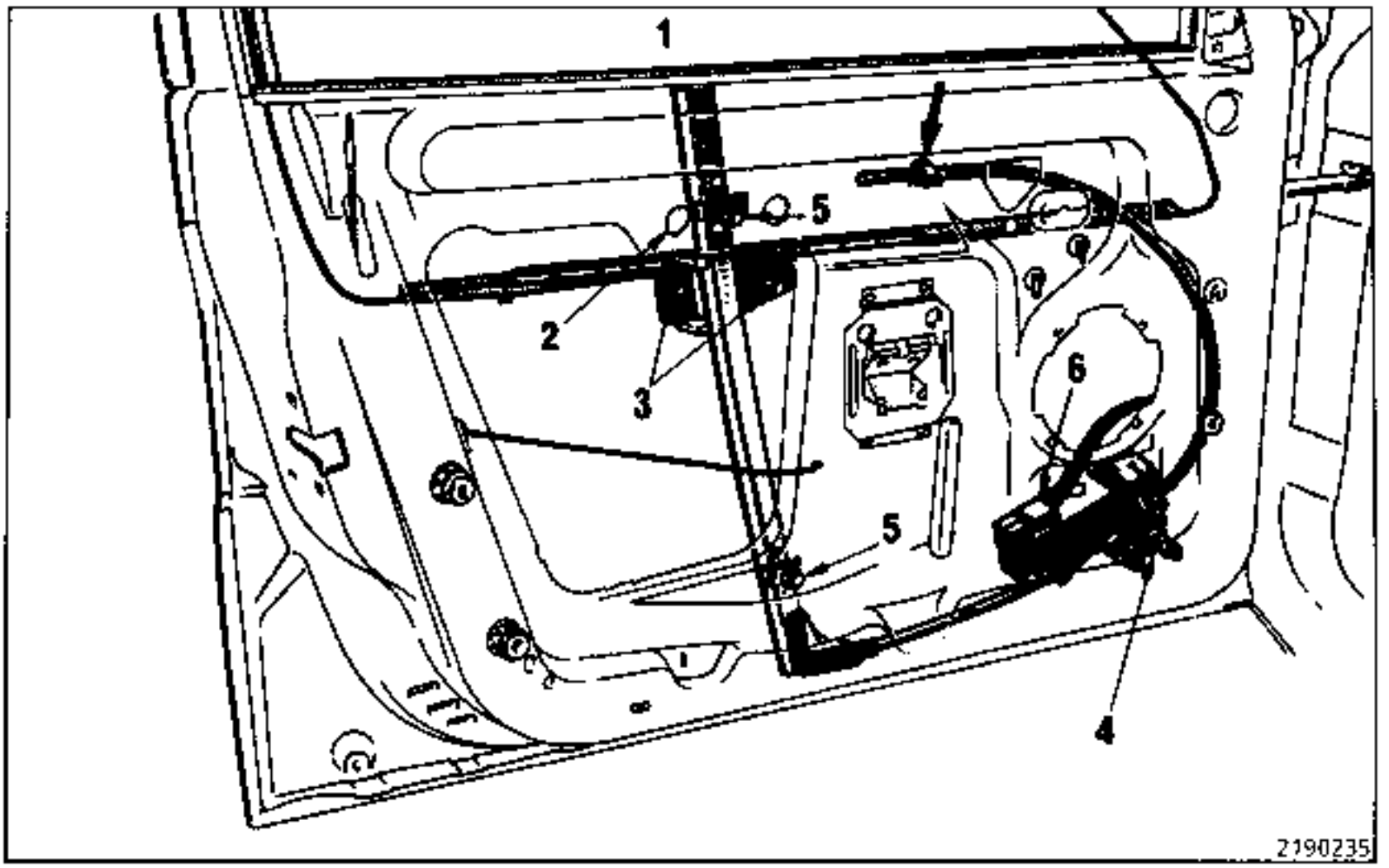
Use a locally made up fork or tool **FACOM D115** as a lever to remove the window winder, taking care to protect the door trim with a piece of cloth (1) and to place a block between the cloth and the tool.

Front and Rear Door Interior Opening Control



Remove screws (1) and separate the interior opening control from the linkage (2).

REMOVING THE WINDOW WINDER (1)



Electric mechanism :

After removing the trim, remove the internal rubbing strip by pulling it upwards.

Raise the window so that the mountings can be seen opposite holes (2). Remove the mountings (3) from the base of the window.

Optional measure : raise the window again by hand and hold it in place using a piece of adhesive tape.

Disconnect the feed from motor (6).

Remove the mountings from the mechanism (4) and the rail (5).

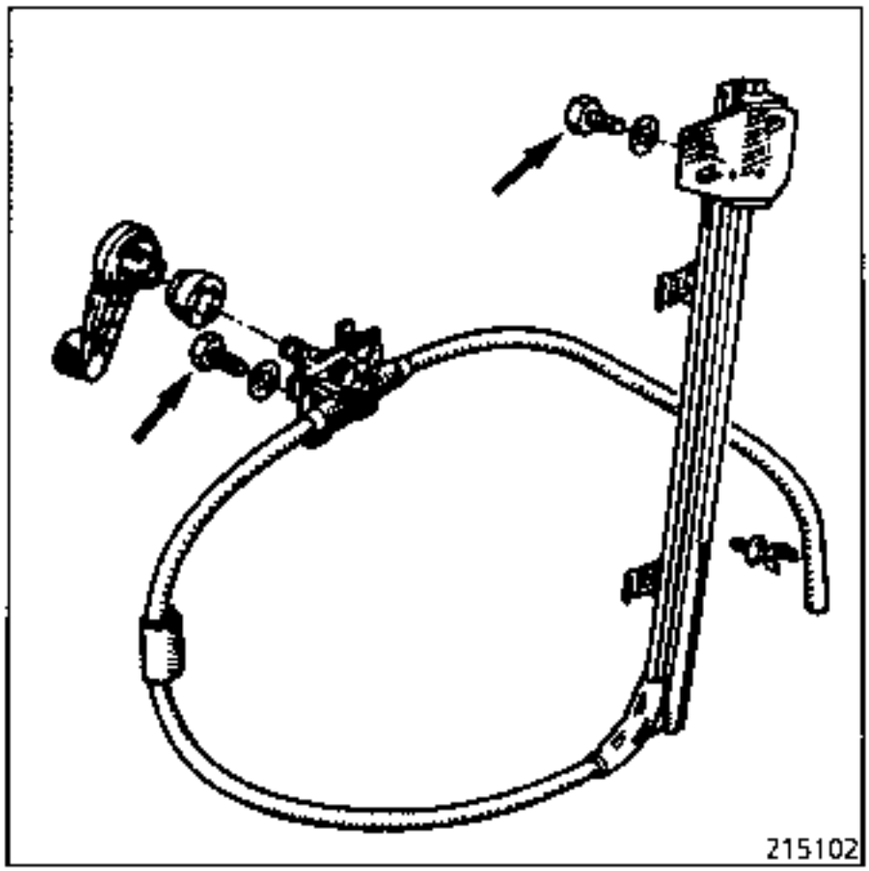
Tilt the assembly and take it out through the door aperture.

Adjusting :

fit the complete mechanism in place in the door (run up the screws without tightening them and connect the power supply).

Re-secure the window completely after pre-tightening the mountings in the bottom of the window (if necessary guide the window to position it correctly in the frame).

Lower the window again and tighten all the mountings.



Mechanism with window winder :

Remove the mountings :

- from the rail,

- from the rack.

Tilt the assembly and take it out through the opening in the door.

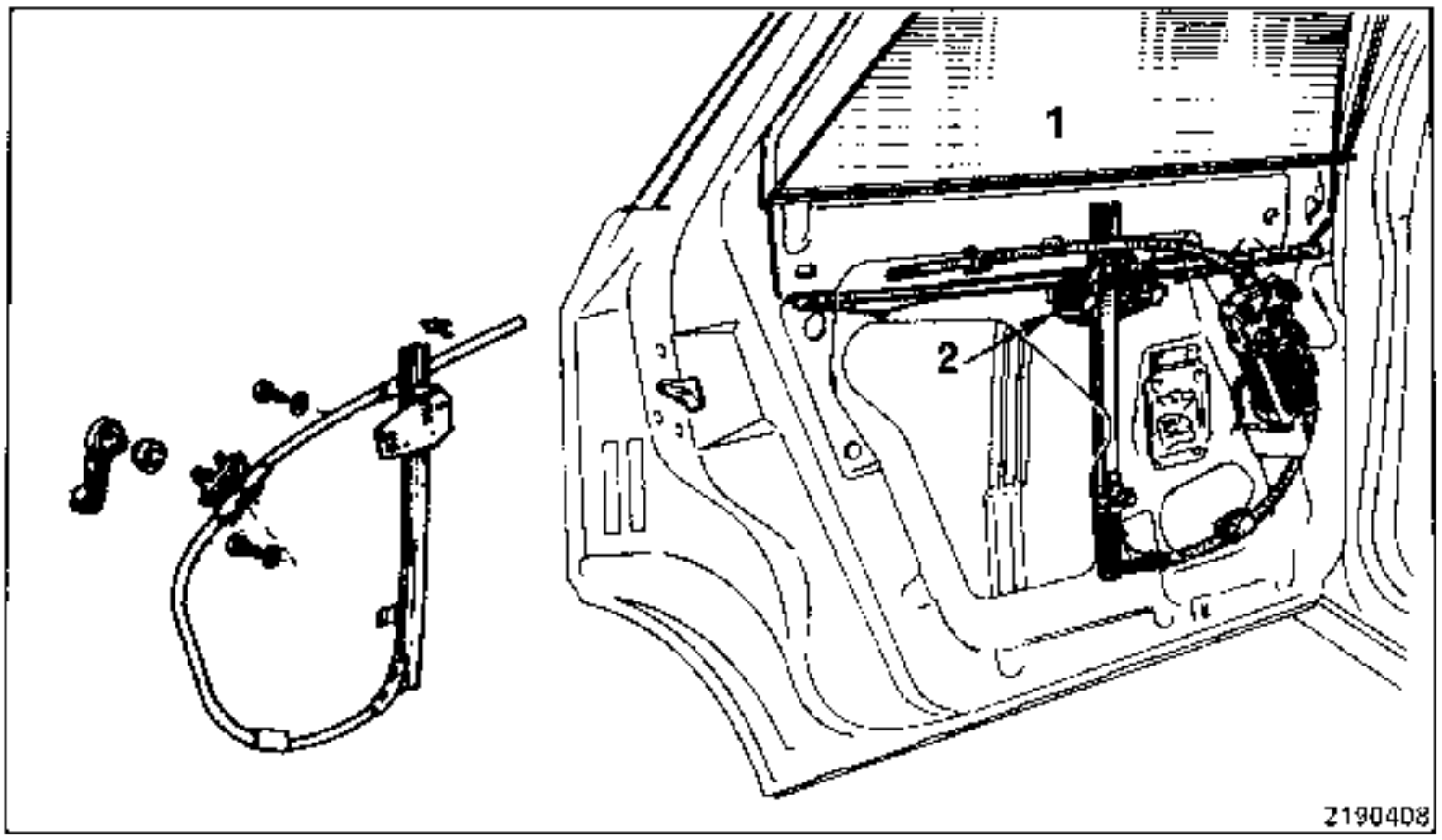
Adjusting :

Fit in place the complete mechanism in the door (run up the screws by hand without tightening them and connect the power supply).

Secure the window back on the mechanism, raise the window completely after pre-tightening the mountings in the bottom of the window (if necessary guide the window into its position in the frame).

Lower the window again and tighten all the mountings.

REMOVING THE WINDOW WINDER MECHANISM (1)



Electric mechanism

After removing the door trim, remove the inner rubbing strip by pulling it upwards.

Optional measure : raise the window so that the mounting are visible opposite holes (2). Remove the mountings from the bottom of the window.

Disconnect the power supply from the motor.

Remove the mountings from the rail and the motor.

Tilt the assembly and take it out through the opening in the door.

Mechanism with handle

Remove the mountings :

- from the rail,

- from the rack.

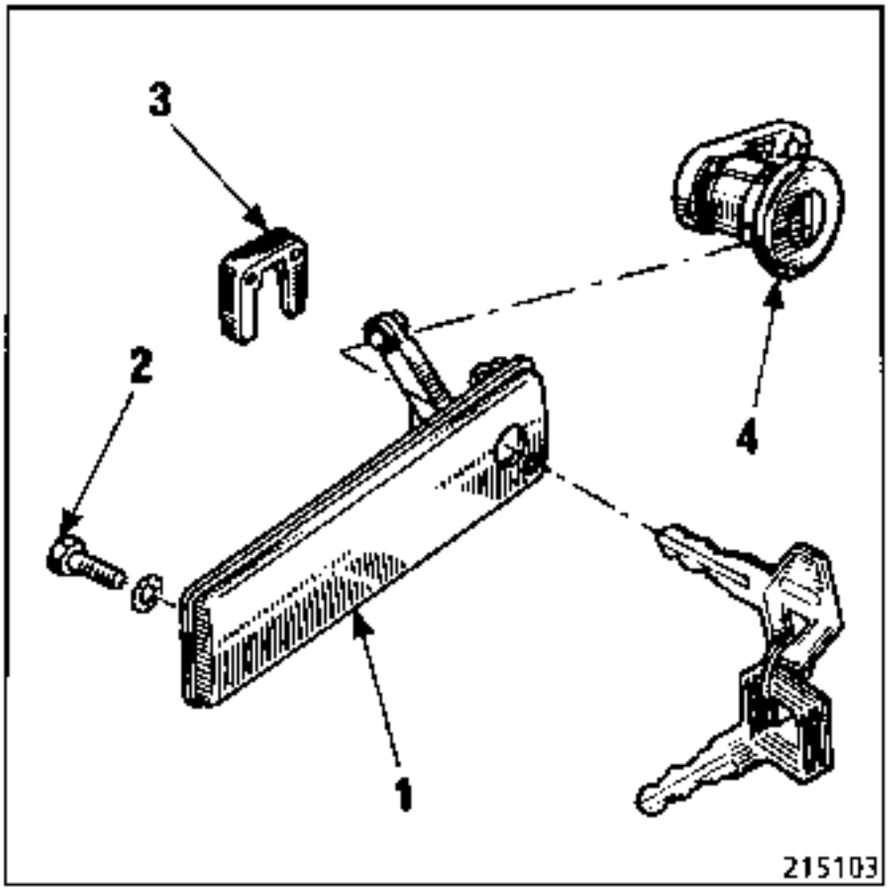
Tilt the assembly and take it out through the opening in the door.

Adjusting

Fit in place the complete mechanism in the door (run up the screws by hand without tightening them). Connect the power supply.

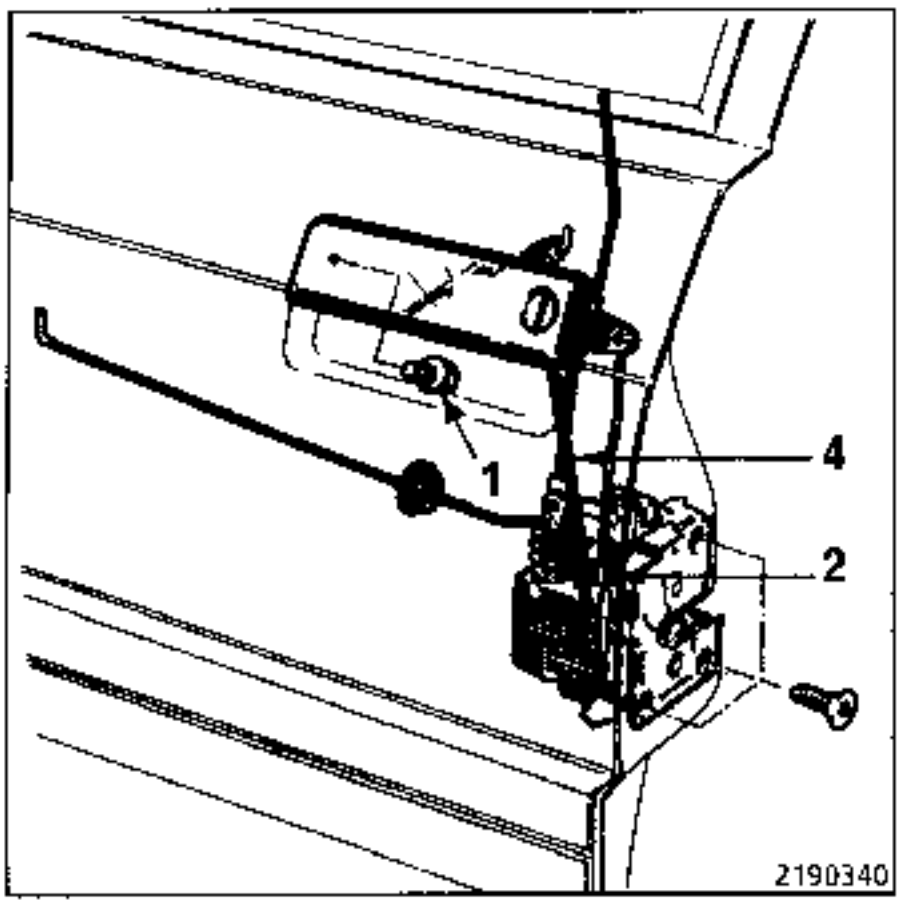
Secure the window back on the mechanism, raise the window completely after pre-tightening the mountings in the bottom of the window (if necessary guide the window into its position in the frame).

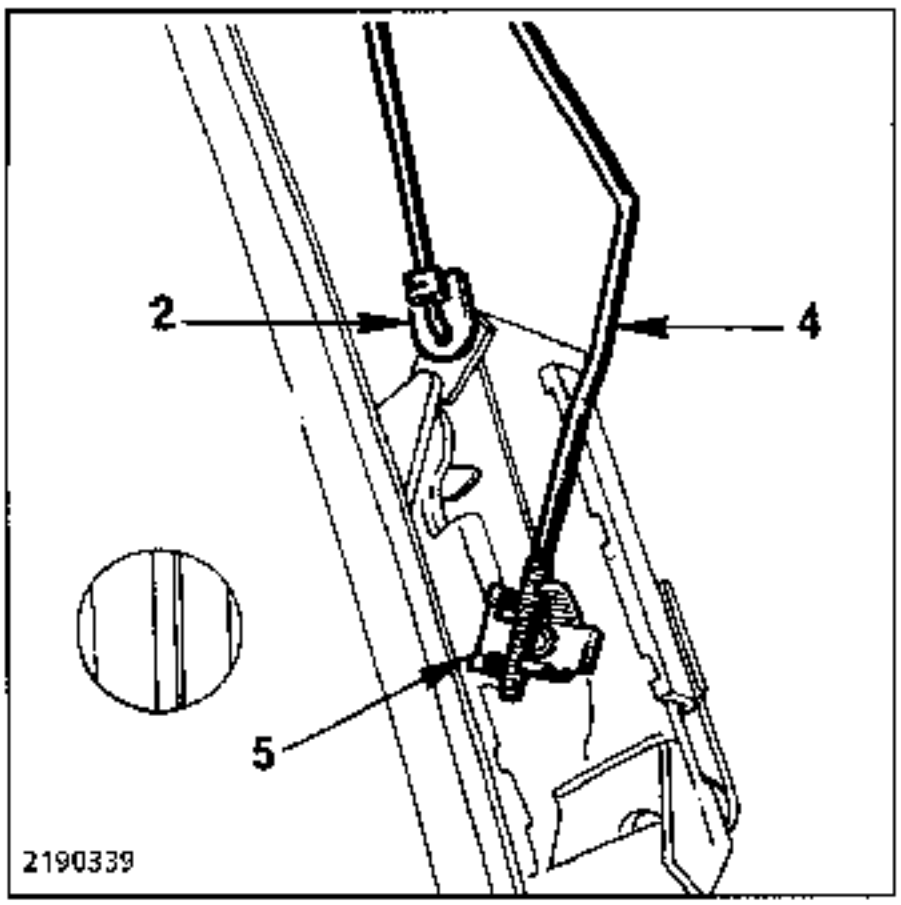
Lower the window again and tighten all the mountings.



1 Finger plate
2 Finger plate mounting
3 Lock barrel mounting
4 Lock barrel

REMOVING THE EXTERNAL FINGER PLATE

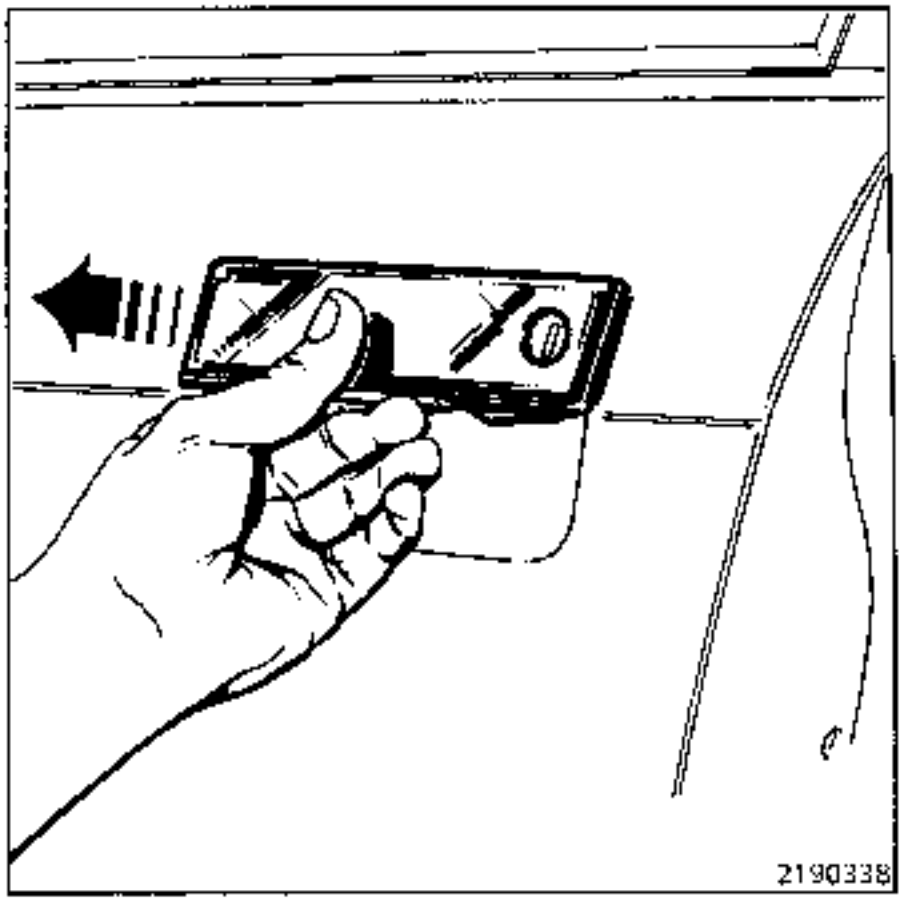




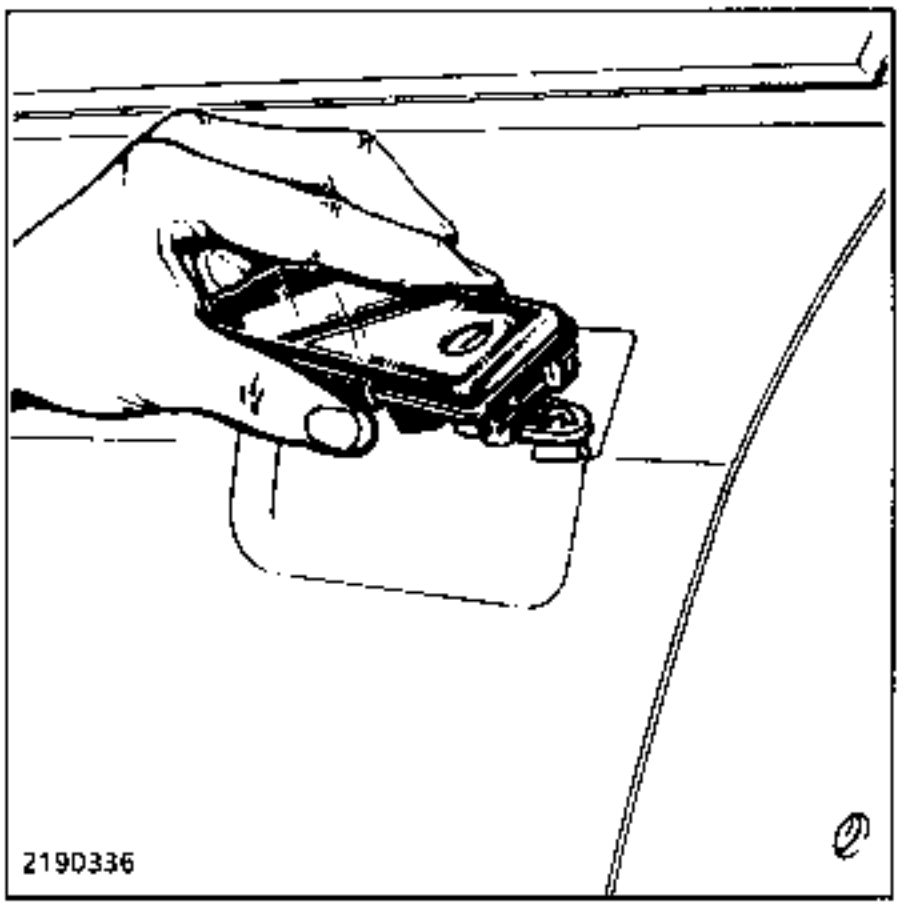
After removing the door trim and the plastic sheet :

- remove mounting screw (1) from the external finger plate,
- uncouple locking rod (2) by unfastening it near the lock.

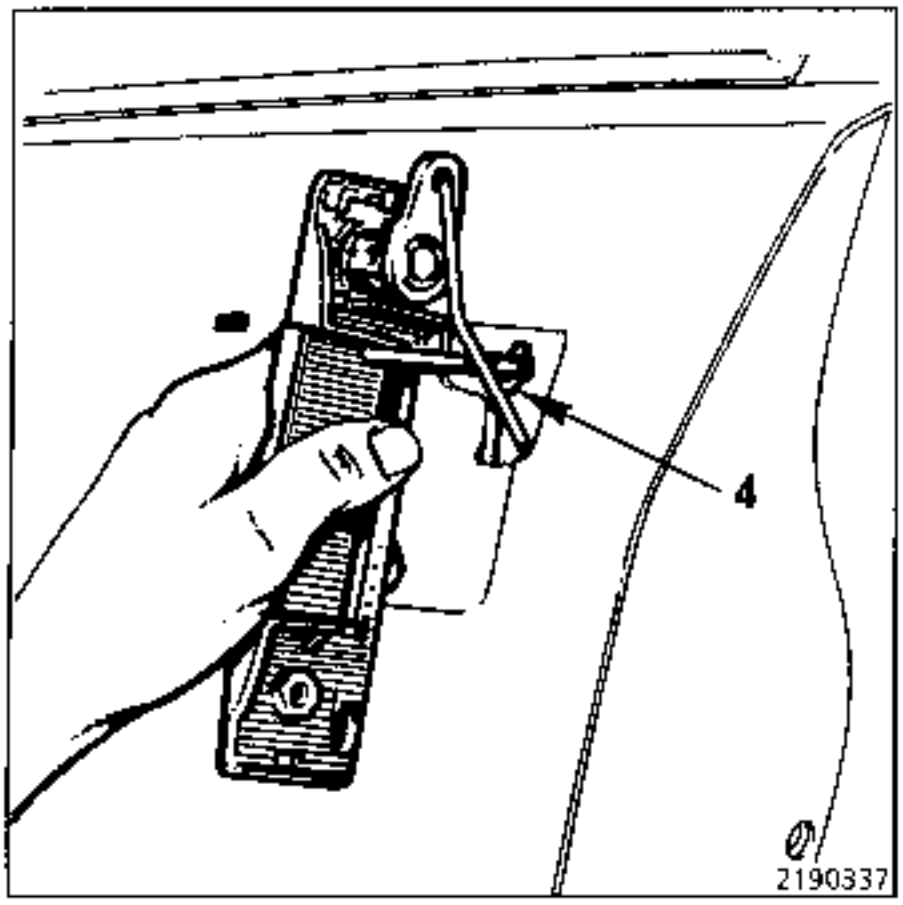
Remove the finger plate by moving it in the direction shown in the drawing below.



Press the finger plate forwards to free it from the panel.



Using your thumb, push clip (5) and rod (4) downwards and take the upper end of the rod (4) out of the door panel.



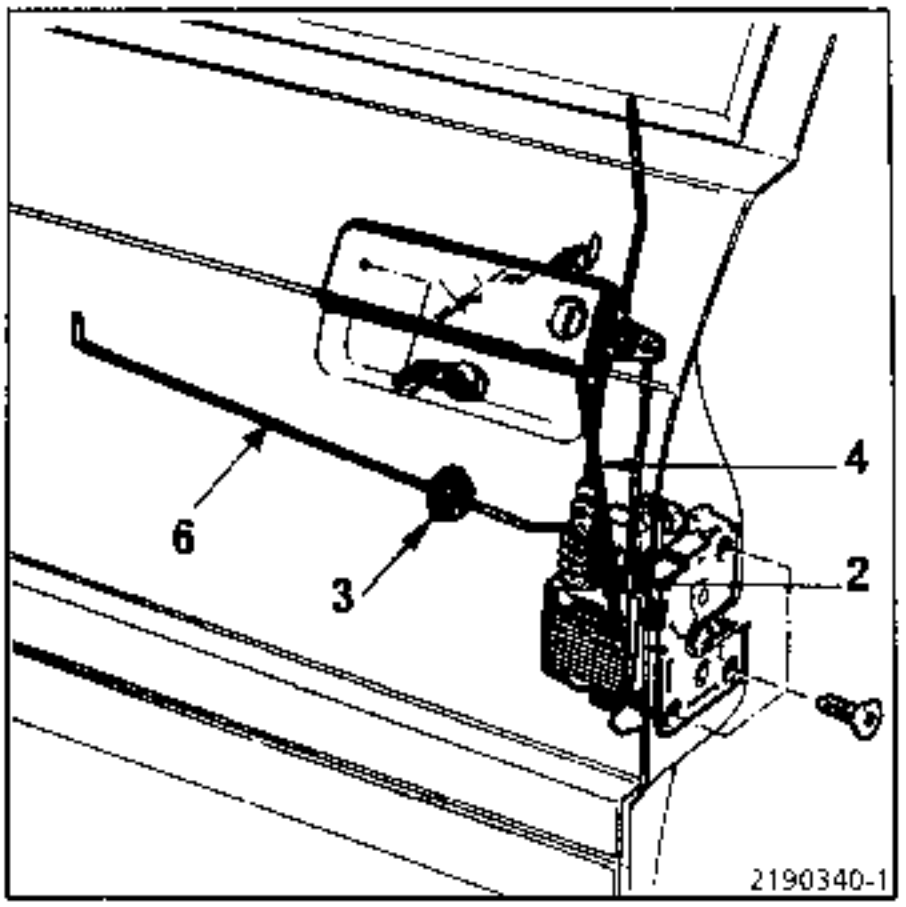
Free the finger plate from the rod (4) by turning the finger plate vertically.

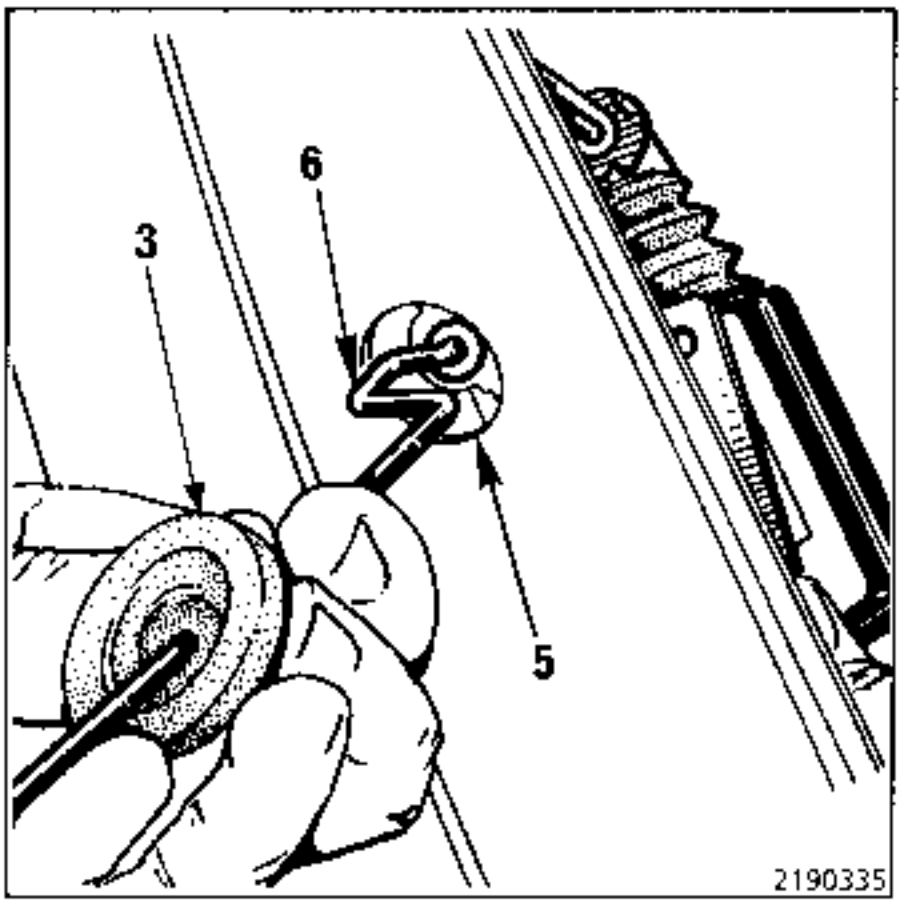
NOTE : it is essential to take the finger plate out without rod (4) in order to avoid damaging its clip.

To adjust the opening of the finger plate if the rod has become detached from its clip (5), clip rod (4) back on after refitting the finger plate.

Unscrew rod (4) from its clip (5) to remove.

REMOVING THE LOCK



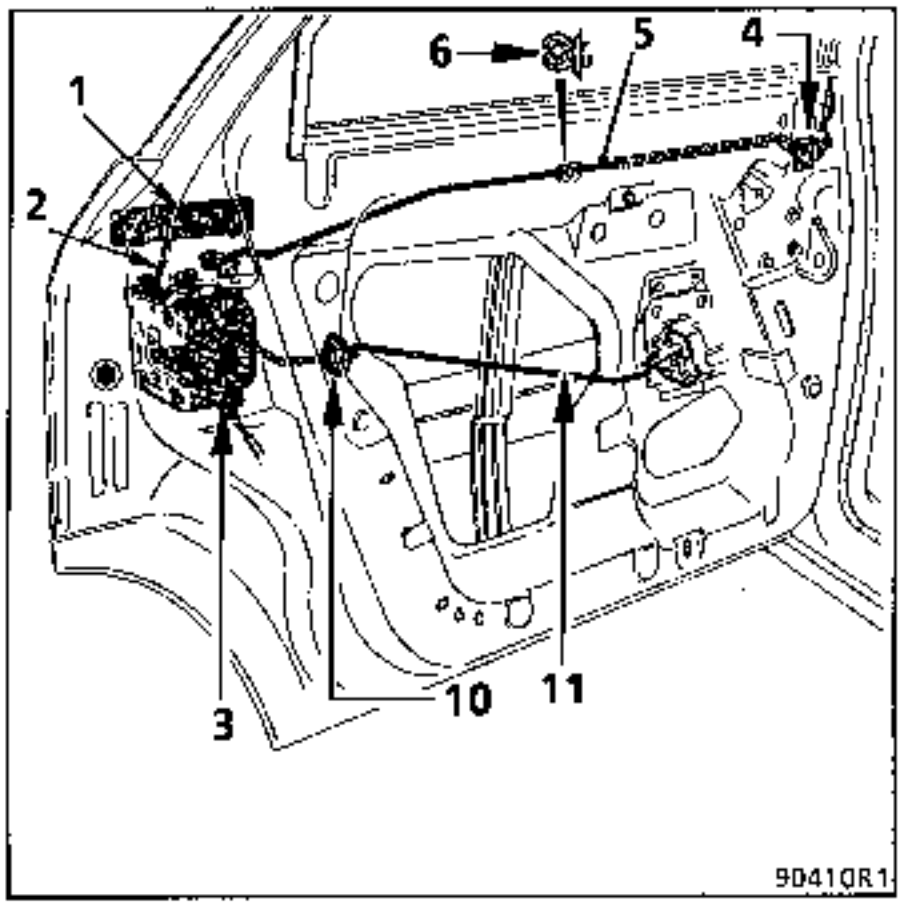


firstly remove the external finger plate together with the locking rod, then :

- disconnect the power supply;
- remove the mountings;
- free the rubber grommet (3);
- move the lock towards slot (5) to disengage the opening control (6).

Take the lock out through the opening.

REMOVING THE LOCK



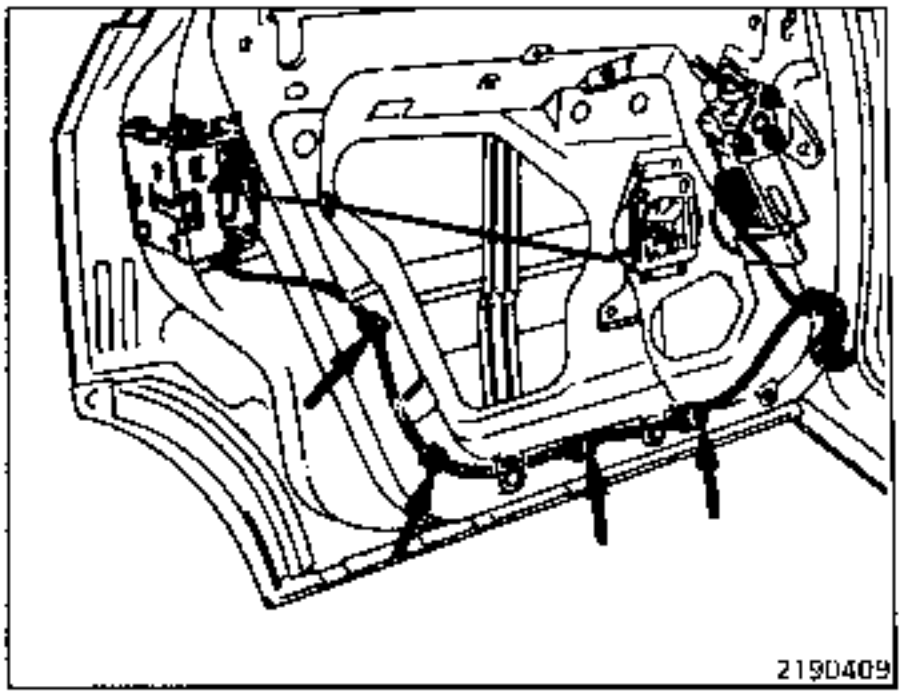
After removing the external finger plate and window :

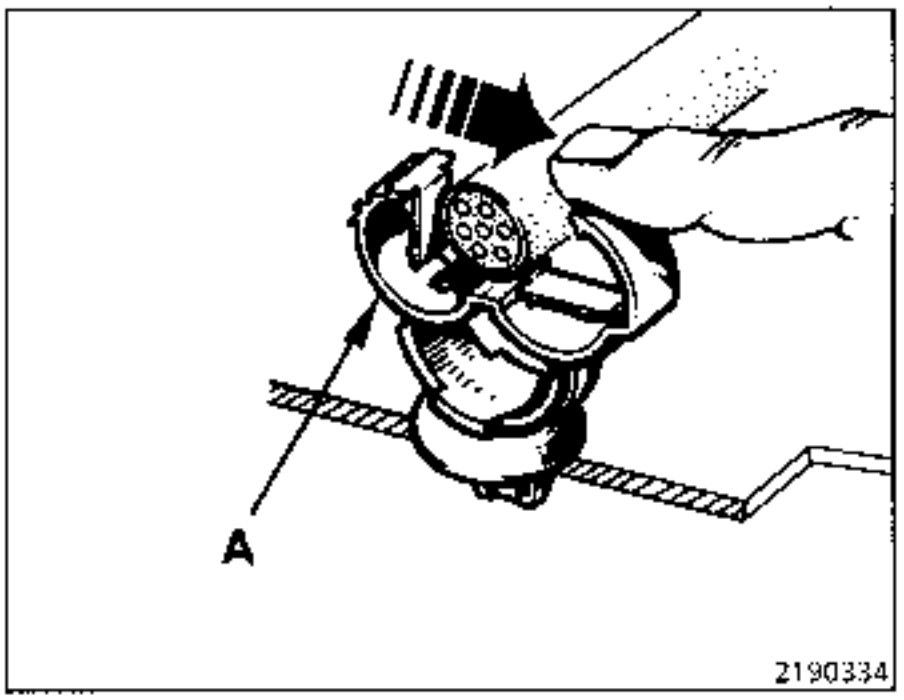
- disconnect the power supply (3),
- remove the two mountings from the window winder rail (see note),
- unclip the rod from clip (6),
- remove fork (4) holding rod (5) in position and push it into the door,
- remove the three mounting screws from the lock,
- move the lock towards hole (10) to disengage the internal opening control rod (11).

Take the lock out through the opening.

NOTE : the two mountings have to be removed from the window winder rail since rod (5) passes between the door and the window winder rail.

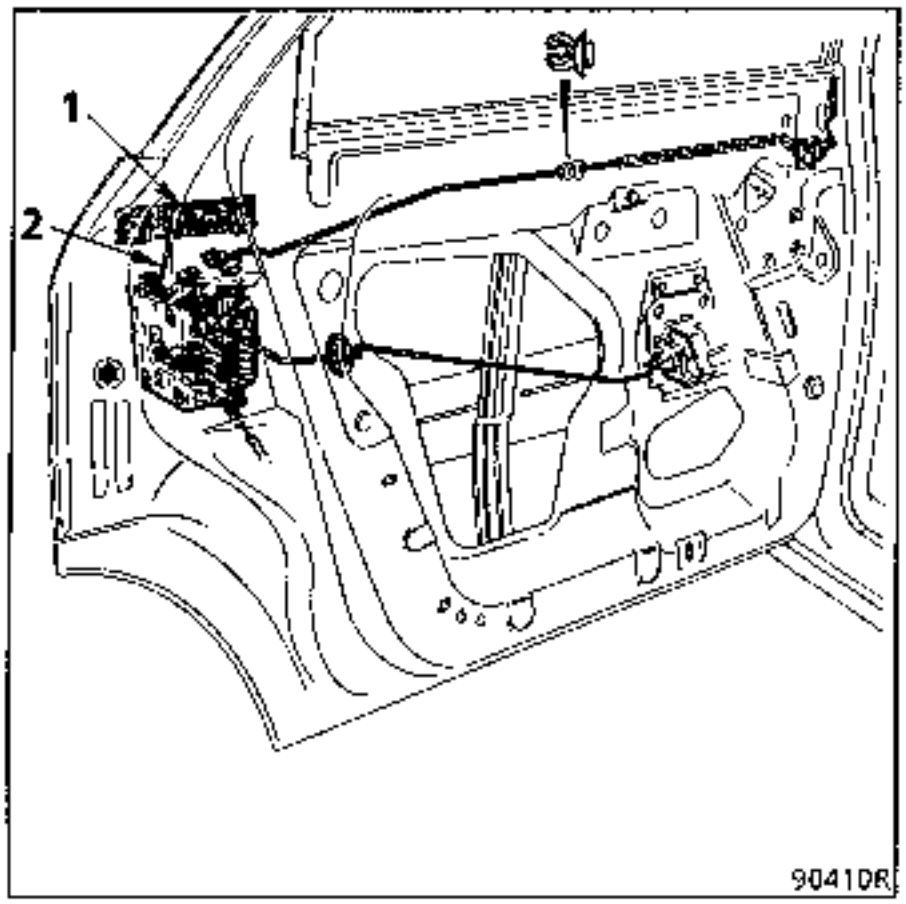
WIRING HARNESS





Harness mounting clip.

REMOVING EXTERNAL FINGER PLATE (1)

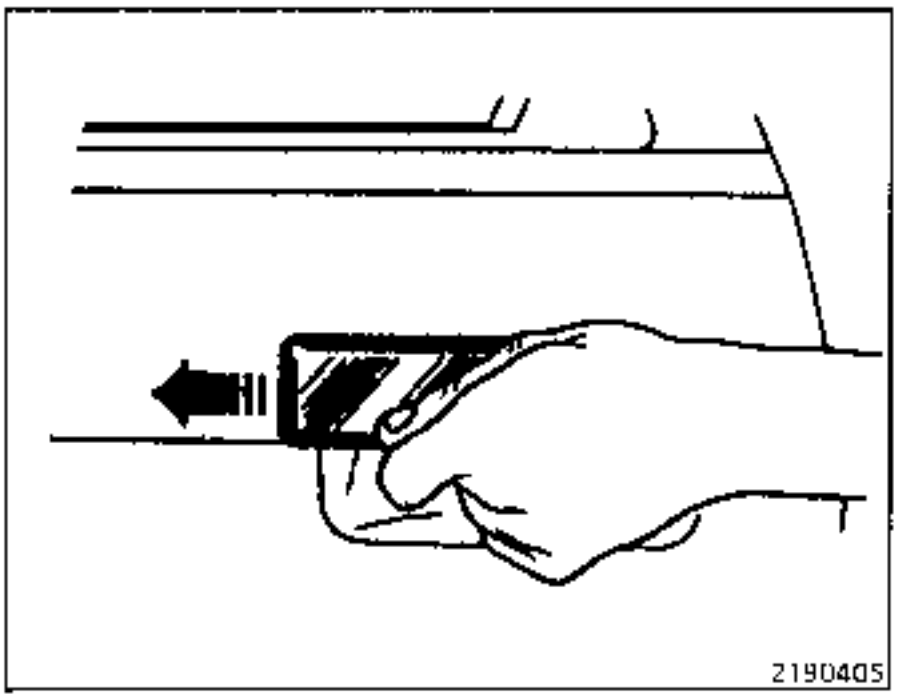


After stripping the door :

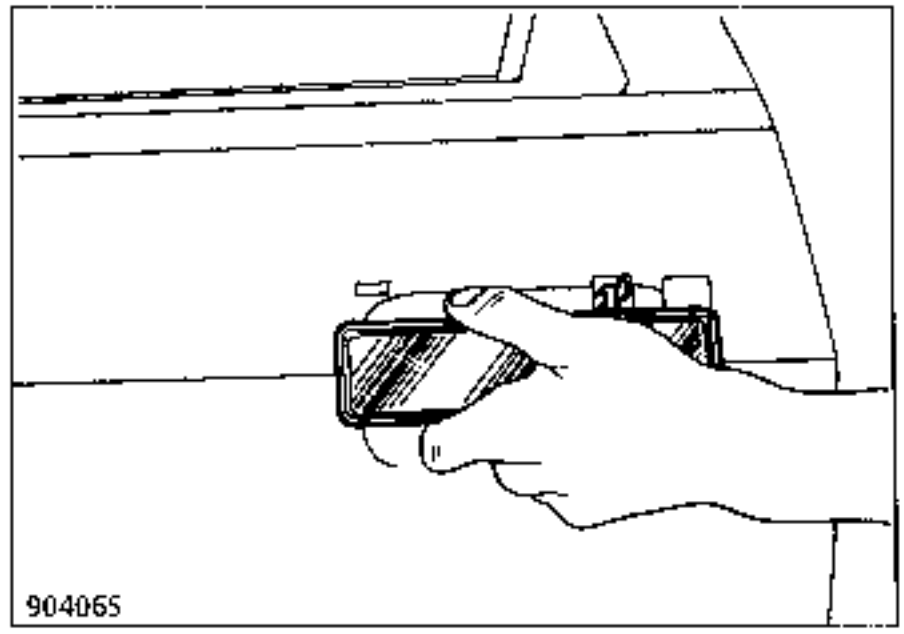
NOTE : it is essential to remove the finger plate without rod (2) in order to avoid damaging its clip.

- remove the mounting screw from the external finger plate.

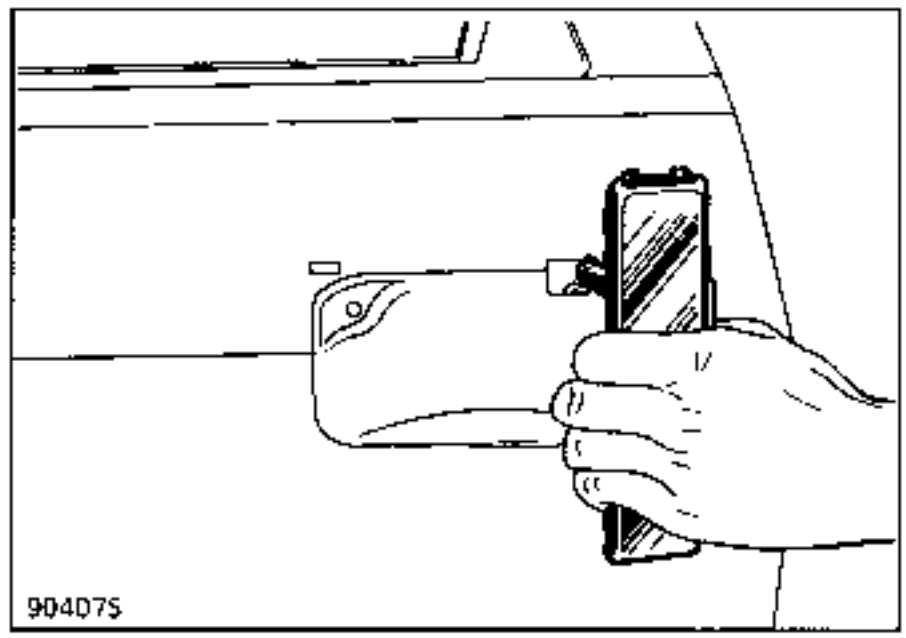
Remove the finger plate in the direction shown in the drawing below.



Push the finger plate forwards then disengage it from the panel.



Using your thumb, push the clip on control rod (2) downwards and take the upper end of rod (2) out of the door panel.

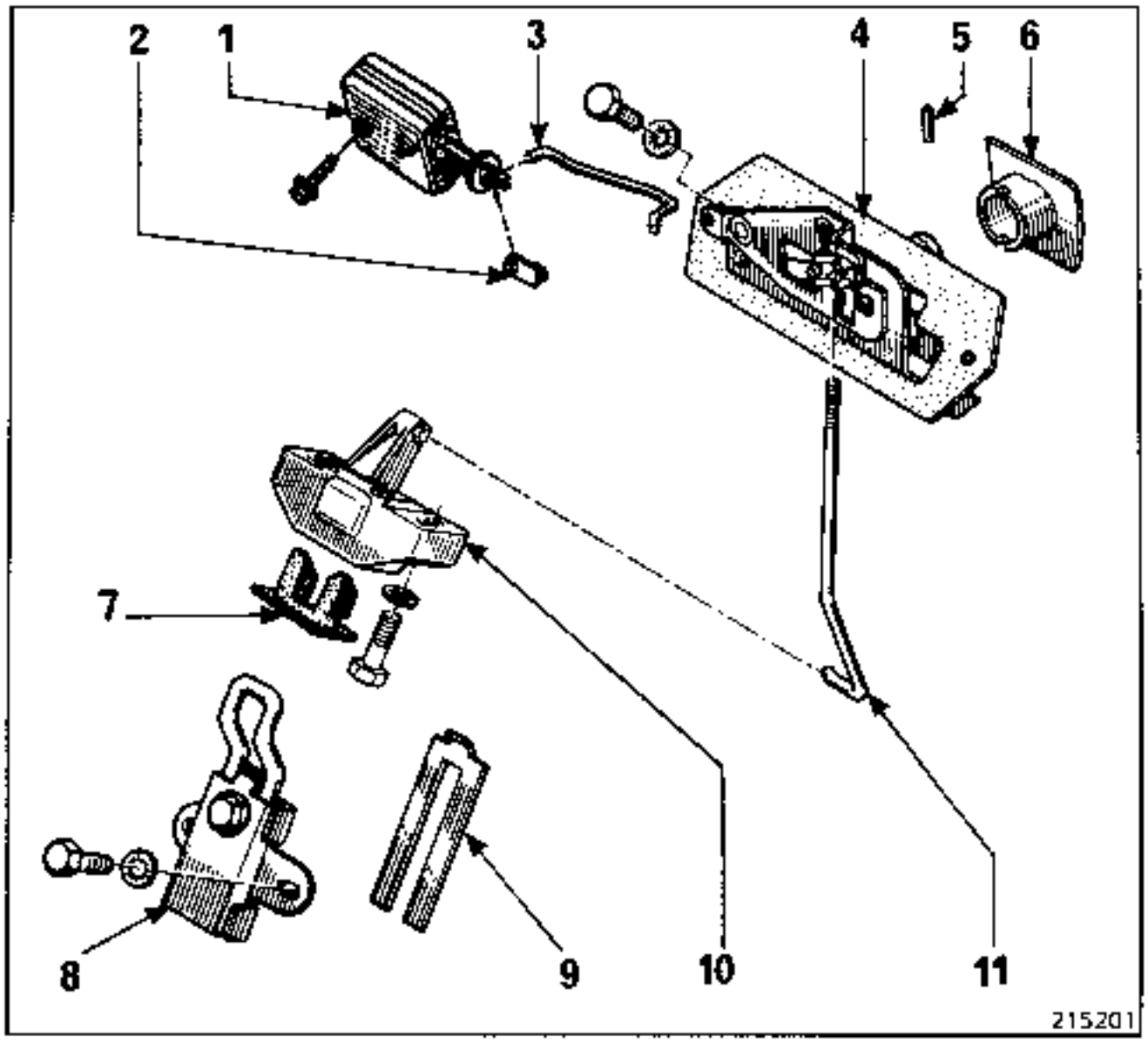


Disengage the finger plate from rod (2) holding the finger plate vertically.

Adjust the opening of the finger plate if the rod has come unfastened from its clip.

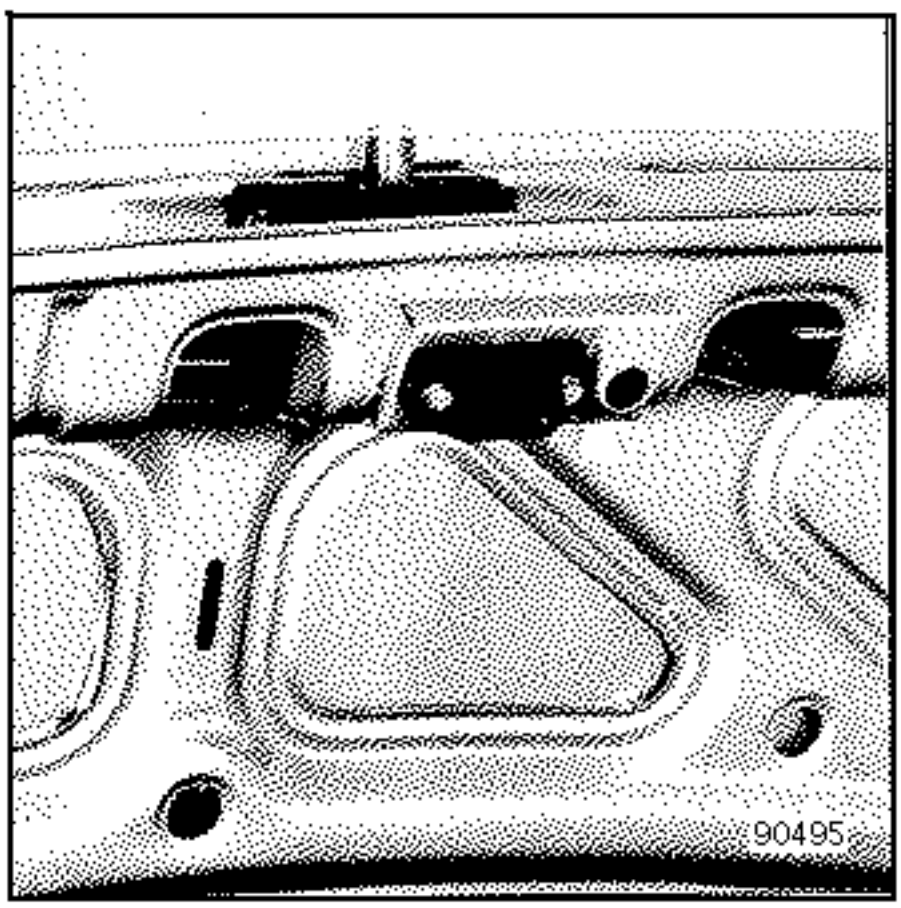
Clip rod (2) back in place after refitting the finger plate.

unscrew the clip to remove rod (2).

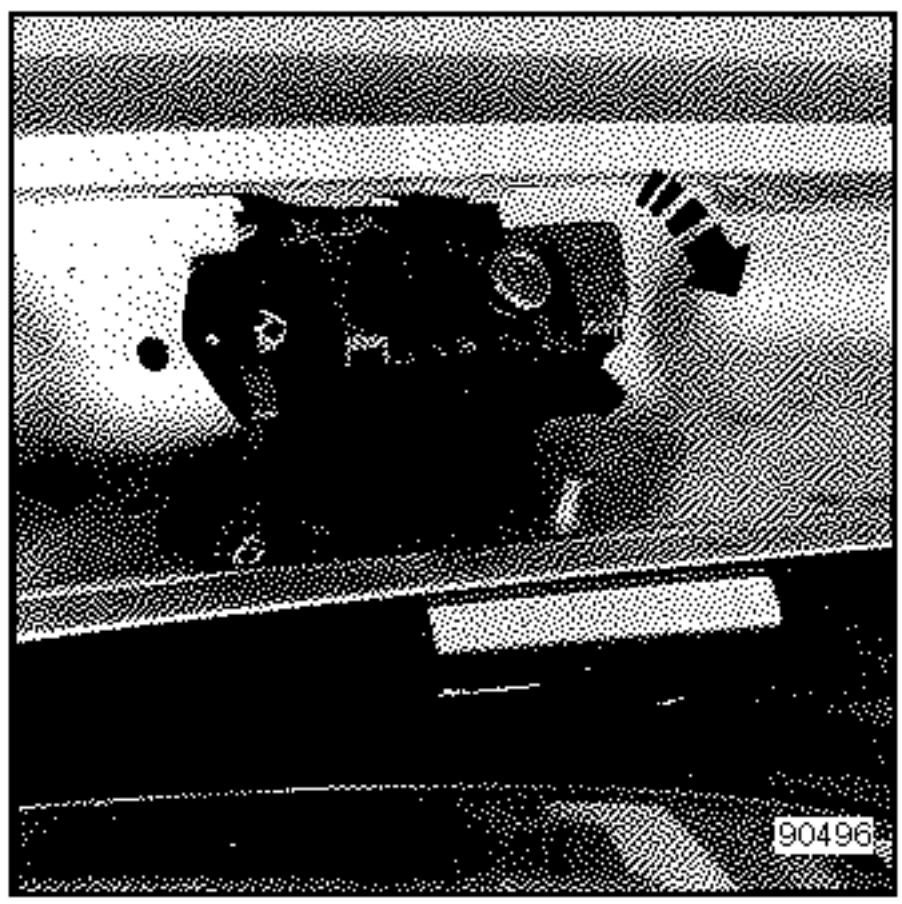


1 Locking motor
2 Rod mounting clip
3 Locking rod
4 External opening control
5 Rollpin
6 Lock cover
7 Centring stop
8 Striker plate
9 Shim
10 Lock
11 Opening rod

Remove :
- the number plate,
- the number plate mounting moulding.

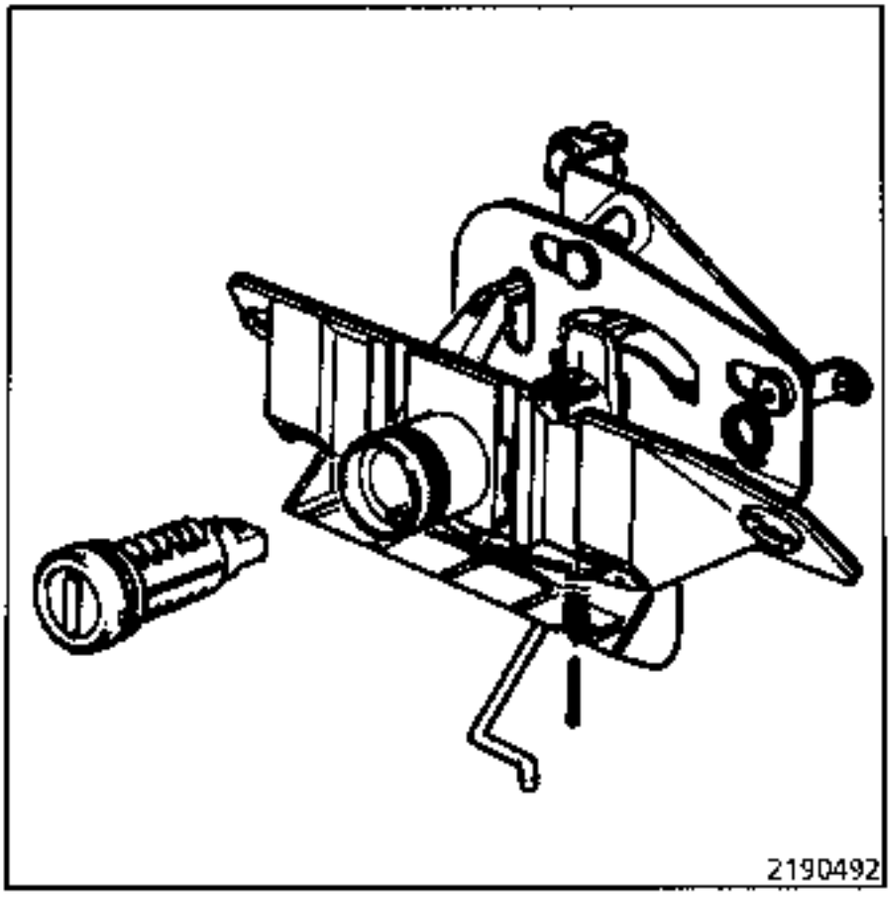


Remove the latch by disengaging it from the control rod.

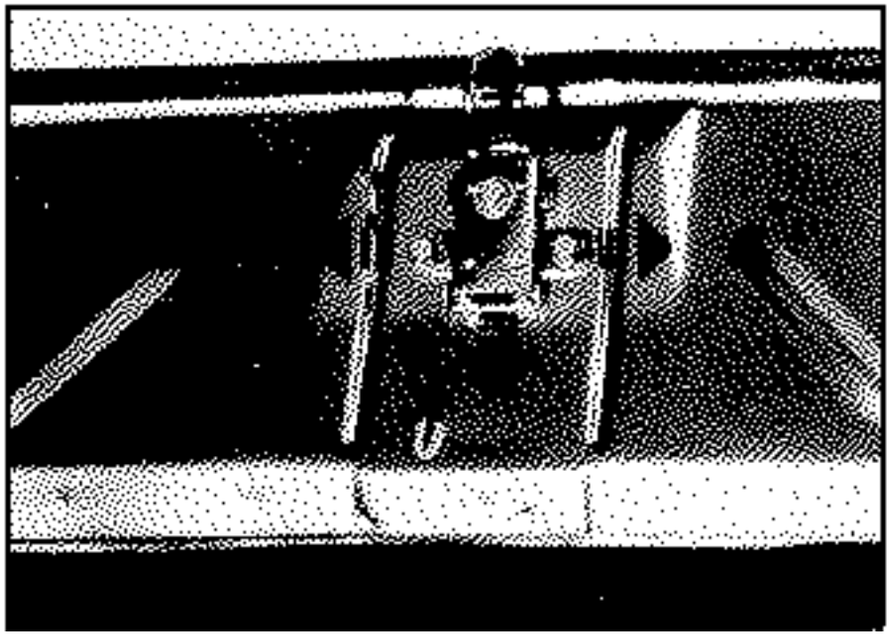


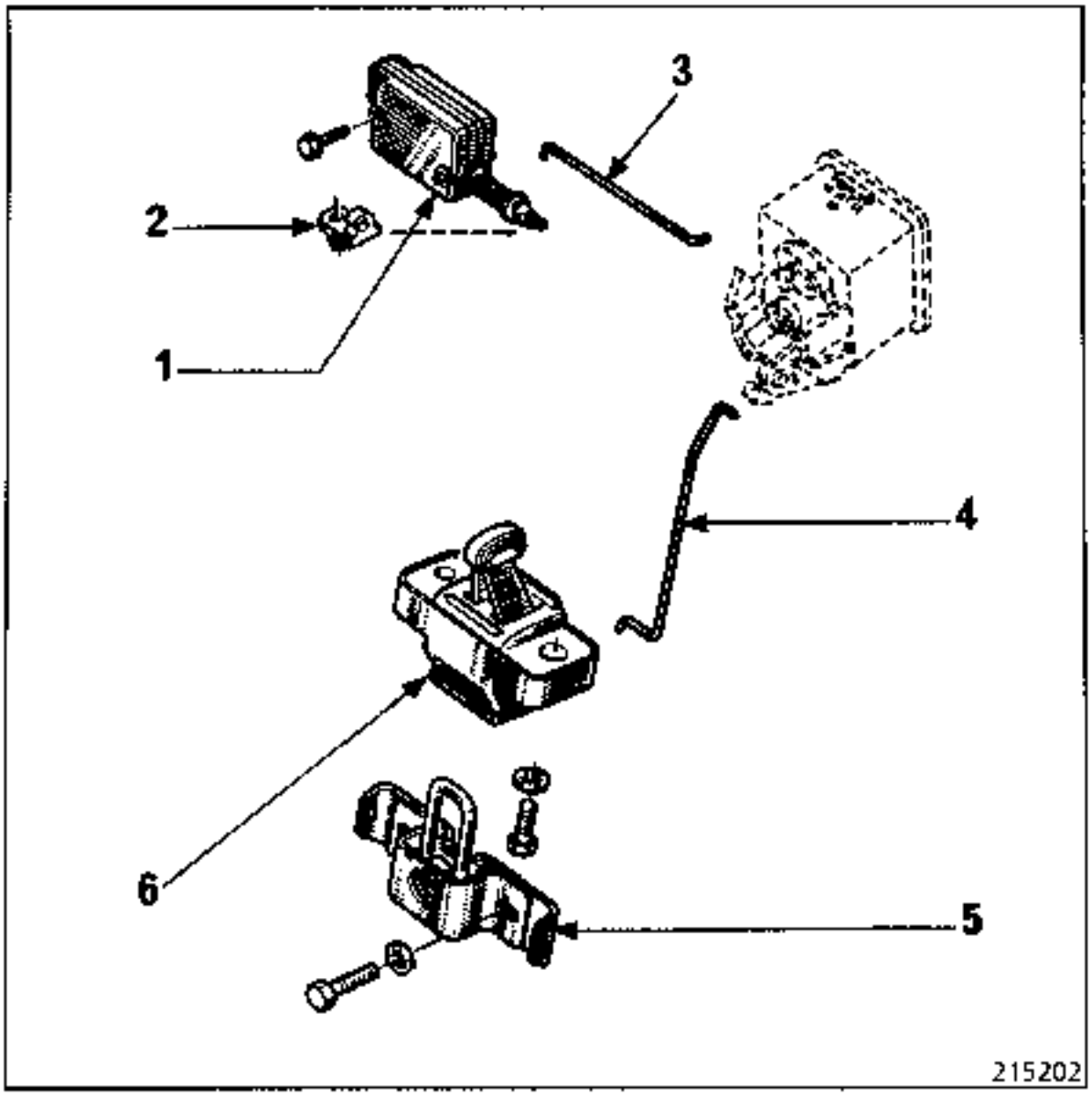
Unclip the electric locking rod. Tilt the lock outwards in order to remove it.

Removing the lock barrel



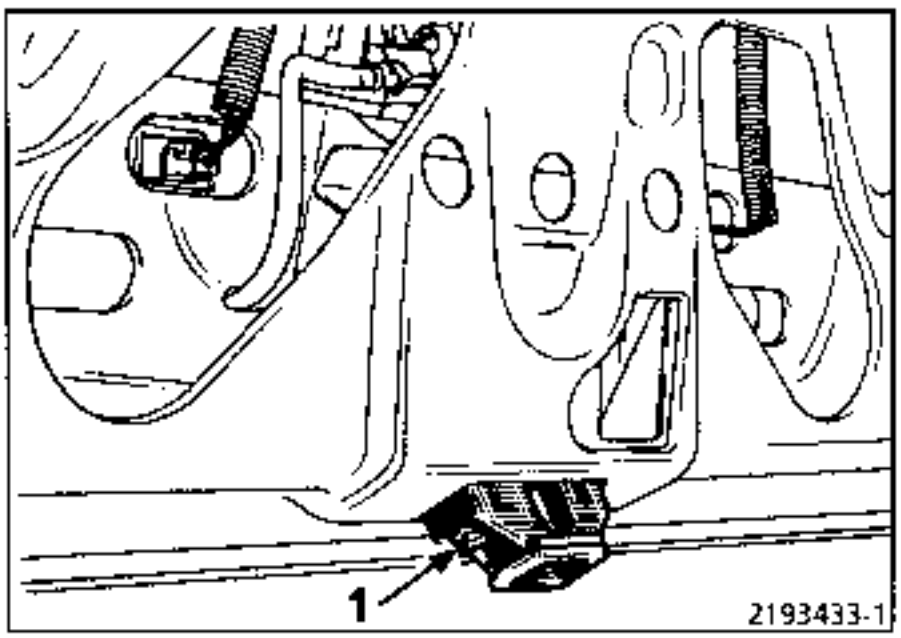
Adjusting the striker plate





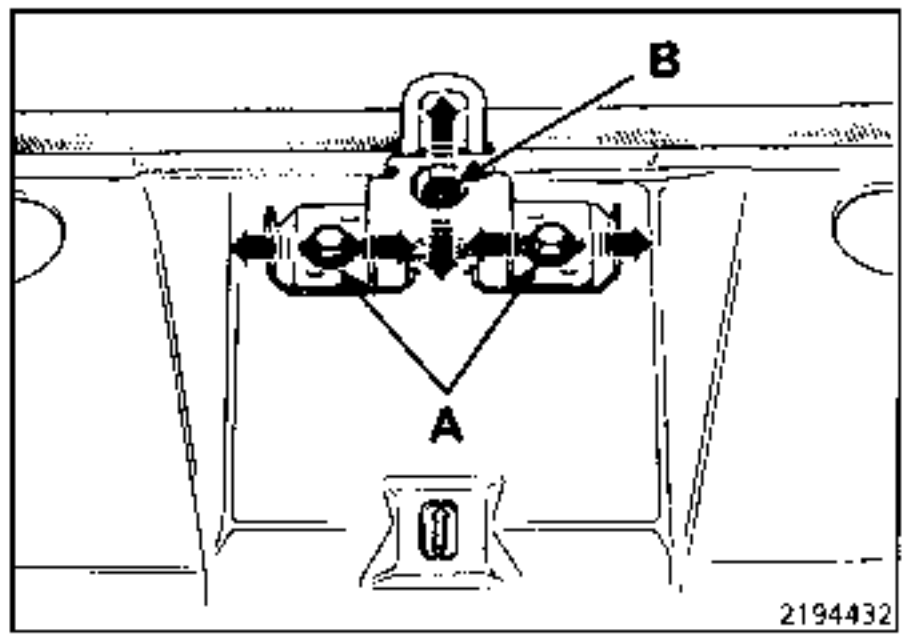
1 Locking motor
2 Rod mounting clip
3 Locking rod
4 Opening rod
5 Striker plate
6 Lock

Removal



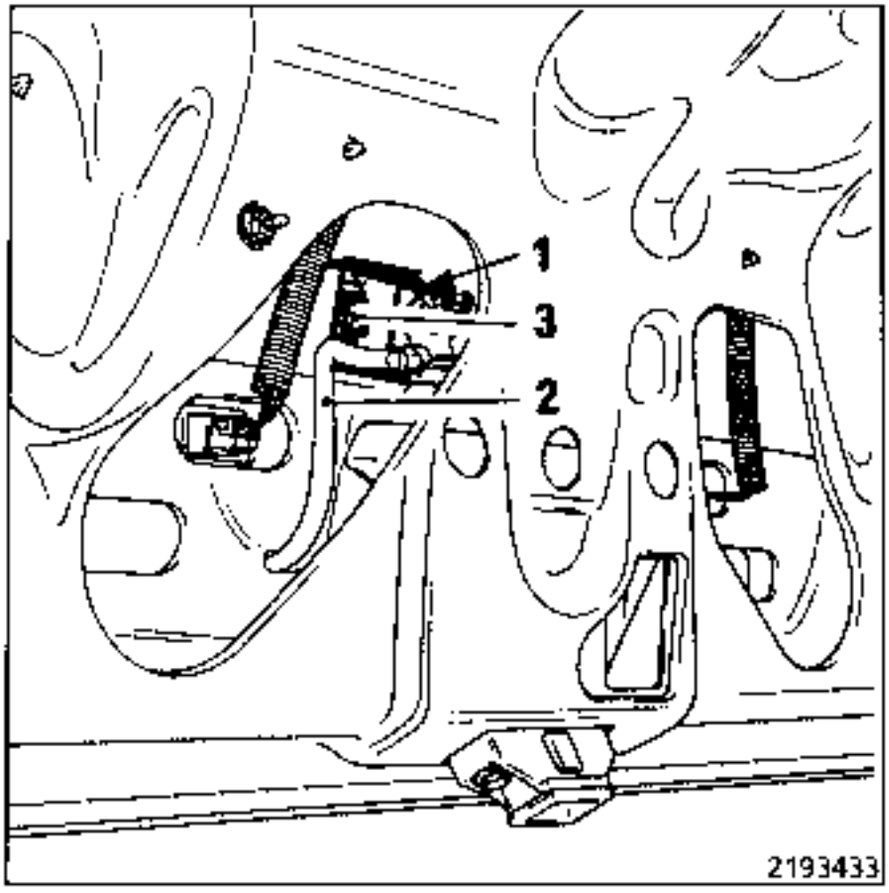
Remove the two screws (1) and pull the lock whilst turning it to disengage the control bolt.

Adjusting the striker plate



Screw A : side adjustment
Screw B : height adjustment

NOTE : The vertical position of the striker plate is self-adjusting (no shims).



Unclip :

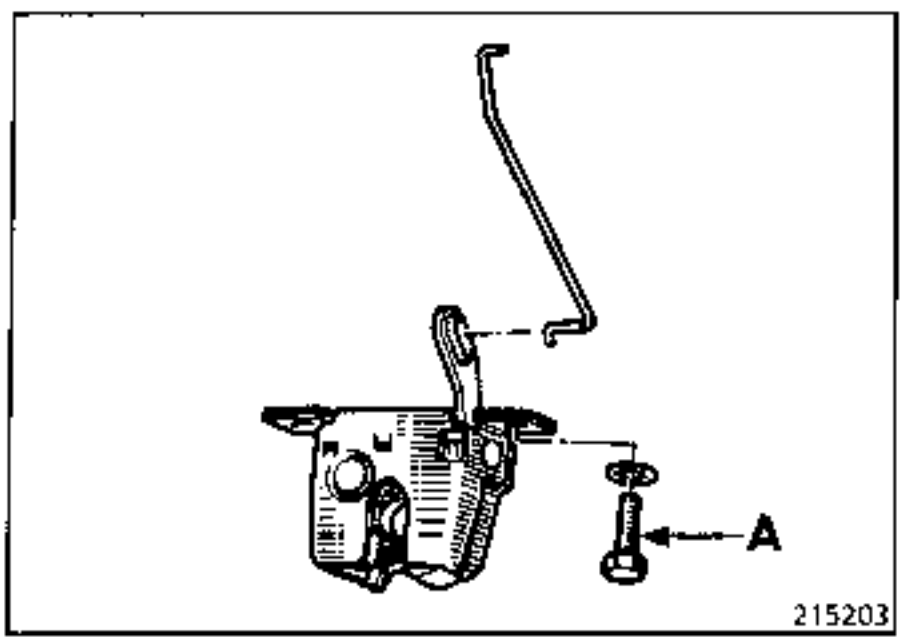
- the locking control rod (1),

- the opening control rod connected to the lock.

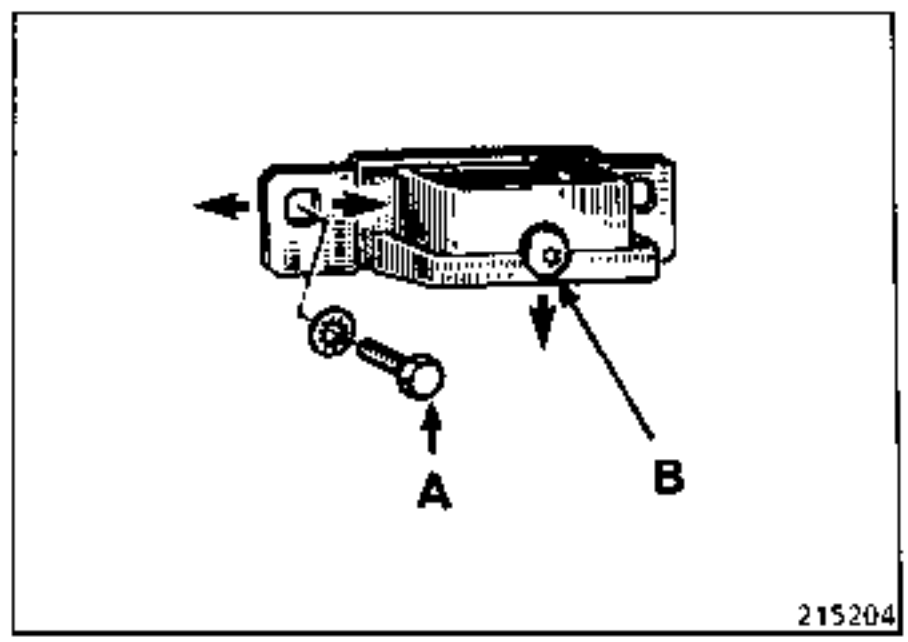
Disconnect the water drainage hose (2) and remove clip (3) holding the lock barrel in place.

Remove the lock barrel from the outside of the boot lid.

Removal

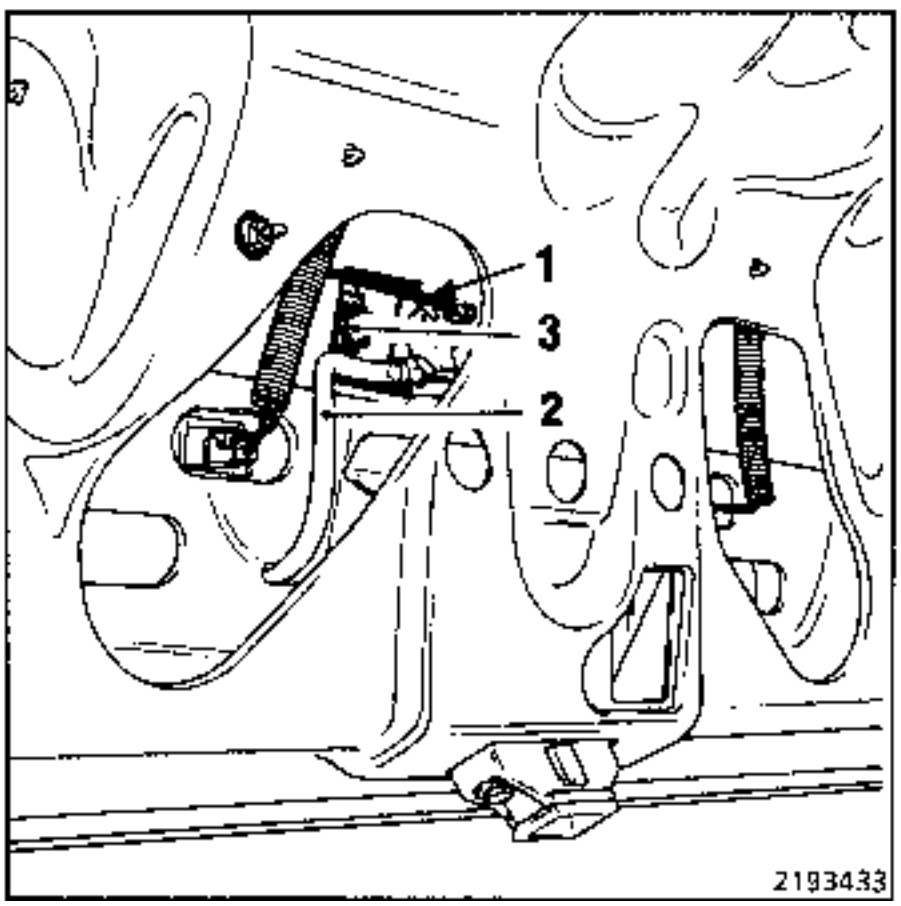


Remove the two screws (A) and pull the lock whilst turning it to disengage the control rod.



Screw A : side adjustment
Screw B : height adjustment

B48 Tailgate lock barrel

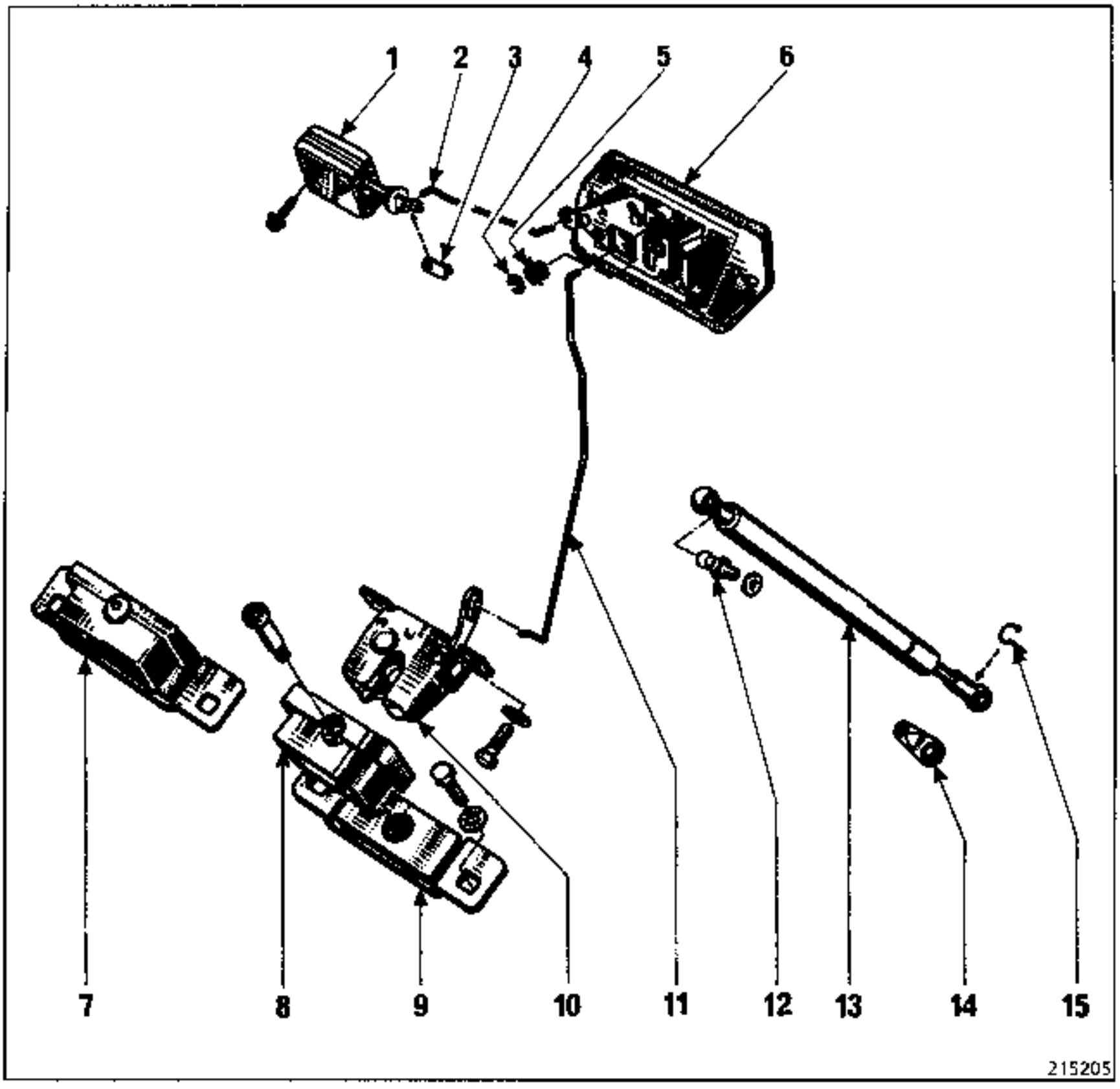


Unclip :

- the locking control rod (1),
- the opening control rod connected to the lock.

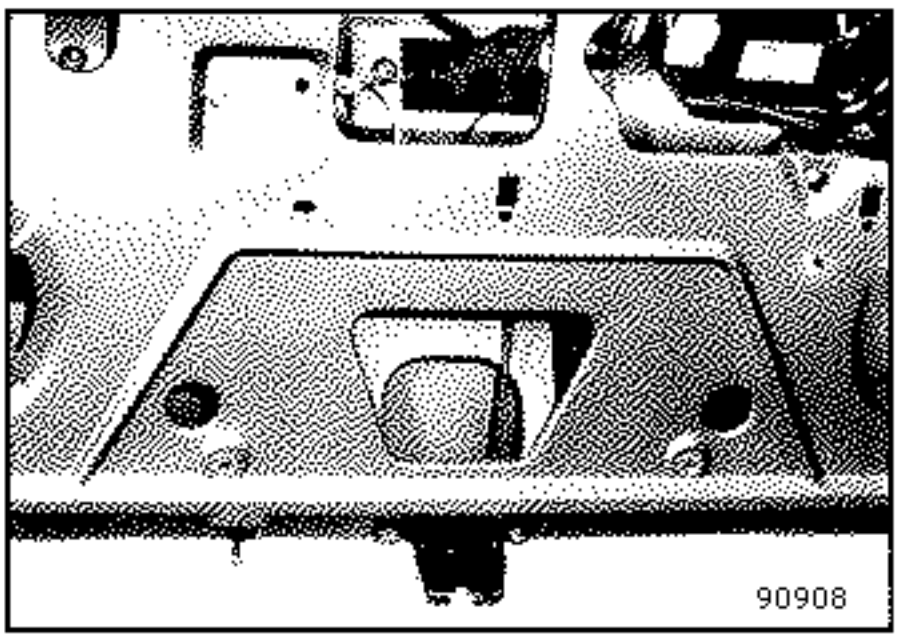
Disconnect the water drainage hose (2) and remove clip (3) holding the lock barrel in place.

Remove the lock barrel from the outside of the boot lid.



1 Locking motor
2 Locking rod
3 Rod mounting clip
4 Circlip
5 Return spring
6 External control
7 Striker plate assembly
8 Striker plate
9 Left-hand plate
10 Lock
11 Opening rod
12 Pivot pin
13 Strut
14 Hinge
15 Clip

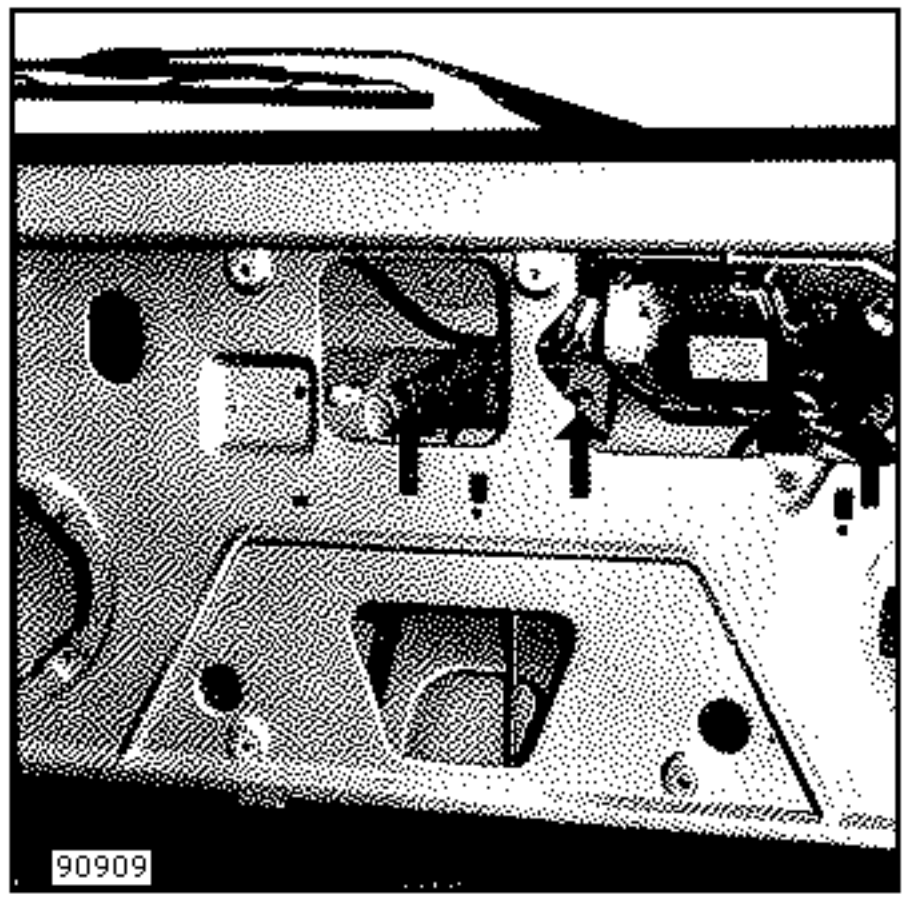
Removing the lock



Remove the internal trim from the tailgate.

Remove the two screws holding the lock.

Remove the lock by unfastening it from the control rod.

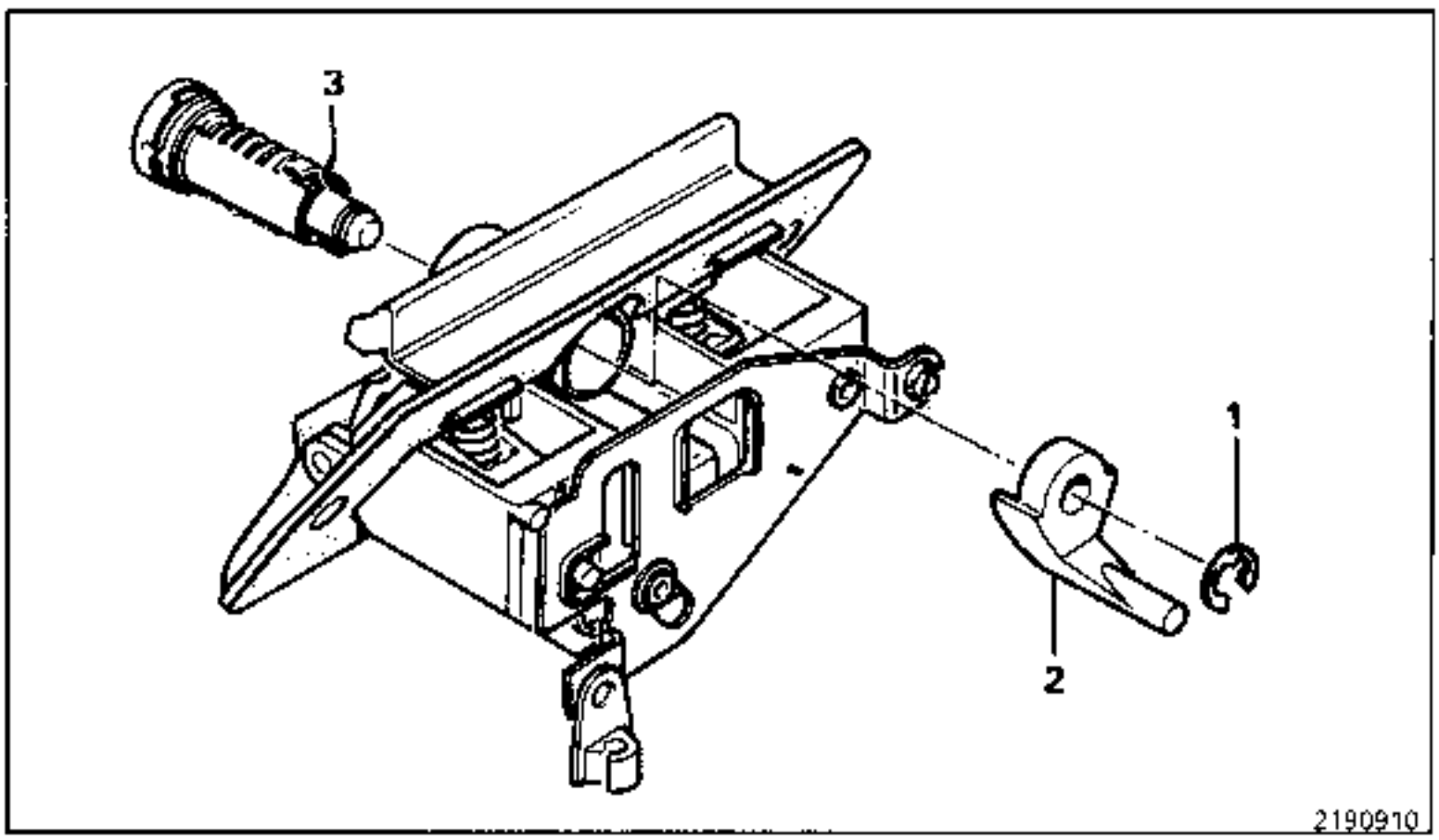


Unclip the electro-magnetic locking rod from the control unit and the control rod from the lock on the handle.

Remove the four nuts holding the number plate lighting moulding.

Disconnect the number plate lights.

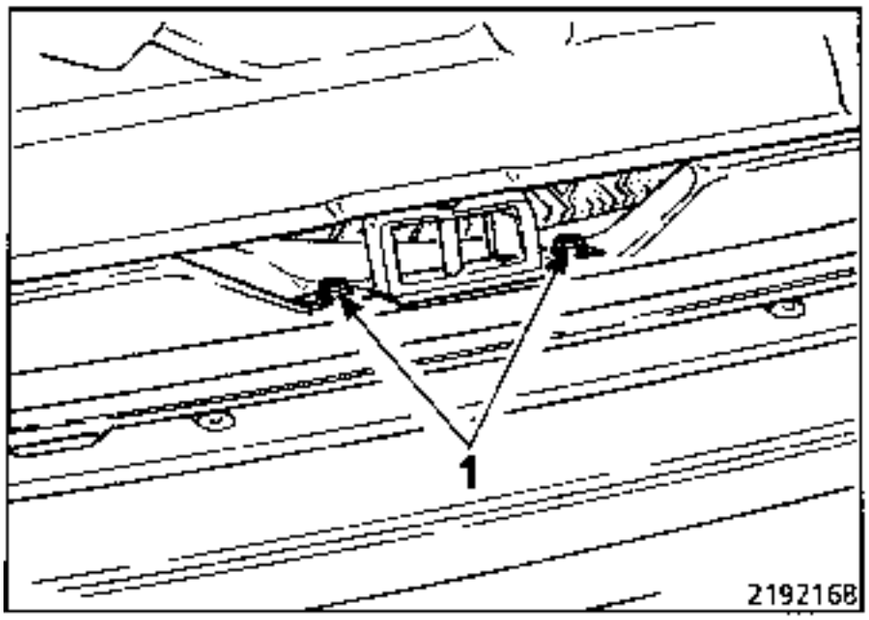
Removing the lock barrel



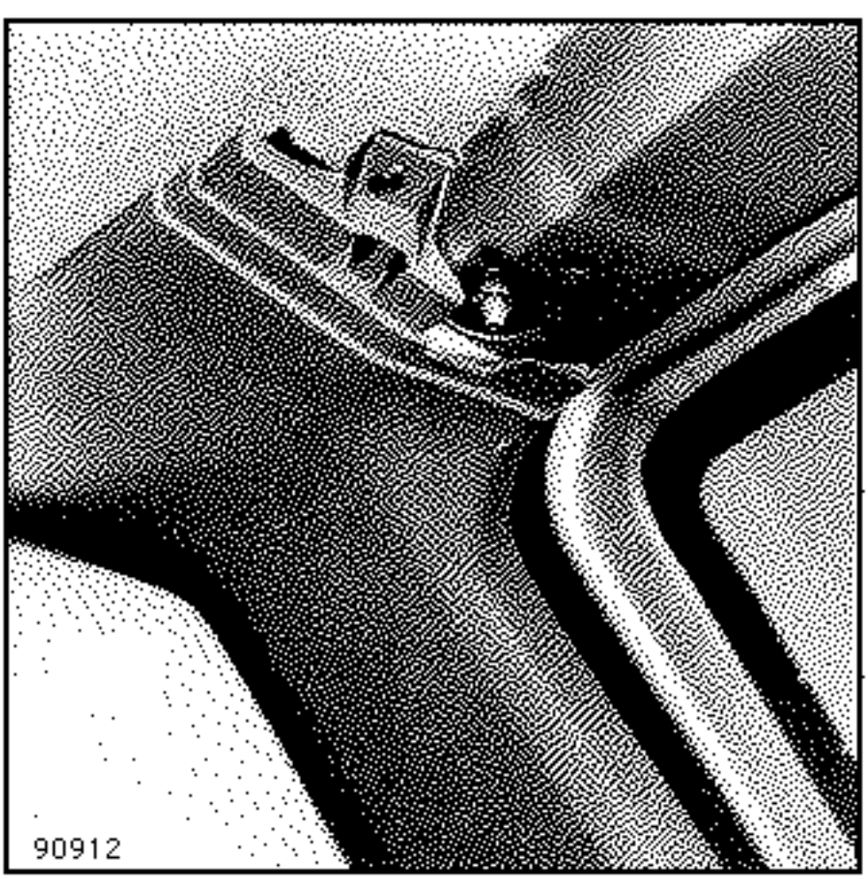
Remove clip (1), disengage control finger (2) and take the lock barrel out, moving it backwards.

NOTE : Make sure spring (3) does not jump out when the lock barrel is removed. This spring enables the lock barrel to return to its original position after it has turned. Before refitting, fit the spring back in place in the groove in the lock barrel, as shown in the drawing.

Adjusting the striker plate

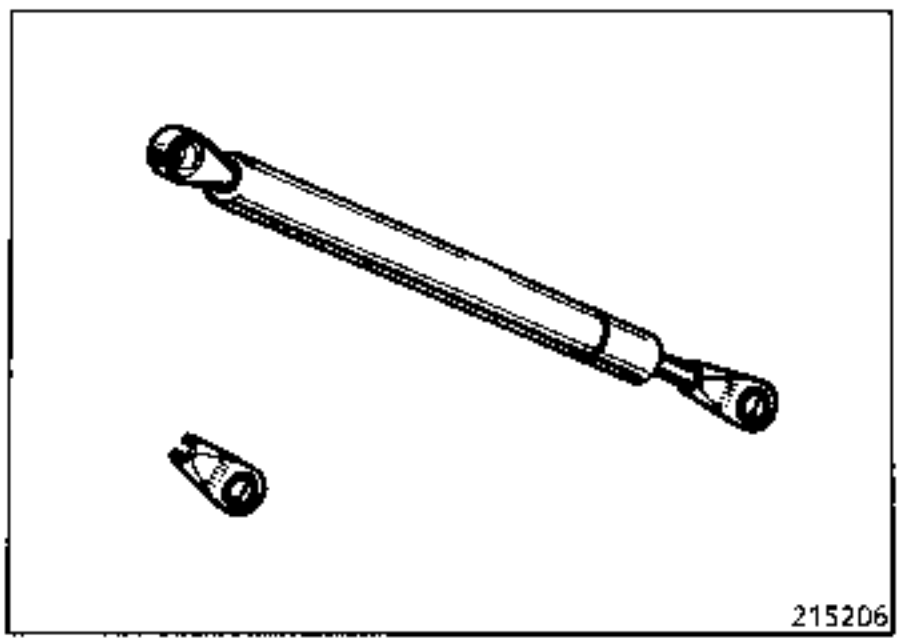


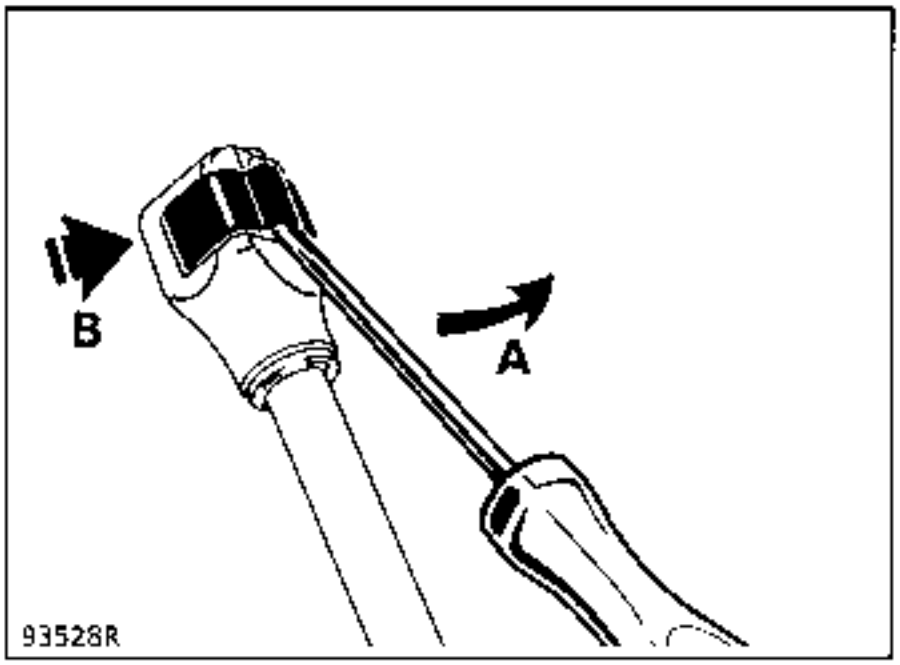
Use the two screws (1) to secure the striker plate in the desired position.



Remove the rear trim strip from the roof and the two nuts holding the hinges.

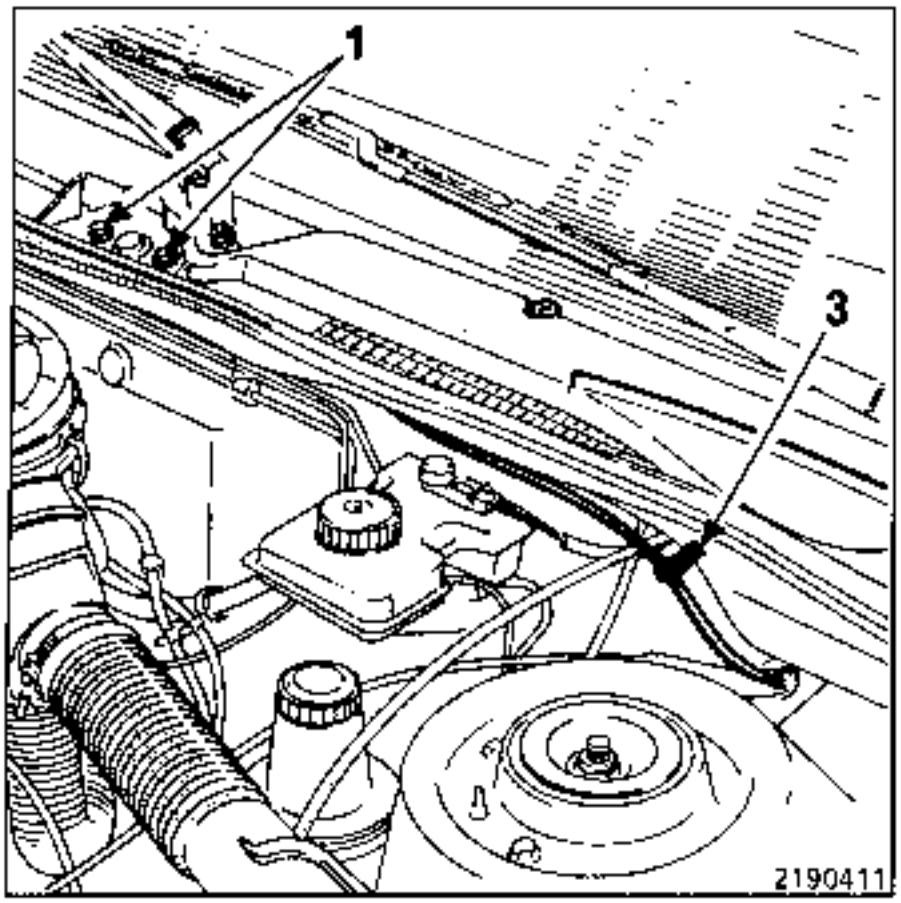
On refitting, wedges are sued to adjust the striker plate so that it is flush with the roof.

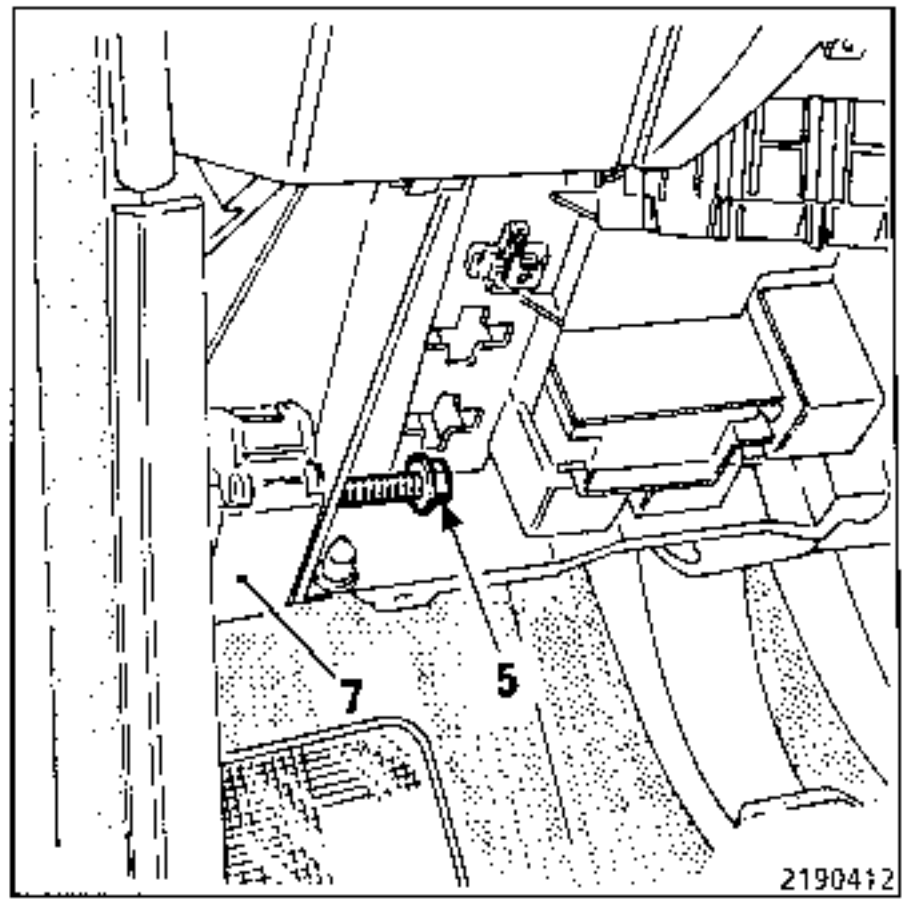


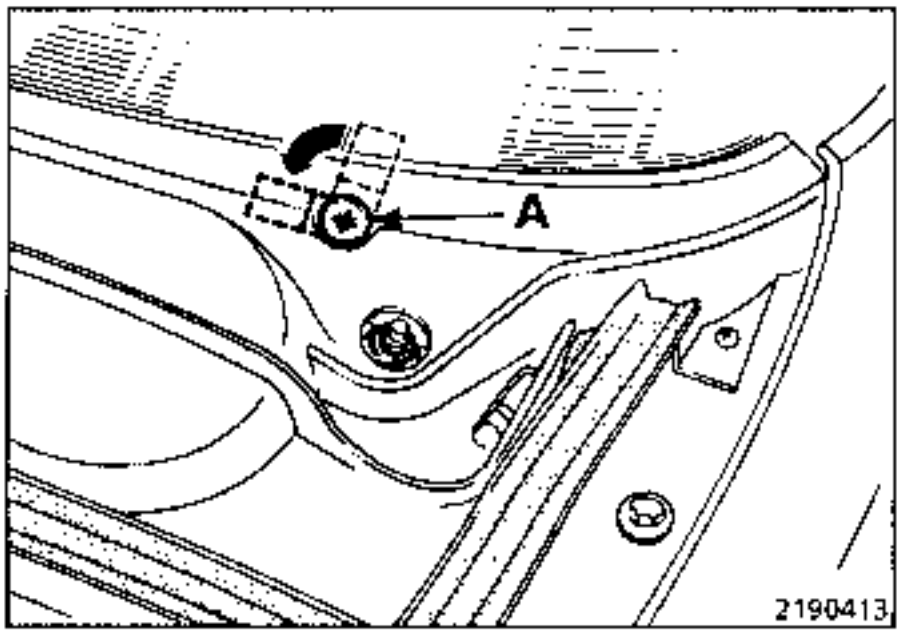


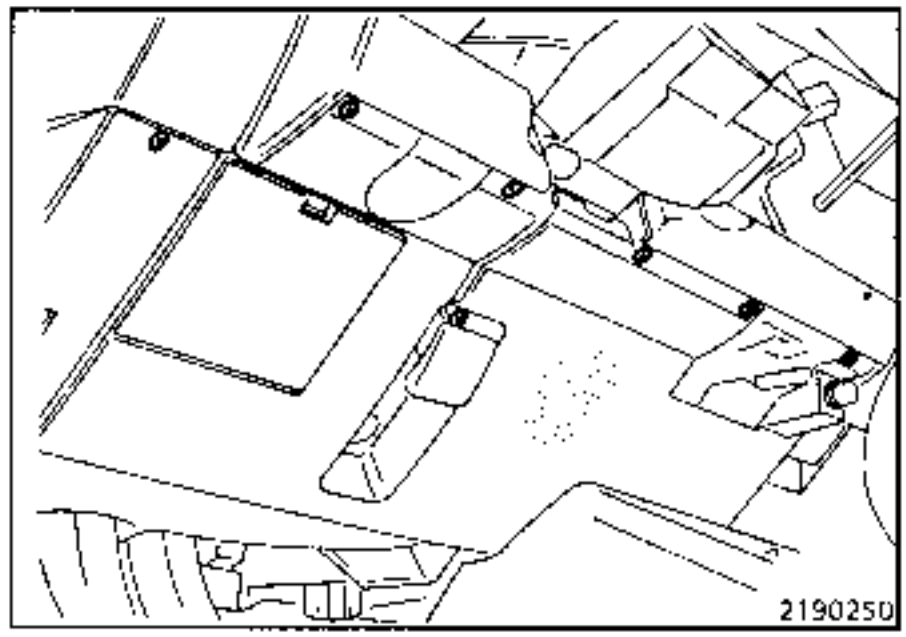
To remove the strut, using a screwdriver move aside the metal clip **(A)** - **but do not remove it** - and take the **pivot pin out of its location.**

If the clip breaks, the end piece on the strut will have to be replaced, Part No : **77 01 034 613**.









A = 1/4 turn screw

Remove :

- the windscreen wiper blades;
- the scuttle grille,
- the 2 screws (1) from the striker plate and separate the cable from the striker plate.

Disengage the cable from the rubber and the clip (3).

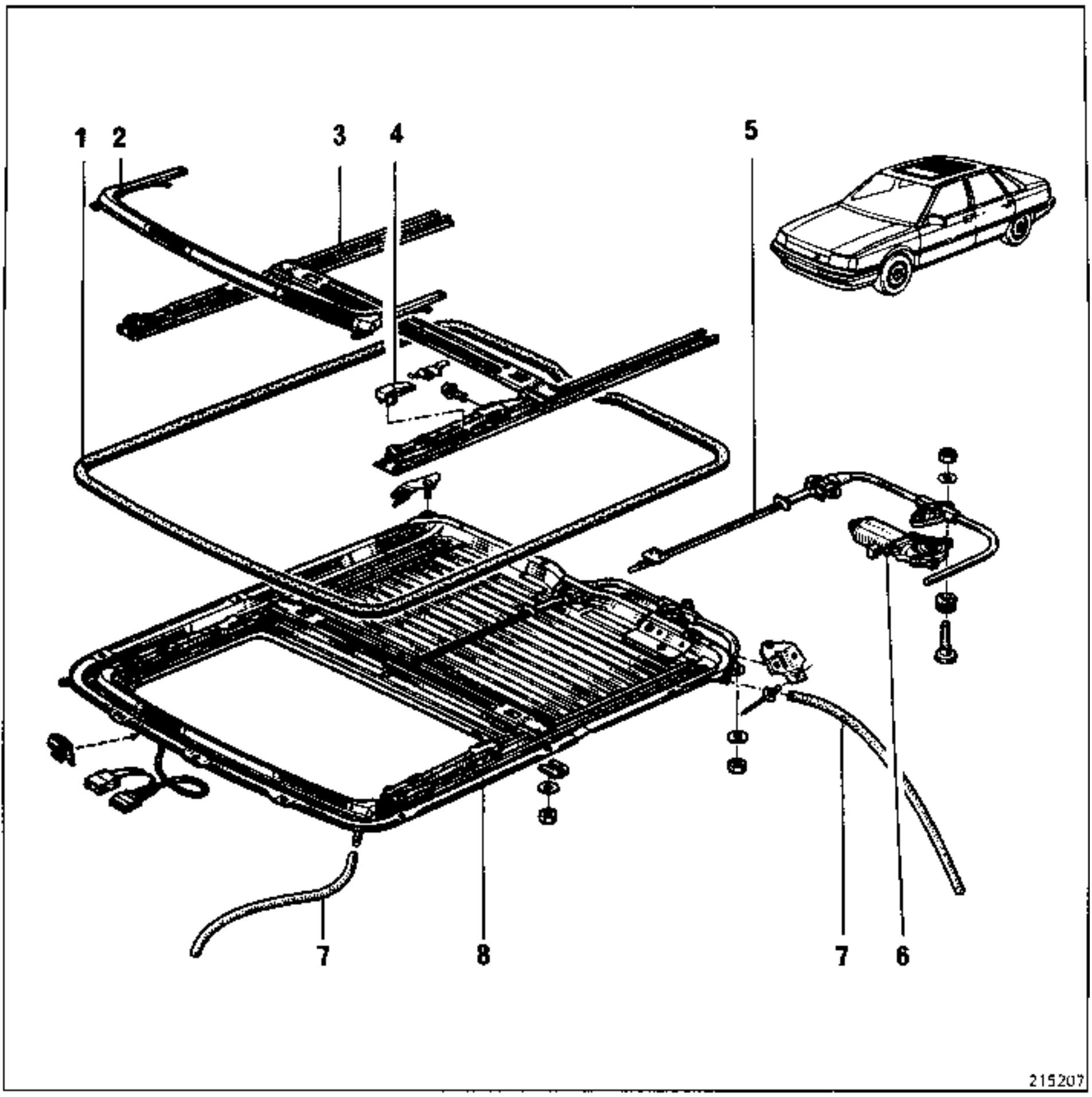
Remove :

- the lower trim from the dashboard and disconnect the cigar lighter;
- screw (5) securing the release lever;
- control handle (7).

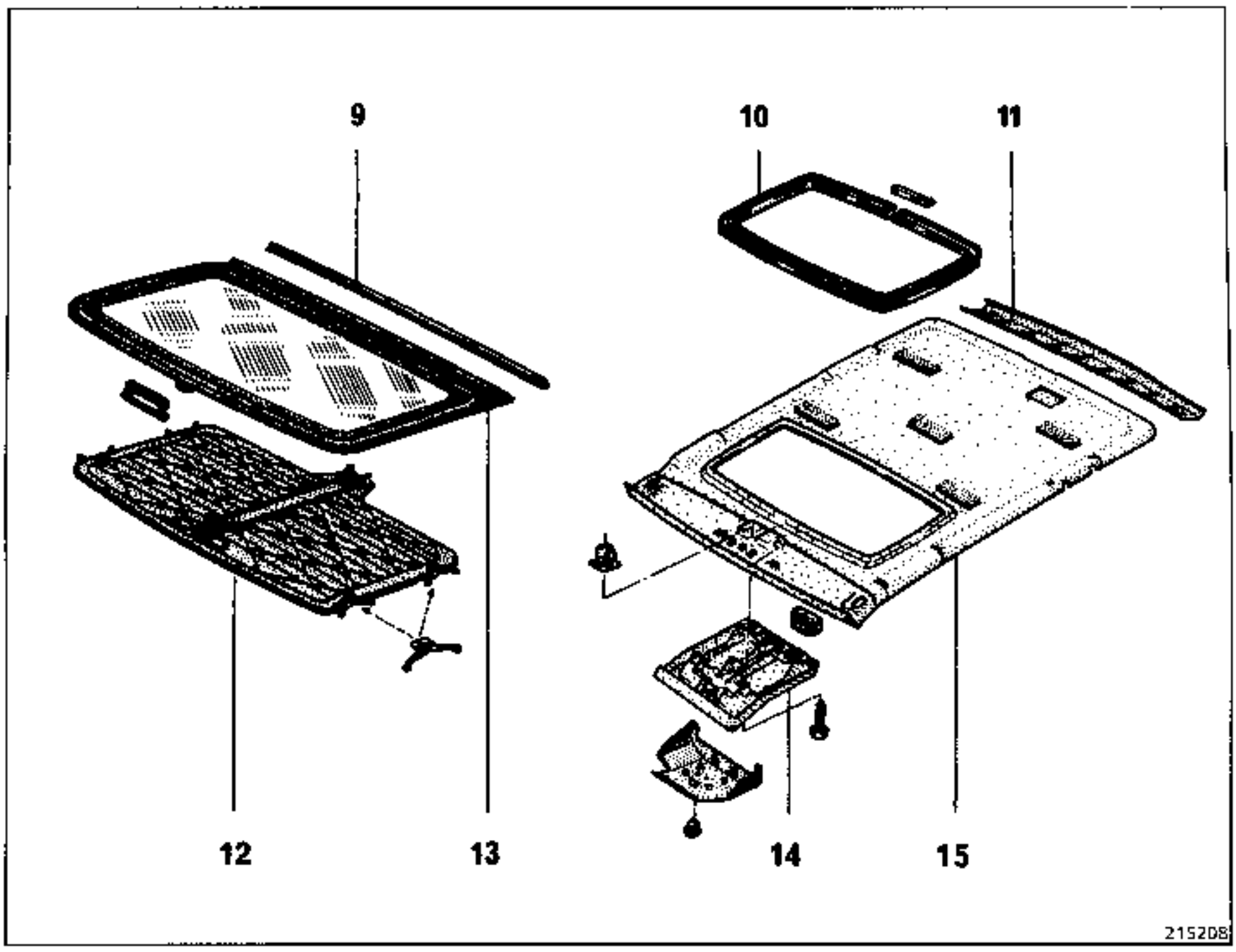
Disengage the cable from the rubber pad reaching it from underneath the dashboard.

Free the cable from the dashboard.

DESCRIPTION OF PARTS



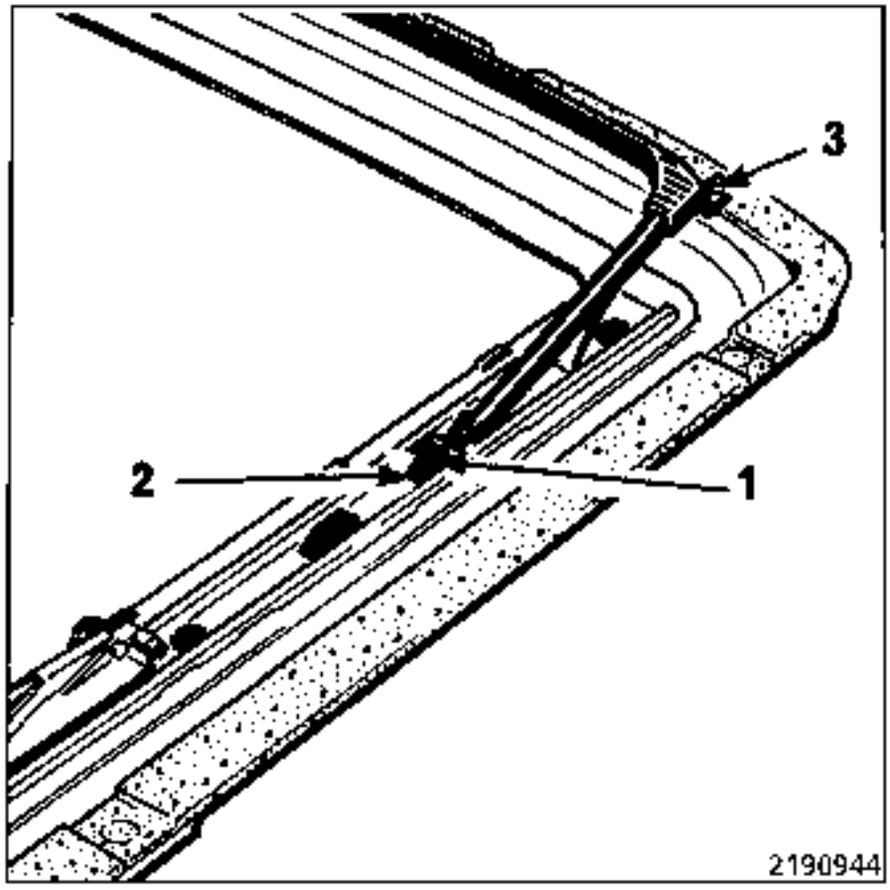
1 Seal
2 Deflector assembly
3 Sunroof control
4 Raising ramp
5 Control cable assembly
6 Sunroof motor
7 Water drainage tube
8 Rain channel assembly



9 Moving panel seal
10 Finishing profile
11 Trim for roof rear cross member
12 Screen
13 Sliding glass panel
14 Roof console
15 Headlining

AIR DEFLECTOR

Removal



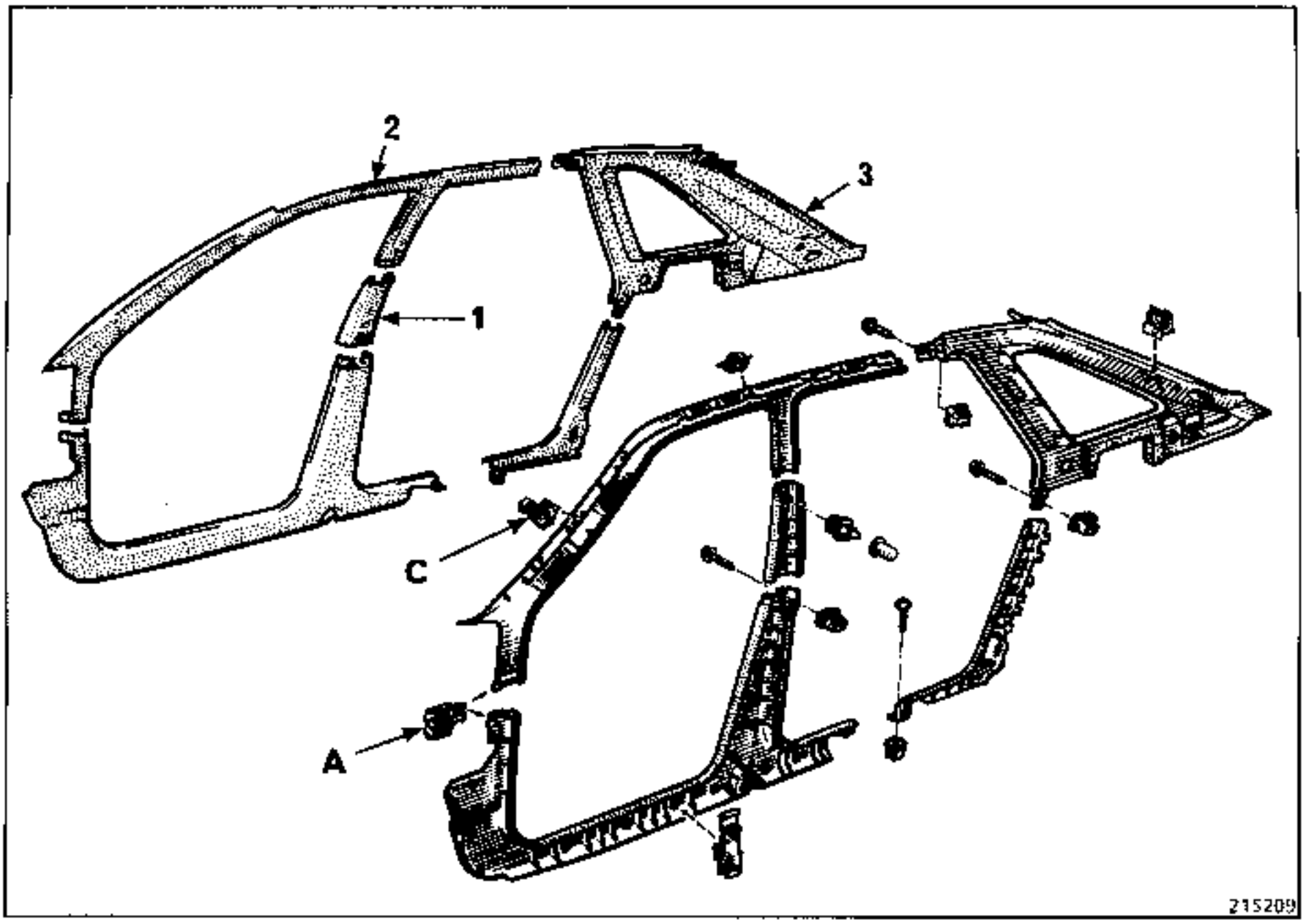
Move the sliding panel into the "**open**" position.

Remove the 2 screws (**1**) securing clips (**2**).

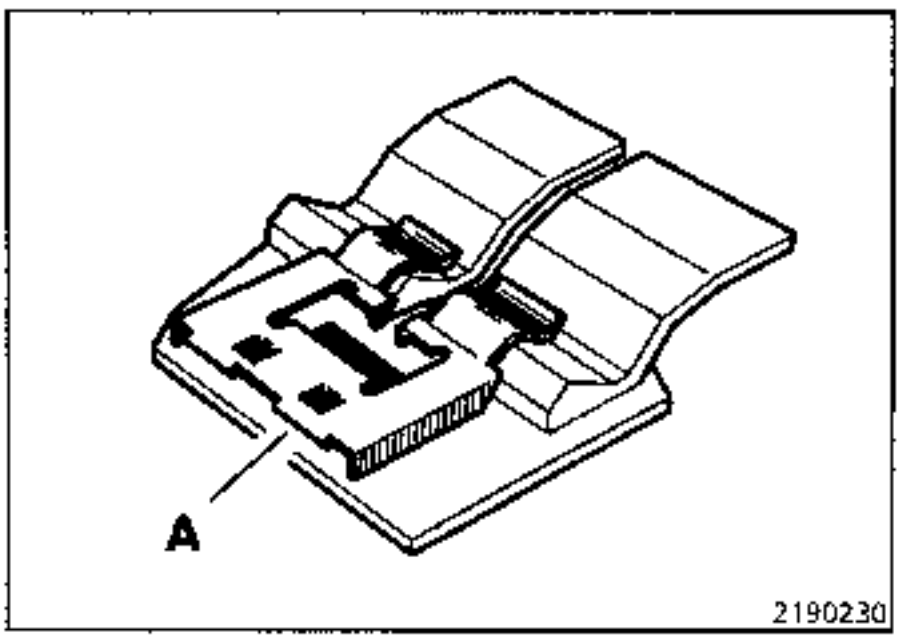
Remove the deflector by disengaging stops (**3**).

RAIN CHANNEL ASSEMBLY

Removal

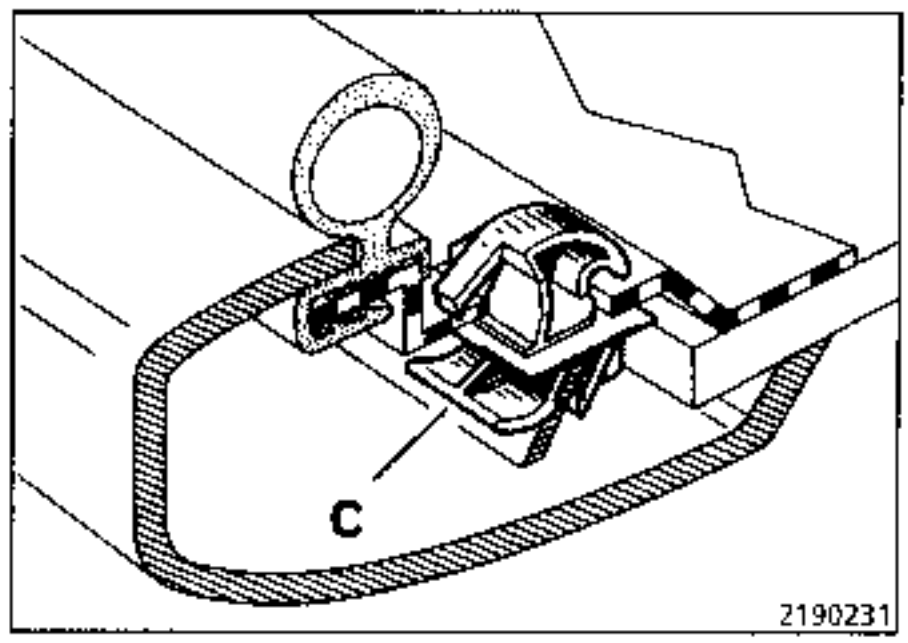


215209



2190230

(A) Snap mounting

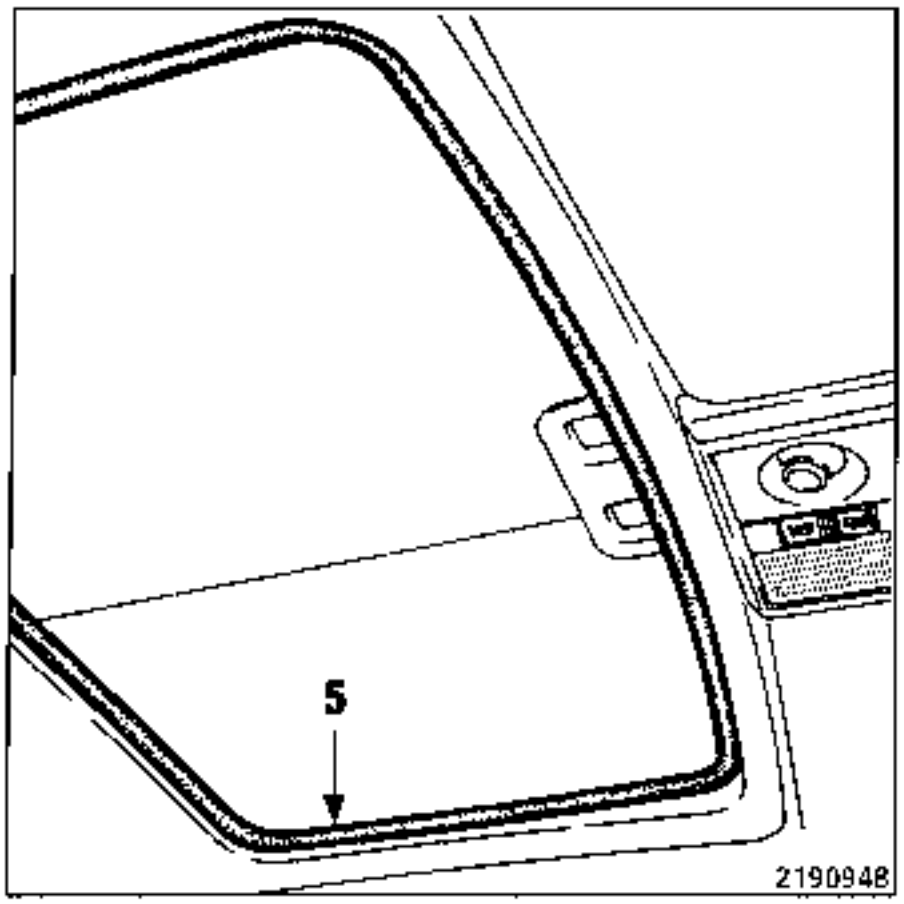


2190231

(C) Snap mounting

Remove :

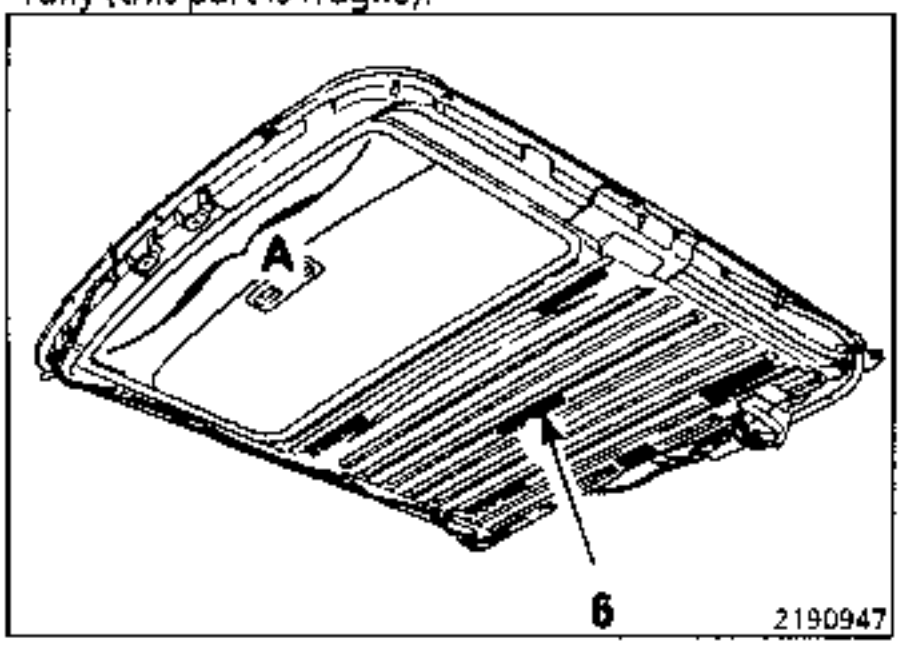
- the grab handles,
- the internal trim from the body sides (1), (2), (3),
- the trim from the roof rear cross member,
- the roof console,
- the sun visors.



Open the screen and the glass panel.

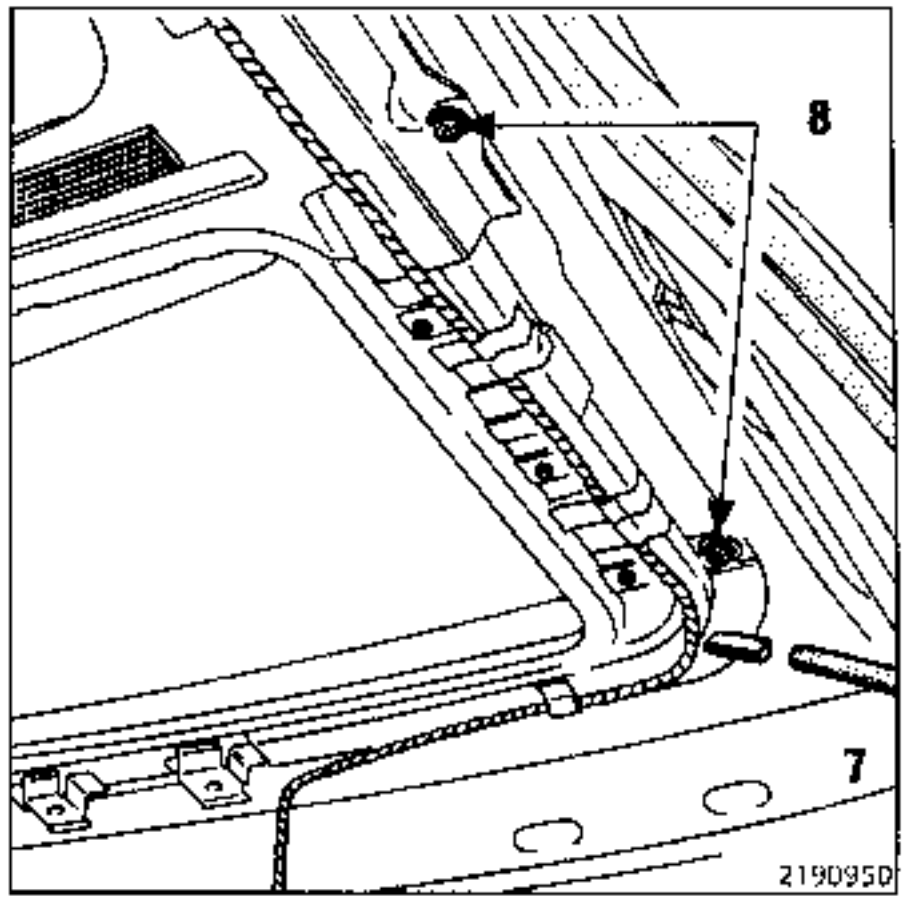
Remove the central clip from the finishing profile (5).

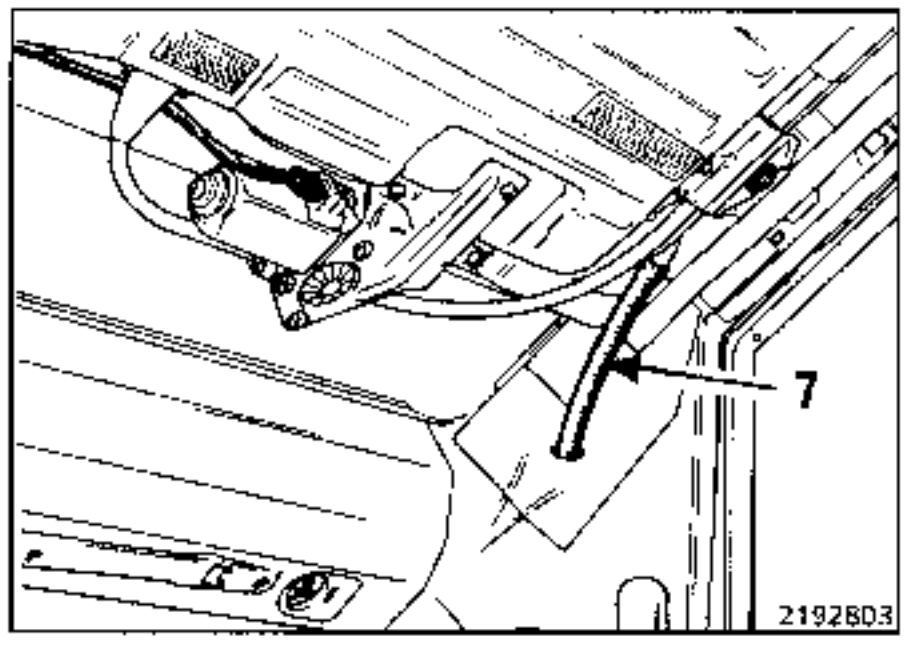
Remove the finishing profile by taking it out carefully (this part is fragile).



Remove the headlining. To do this, unstick the headlining using a blade in part (A) and unfasten it from the **6 "velcro"** strips (6).

Take out the headlining through the tailgate frame.





Disconnect the motor power supply connector.

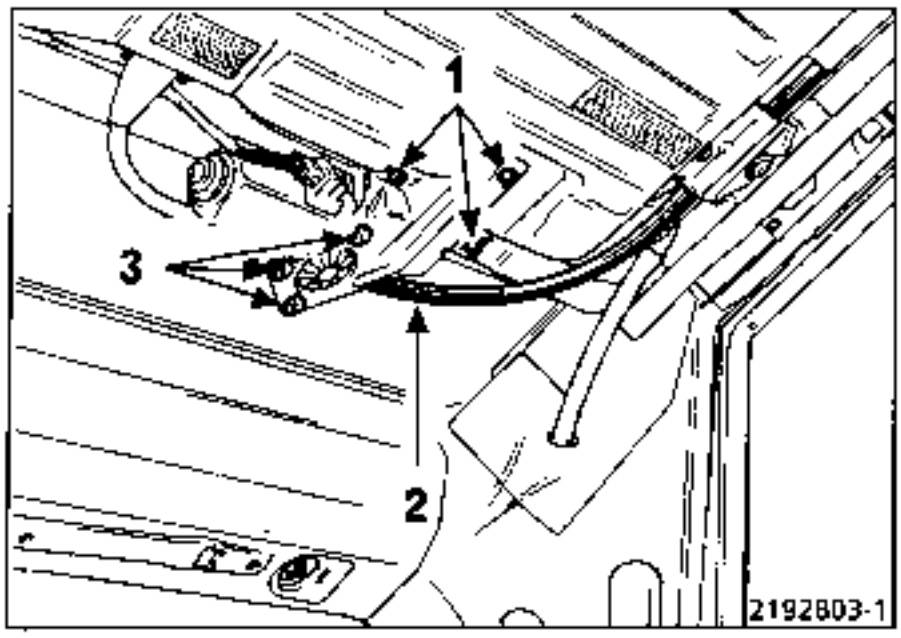
Separate the 4 water drainage tubes (7).

Remove the 8 nuts (8) securing the rain channel.

Take out the rain channel through the tailgate frame.

MOTOR

Removal

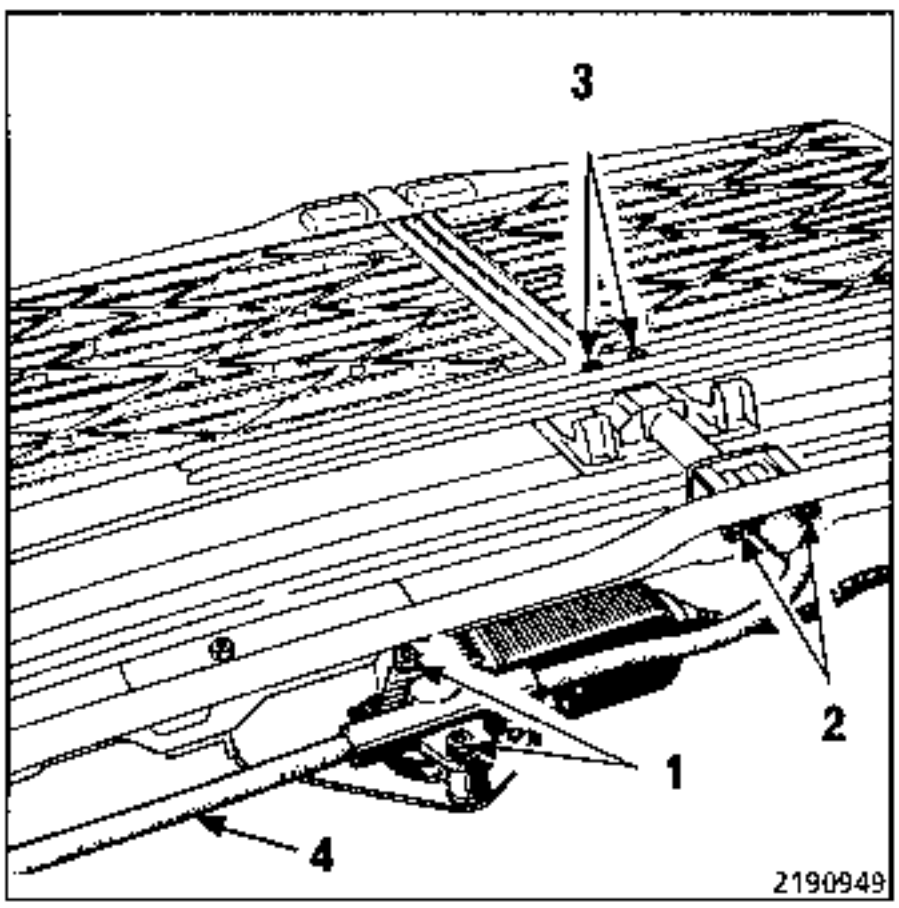


Disconnect the power supply connector from the motor.
Remove the 3 screws (1) holding the motor mounting plate .
Take out the drive cable sheathing (2) from its location.
Remove the 3 screws (3) securing the motor on the plate.
Remove the motor by separating it from the drive cable sheathing.

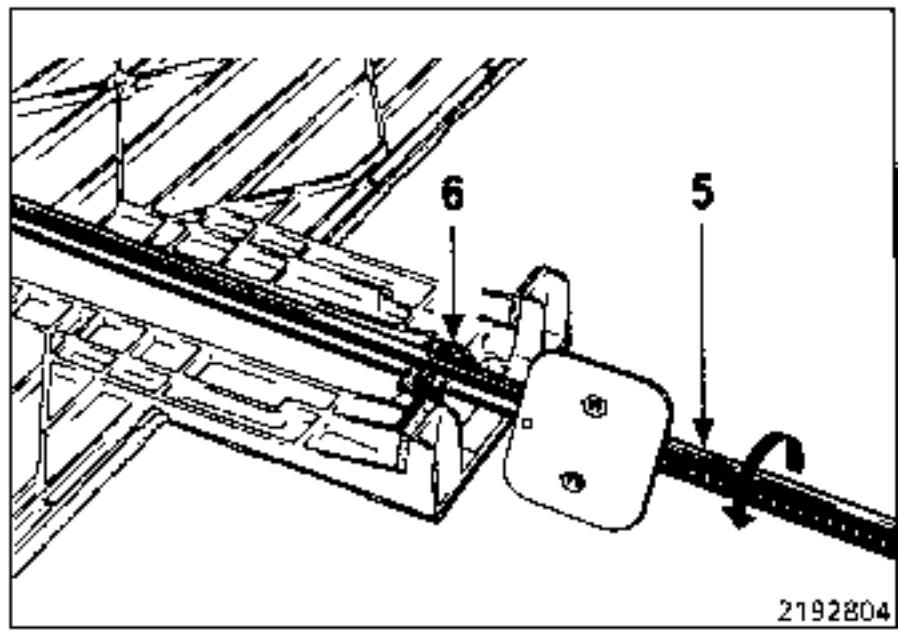
CONTROL CABLE ASSEMBLY

Removal

NOTE : The rain channel has to be removed in order to perform this operation.



Remove :
- the 2 nuts (1) securing the cable on the motor,
- the 2 nuts (2) securing the sheathing to the rain channel,
- the 2 screws (3) securing the cable end piece to the central cross member,
- the sheathing (4) by separating it from the control cable.

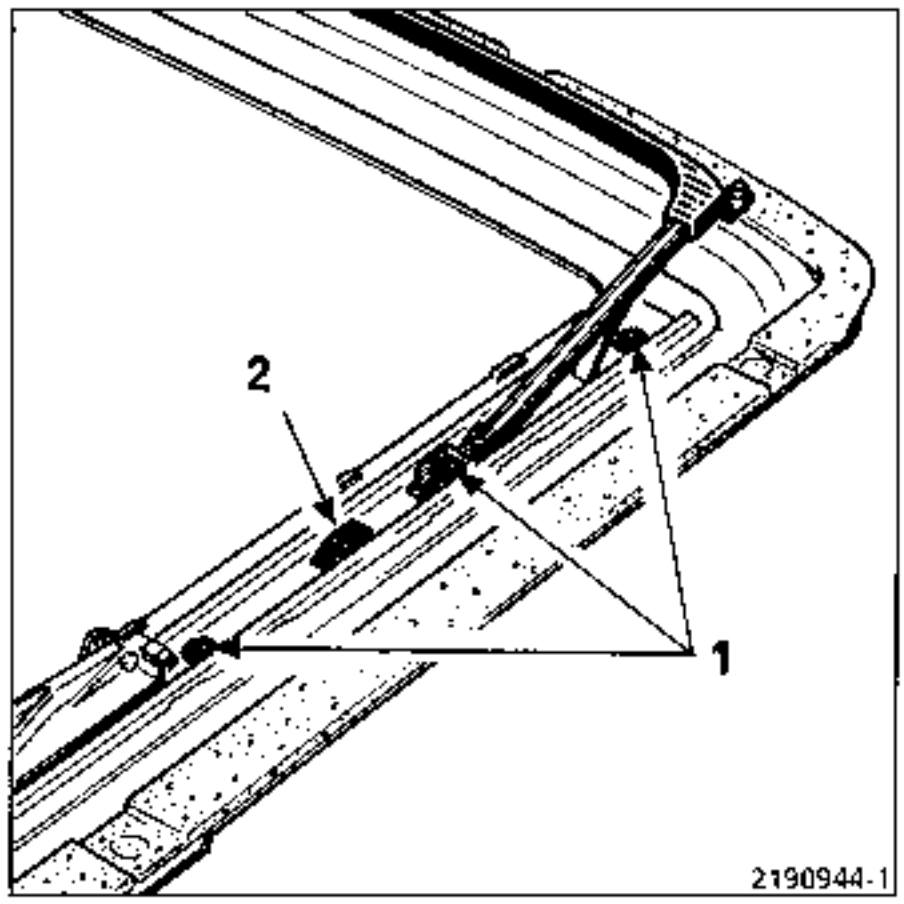


Pivot the guide tube (5) on its shaft around hook (6) to separate it from the screen.

SUNROOF CONTROL MECHANISM

Removal

NOTE : The rain channel has to be removed in order to perform this operation.

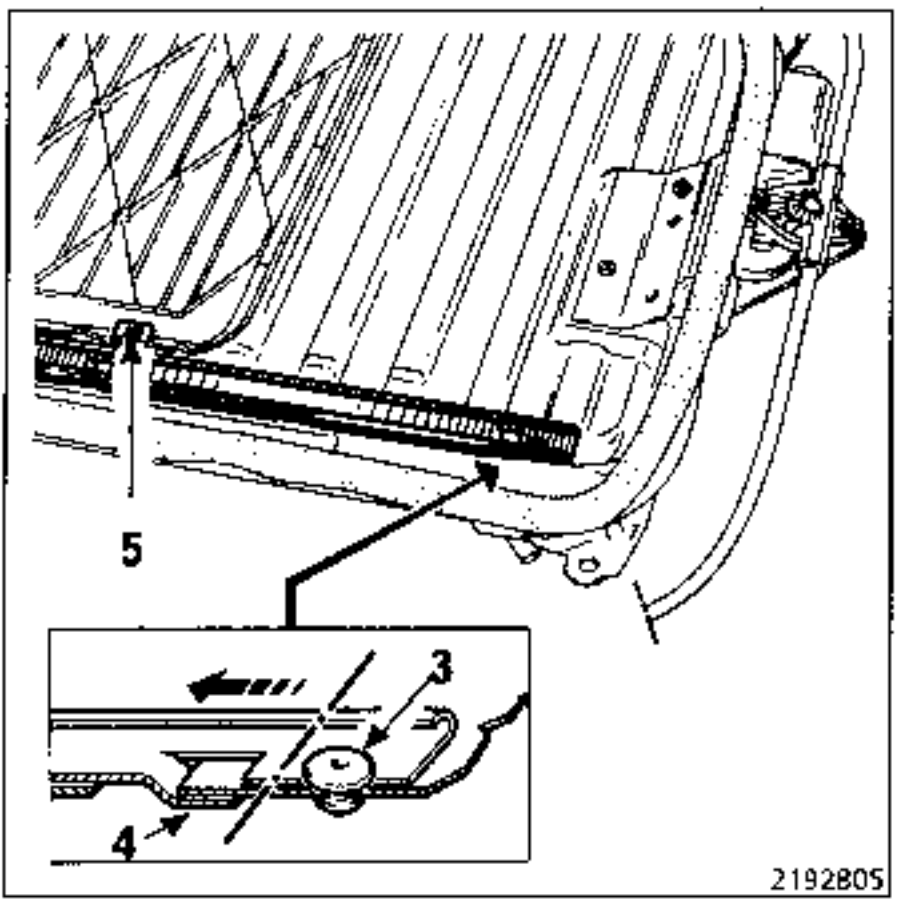


Move the mechanism into the "**open**" position.

Remove the six screws (1) securing the rails to the rain channel.

Unclip the 2 raising ramps (2).

Remove the 2 screws securing the control cable end piece to the mechanism central cross member.

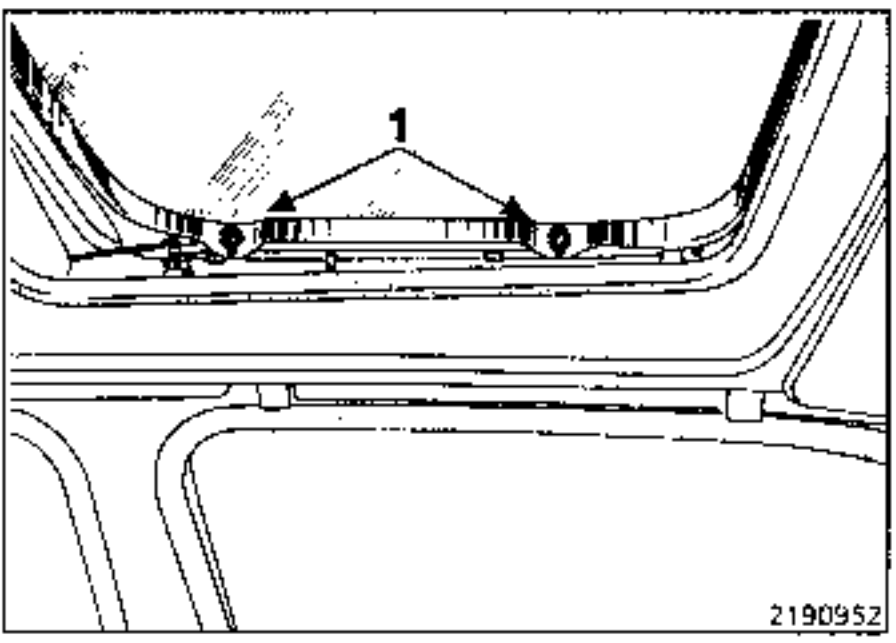


Drill the 2 rivets (3) securing the rails at the rear and remove the mechanism by pulling the rails towards the front to free catches (4).

Hold the screen whilst removing the mechanism in order to free the guide springs (5).

MOVING GLASS PANEL

REMOVAL



Close the panel.
Remove the 4 screws (1) (stamped BTR).
Use the electric control to move the sunroof backwards.
Tilt the glass panel slightly backwards and take it out from outside the vehicle, moving from the rear towards the front.

REFITTING and ADJUSTING

Place the glass panel on the control mechanism and run up the 4 screws (1) without tightening them.

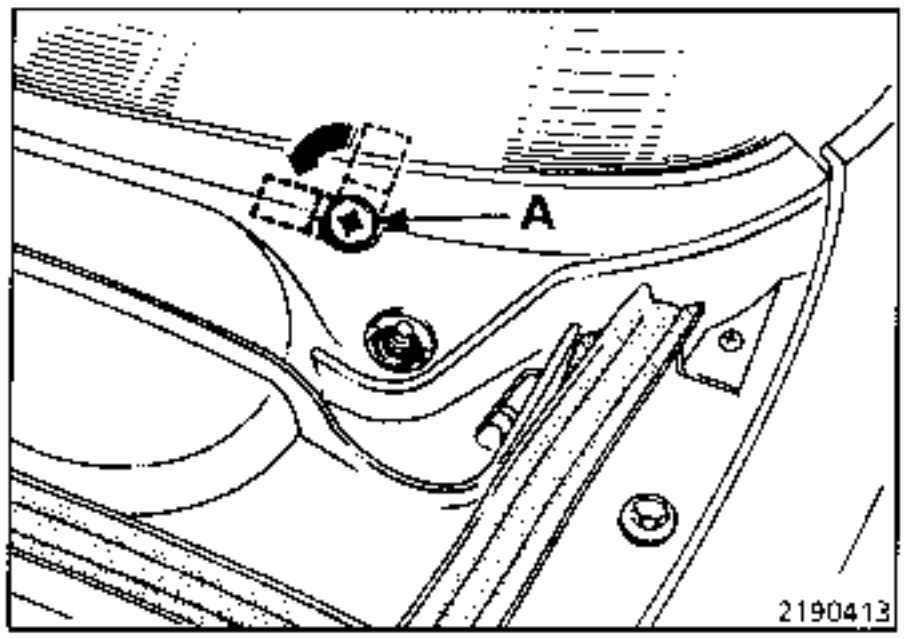
Move the control to the "closed" position and adjust the alignment of the moving panel with the roof.

Tighten the 4 screws.

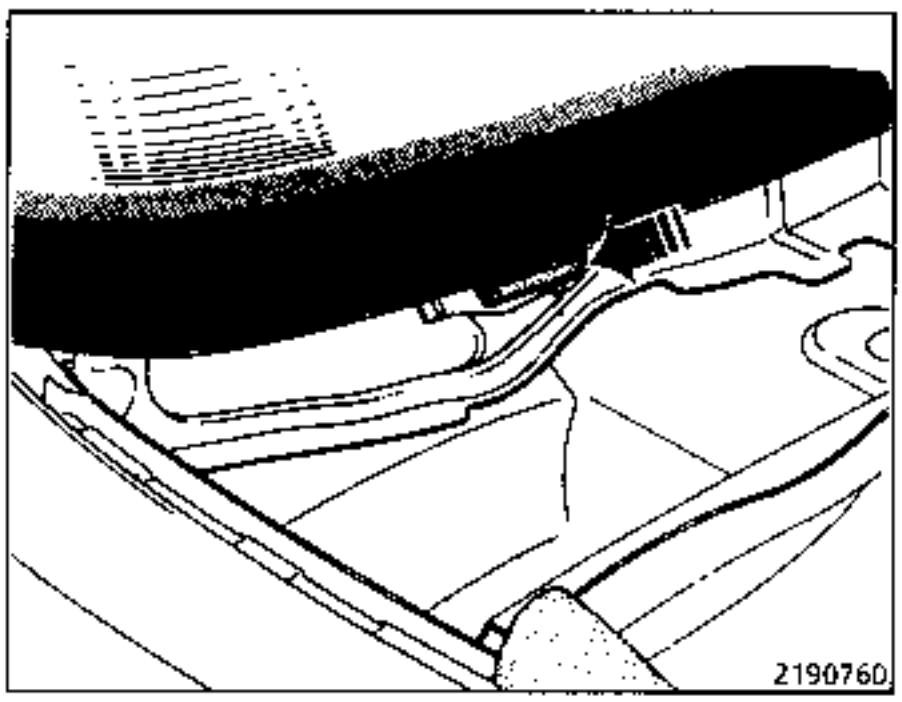
Activate the sunroof a number of times in order to check that it is flush and alter the alignment if necessary.

REMOVING THE TRIM

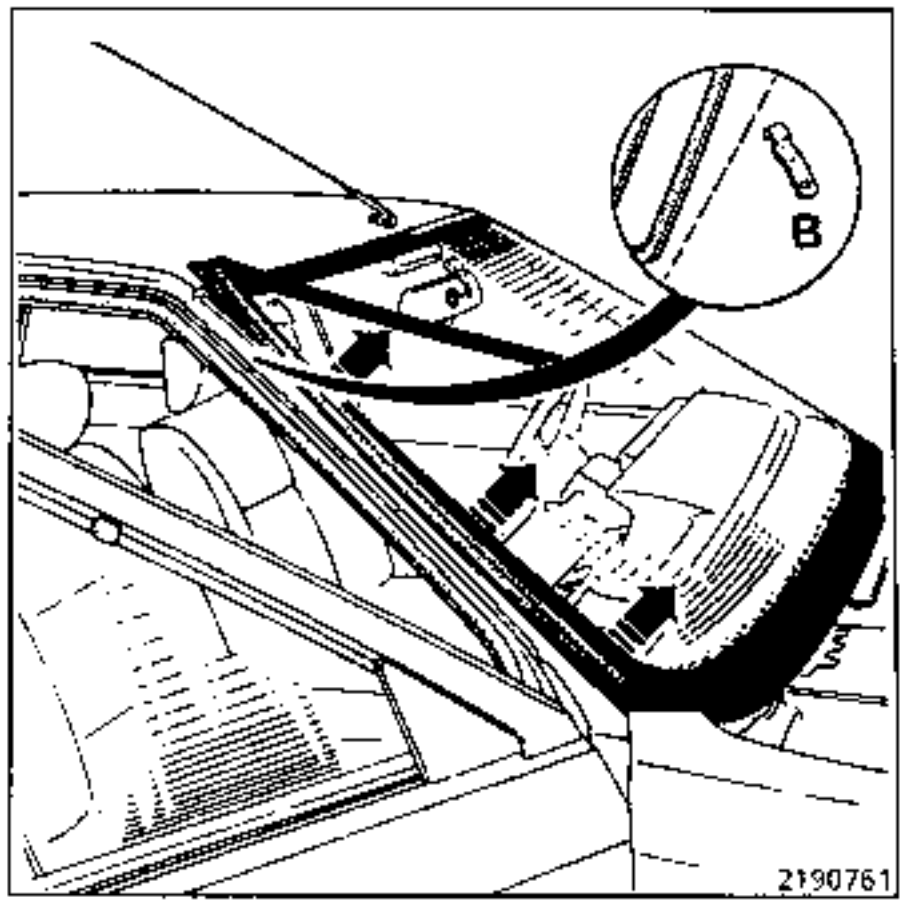
Remove :



- the windscreen wiper blades,
- the scuttle grille (clips (A) with a cross-head are to be turned 1/4 of a turn),



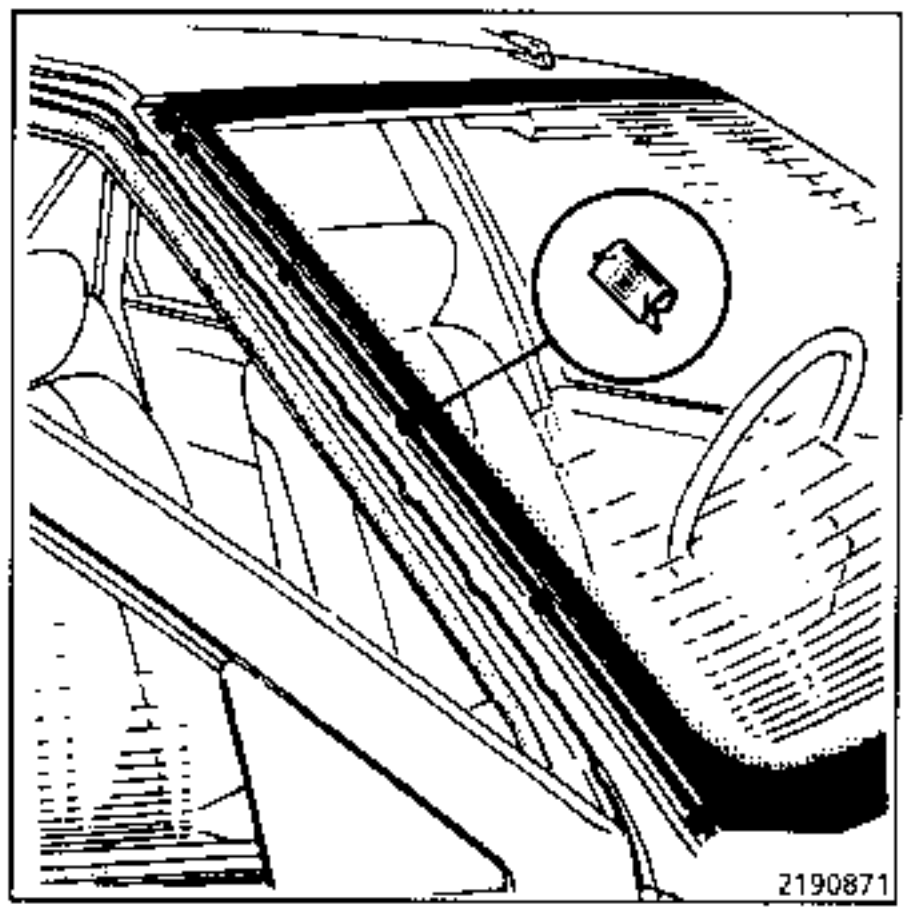
- Unclip the lower stops and remove them.



Moulding fastening clip (B).

The mouldings cannot be re-used. They must be replaced.

They are to be bonded over the entire length of the windscreen pillars using glass bonding mastic. To remove the mouldings they must be torn away from the surround.



When the mouldings have been removed, 6 holding clips should remain on the aperture in the positions shown in the drawing. If necessary, replace any missing clips (direct the clips so that the spikes are facing outwards).

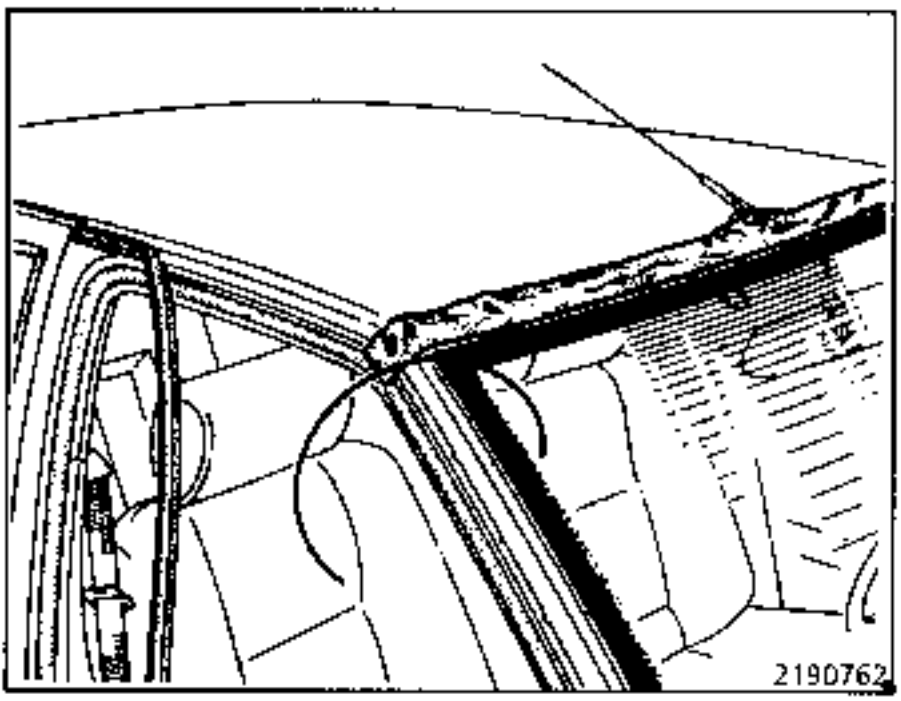
REMOVAL

Stick a strip of adhesive tape over the front section of the roof in order to protect it.

Check the top edge to see whether there is sufficient clearance between the moulding mounting and the aperture to enable the wire to be passed through over the entire length of the moulding mounting.

If the clearance is not sufficient, remove the moulding mounting. To facilitate its removal it can be heated slightly using a hot air torch.

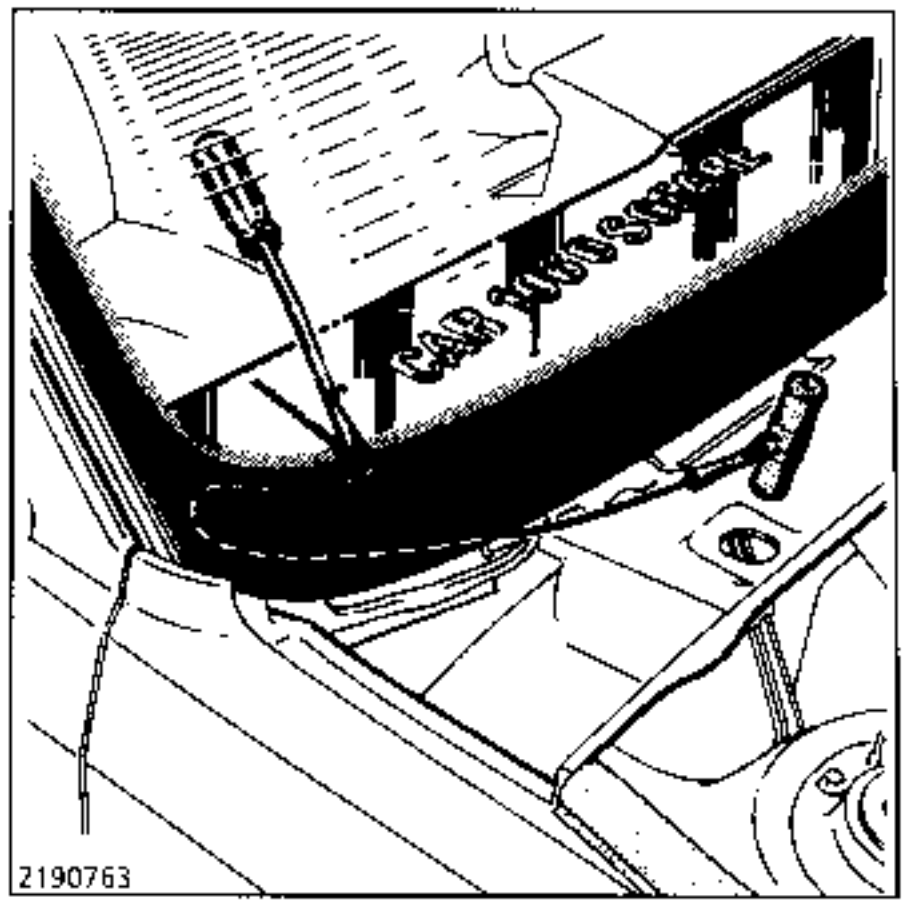
Fit the dashboard protector in place.



At one of the upper corners pass a piece of steel wire approximately **30 cm** long through the mastic bead.

Fit in place the pricker tool and pulling handle.

Cut the mastic bead starting at the two sides and upper edge.



For the lower corners, pass the wire under the window and pull at the opposite corner so as not to damage the upper corner of the wing.

In the lower part of the windscreen the mastic bead is situated very high with respect to the outer edge of the glass.

During the cutting operation, the operator pulling on the pulling handle should keep his hand as low as possible in order to avoid scraping the edge of the glass.

CLEANING THE EDGE OF THE WINDSCREEN APERTURE

Use a spatula approximately **20-25 mm** wide which has been sharpened, to cut and smooth down the remaining mastic bead so that there remains a thickness of approximately **0.5-1 mm** on the windscreen surround.

NOTE : It is essential that a film of this mastic should be left on the windscreen surround to act as a key for the new bead.

Remove all mastic residue and dust from the windscreen surround by blowing it with an air gun.

NOTE : Only use dry air which is absolutely free from oil. As a general rule, no cleaning product or degreasing agent is to be used on this film of mastic.

PREPARING THE NEW WINDSCREEN

Carefully clean the enamelled surface around the entire periphery of the windscreen.

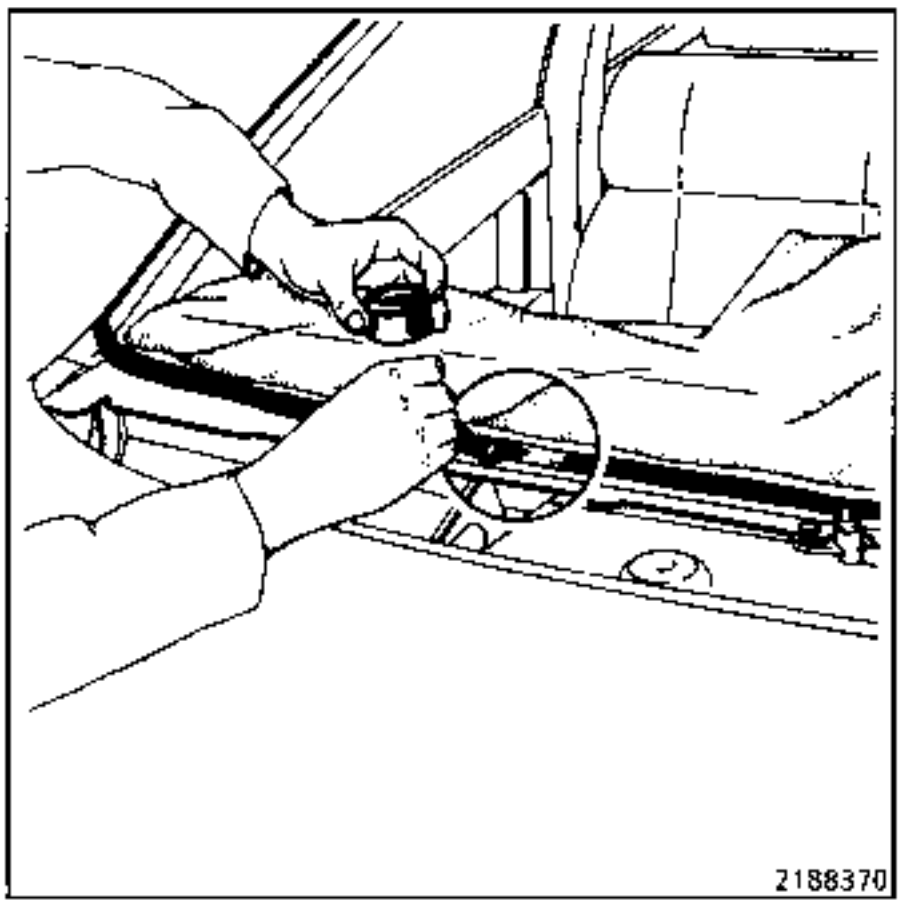
1) If possible, use de-mineralised water, wiping it off with a dry clean cloth.

2) Then, use a degreasing solvent, using the special cloth supplied in the kit.

Apply glass primer between the anti-overflow seal and the edge of the windscreen over the 3 upper edges and over a width of approximately **20 mm** along the anti-overflow seal for the lower edge.

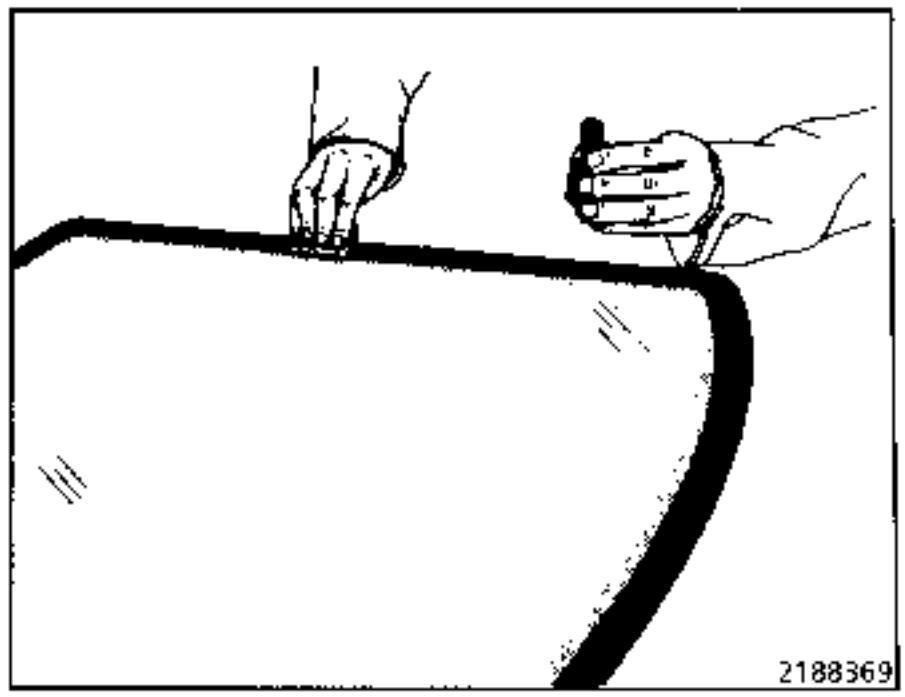
Fit the moulding to the upper edge of the windscreen.

PREPARING THE WINDSCREEN SURROUND



Apply metal primer to those areas where the surround has been stripped back to the bare metal during removing or cleaning operations.

Do not apply it to the remaining strip of mastic. If necessary, re-cut the end of the applicator with a pair of scissors.



REFITTING

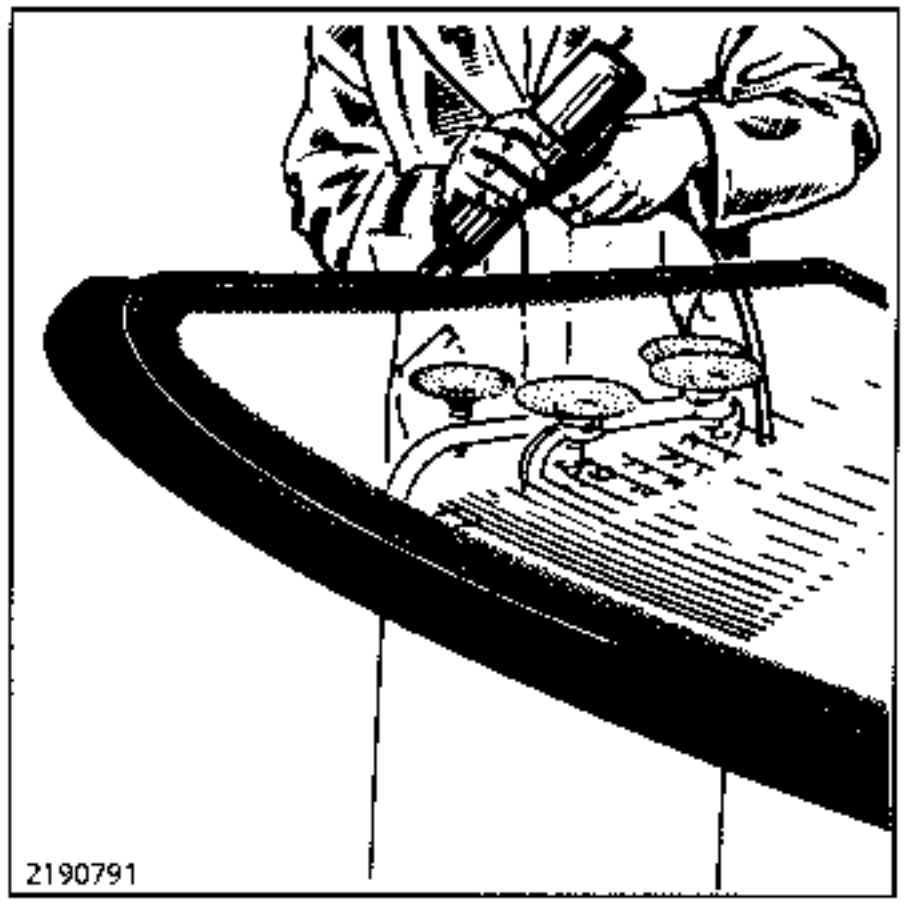
Refit the double seal.

For the **Renault 21**, a special nozzle which has already been cut out to a triangular shape has been added to the kit.

If you do not have this nozzle, cut the one found in your kit so as to obtain a triangle with a base approximately **7 mm long** and height **10 mm**.

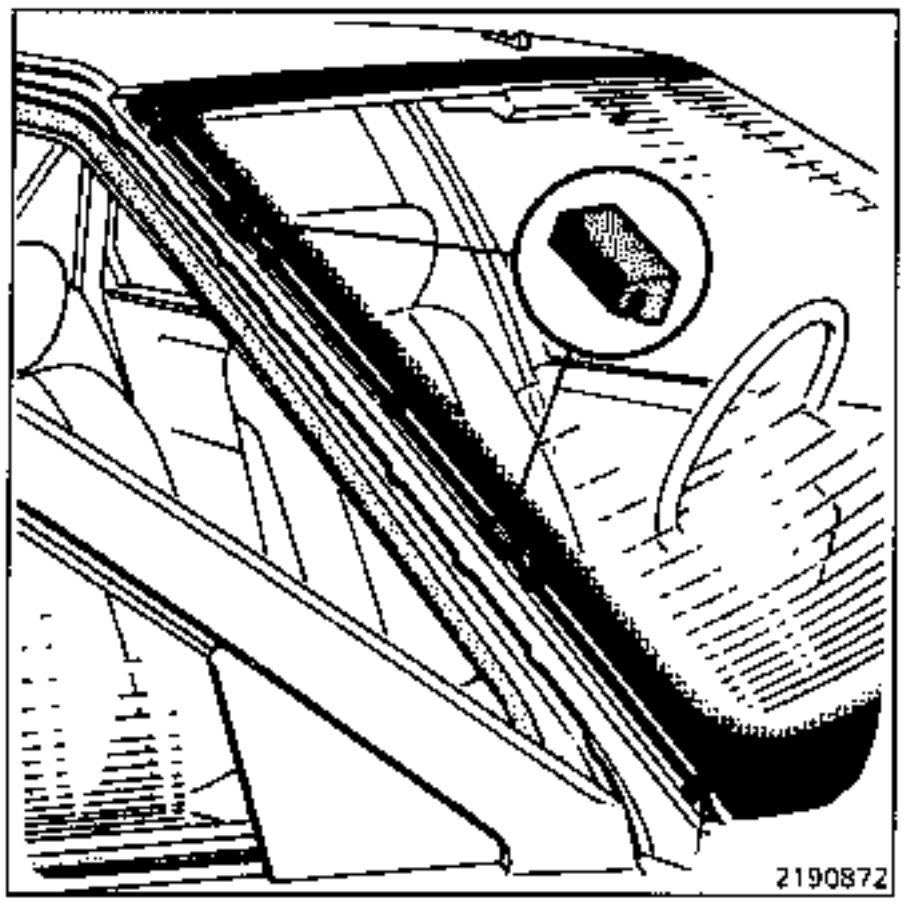
Taking the cartridge, pierce the diaphragm with a screwdriver and screw on the nozzle.

Remove the base from the cartridge and take out the drying agent.



Using a spray gun, apply the mastic bead to the windscreen along the anti-overflow seal. Using a spatula, smooth down the join where the ends of the mastic bead meet.

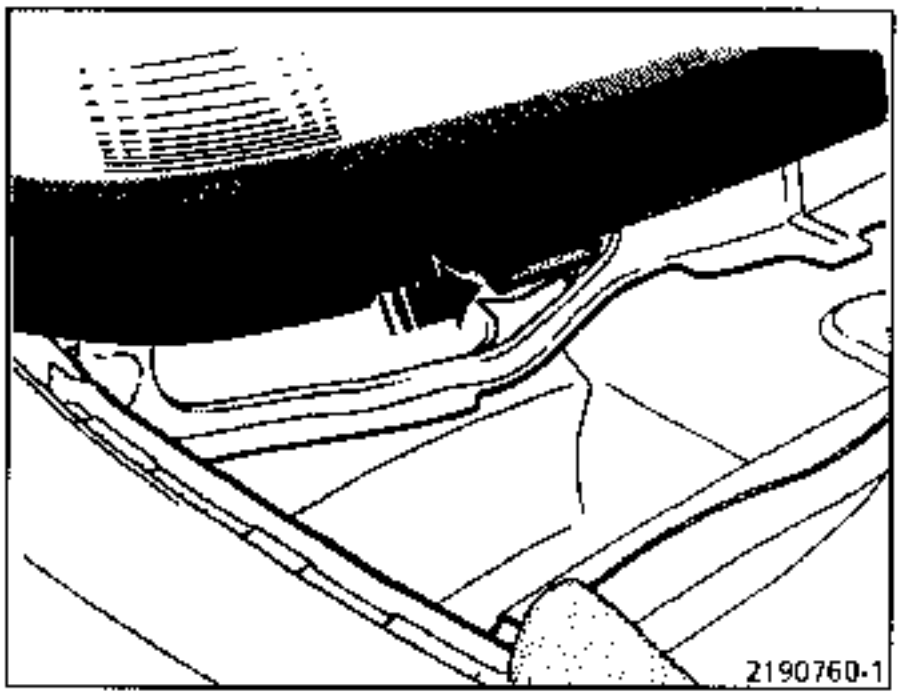
Keep the cartridge as the remaining mastic can be used to bond the mouldings.



To make it easier to centre the windscreen at the sides, fit the Renault 25 locating wedges to be found in the bonding kit, to the windscreen aperture.

Using the suction pads, place the windscreen on the vehicle.

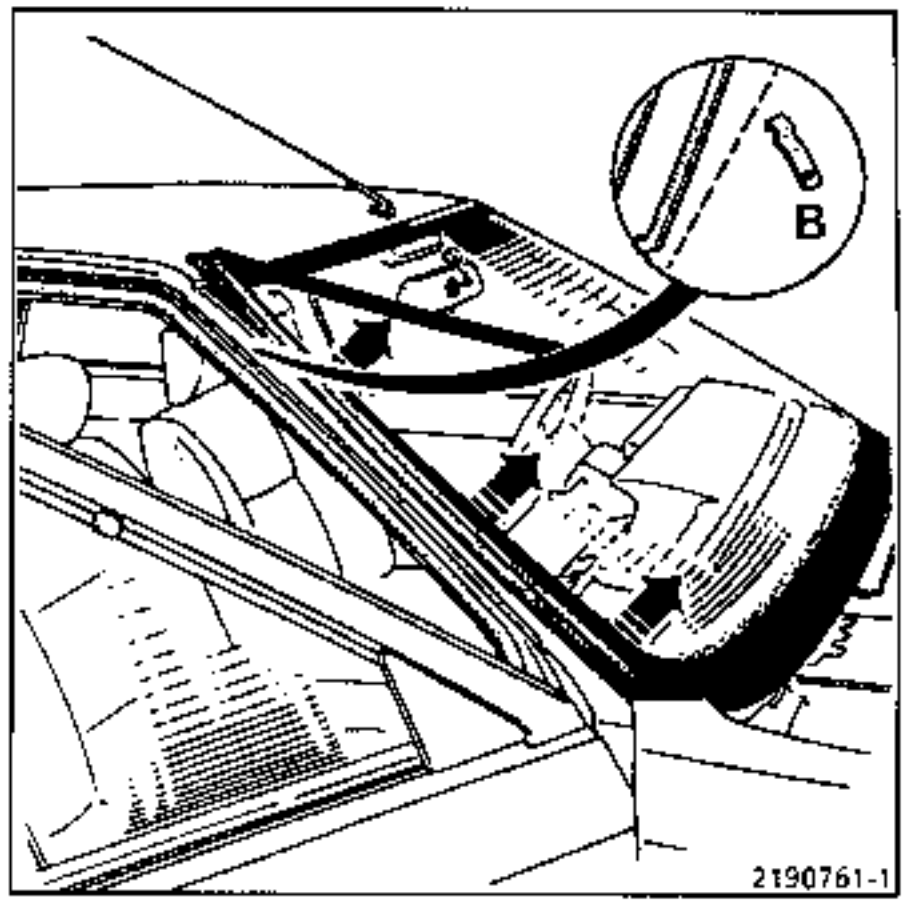
IMPORTANT : The windscreen must be offered up parallel to the aperture. Fit it, centring it between the wedges and so that it abuts the base of the upper aperture.



Check the clearance between the windscreen glass and the lower stop mounting lugs. It should be approximately **9 mm**.

Fit the lower stops and clip them so that the windscreen is held correctly in the base of the aperture.

REFITTING THE MOULDINGS



Use the remaining mastic to apply a thin bead to the area of the aperture or in the groove of the new moulding.

Fit the mouldings, starting by sliding the lower part of over the wing. Adjust the final position by guiding it in relation to the upper corner.

Clip the upper part of the mouldings in place and refit the centre clip.

Refit the scuttle grille and the windscreen wiper blades.

NOTE : The vehicle must remain stationary for at least **3 hours**. You are strongly recommended to use this time to run water over the edge of the windscreen in order, on the one hand, to find any areas where the sealing is poor and, on the other hand, to accelerate polymerisation of the mastic thanks to the moisture.

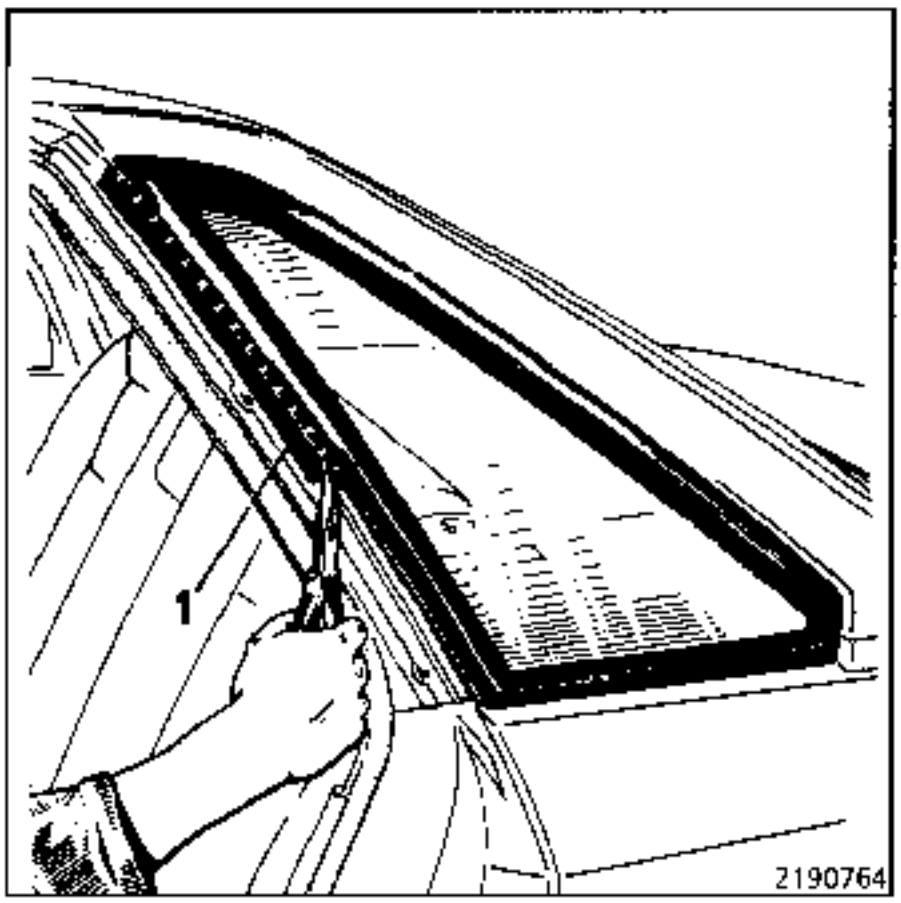
REMOVING THE TRIM

Remove the internal trim from the rear quarter window.

Remove the double seal away from the rear door frame.

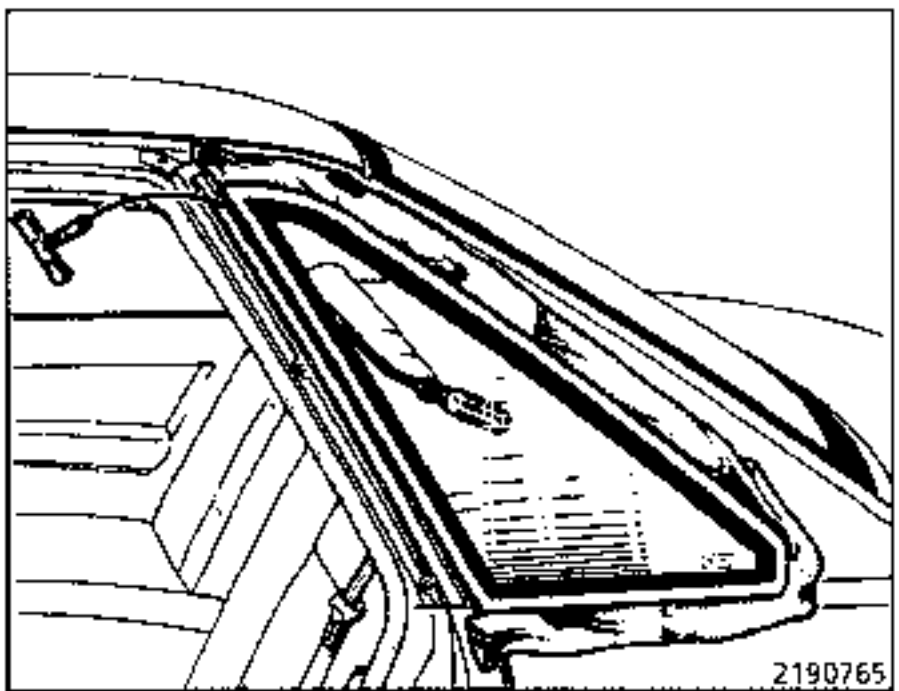
REMOVAL

Using a wide strip of adhesive tape, protect the bodywork around the edge of the window.

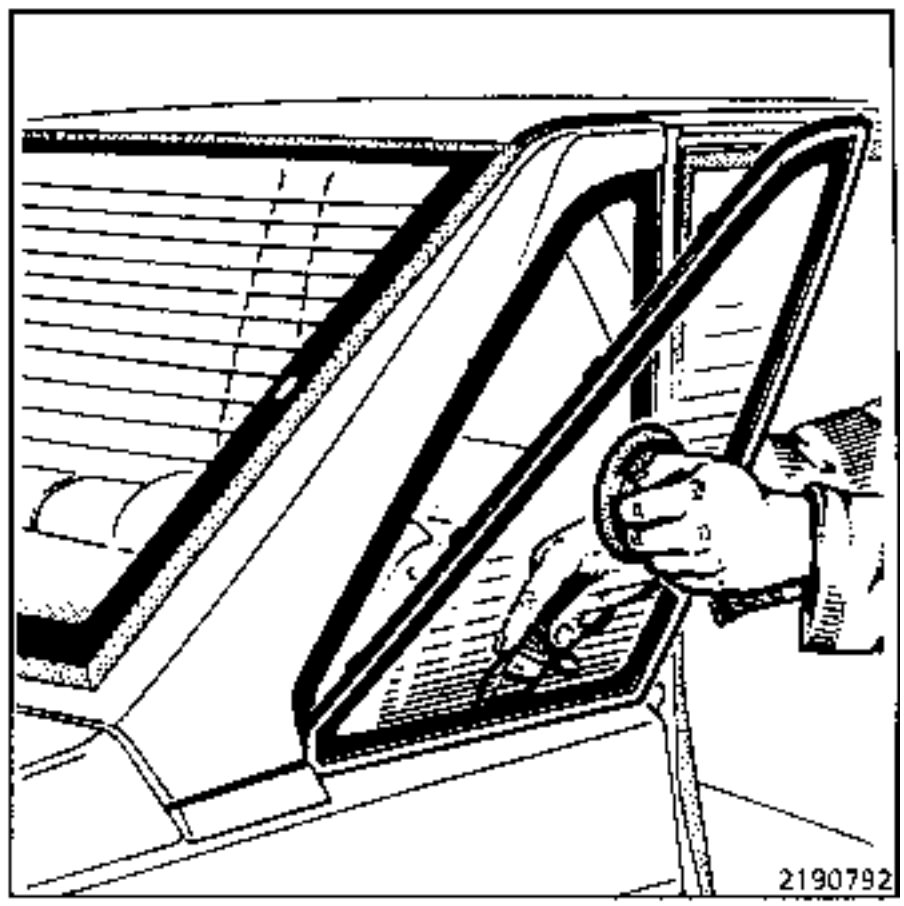


NOTE : Removal of the window means that the moulding frame must be replaced.

Using a pair of pliers, break the return (1) on the plastic moulding frame following the dotted line (- - - -).



Pass a piece of steel wire approximately **30 cm** long through the bead of mastic at the upper corner. Fit in place the pricker tool and pulling handle. Cut the mastic bead following the order shown in the drawing.



After cutting the first 2 sides, move the window away and, using a sharp blade, cut the remaining mastic taking care not to catch the 3 clips holding the frame.

CLEANING THE WINDOW SURROUND

Using a spatula approximately **20-25 cm** wide, the edge of which has been sharpened, cut and smooth down the mastic bead to leave a thickness of approximately **0.5 to 1 mm** of mastic on the surround.

NOTE : It **is essential to leave a film of mastic on the window surround** to act as a key for the new bead.

Remove all mastic residue and dust by blowing it with an air gun.

NOTE : Only use dry air, free from all traces of oil.

As a general rule, no cleaning or degreasing product is to be used on the remaining film of mastic.

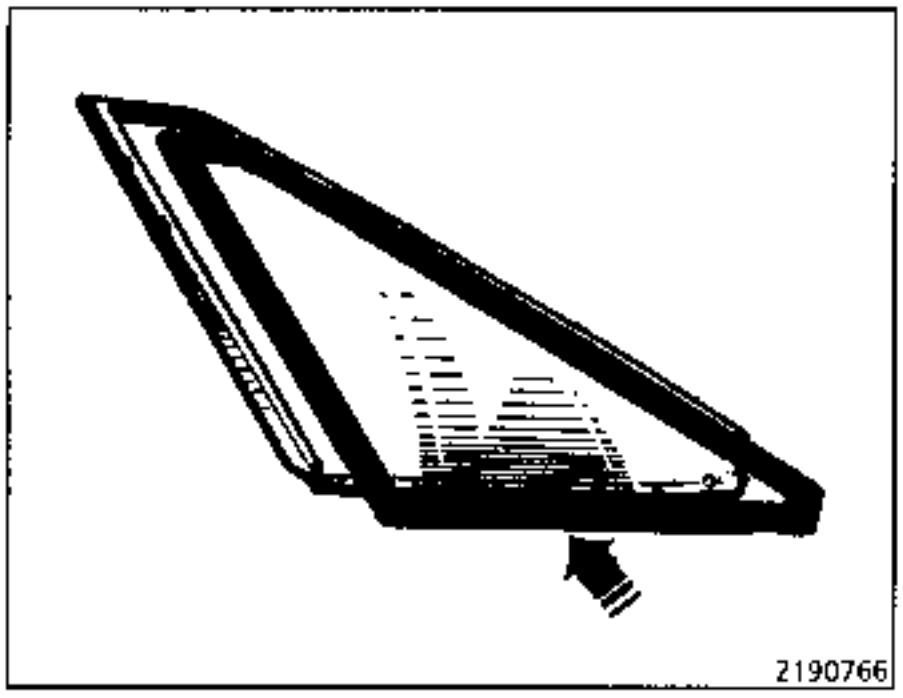
PREPARING THE NEW WINDOW

Carefully clean the enamelled surface around the entire periphery of the windscreen.

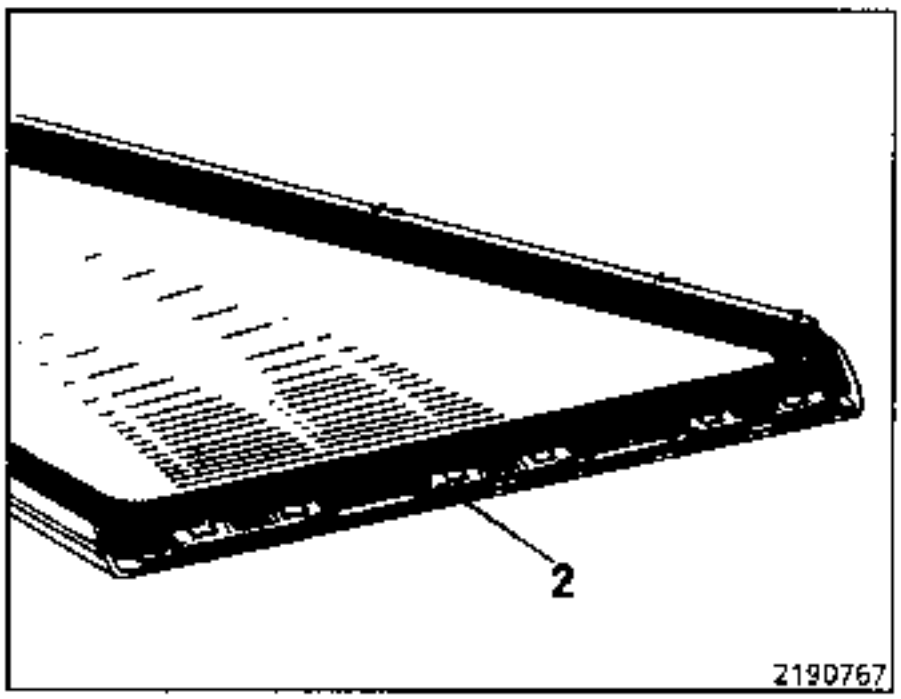
1) If possible, use de-mineralised water, wiping it off with a dry clean cloth.

2) Then, use a degreasing solvent, using the special cloth supplied in the kit.

Using the pad, apply the glass primer to the enamelled surface.



When the primer is dry, insert the window into the new moulding frame. Do not touch the prepared surface with your fingers.

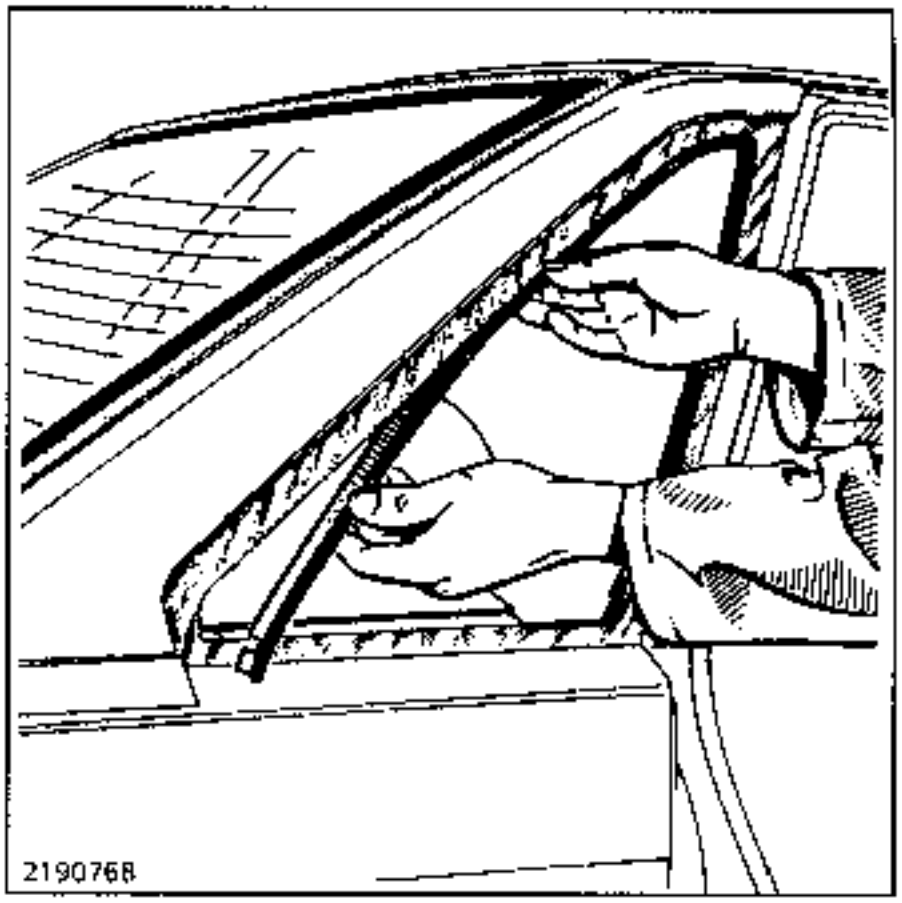


fit the clips (2) securing the moulding frame to the glass.

PREPARING THE WINDOW SURROUND

Apply a metal primer to those parts of the surround that have been damaged back to the bare metal during the removing or cleaning operations.

Do not apply this primer to the remaining film of mastic. If necessary, re-cut the applicator with a pair of scissors.



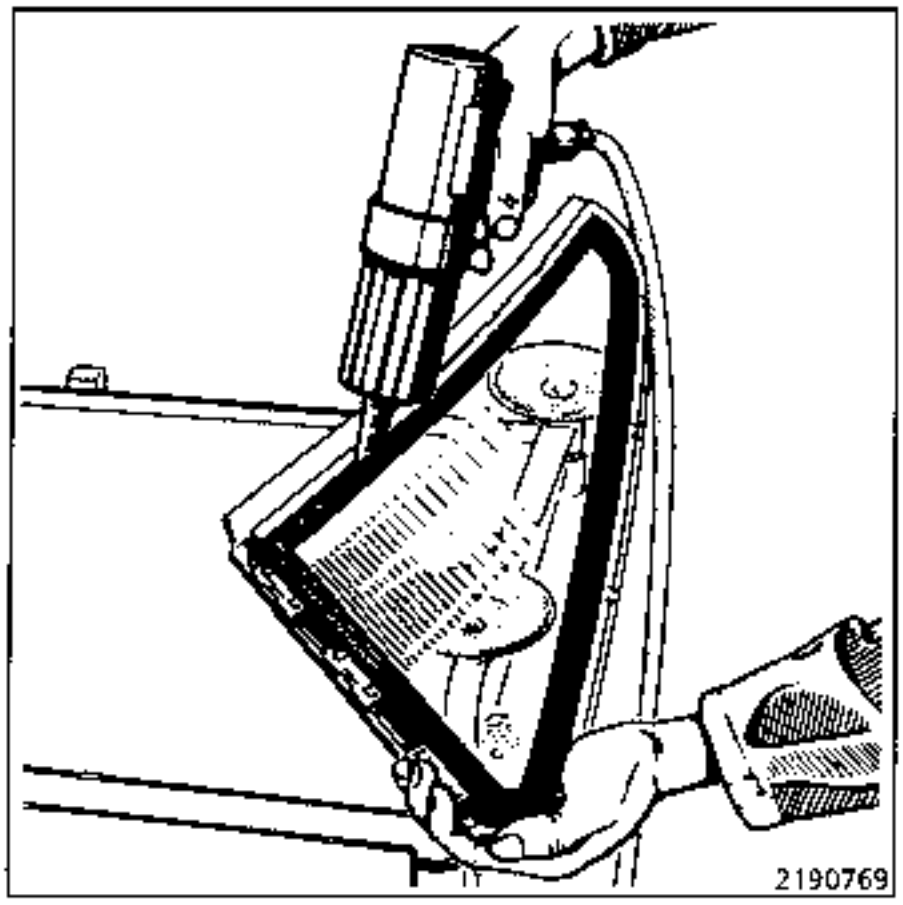
Fit the anti-overflow seal, bonding the adhesive surface inside the aperture.

REFITTING

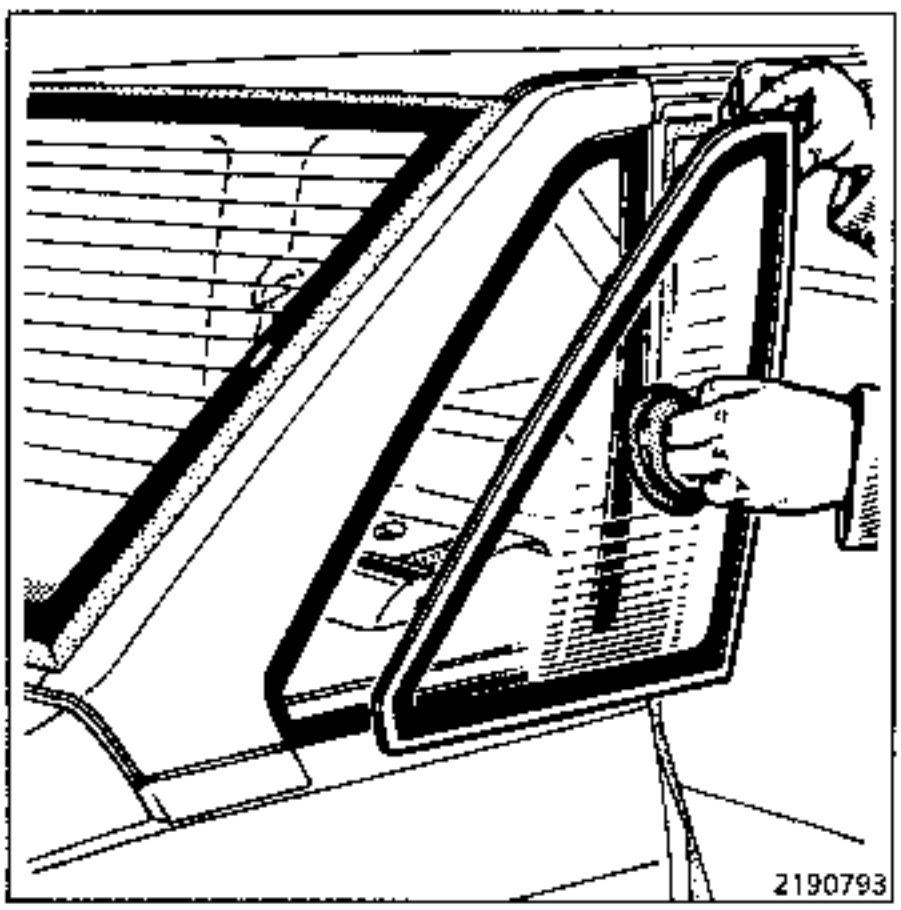
Pierce the membrane on the mastic cartridge and screw on the nozzle pre-cut to a triangular shape.

NOTE : If you do not have this nozzle, cut the one found in your kit so as to obtain a triangle with a base approximately **7 mm** long and height **10 mm**.

Remove the bottom of the cartridge and take out the drying agent.



Using the spray gun, apply a bead of mastic to the window running along the edge of the clips and following the edge of the moulding frame. Use a spatula to smooth down the join where the ends of the mastic bead meet.



Using a single suction pad (for the part number see the beginning of the section), fit the window to the vehicle offering it up parallel to the aperture.

Adjust the position of the window in relation to the rear door when closed and hold it in place using a strip of adhesive tape.

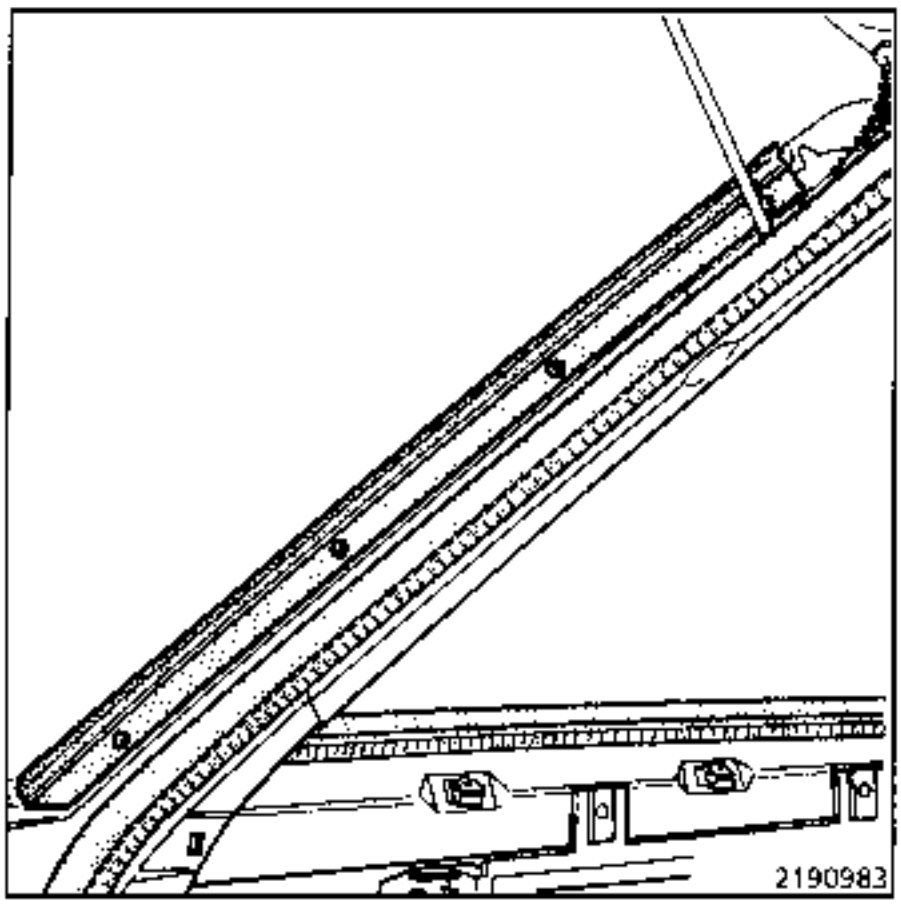
Refit the double seal and the quarter panel internal trim.

NOTE : The speed of polymerisation of the bonding mastic is the same as for the windscreen or the rear screen. However, if the customer so wishes, the vehicle may be returned to him at the end of the operation. If this is the case, hold the window in position using a wide strip of strong adhesive tape stuck around the glass so as to prevent any risk of its lifting.

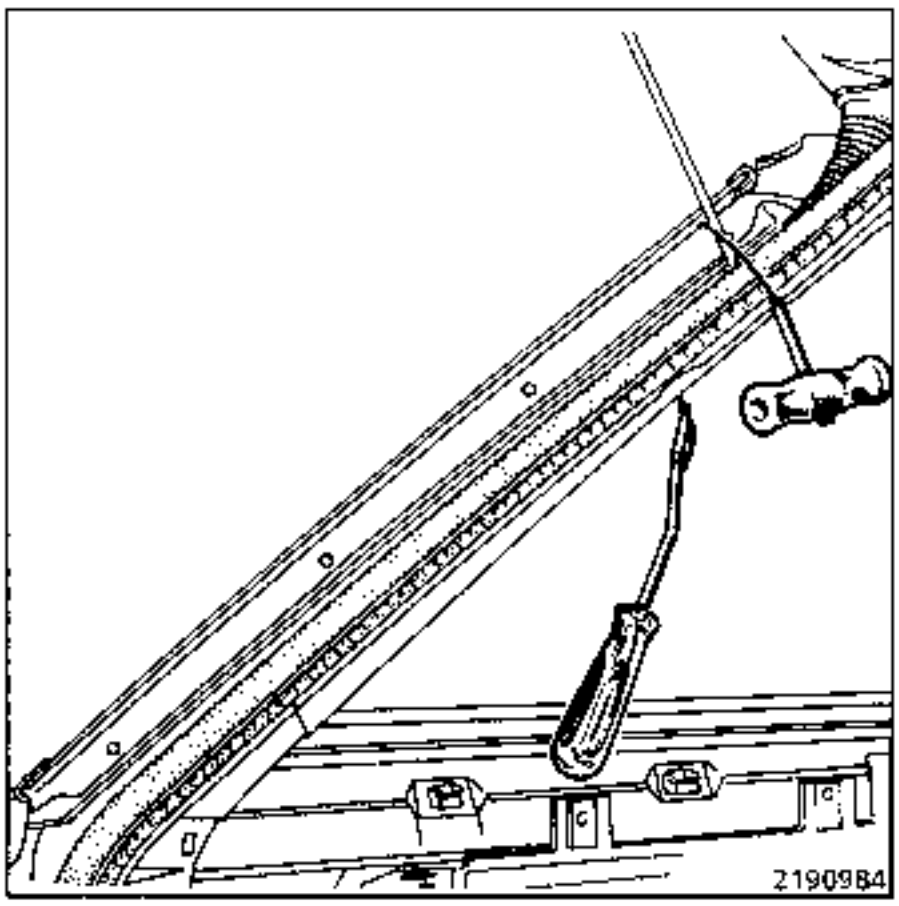
REMOVING THE TRIM

Remove the trim from inside the rear quarter panel.

REMOVAL

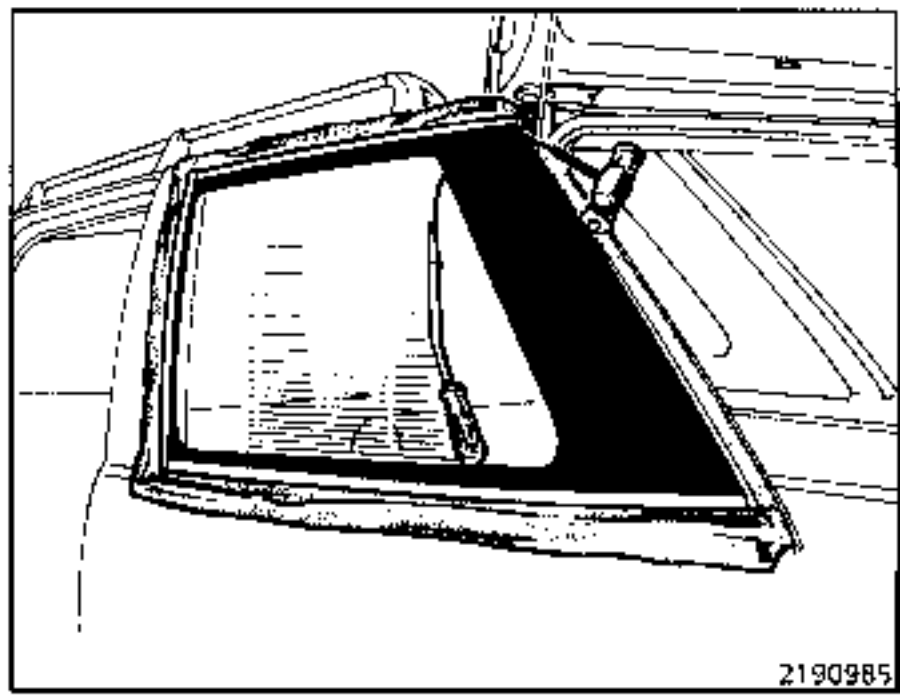


Remove the 4 rivets holding the rear moulding.



Using a wide strip of adhesive tape, protect the bodywork around the edge of the window.

Pass a piece of steel wire approximately **30 cm** long through the mastic bead at the upper rear corner. Fit in place the pricker tool and pulling handle.



Cut the mastic bead as shown in the drawing above.

NOTE : The 3 mouldings (upper, lower and front) stay fitted on the window when it is removed. Keep a constant watch on the cutting wire.

When the window has been removed, check the condition of the mouldings.

CLEANING THE WINDOW SURROUND

Using a spatula approximately **20-25 cm** wide, the edge of which has been sharpened, cut and smooth down the mastic bead to leave a thickness of approximately **0.5 to 1 mm** of mastic on the surround.

NOTE : It is essential to leave a film of mastic on the window surround to act as a key for the new bead.

Remove all mastic residue and dust by blowing it with an air gun.

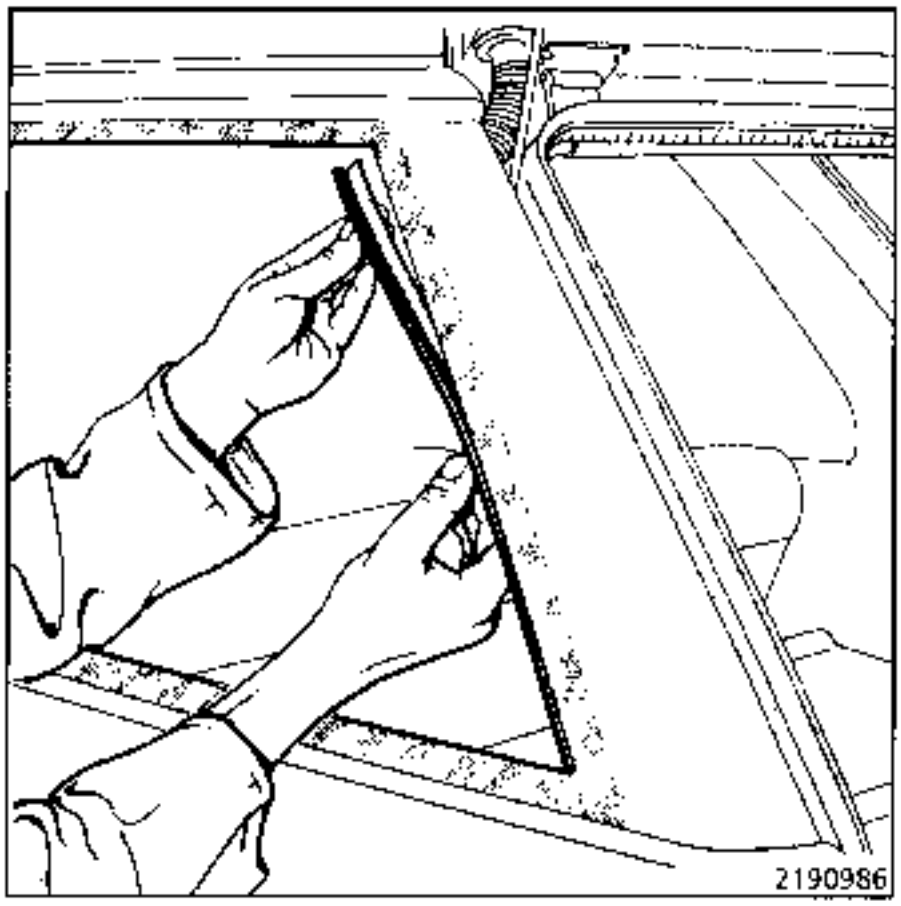
NOTE : Only use dry air, free from all traces of oil.

As a general rule, no cleaning or degreasing product is to be used on the remaining film of mastic.

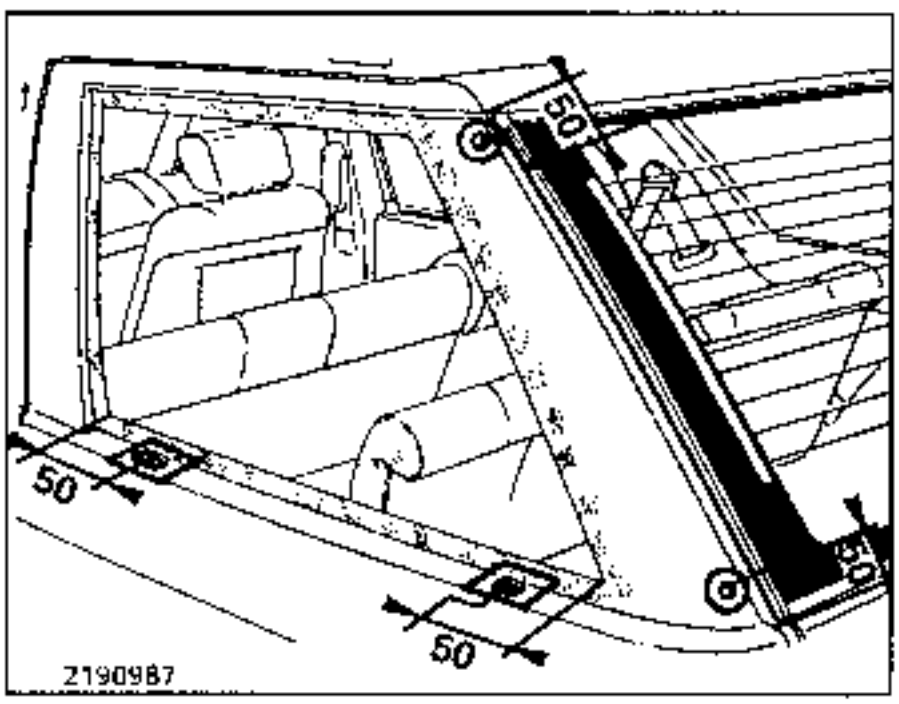
PREPARING THE WINDOW SURROUND

Apply a metal primer to those parts of the surround that have been damaged back to the bare metal during the removing or cleaning operations.

Do not apply this primer to the remaining film of mastic. If necessary, re-cut the applicator with a pair of scissors.



Fit the anti-overflow seals (1 per side), sticking the adhesive surface inside the aperture.



Fit the wedges for the base of the aperture and the round bearing stops as shown in the drawing above.

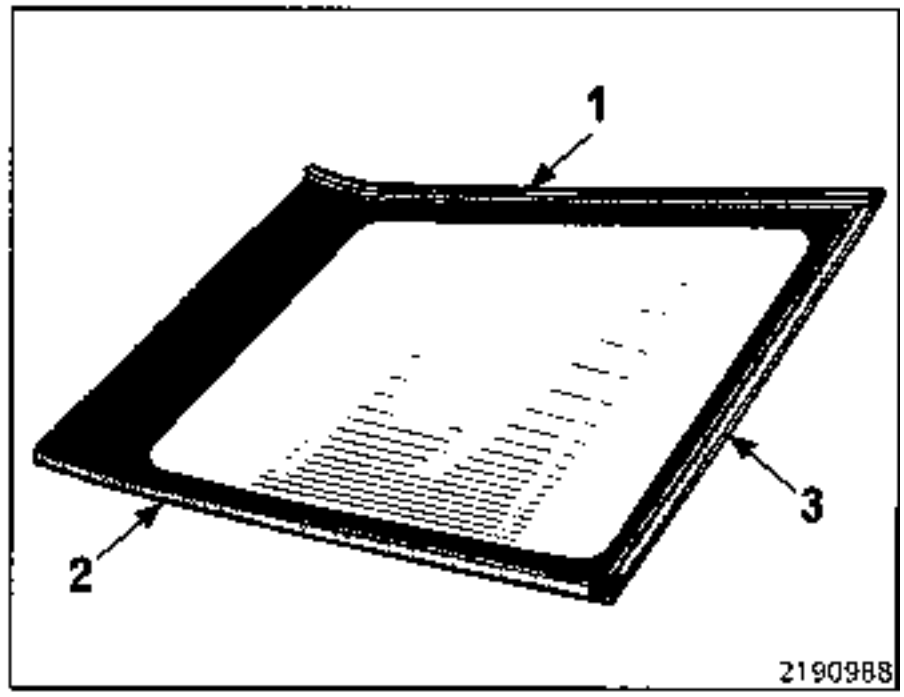
PREPARING THE NEW WINDOW

Carefully clean the enamelled surface around the entire periphery of the windscreen.

1) If possible, use de-mineralised water, wiping it off with a dry clean cloth.

2) Then, use a degreasing solvent, using the special cloth supplied in the kit.

Using the pad, apply the glass primer to the enamelled surface approximately 5 mm from the edge of the enamelled surface on the inner edge and over a width of 20 mm.



Fit the upper and lower trim pieces (1) and (2) to the edge of the window pushing them down to approximately half the depth of the U shape. Then fit the front moulding (3) in the same way.

Offer up the screen to the vehicle.

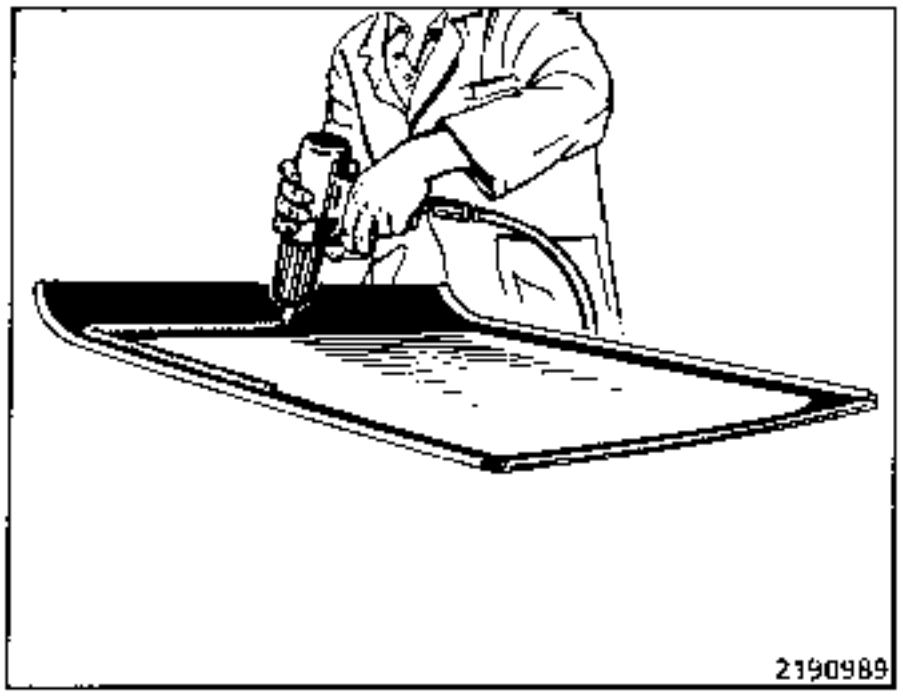
Rectify the positions of the mouldings to obtain a clearance of approximately 2 mm between them and the window surround.

REFITTING

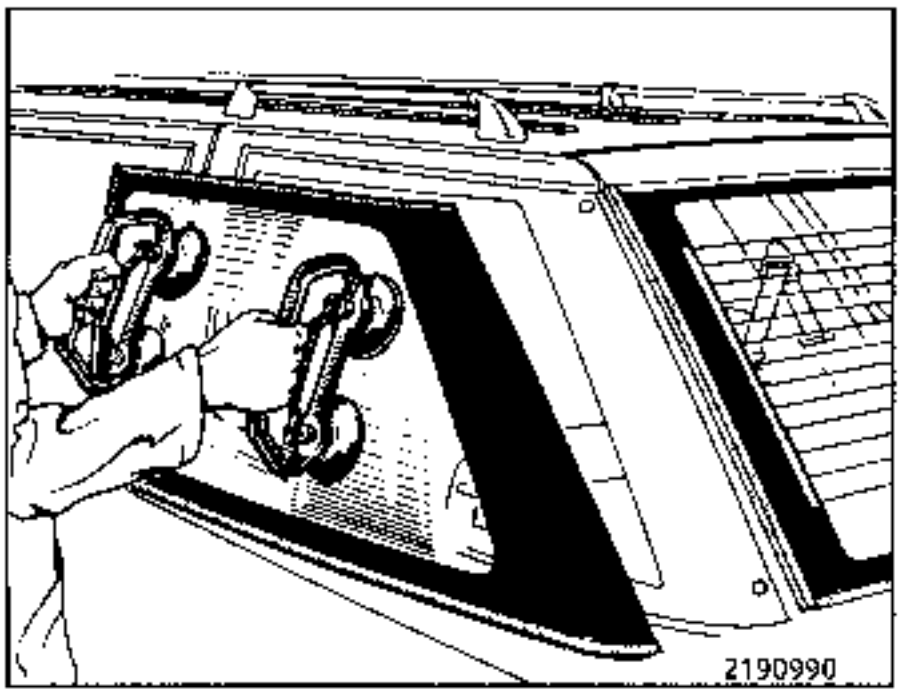
Pierce the membrane on the mastic cartridge and screw on the nozzle pre-cut to a triangular shape.

NOTE : If you do not have this nozzle, cut the one found in your kit so as to obtain a triangle with a base approximately 7 mm long and height 10 mm.

Pierce the base of the cartridge.

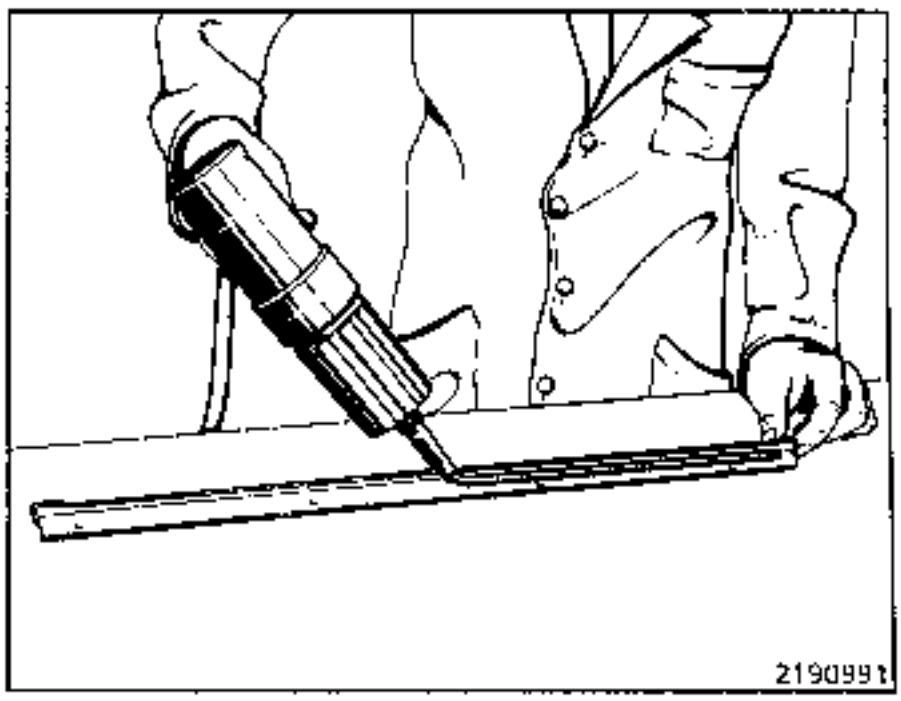


Using a spray gun, apply a bead of mastic over the primer strip, using the mouldings as a guide.

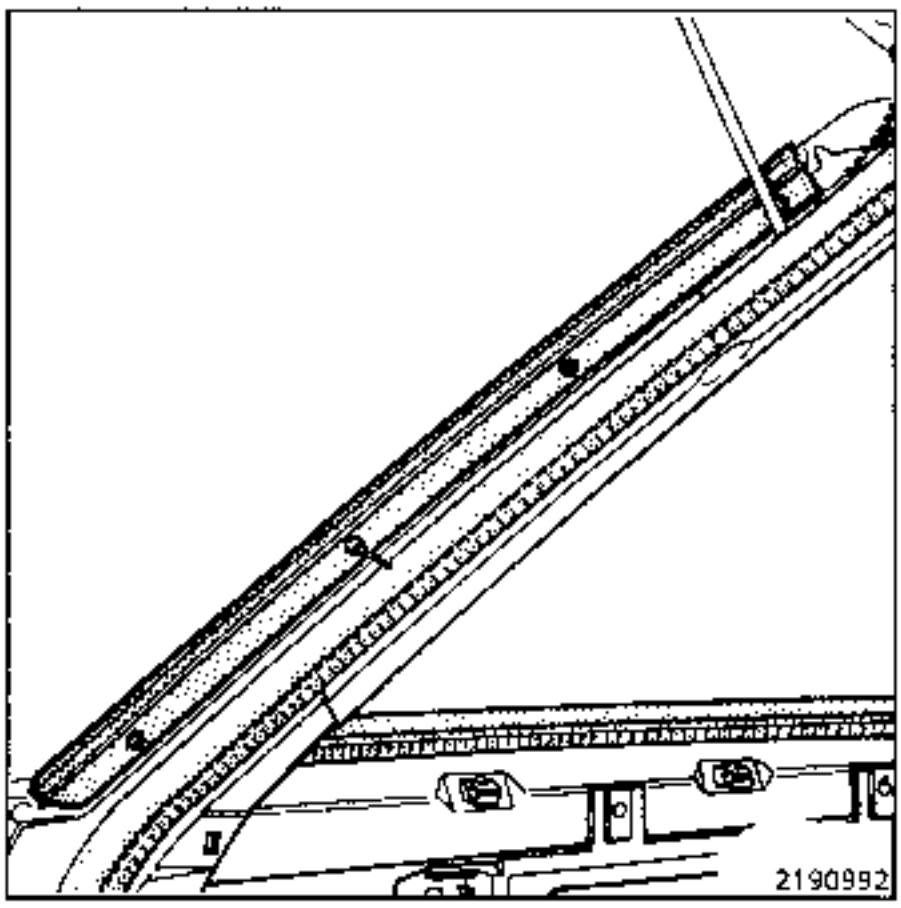


Using the suction pads, fit the window to the vehicle offering it up parallel to the aperture.

Alter the position of the window in relation to the aperture and the rear screen. Hold the window in place using a wide strip of adhesive tape.



If the moulding has to be replaced, prepare it by applying a small bead from the mastic remaining in the cartridge.

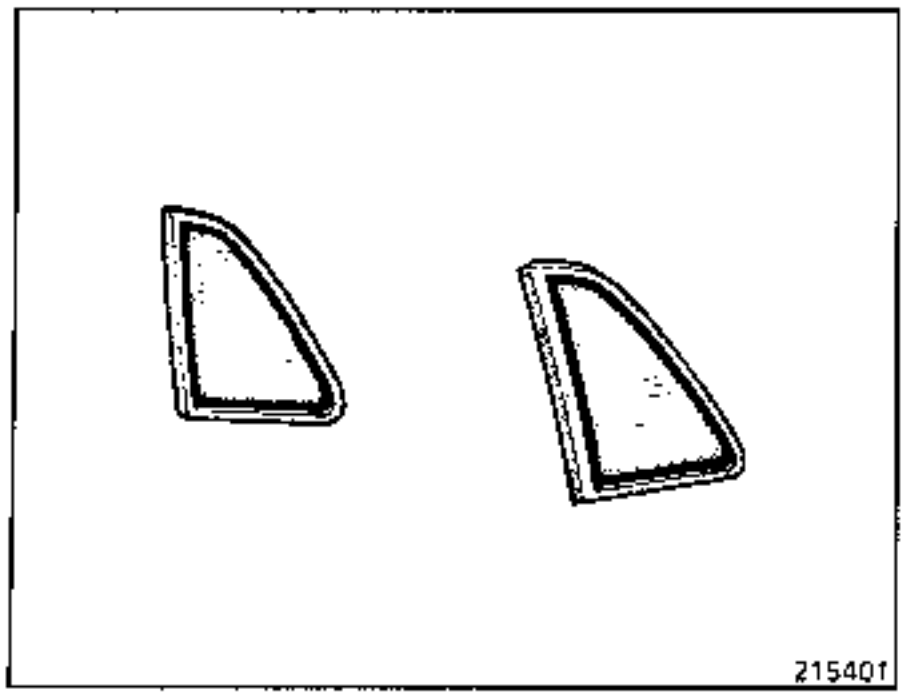


Fit the moulding and align it with the 2 upper and lower mouldings and the rear screen.

Secure it using leaktight rivets,
Part No :77 03 072 051.

Check that the window is held in place correctly with the adhesive tape. If necessary, use a strap to ensure that it is held.

NOTE : The vehicle must remain stationary for at **least 3 hours**. You are strongly recommended to use this time to run water over the edge of the windscreen in order, on the one hand, to find any areas where the sealing is poor and, on the other hand, to accelerate polymerisation of the mastic which is of the moisture-cured type.



This window is of the moulded type, that is, the moulding is moulded around its edge. It is impossible to separate the moulding from the window.

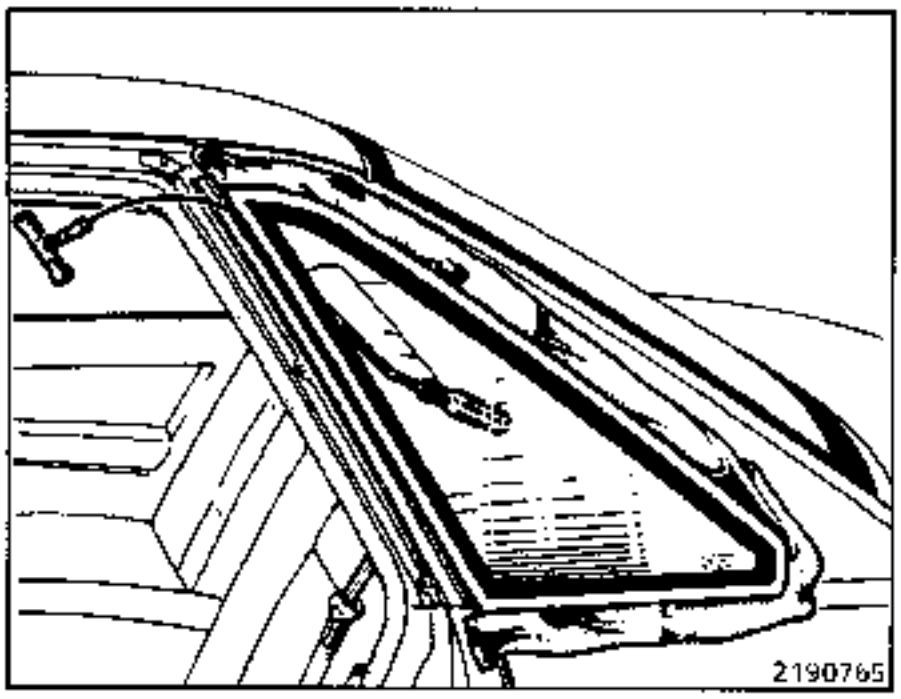
REMOVAL

Two methods may be used to cut the bonding mastic bead. In each case proceed with care so as not to damage the moulding.

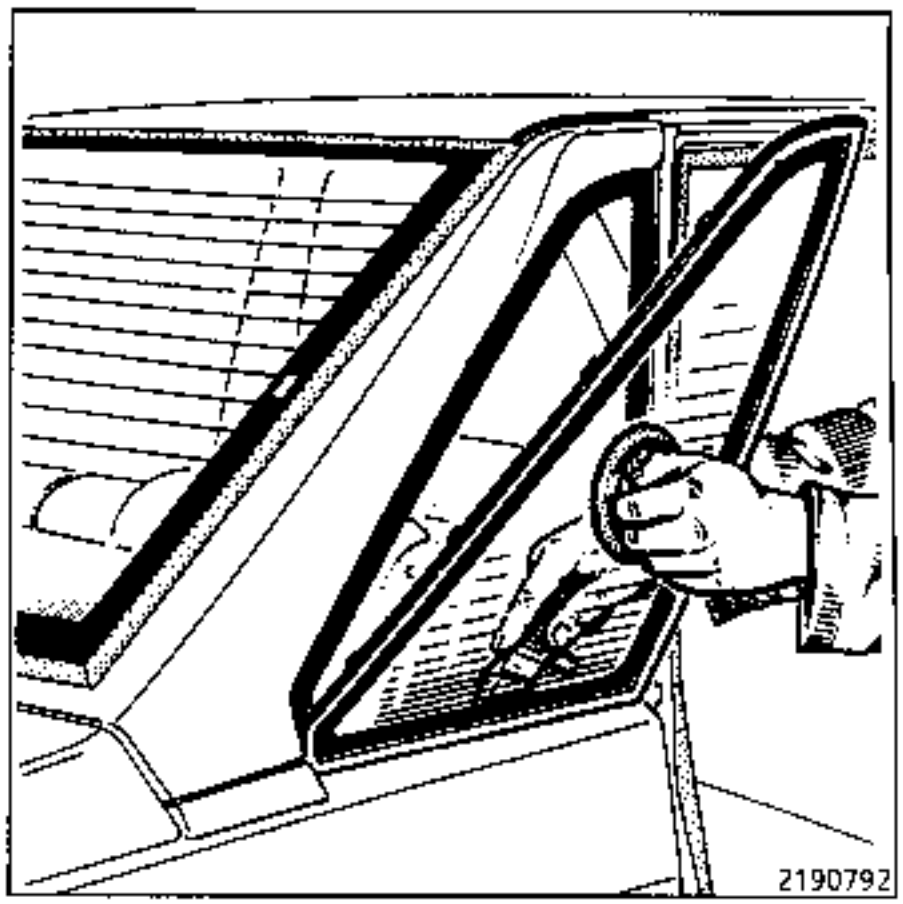
Method 1
Remove the trim from the rear quarter window.

Partially remove the double seal.

Using a strip of wide adhesive tape, protect the bodywork around the window.



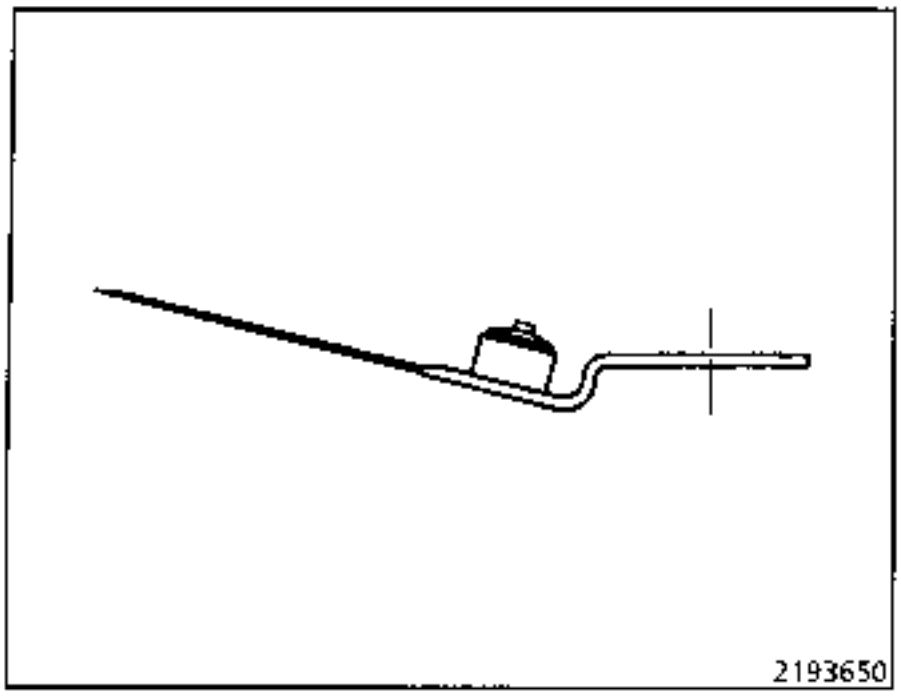
Pass a piece of steel wire approximately 30 cm long through the mastic bead at the upper corner. Fit in place the pricker tool and pulling handle. cut the mastic bead following the direction shown in the drawing.



After the first two sides have been cut, move the window away and cut the remaining mastic using a cutting blade.

Method 2

The window may be removed using a **FEIN** electric blade. In this cases use blade,
Part No : **63903097018.**



Sharpen the blade using the machine on setting position **2**.

Remove the trim from the rear quarter panel. Cutting is carried out from inside the vehicle. Start cutting by inserting the blade in the bead of glue (machine running on setting position **2**).

Cut the mastic, varying the power of the machine to suit the stress applied for cutting.

NOTE : It is most important that the blade is sharp. The blade should be sharpened each time it is used.

REFITTING

CLEANING THE WINDOW SURROUND
Using a spatula approximately **20-25 cm** wide, the edge of which has been sharpened, cut and smooth down the mastic bead to leave a thickness of approximately **0.5 to 1 mm** of mastic on the surround.

NOTE : It is essential to leave a film of mastic on the window surround to act as a key for the new bead.

Remove all mastic residue and dust by blowing it with an air gun.

NOTE : Only use dry air, free from all traces of oil.

As a general rule, no cleaning or degreasing product is to be used on the remaining film of mastic.

PREPARING THE NEW WINDOW

Carefully clean the enamelled surface around the entire periphery of the windscreen.

1) If possible, use de-mineralised water, wiping it off with a dry clean cloth.

2) Then, use a degreasing solvent, using the special cloth supplied in the kit.

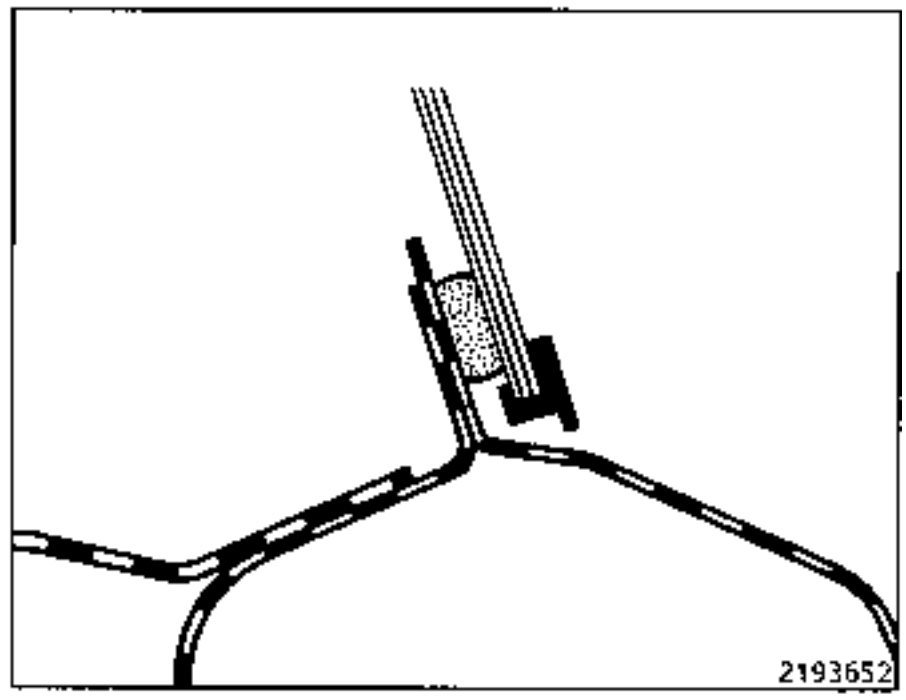
Using the pad, apply the glass primer to the enamelled surface.

PREPARING THE WINDOW SURROUND

Apply metal primer to those parts of the surround that have been damaged back to the bare metal during the removing or cleaning operations.

FITTING THE WINDOW

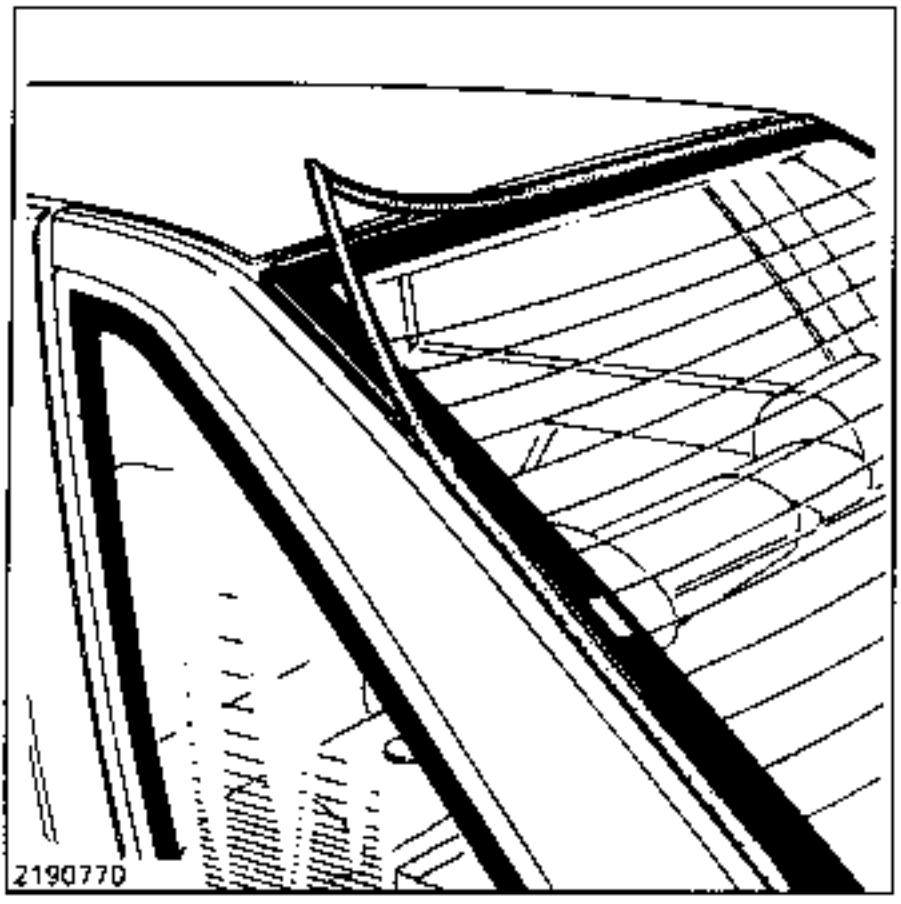
Apply a bead of bonding mastic with a triangular cross-section to the window.
Guide the cartridge nozzle over the edge of the moulding.
Smooth down the join where the ends of the bead meet.
Using a suction pad, fit the window in place in its location.



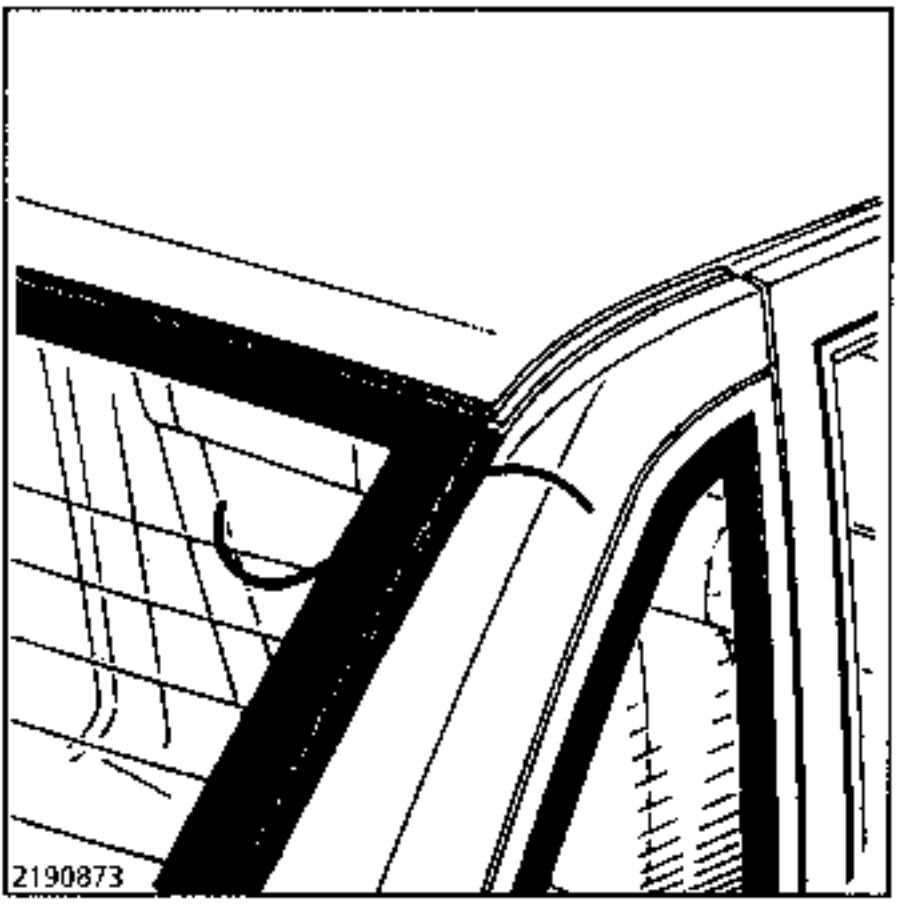
Centre the window so that a clearance of **2 mm** is obtained between the edge of the moulding and the side panel.

NOTE : The vehicle must remain stationary for at least **3 hours.** You are strongly recommended to use this time to run water over the edge of the windscreen in order, on the one hand, to find any areas where the sealing is poor and, on the other hand, to accelerate polymerisation of the mastic which is of the moisture-cured type.

STRIPPING



Remove :
- the outer moulding (in one part),
- the inner trim from the right-hand and left-hand rear quarter windows, to reach the connectors for the heated screen. Disconnect the connectors and fold back the tabs on the screen.



From outside the vehicle, check to see whether it is possible to pass the wire freely under the moulding mountings in all four corners of the screen when the seal is being cut. If it is not, remove the mounting or mountings which are in the way, after first protecting the frame with tape.

NOTE : It is easier to remove the mountings by heating them gently with a hot air torch.

In one corner, pass a piece of steel wire through the mastic bead. Fit in place the pricker tool and pulling handle. Cut the mastic bead taking care in the corners that the wire passes under the moulding mountings.

CLEANING THE WINDOW SURROUND

Using a spatula approximately **20-25 cm** wide, the edge of which has been sharpened, cut and smooth down the mastic bead to leave a thickness of approximately **0.5 to 1 mm** of mastic on the surround.

NOTE : It is essential to leave a film of mastic on the window surround to act as a key for the new bead.

Remove all mastic residue and dust by blowing it with an air gun.

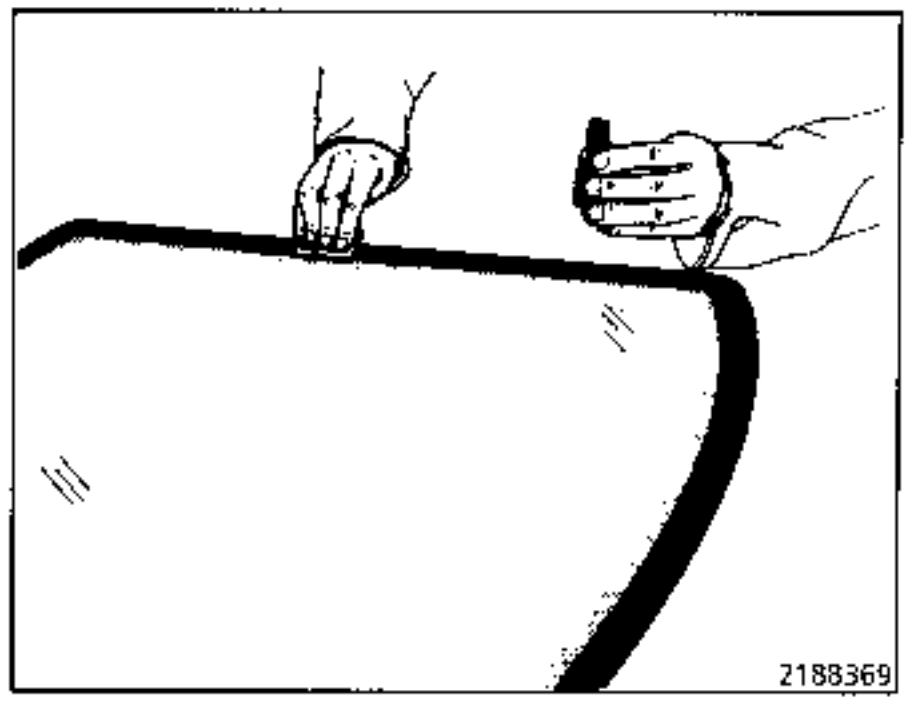
NOTE : Only use dry air, free from all traces of oil.

As a general rule, no cleaning or degreasing product is to be used on the remaining film of mastic.

PREPARING THE NEW WINDOW

Carefully clean the enamelled surface around the entire periphery of the windscreen.

1) If possible, use de-mineralised water, wiping it off with a dry clean cloth.



2) Then, use a degreasing solvent, using the special cloth supplied in the kit.

Do not touch the enamelled surface with your fingers.

Apply glass primer between the seal and the edge of the screen. Using a rubber mallet, fit on the 4 moulding mountings, after the primer has dried.

Fit in place the outer moulding.

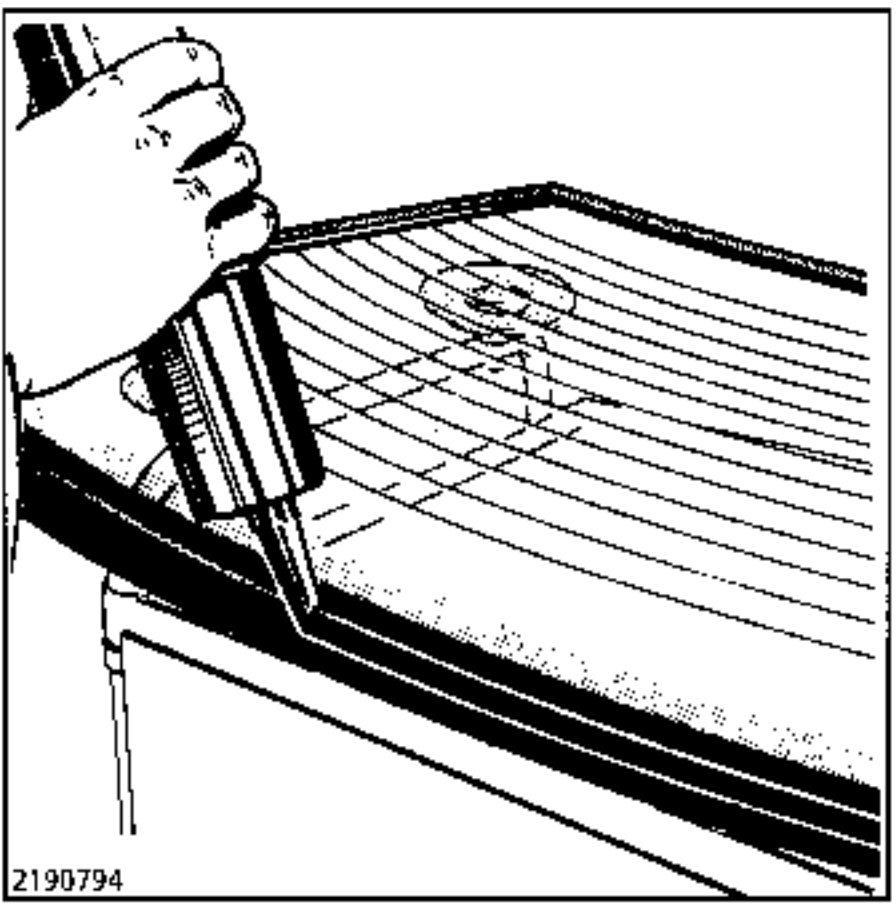
Apply a metal primer to those parts of the surround that have been damaged back to the bare metal during the removing or cleaning operations.

Do not apply this primer to the remaining film of mastic. If necessary, re-cut the applicator with a pair of scissors.

REFITTING

Pierce the membrane on the mastic cartridge and screw on the nozzle pre-cut to a triangular shape.

Remove the bottom of the cartridge and take out the drying agent.

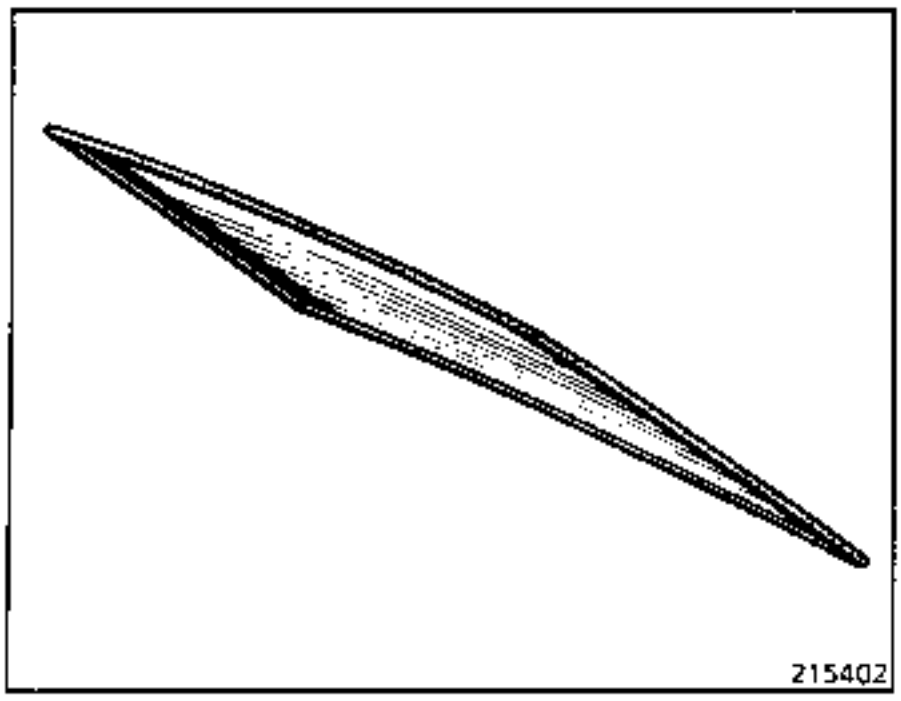


Using a spray gun apply a bead of mastic to the screen passing along the anti-overflow seal. Use a spatula to smooth down the join where the ends of the mastic bead meet.

Using the suction pads, fit the screen in place.

Reconnect the tabs for the heated screen and refit the rear quarter panel internal trim.

NOTE : The vehicle must remain stationary for at least 3 hours. You are strongly recommended to use this time to run water over the edge of the windscreen in order, on the one hand, to find any areas where the sealing is poor and, on the other hand, to accelerate polymerisation of the mastic which is of the moisture-cured type.



This window is of the moulded type, that is, the moulding is moulded around its edge. It is impossible to separate the moulding from the window.

REMOVAL

Two methods may be used to cut the bonding mastic bead. In each case proceed with care so as not to damage the moulding.

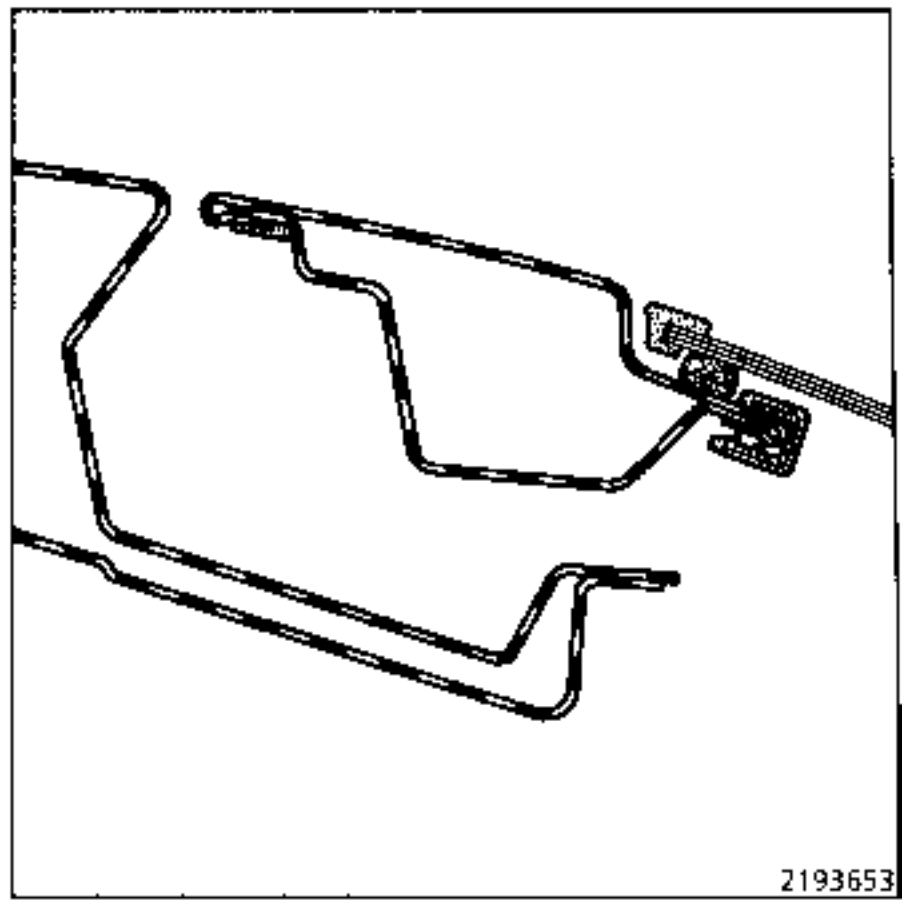
Method 1

Disconnect the feed wires from the heated screen.

Remove the anti-overflow seal.

The seal may have to be pulled relatively hard to remove it from the screen surround if this is set in the bonding mastic.

Stick a strip of adhesive tape tot he upper and lower edges of the tailgate.

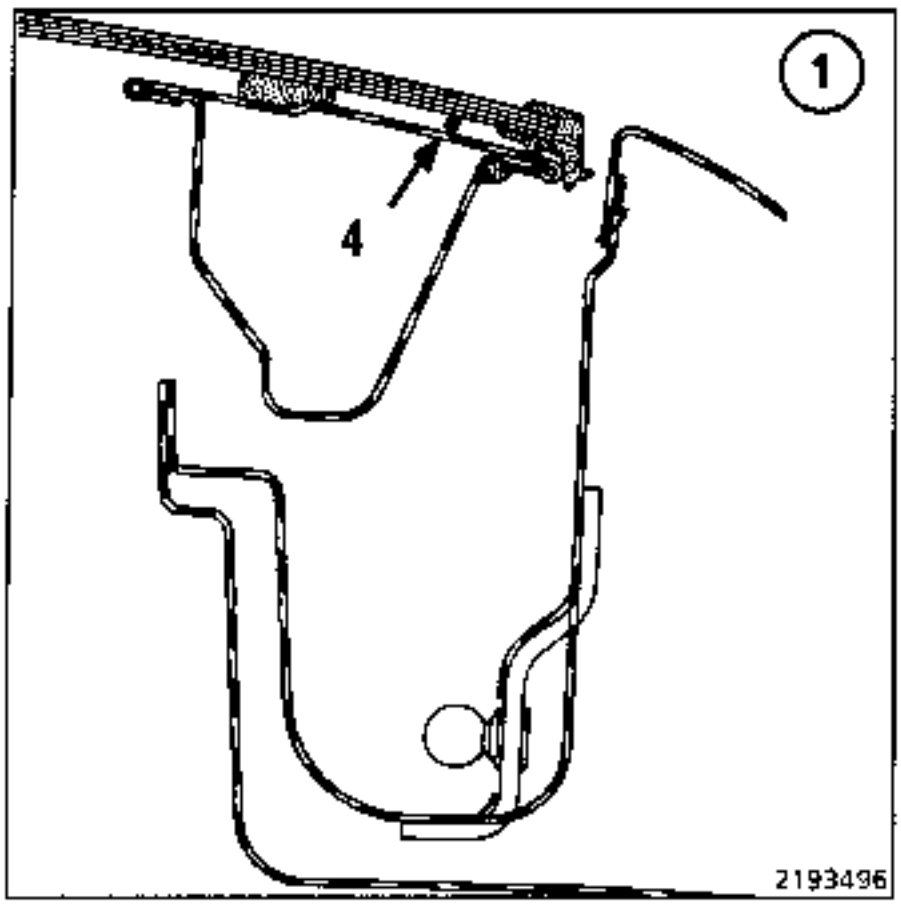


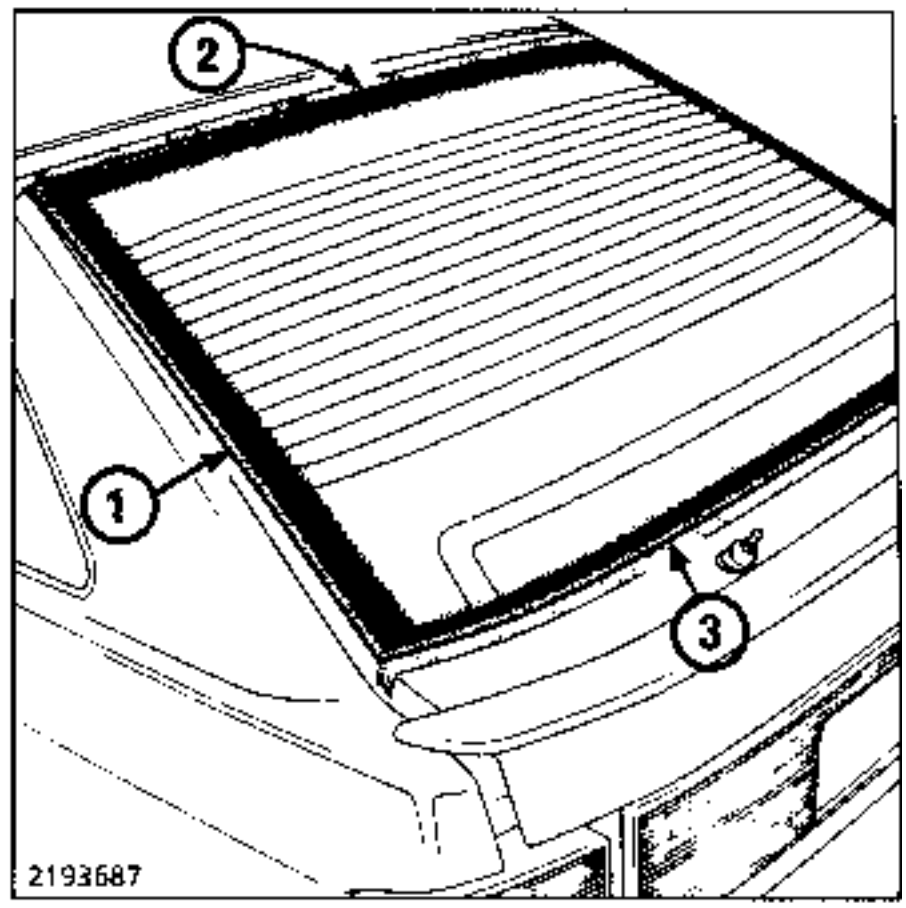
At the edges (lower and upper) check to see whether the clearance between the moulding and the surround is sufficient to pass through the cutting wire. If it is not, use **Method 2**.

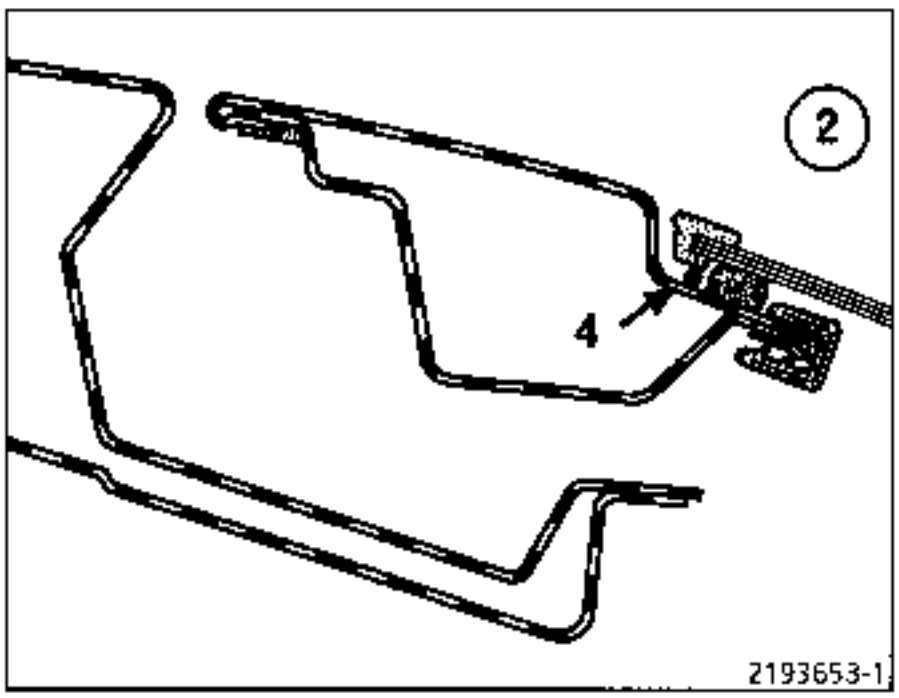
Pass a piece of cutting wire through the mastic bead, in one of the 2 upper corners.

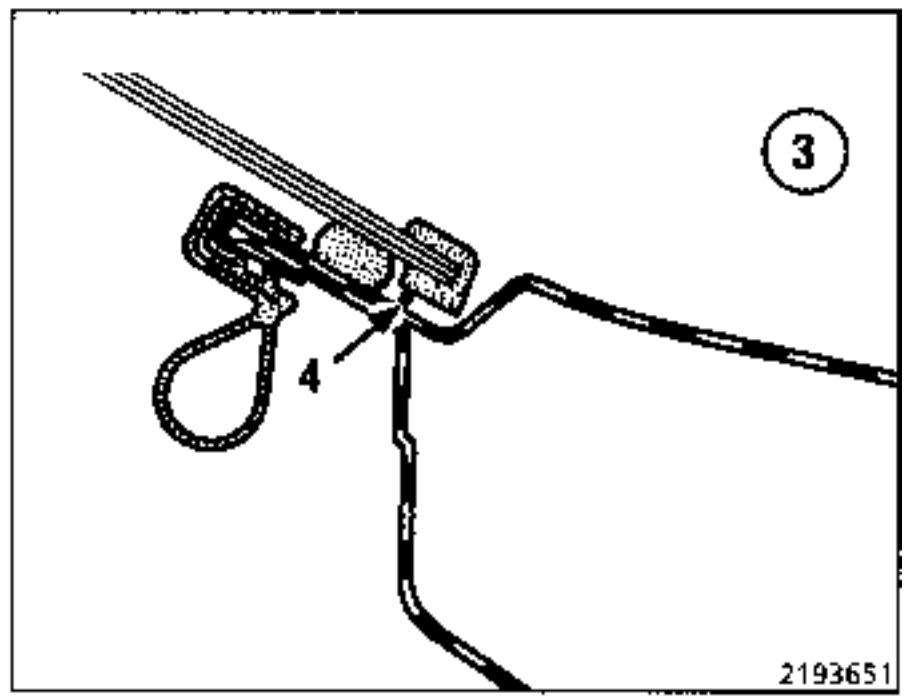
Cut the mastic bead finishing at the opposite lower corner.

Method 2





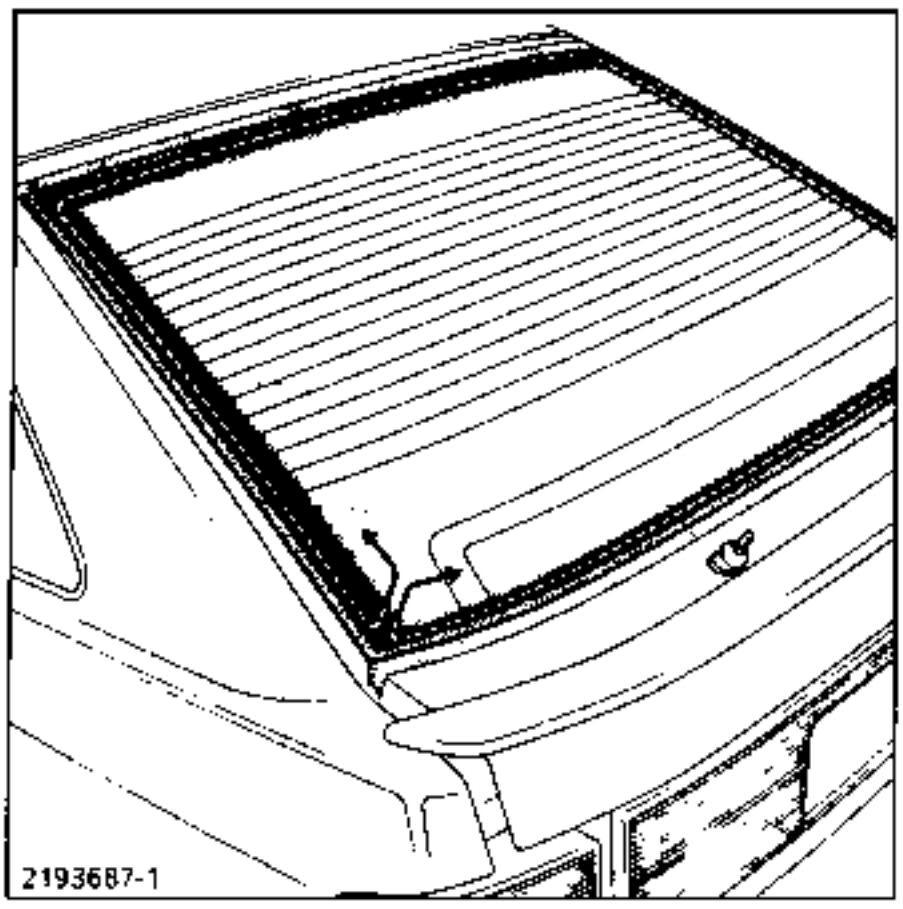




Use a piece of cutting wire **5 mm** long.

In one of the lower corners and working from the outside towards the inside, pass approximately **15 to 20 cm** of the wire through the mastic bead.

On the outside, pass the wire (4) under the moulding, all around the screen. Apply pieces of adhesive paper at regular intervals to ensure that it does not move.



After cutting around the entire screen pass the other end of the wire through the mastic bead as shown in the drawing.

From the inside of the tailgate, fit in place the pulling handle and pricker tool. Cut the mastic bead without changing the position of the pricker tool.

As you cut, reduce the length of the wire at the handle and ensure that the wire passes correctly under the moulding so as not to damage it.

REFITTING

CLEANING THE WINDOW SURROUND
Using a spatula approximately 20-25 cm wide, the edge of which has been sharpened, cut and smooth down the mastic bead to leave a thickness of approximately 0.5 to 1 mm of mastic on the surround.

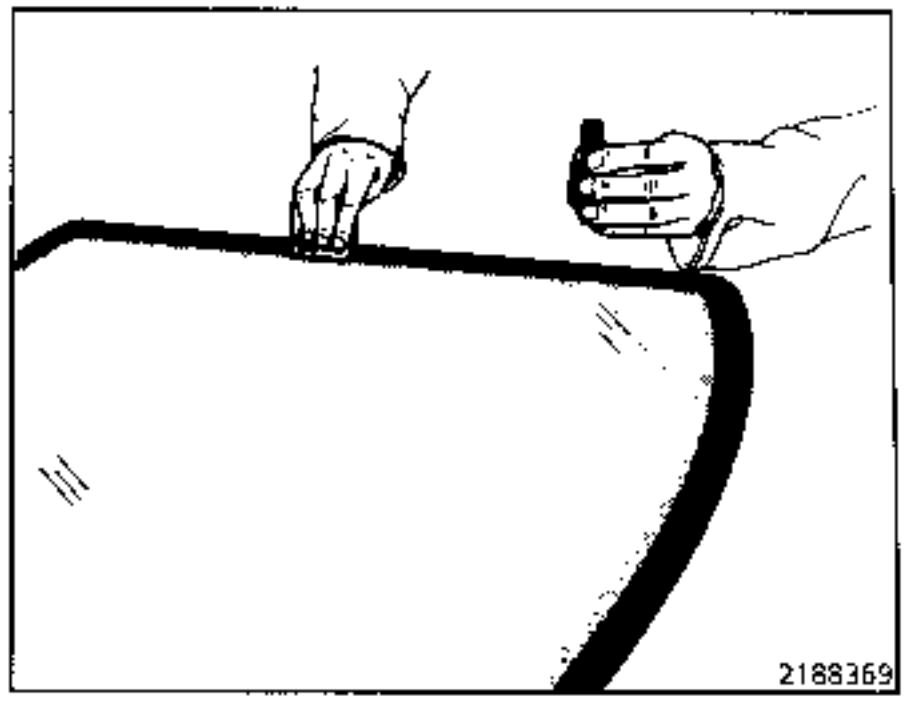
NOTE : It is essential to leave a film of mastic on the window surround to act as a key for the new bead.

Remove all mastic residue and dust by blowing it with an air gun.

NOTE : Only use dry air, free from all traces of oil.

As a general rule, no cleaning or degreasing product is to be used on the remaining film of mastic.

PREPARING THE NEW WINDOW



Carefully clean the enamelled surface around the entire periphery of the windscreen.

1) If possible, use de-mineralised water, wiping it off with a dry clean cloth.

2) Then, use a degreasing solvent, using the special cloth supplied in the kit.

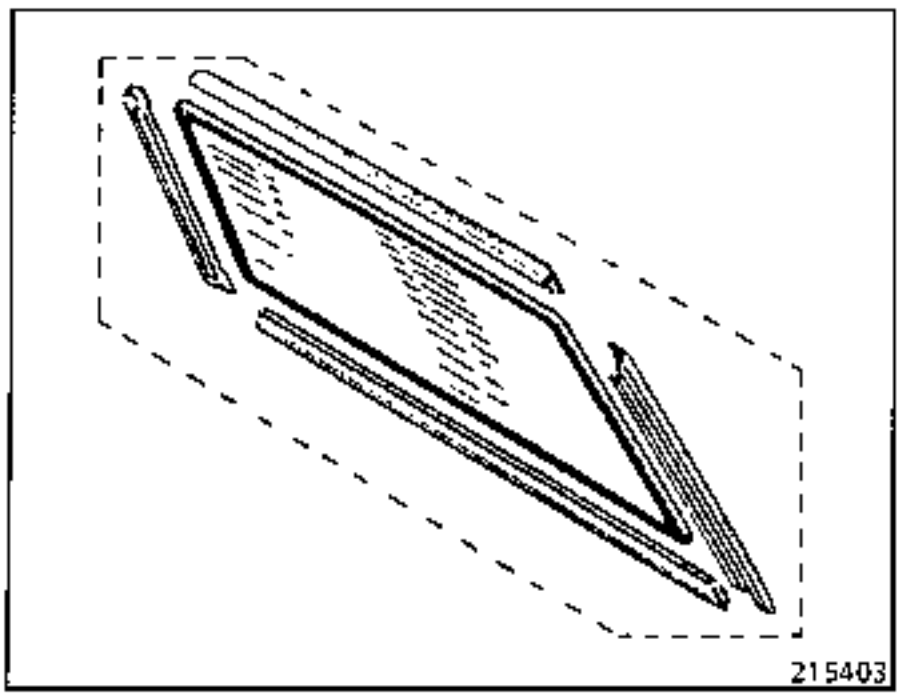
Apply glass primer over the entire enamelled area of the upper and lower edges and over a 30 mm wide strip in the centre of the enamelled area on the sides.

PREPARING THE WINDOW SURROUND
Apply metal primer to those parts of the surround that have been damaged back to the bare metal during the removing or cleaning operations.

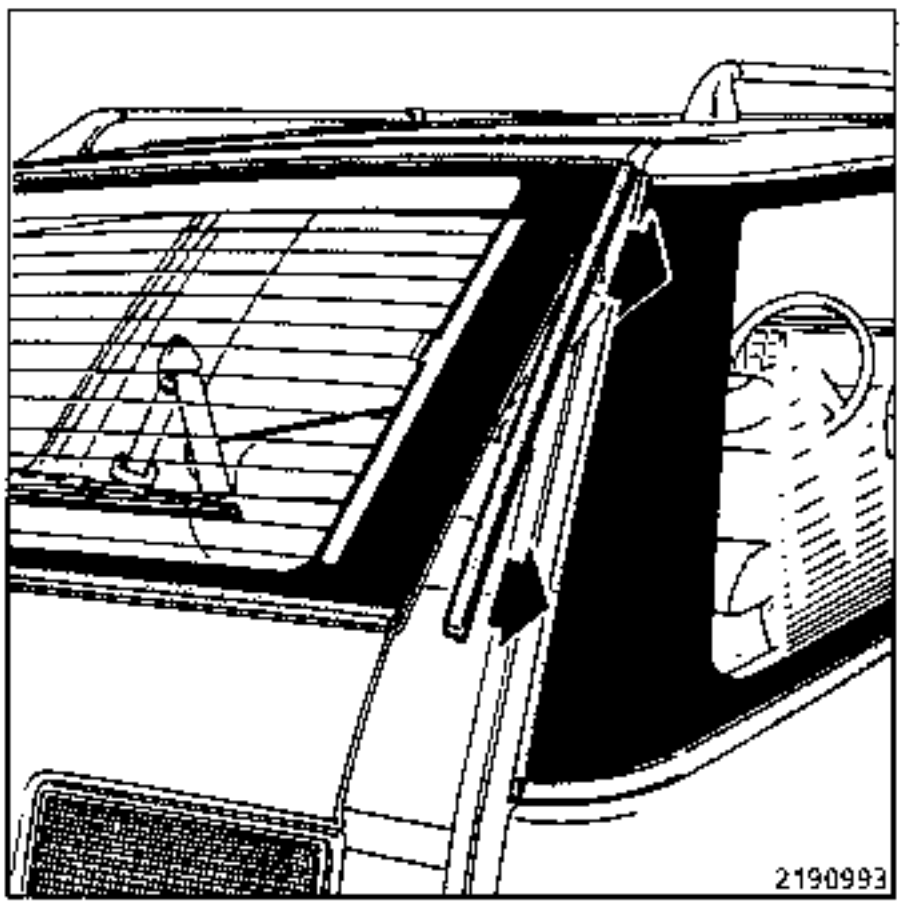
Using a mallet, fit a new anti-overflow seal.

FITTING THE SCREEN
Apply a bead of bonding mastic with a triangular cross-section to the screen. Centre the mastic bead in relation to the strip of primer. Using a spatula, smooth down the join where the ends of the mastic bead meet. Using suction pads, fit the screen in place centring it at the sides. Reconnect the tabs for the heated screen.

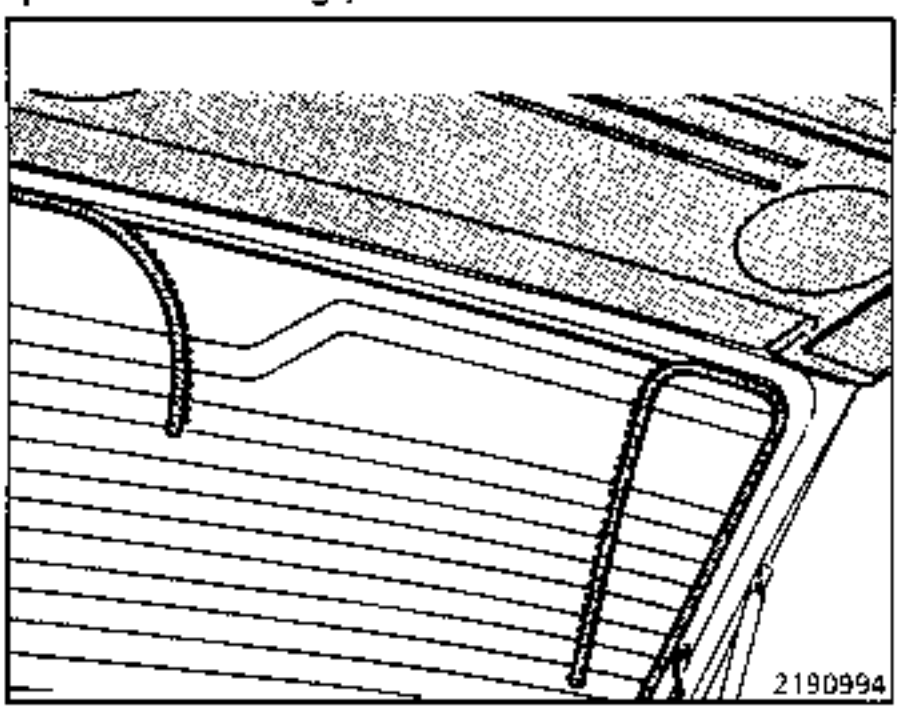
NOTE : As the vehicle cannot be driven for at least 3 hours, we strongly recommend that this period be used to pour water around the periphery of the screen both to detect any leaks and to accelerate the curing of the mastic, which is of the moisture-cured type.



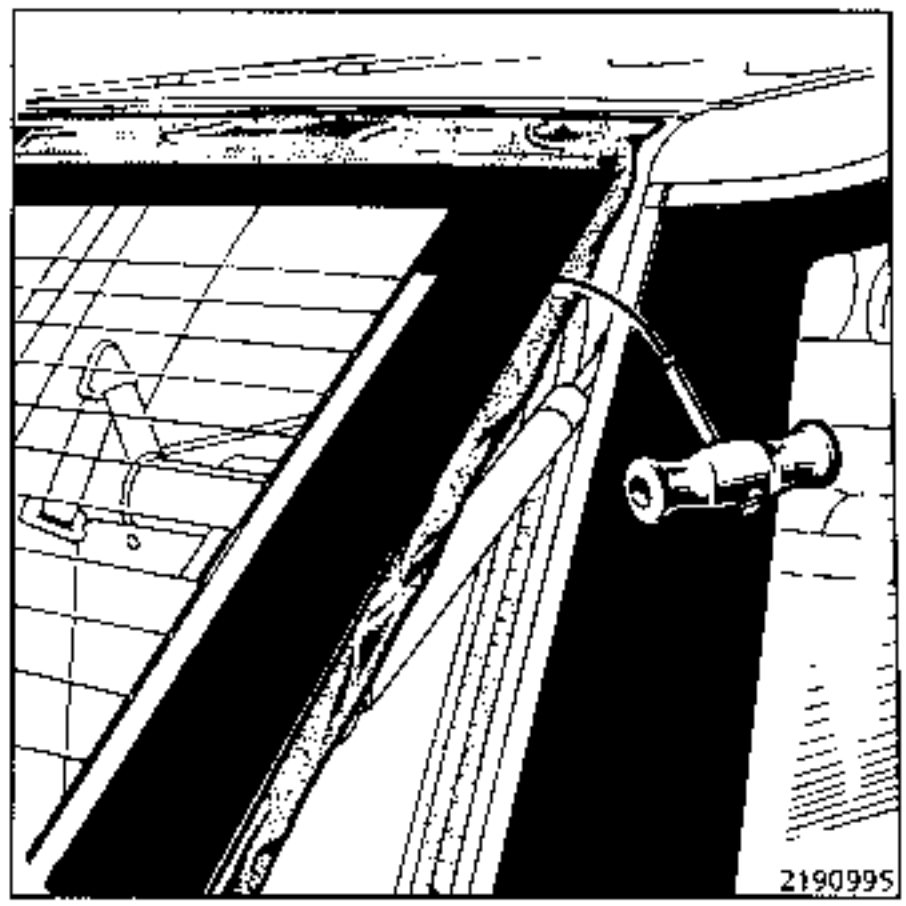
DEPOSE



Pull the mouldings to remove them (there are no positive mountings).



Disconnect the tabs for the power supply to the heated screen. Pull on the anti-overflow seal to remove it.



Using adhesive tape, protect the bodywork around the edge of the screen.

Pass a piece of steel wire approximately 30 cm long through the mastic bead.

Fit in place the pricker tool and pulling handle and cut the mastic bead. In the corners take care that the wire passes correctly under the mouldings.

CLEANING THE WINDOW SURROUND

Using a spatula approximately 20-25 cm wide, the edge of which has been sharpened, cut and smooth down the mastic bead to leave a thickness of approximately 0.5 to 1 mm of mastic on the surround.

NOTE : It is essential to leave a film of mastic on the window surround to act as a key for the new bead.

Remove all mastic residue and dust by blowing it with an air gun.

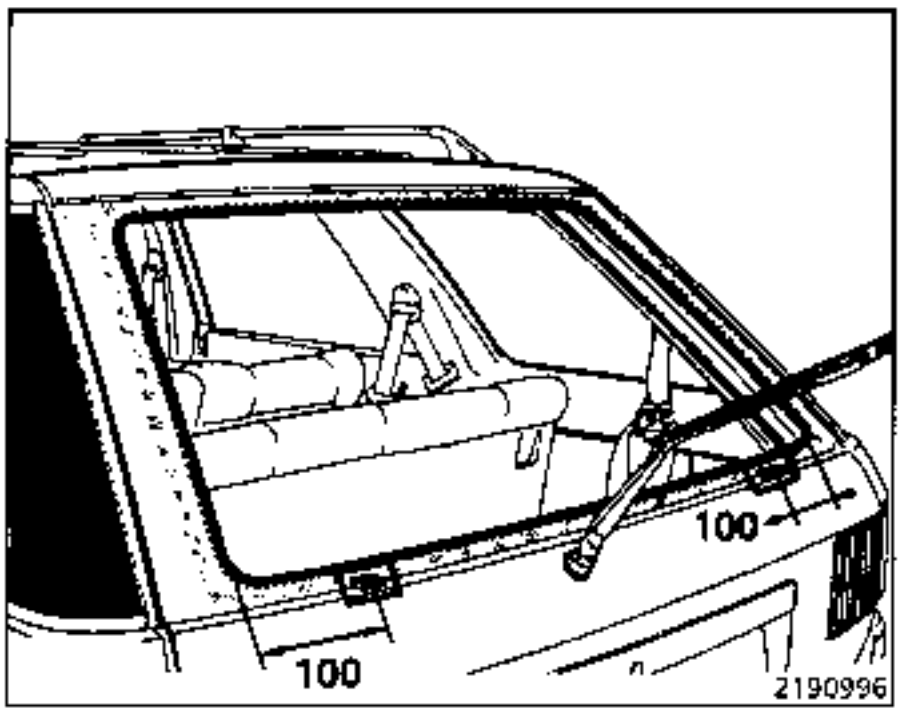
NOTE : Only use dry air, free from all traces of oil.

As a general rule, no cleaning or degreasing product is to be used on the remaining film of mastic.

PREPARING THE WINDOW SURROUND

Apply metal primer to those parts of the surround that have been damaged back to the bare metal during the removing or cleaning operations.

Do not apply this primer to the remaining film of mastic. If necessary, re-cut the applicator with a pair of scissors



Using a rubber mallet tap the anti-overflow seal onto the screen surround (with the clips on the outside of the vehicle).

Fit the lower pads as shown in the above illustration.

PREPARING THE NEW SCREEN

Carefully clean the enamelled surface around the entire periphery of the screen.

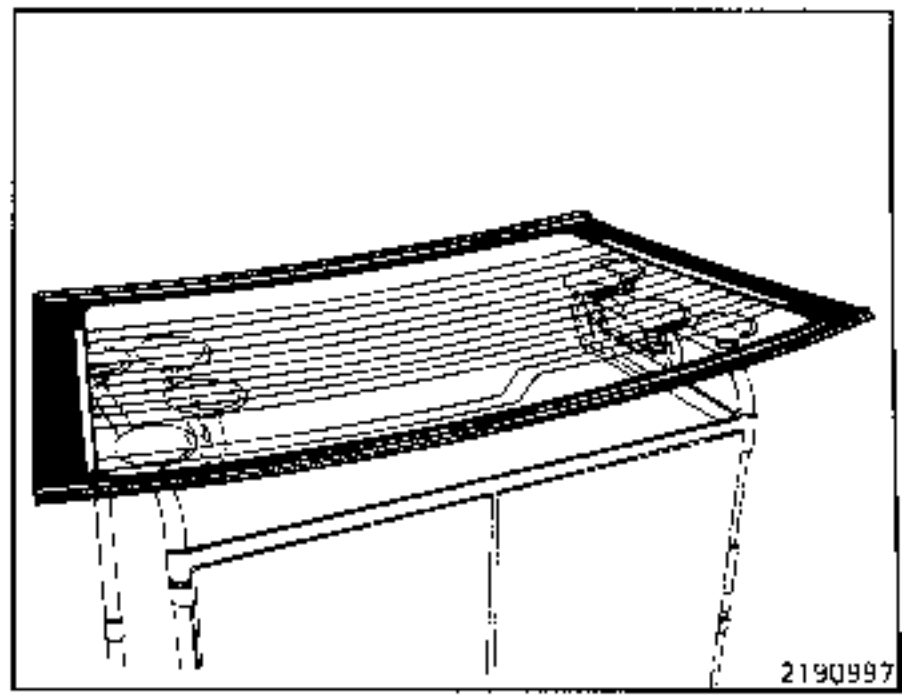
1) If possible using de-mineralised water, wiping it with a clean, dry cloth.

2) Then with degreaser, using the special cloth supplied in the kit.

A Using the pad, apply the glass primer to the enamelled surface to the following dimensions :

- approximately **10 mm** from the inner edge of the enamel over a **20 mm** width on the upper and lower edges,

- approximately **20 mm** from the inner edge of the enamel over a width of **20 mm** on the two side edges.



Fit the upper and lower mouldings to the edge of the screen, pushing them down to approximately half the depth of the U shape.

Offer up the screen to the vehicle.

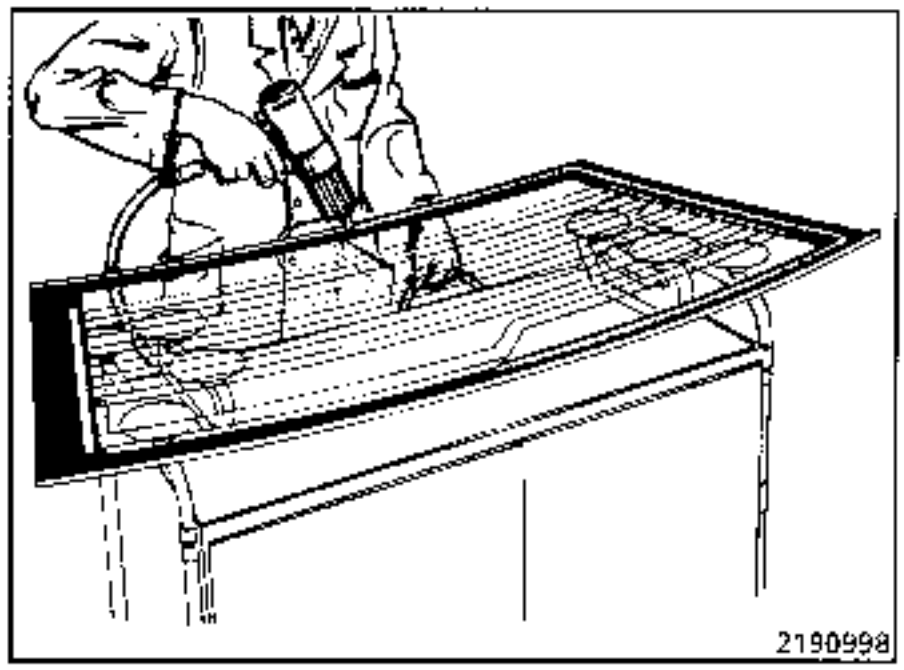
Rectify the positions of the mouldings to obtain a clearance of approximately 2 mm between them and the window surround.

REFITTING

Pierce the membrane on the mastic cartridge and screw on the nozzle pre-cut to a triangular shape.

NOTE : If you do not have this nozzle, cut the one found in your kit so as to obtain a triangle with a base approximately **7 mm** long and height **10 mm**.

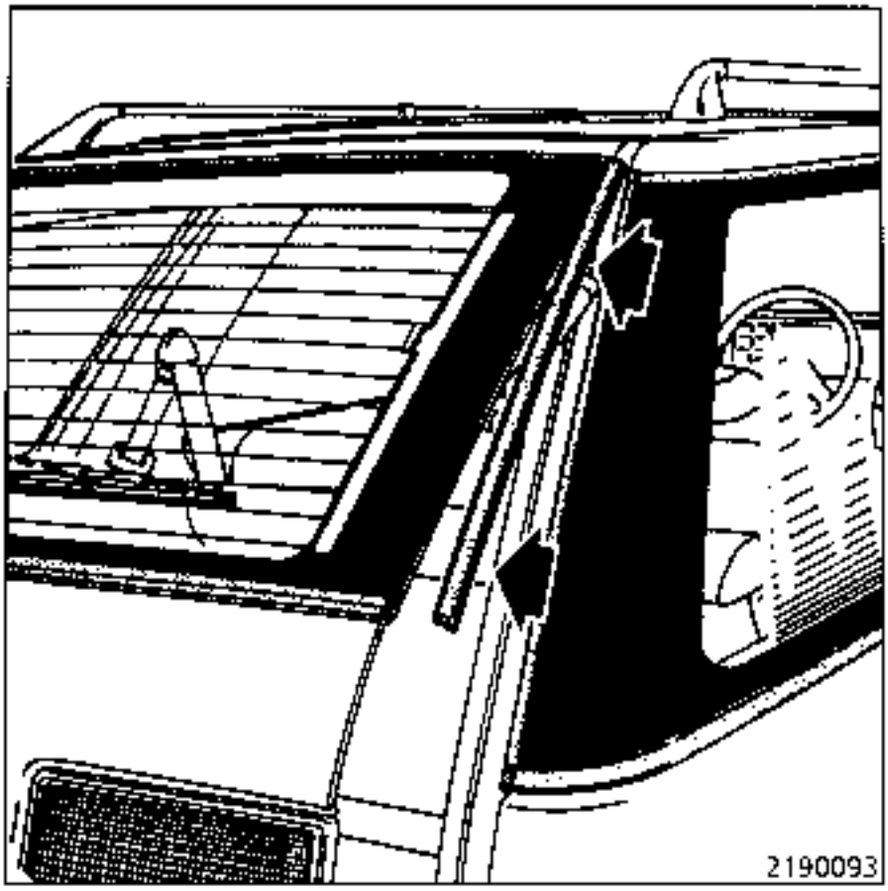
Pierce the bottom of the cartridge.



Using a spray gun, apply a bead of mastic to the primer strip, using the mouldings as a guide on the upper and lower edges..

Using the suction pads, place the screen on the vehicle parallel with the window surround.

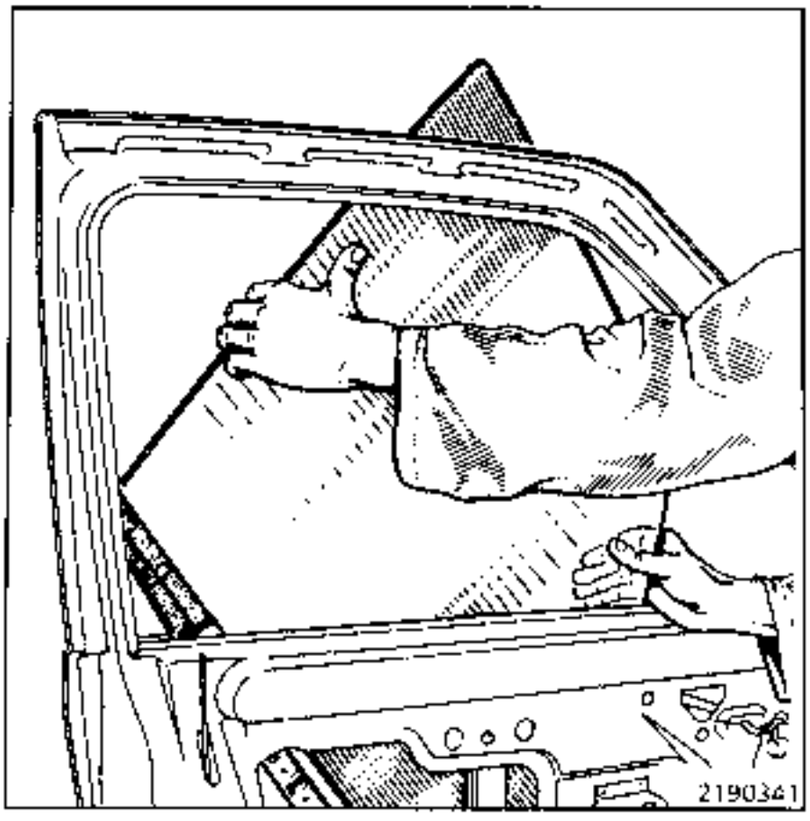
Adjust the position of the screen laterally and hold it in place with wide adhesive tape.



Fit the side trim pieces to the screen and adjust the position of the screen to bring it in line with the quarter lights..

NOTE : As the vehicle cannot be driven for at least 3 hours, we strongly recommend that this period be used to pour water around the periphery of the screen both to detect any leaks and to accelerate the curing of the mastic, which is of the moisture-cured type.

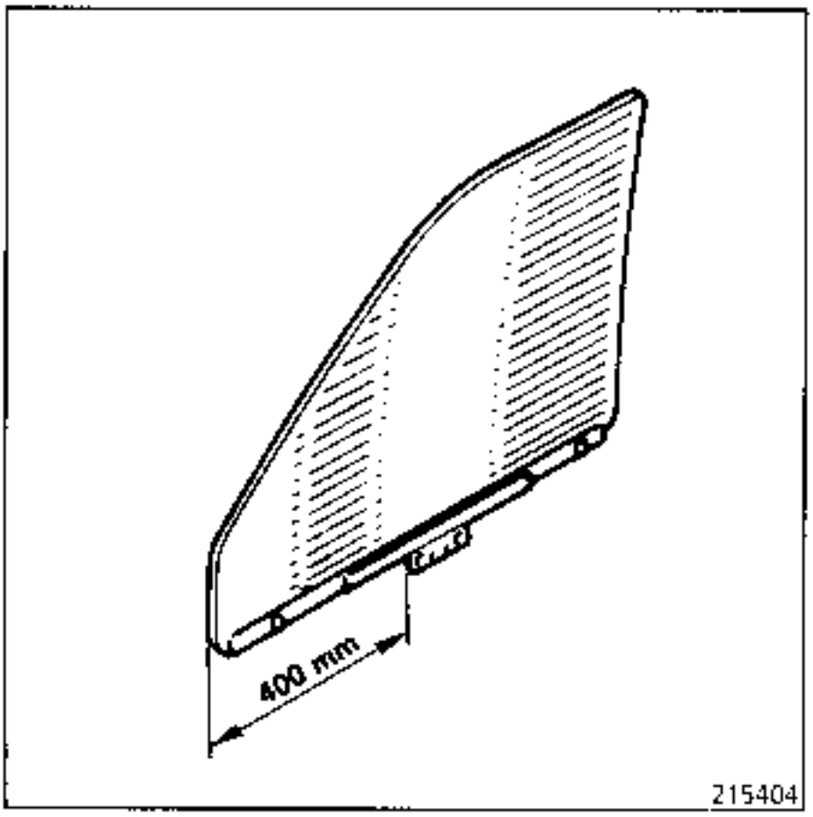
REMOVING THE WINDOW



NOTE : The mechanism does not have to be replaced when replacing the window.

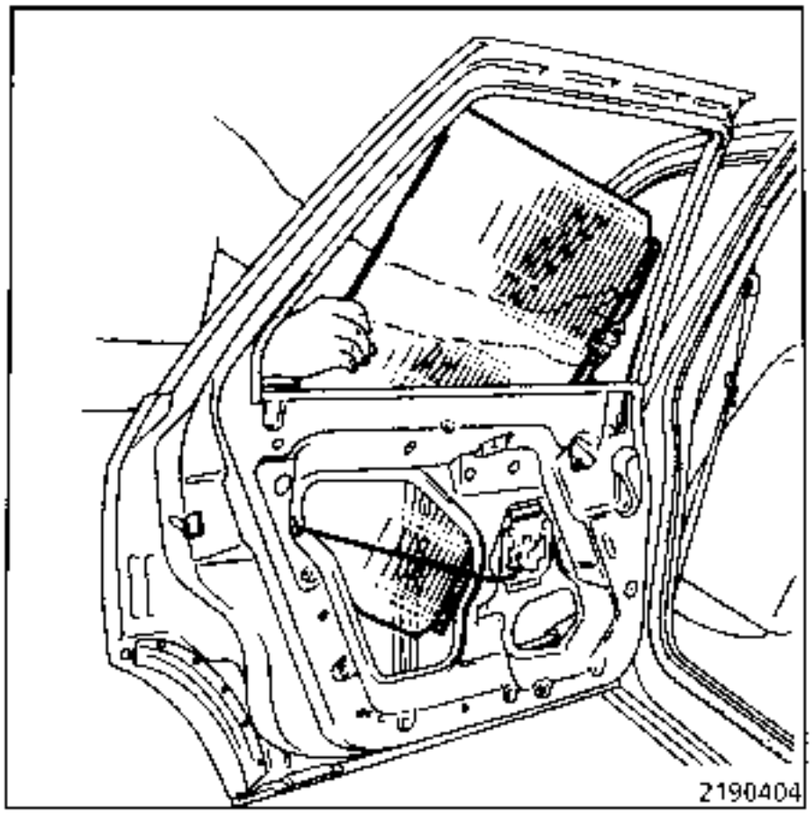
Tilt the window as shown in the drawing above.

The mobile section of the rail is at the bottom.



Dimension for the bottom of the window.

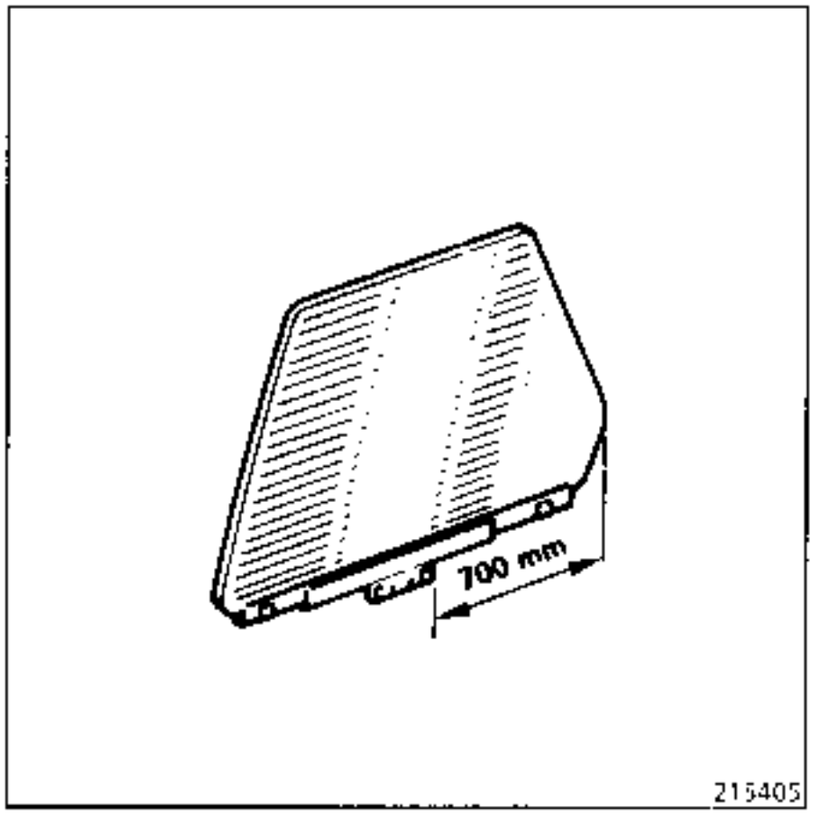
REMOVING THE WINDOW



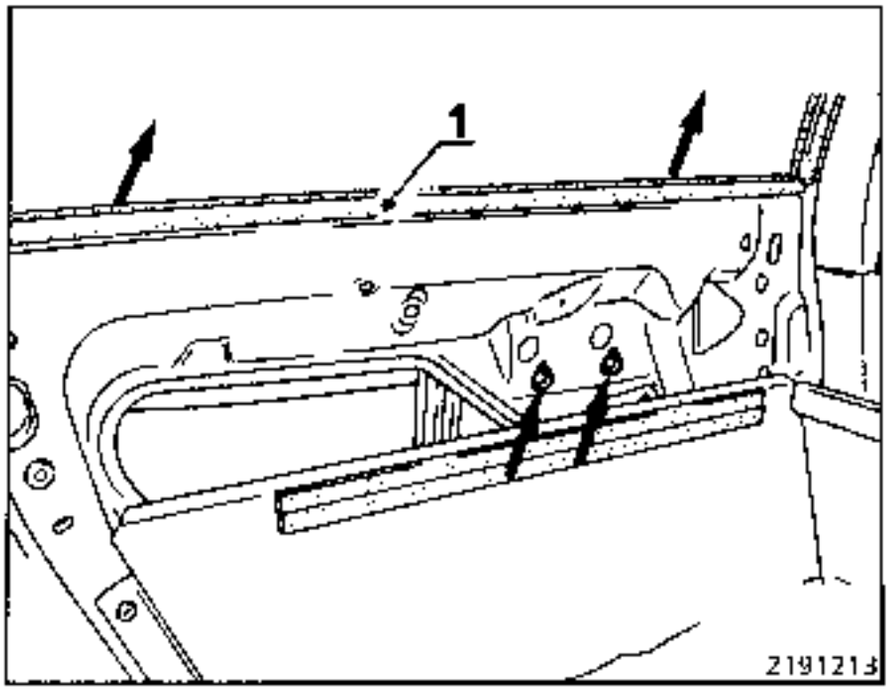
NOTE : The mechanism does not have to be replaced when replacing the window.

Tilt the window as shown in the drawing above.

The mobile section of the rail is at the bottom.



Dimension for the bottom of the window.



REMOVING THE WINDOW

The window in the rear door is retained in the raised position by a window support bolted to the door and to the bottom of the window (the mechanism has been removed).

The window is removed by removing the window support mountings from the door and the mountings for the bottom of the window from the window support.

Lower the window into the door.

Remove the inner rubbing strip (1) and the inner and outer frame seals.

Take out the window from the outside of the door.

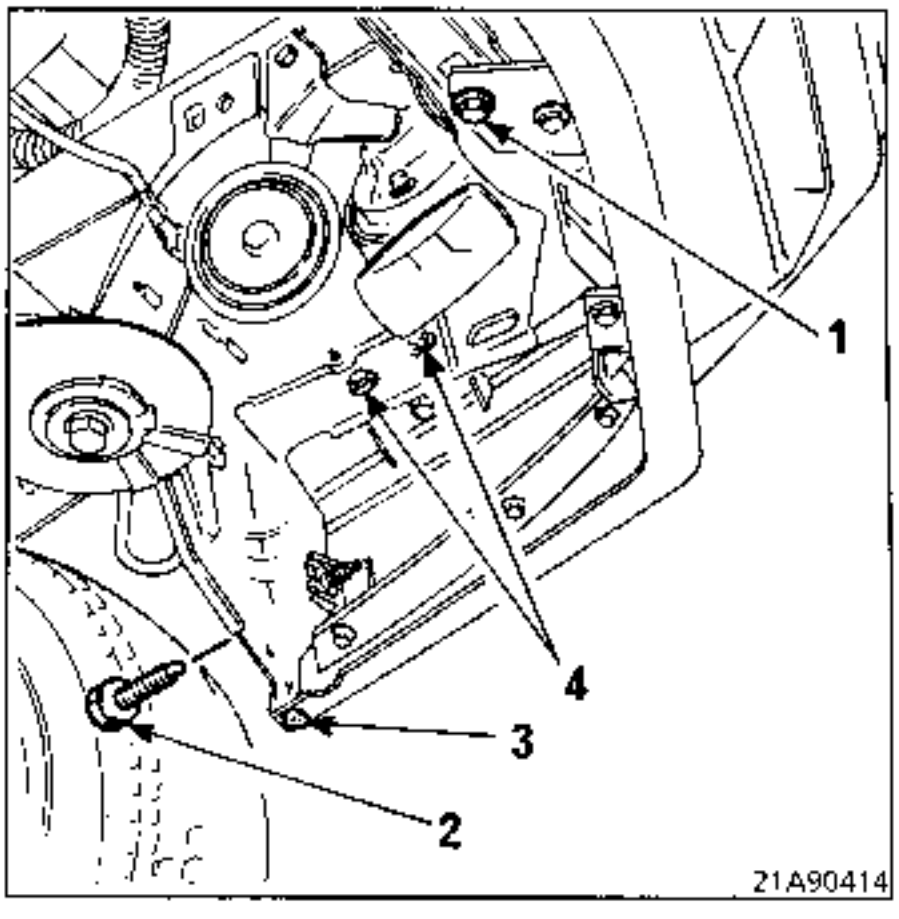
NOTE : The door does not have to be opened in order to remove the window.

Remove part of the spoiler in the vicinity of the shield mounting (1).

Remove the right-hand and left-hand sections of the protection skid so that shield bolts (4) can be reached.

Remove :

- bolts (1), (2), (3), (4).



Phase 1 - Rear bumpers

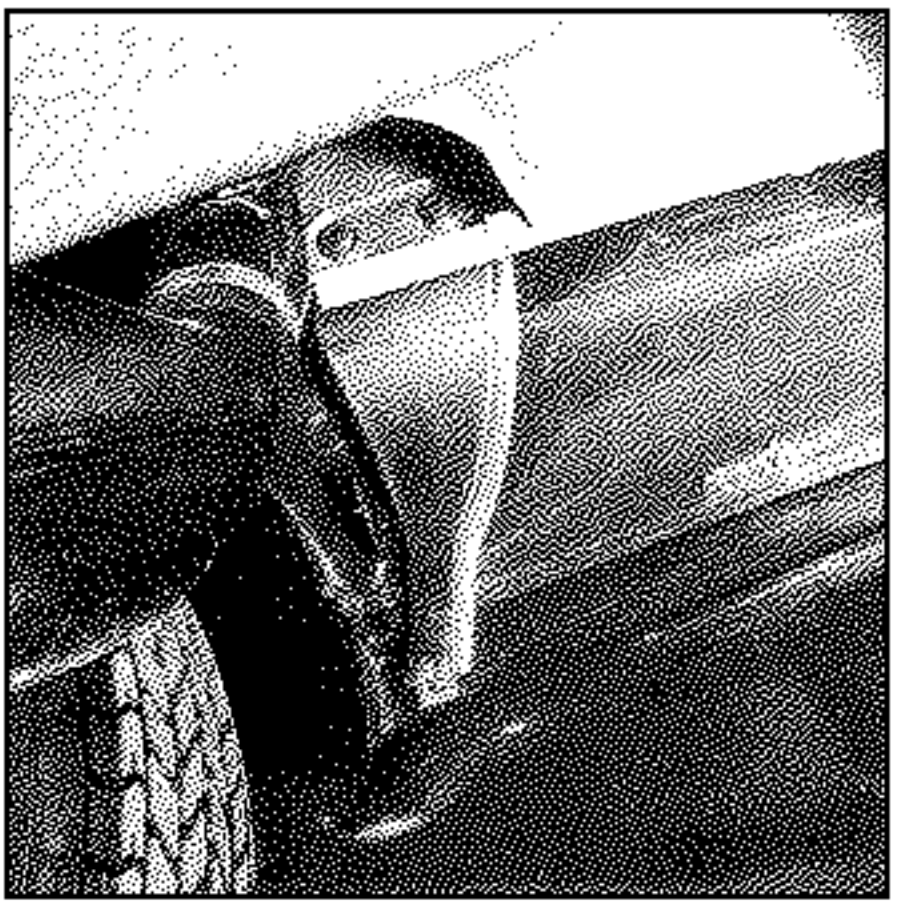
Left-hand side



Remove :

- the side mountings, located behind the side panel trim,
- the mud flap outer mounting.

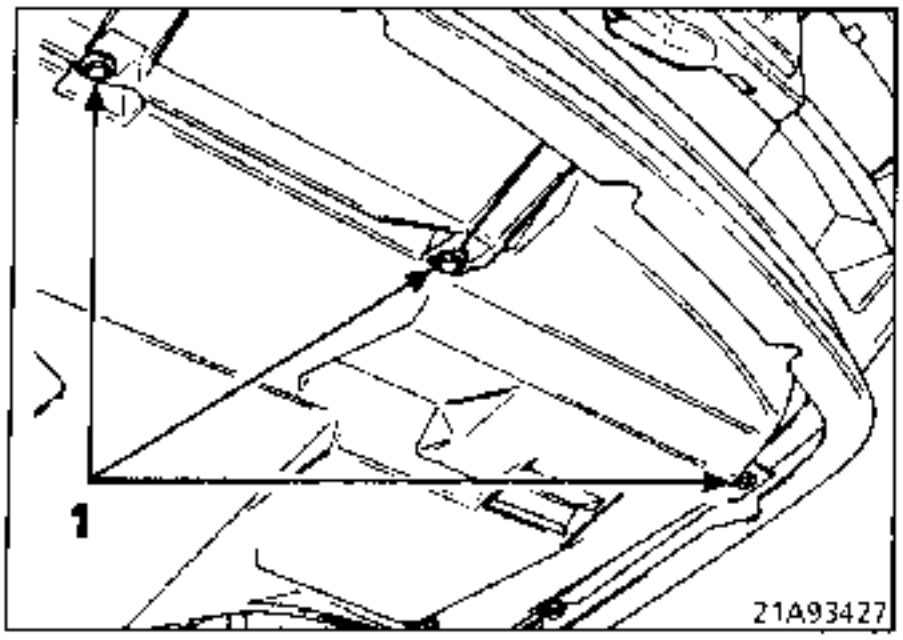
Right-hand side

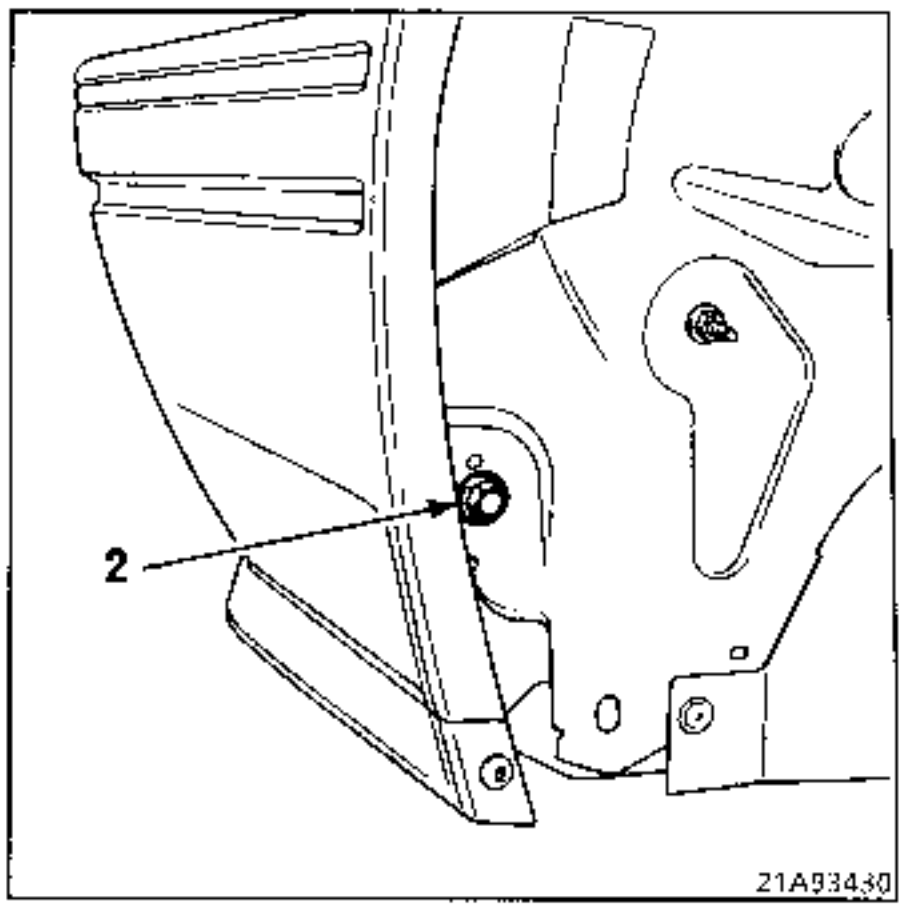


Remove:

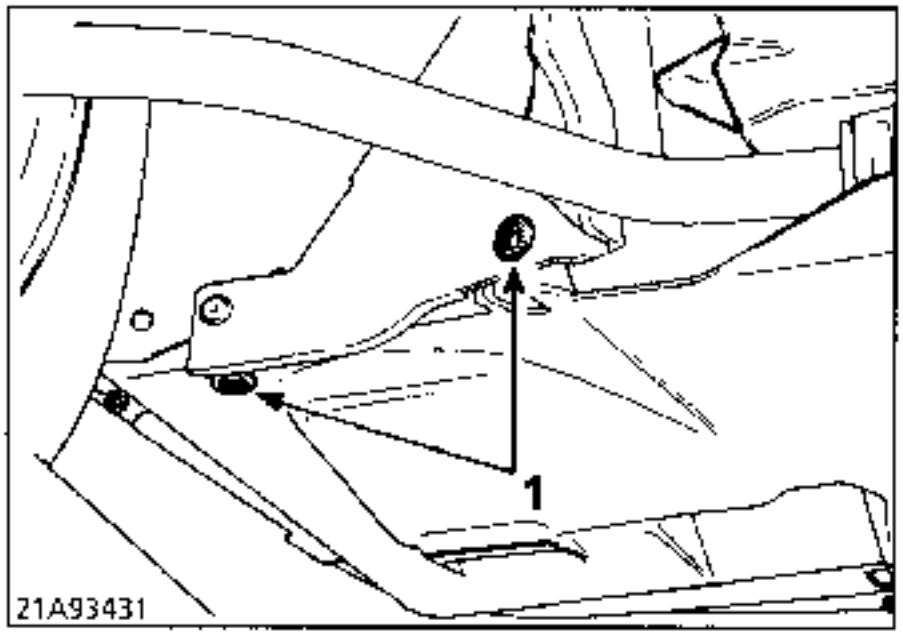
- the side mountings which can be reached through the wheel arch,
- the shield, by pulling it backwards. The impact absorbing pads are not secured.

REMOVAL



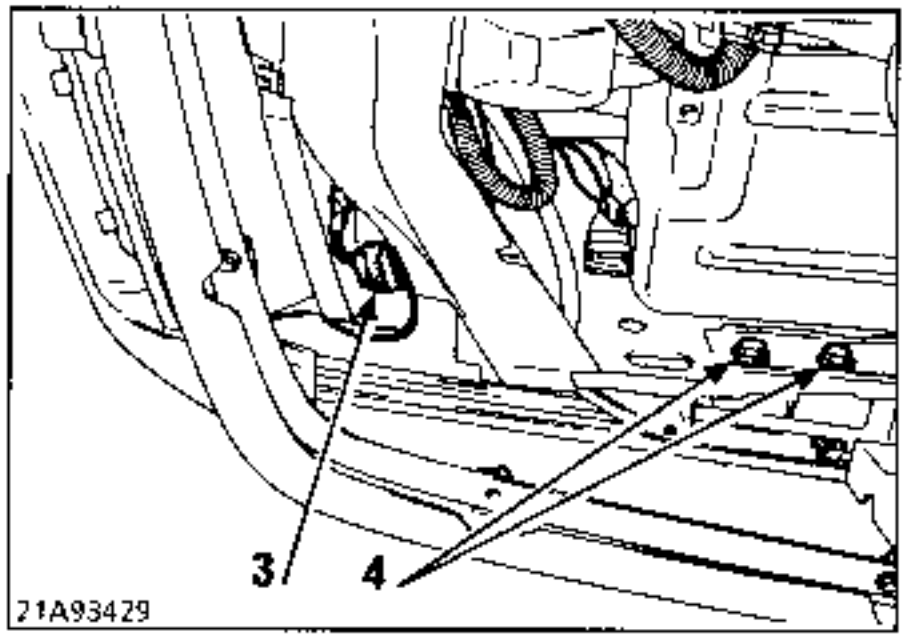


- the two bolts (**2**) for the rear mounting.



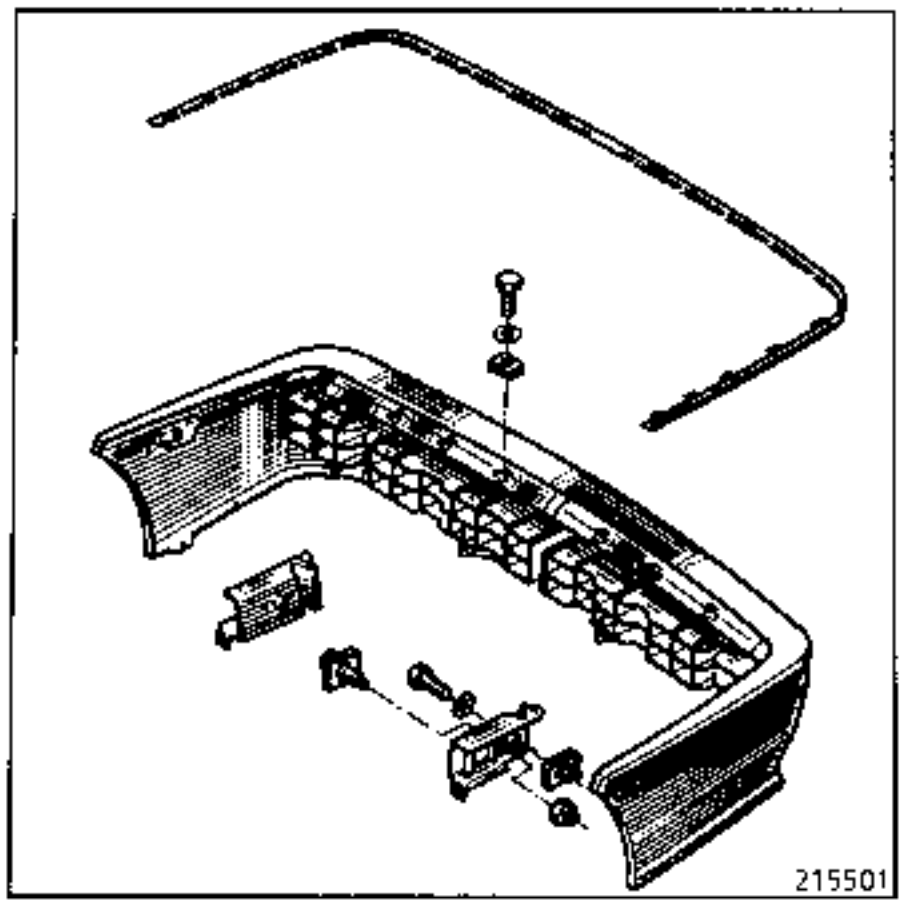
Remove :

- the two bolts (**1**) holding the engine undertray in place,

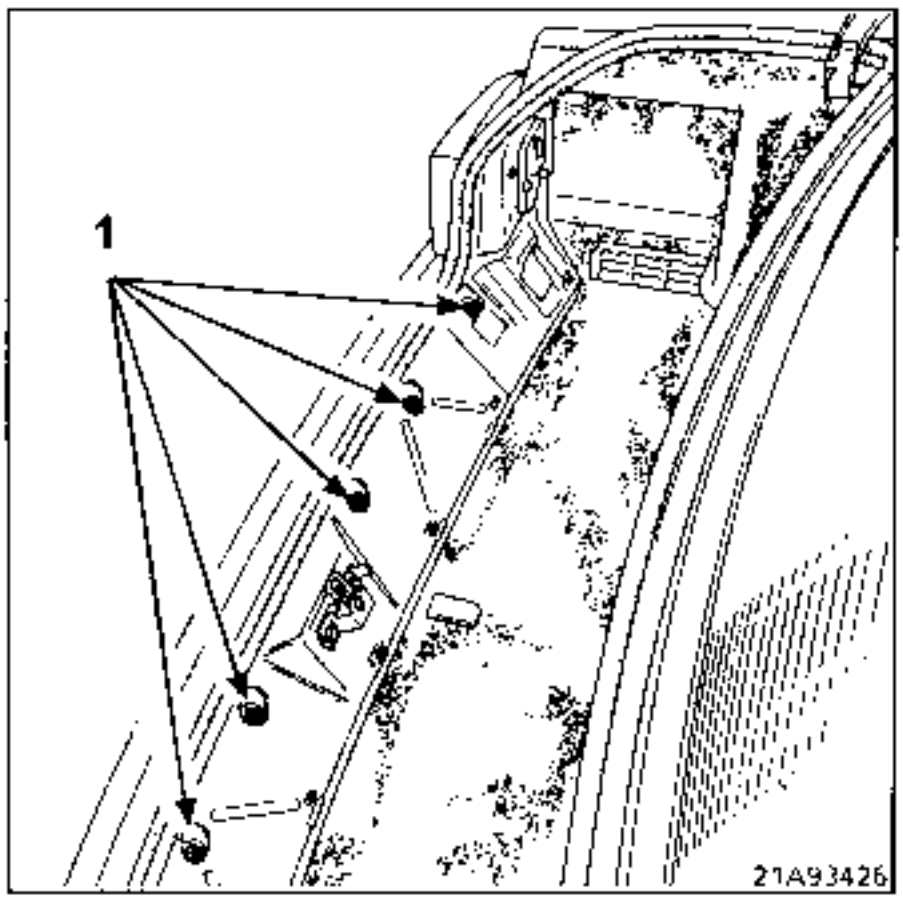


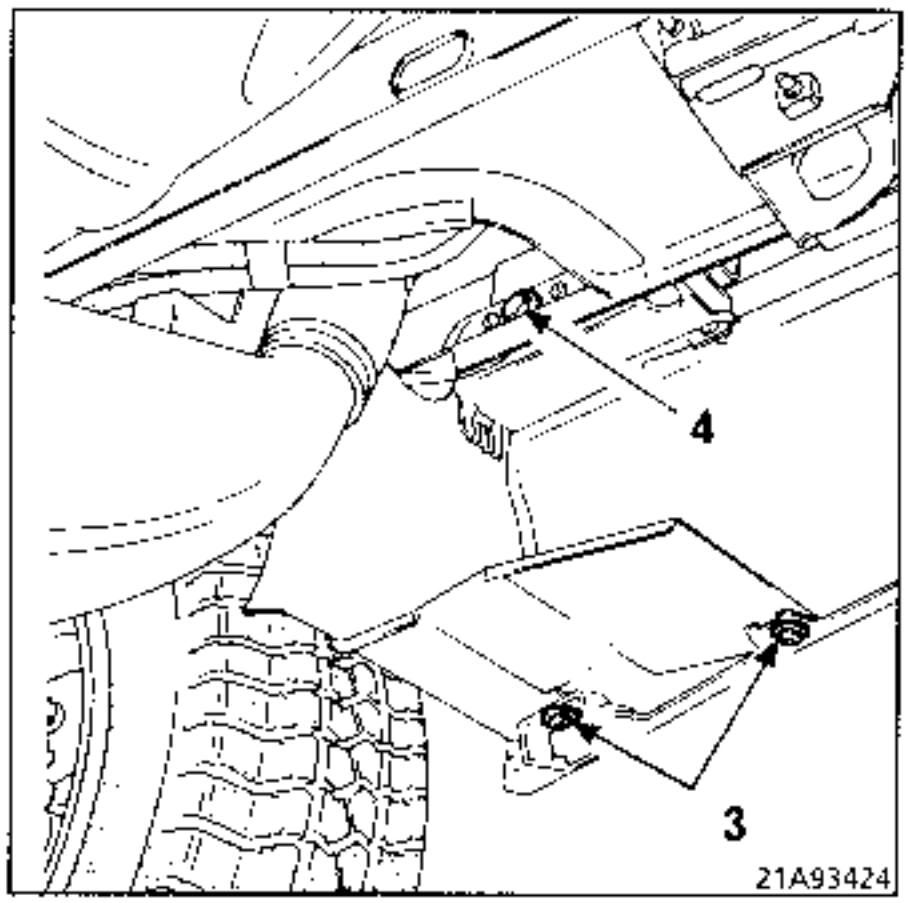
Disconnect the fog light connector (**3**).

Remove the four side mounting bolts (**4**) and remove the shield.



REMOVAL





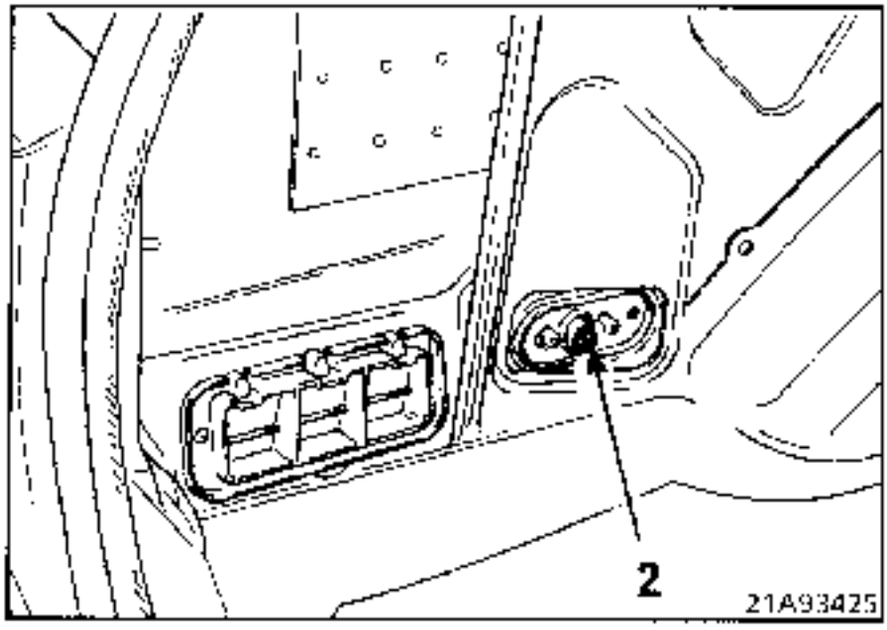
Remove:

-- the inner trim from the rear end panel secured by nine **Torx** type bolts,

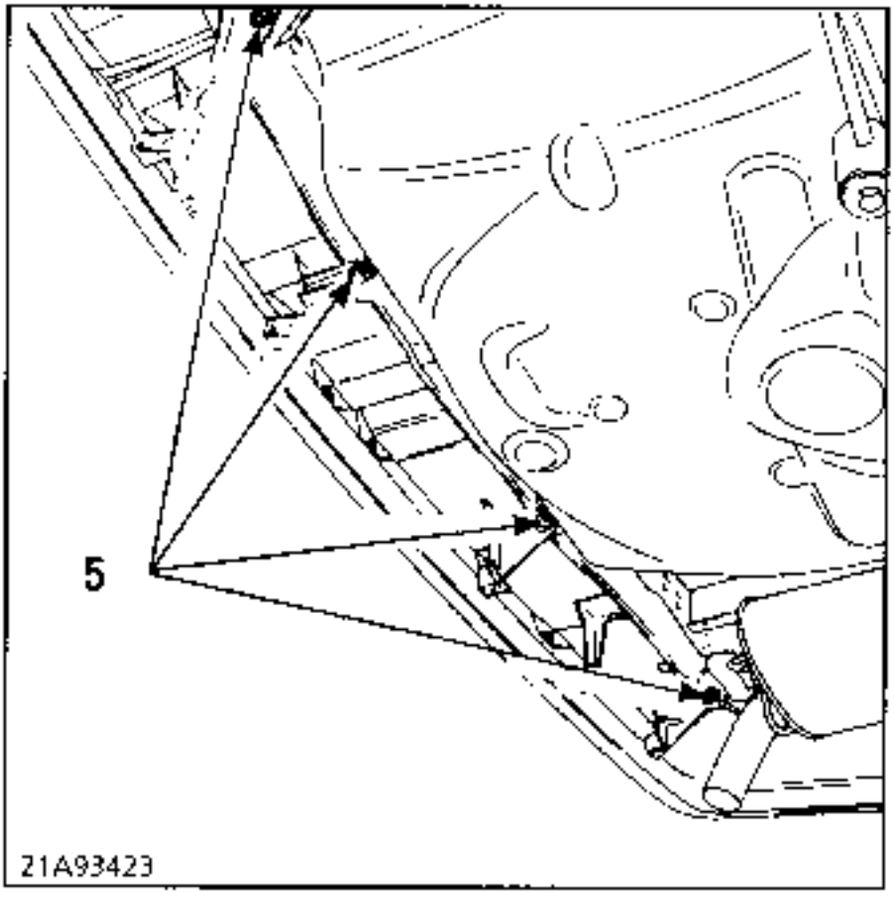
- the six **bolts (1)** securing the top of the shield,

- the four **bolts (3)** securing the wheel arch protectors,

- on the right-hand side, **bolt (4)** for the side mounting,

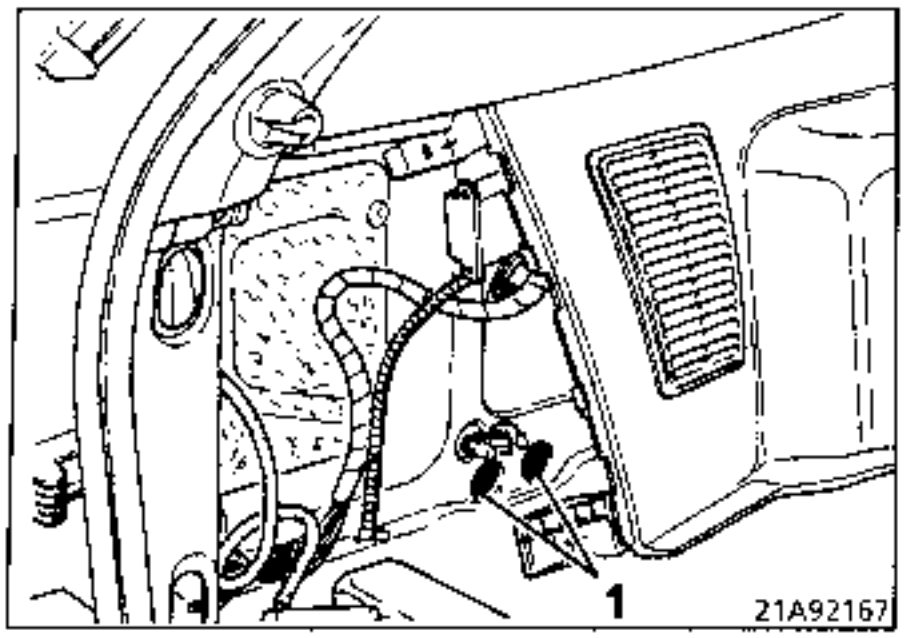


- remove the left-hand side mounting bolt (2), after moving away the wheel arch trim,



- the four bolts (5) on the lower cross member,
- the shield.

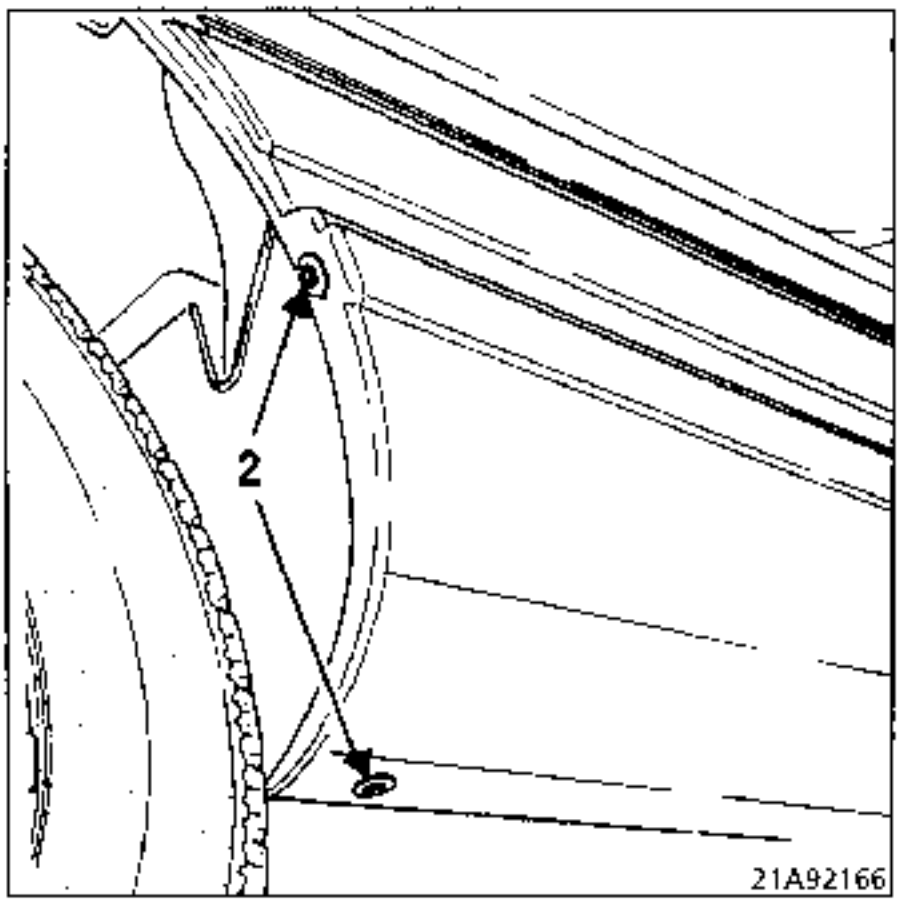
REMOVAL



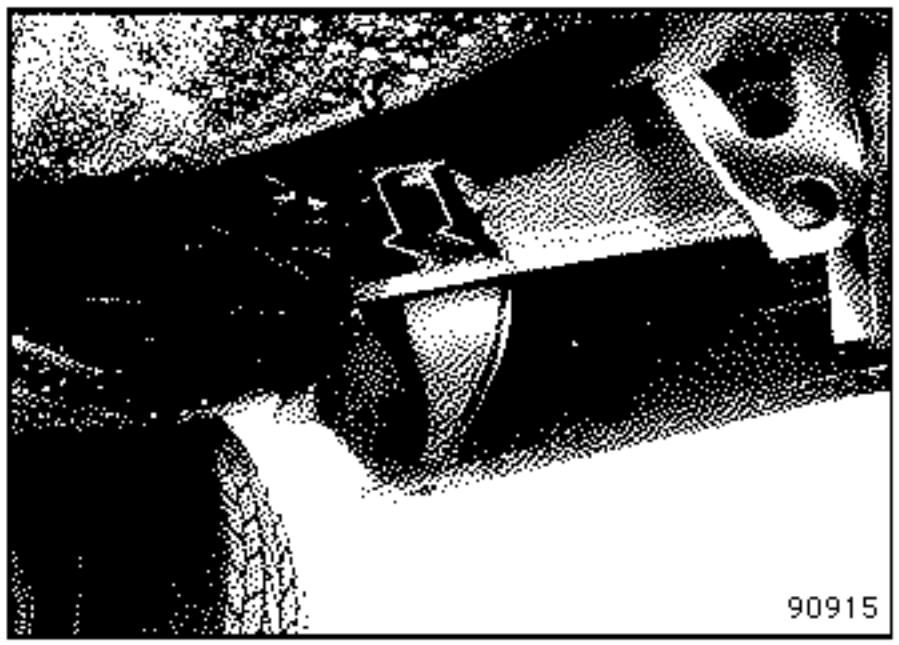
Remove the small door supporting the windscreen washer bottle.

Move aside the wheel arch trim.

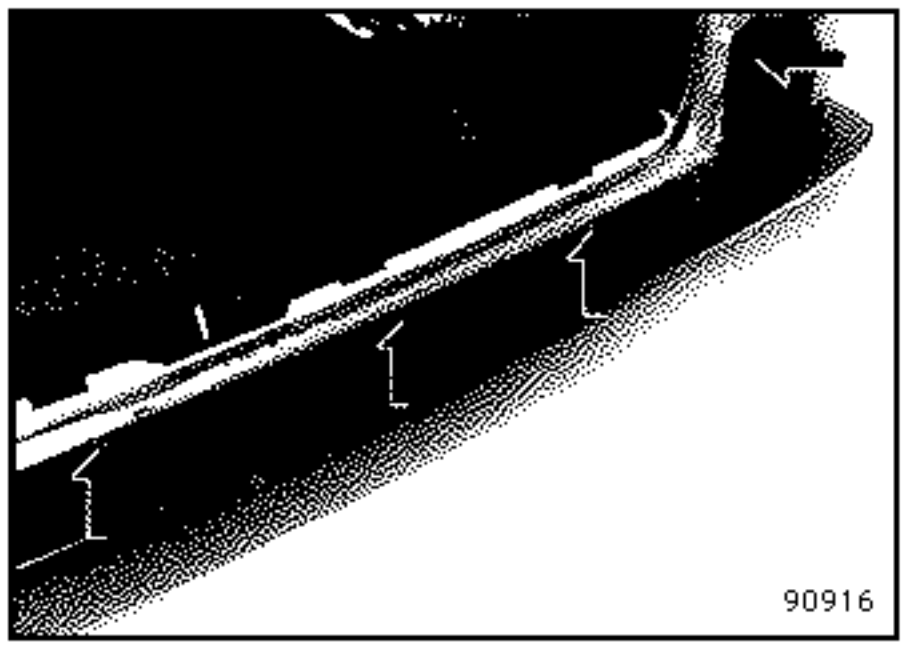
Remove the left-hand side mounting bolts (1).



On the left-hand and right-hand sides, remove the two bolts (2) securing the plastic protectors for the wheel arches.



From underneath the vehicle, remove the two right-hand side mounting bolts (3).

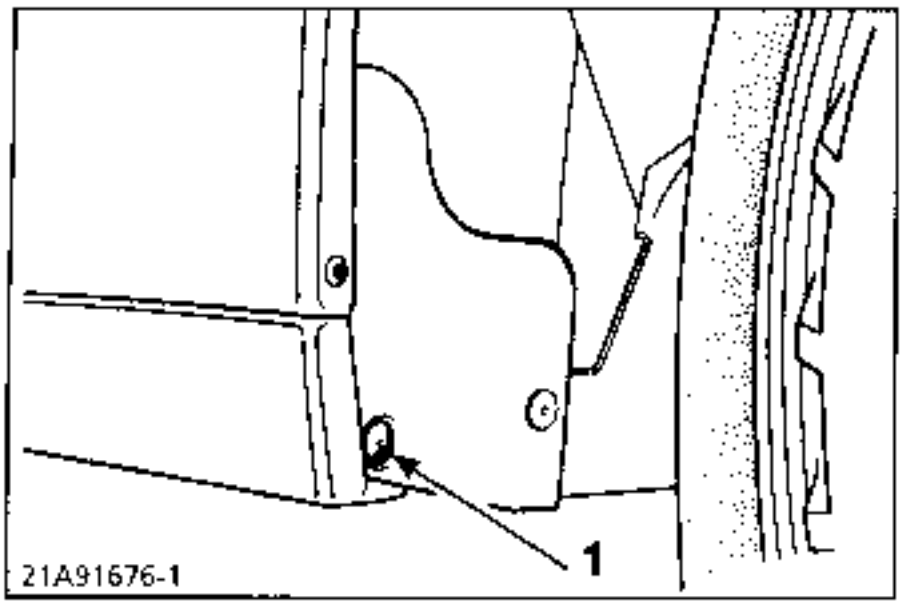


Remove the upper mounting bolts and take off the shield, pulling it backwards.

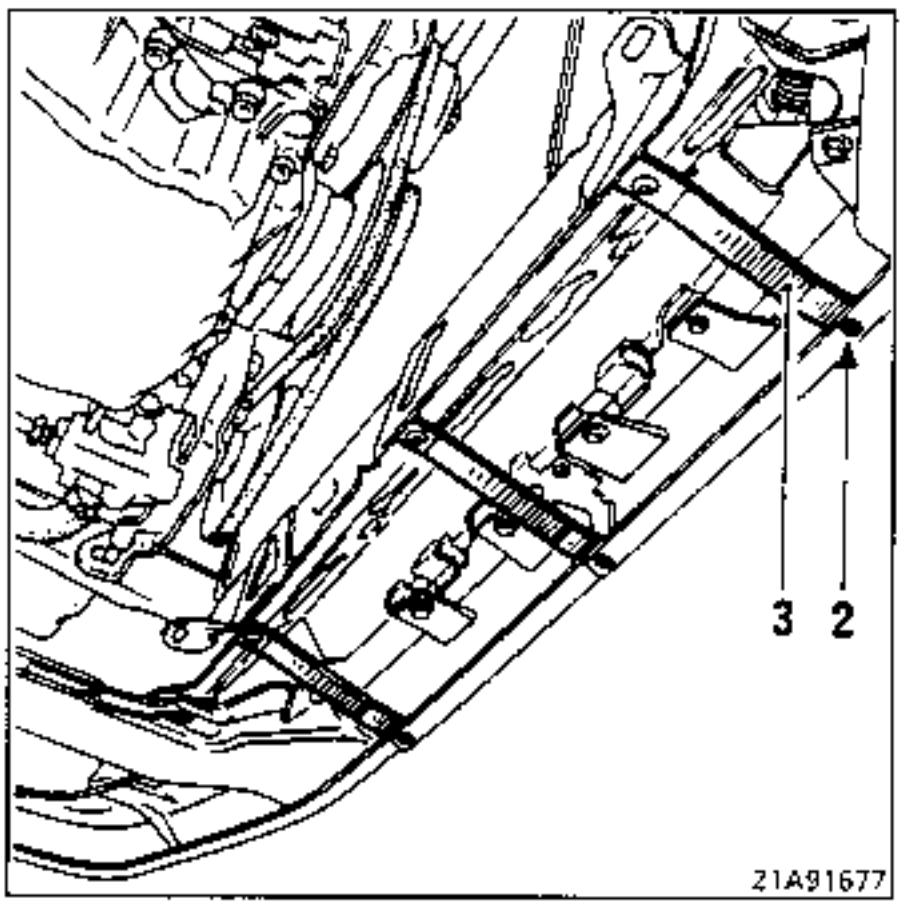
REMOVAL

Drill :

- rivet head (1) securing the rear end of the spoiler,

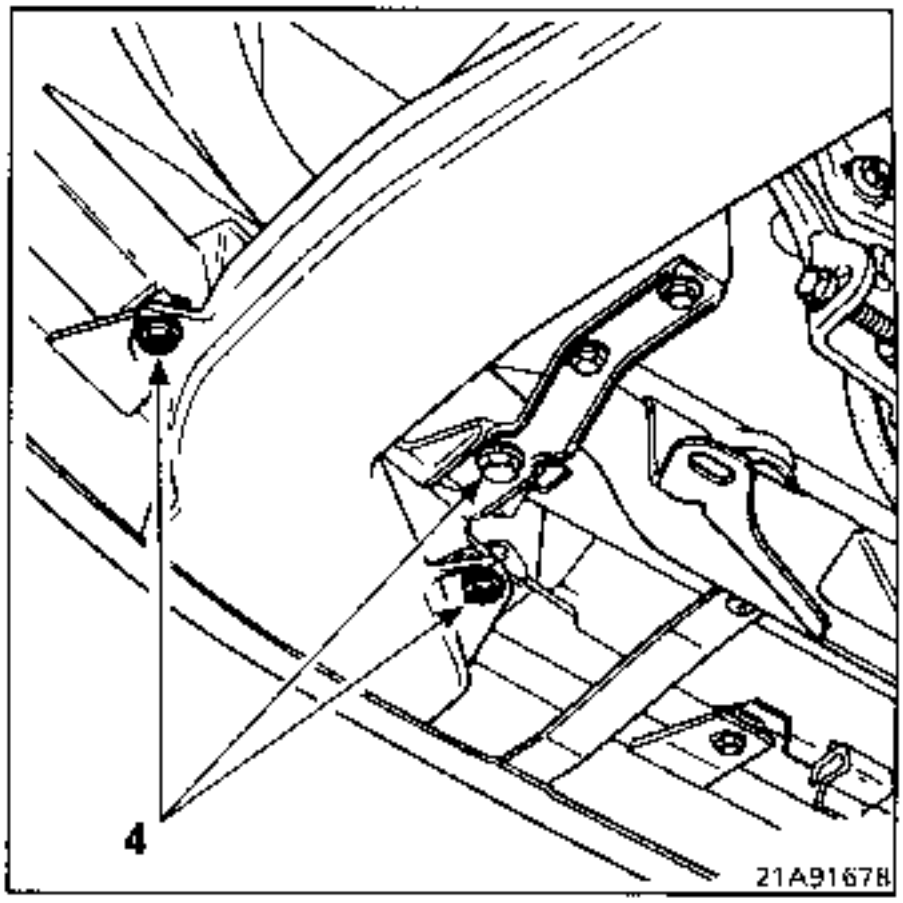


- the 3 rivet heads (2) securing the spoiler to the lower cross member by means of metal lugs (3).

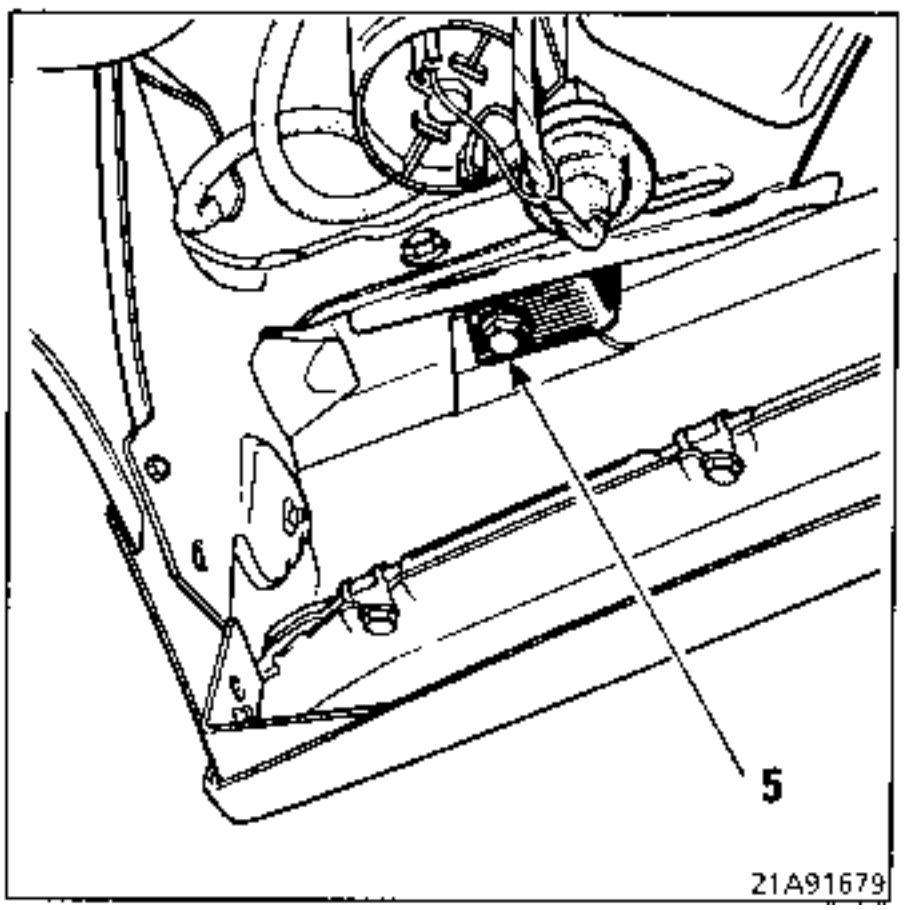


Remove :

- the bolts (4) securing the air ducts to the spoiler,



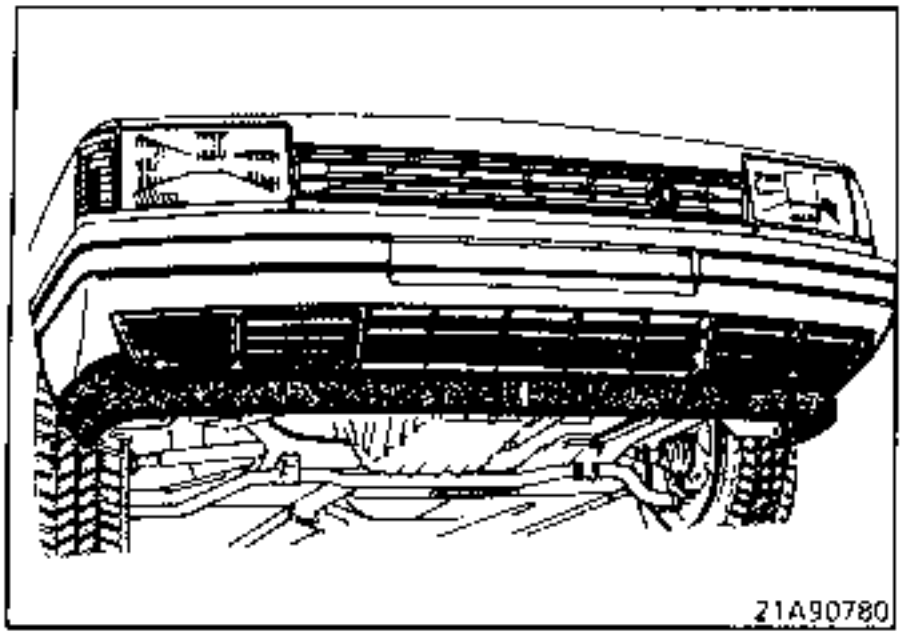
- the two bolts (5) securing the sides of the shield.



There are 2 types of spoiler, depending on the shape of the shield :

1st version

Shield with ventilation grille



The kit consists of :

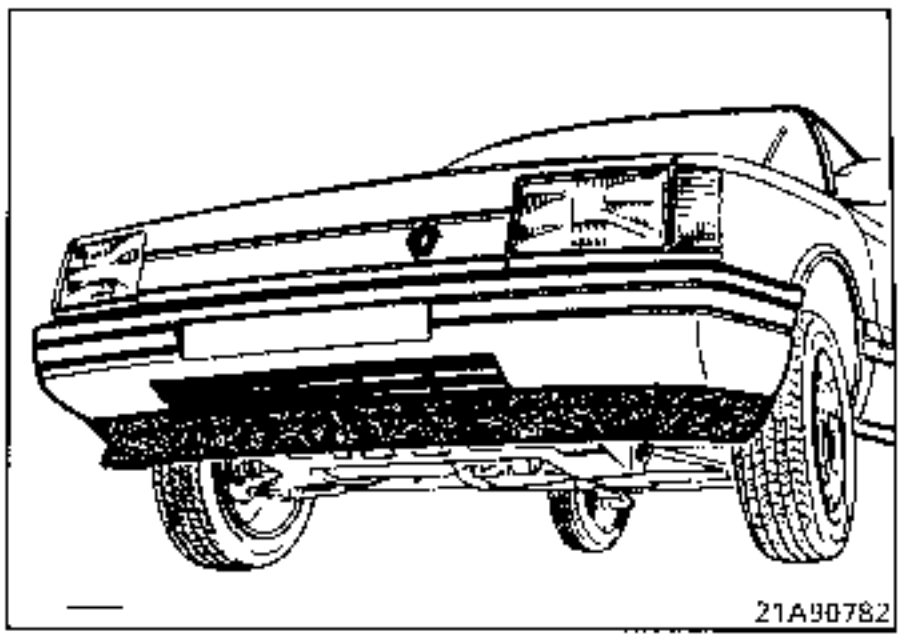
- 1 right-hand 1/2 component,
- 1 left-hand 1/2 component,
- 1 sachet.

The sachet contains :

Mark		Quantity
2 rivet C6 - 9.3	77 03 072 236	2
3 base screw M6 x 100	77 03 002 020	16
4 sheet metal nut 4.2	77 03 046 069	3
5 Aluminium rivet C3 4.8 - 13	77 03 072 202	2
6 sheet metal nut M6 AC200/4	77 03 046 034	16
7 sheet metal RLX bolt 4.2 (black stainless steel)	77 03 016 340	3
8 base screw M8 x 125	77 03 020 006	2
9 sheet metal nut M8	77 03 046 020	2

2nd version

Shield without ventilation grille



The kit consists of :

- 1 right-hand 1/2 component,
- 1 left-hand 1/2 component,
- 1 sachet.

The sachet contains :

Mark		Quantity
1 base nut M6	77 03 035 015	4
2 rivet C6 - 9.3	77 03 072 236	2
3 base screw M6 x 100	77 03 002 020	10
4 sheet metal nut M6 x 100	77 03 046 034	10
5 Aluminium rivet C3 4.8 - 13	77 03 072 202	2
6 sheet metal nut 4.2	77 03 046 069	3
7 sheet metal RLX bolt 4.2 (black stainless steel)	77 03 016 340	3
8 base screw M8 x 125	77 03 020 006	2
9 sheet metal nut M8	77 03 046 020	2

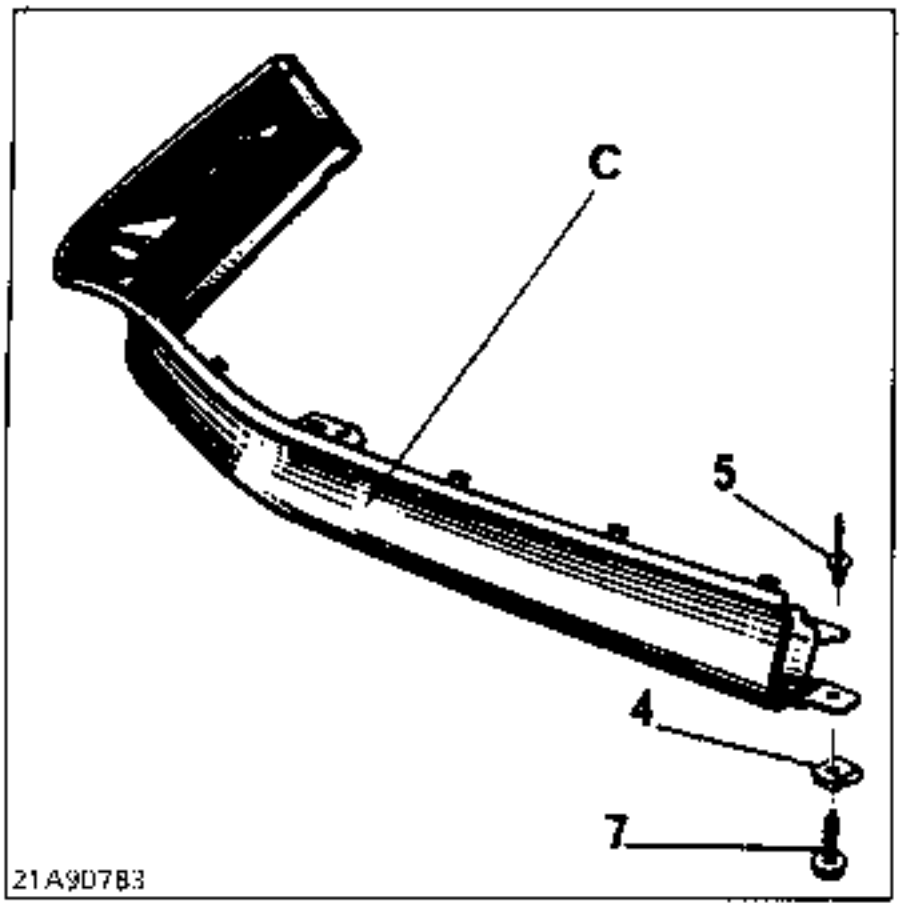
1st version

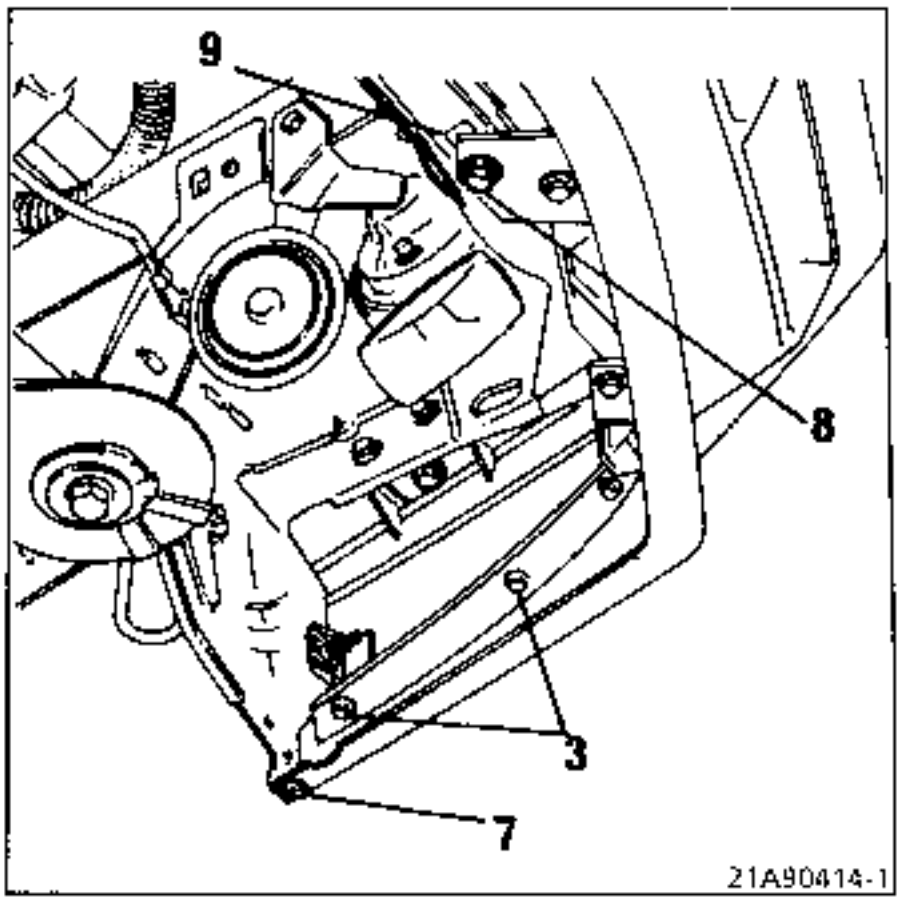
On assembly, it is essential to follow the order as given below. This is due to the special way in which components B and C are clipped under the ventilation grilles on shield A.

To fit component C, it must be positioned simultaneously under the ventilation grille whilst B and C are connected.

IMPORTANT

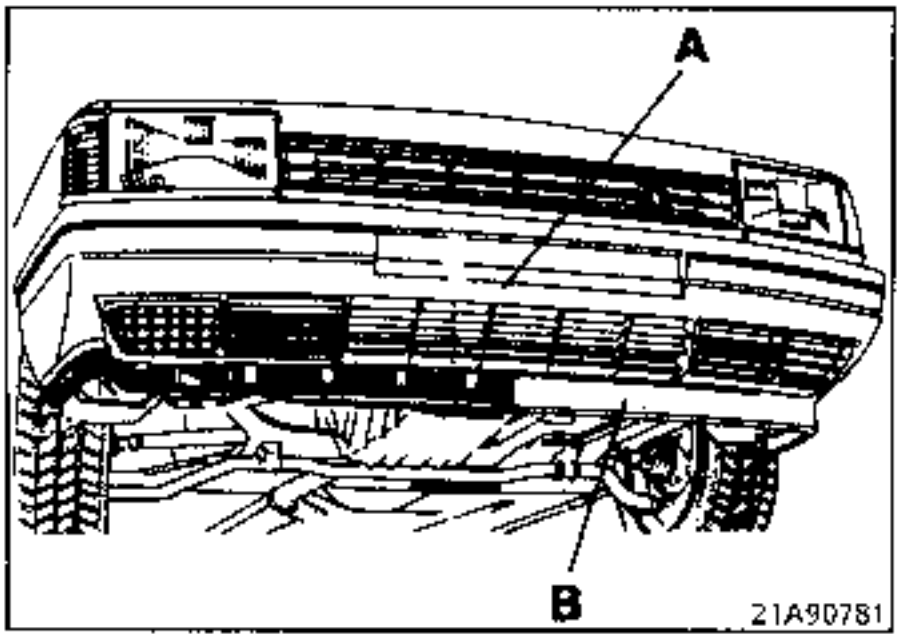
Fit in order B to A, then C to A and connect B with C.

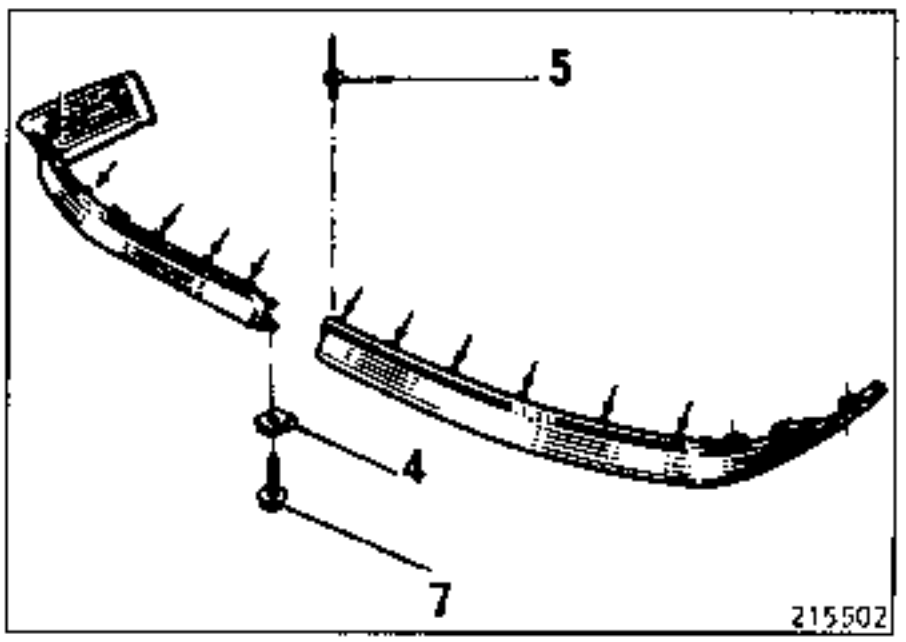




2nd version

Shield without ventilation grille. The two components can be assembled before they are secured to the shield, which makes it easier to fit rivet (5), bolt (7) and sheet metal nut (4).

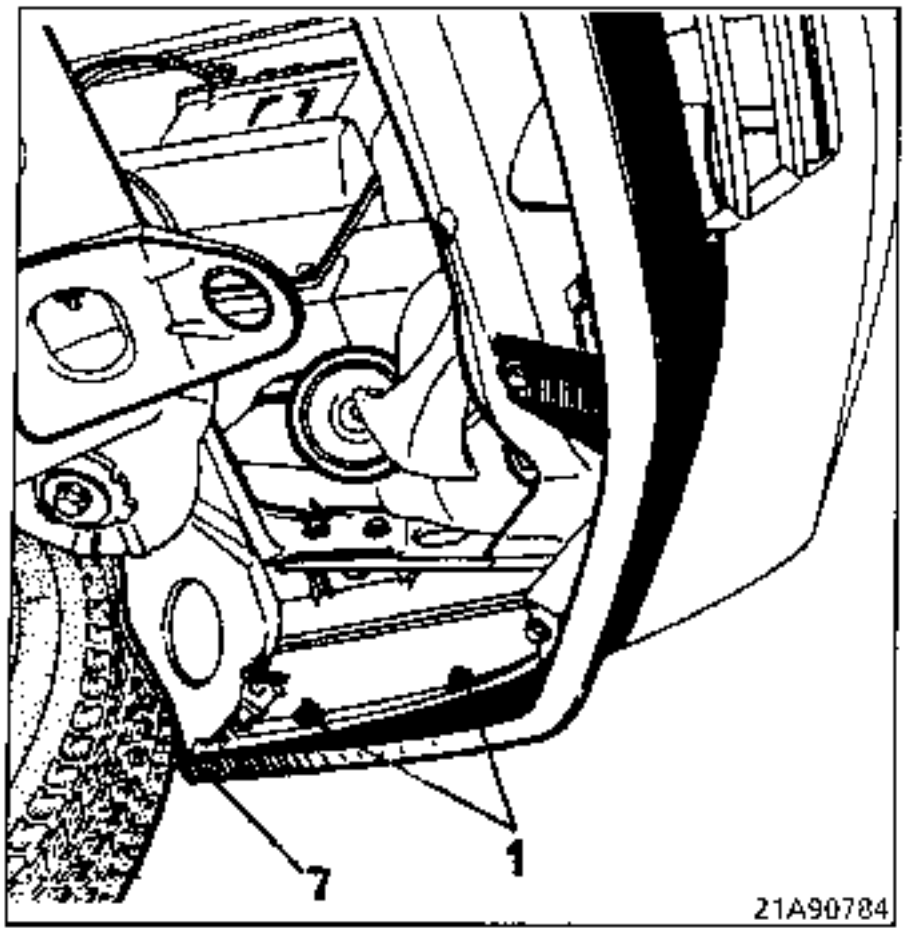


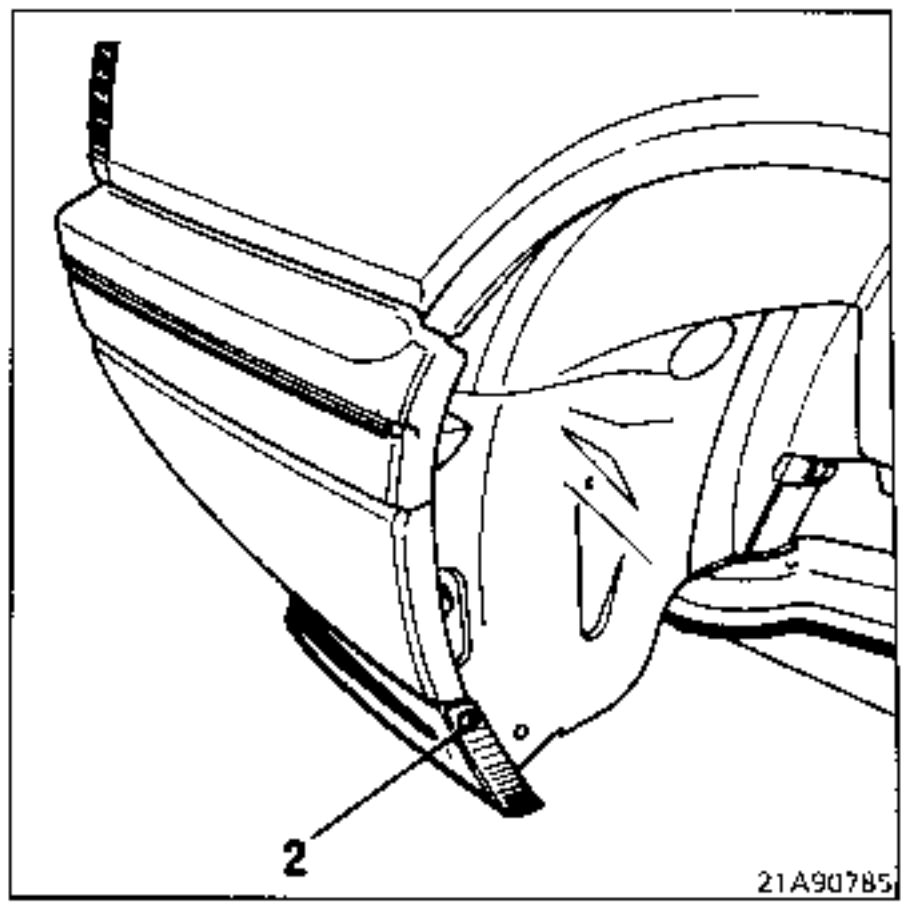


Fit the spoiler to the shield (in the order given above) and secure it using bolts (3), (8) and (7), after first positioning the sheet metal nuts.

Check that all the clips are correctly in place (see page 3).

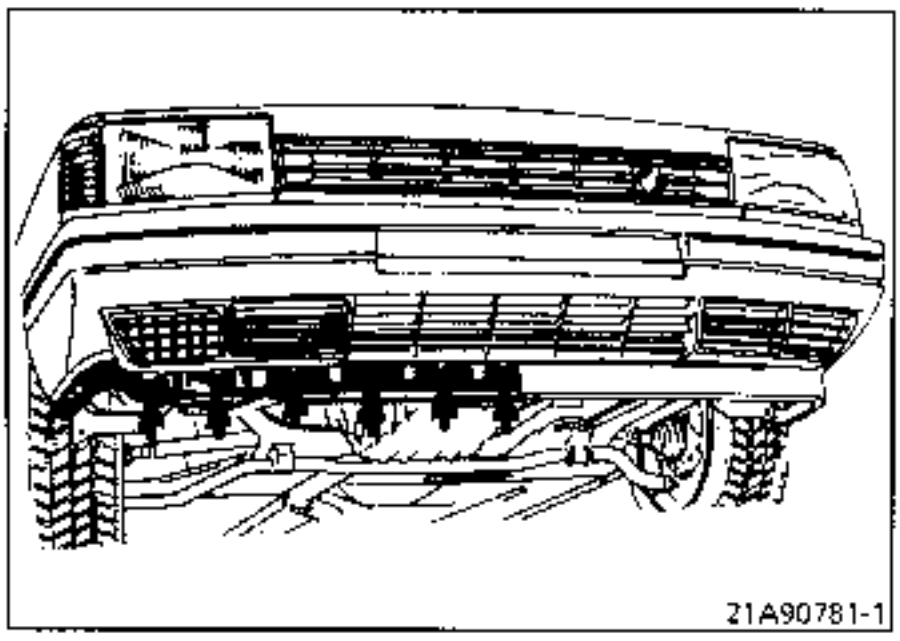
The difference in respect to the first version is the base nut (1), which requires the position of the components to be determined by fitting the base screws (1) in their locations.





1st and 2nd versions

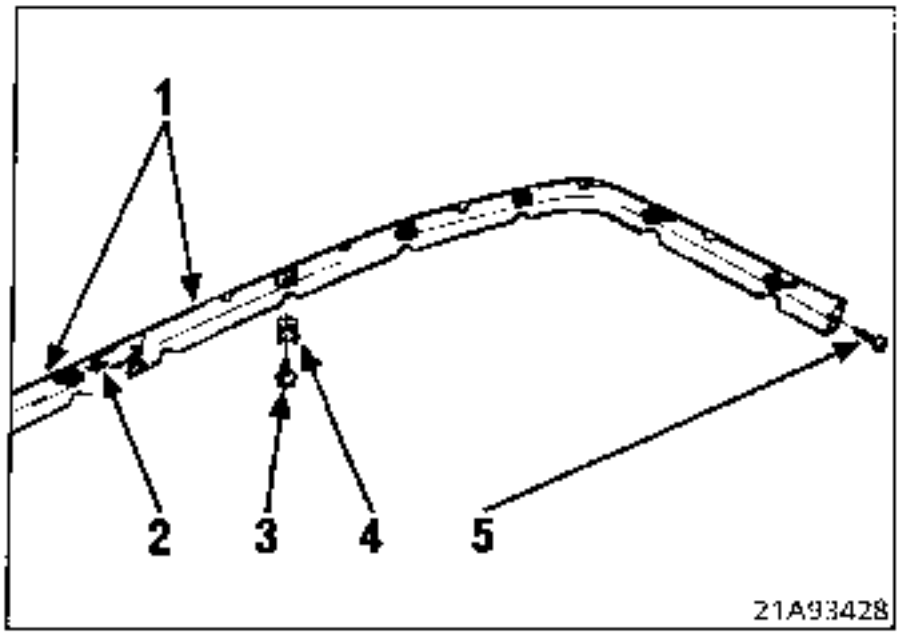
IMPORTANT : It is essential to make sure that the clips are correctly positioned in their locations.



Secure the ends of the spoiler using mountings (2).

NOTE : Mountings (2) may be replaced by bolts (7) and their sheet metal nuts (6).

FITTING

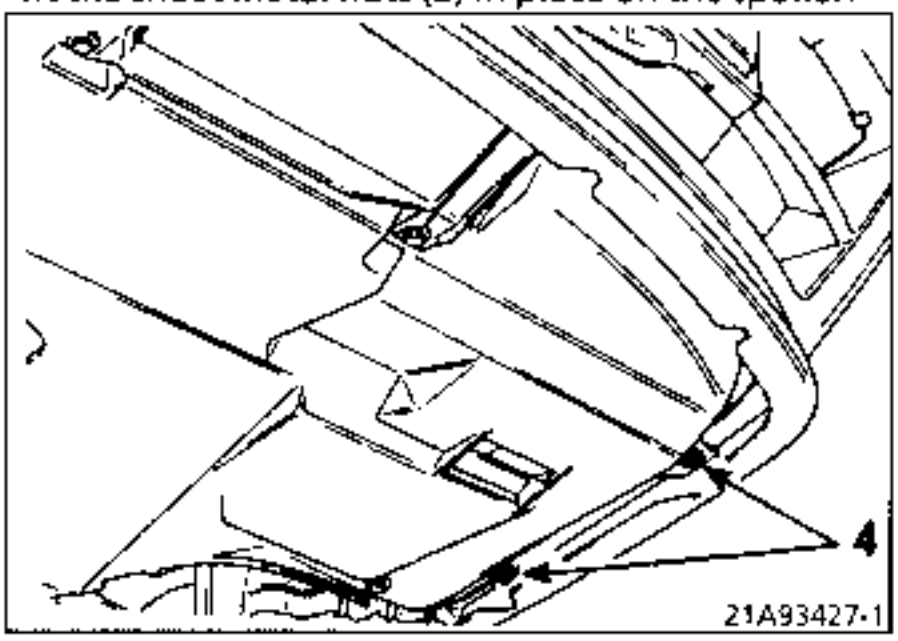


The kit consists of :

1 left-hand and right-hand side spoiler component
2 3 rivets
3 12 bolts
4 12 sheet metal nuts
5 2 sheet metal screws

Assemble the two left-hand and right-hand sides of the spoiler and secure them using rivets (2).

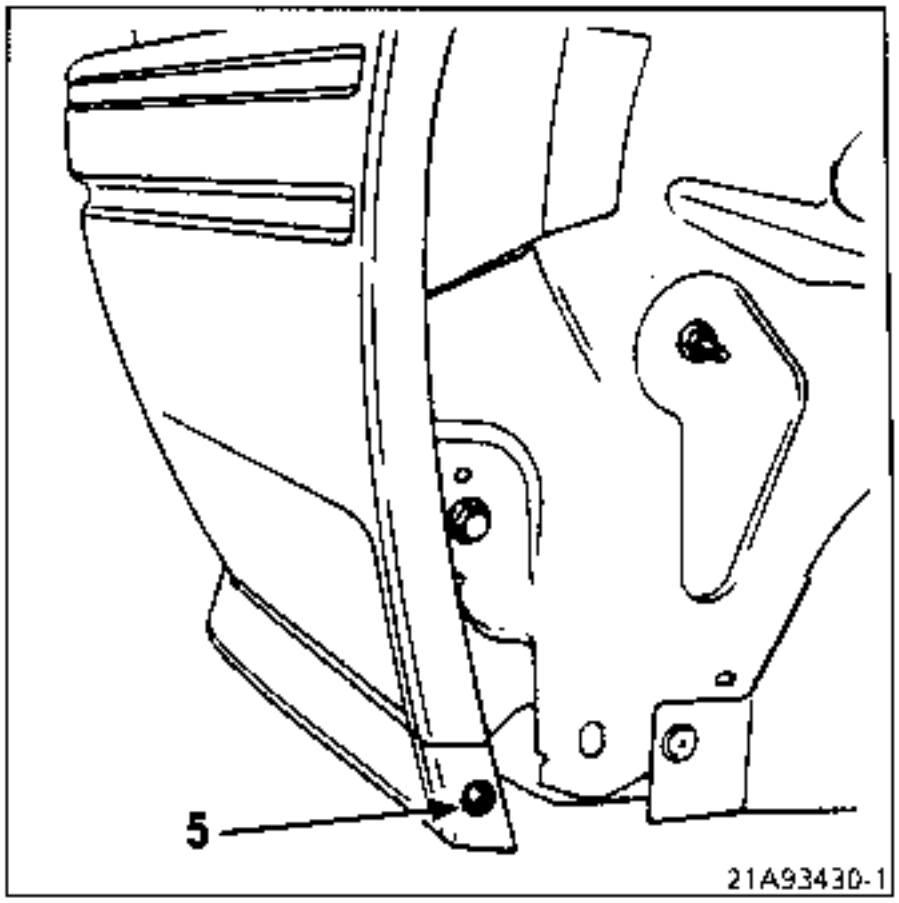
fit the sheet metal nuts (3) in place on the spoiler.



Fit the spoiler to the vehicle.

Check that the undertray is correctly positioned below the engine.

Secure the spoiler using the 12 bolts (4).

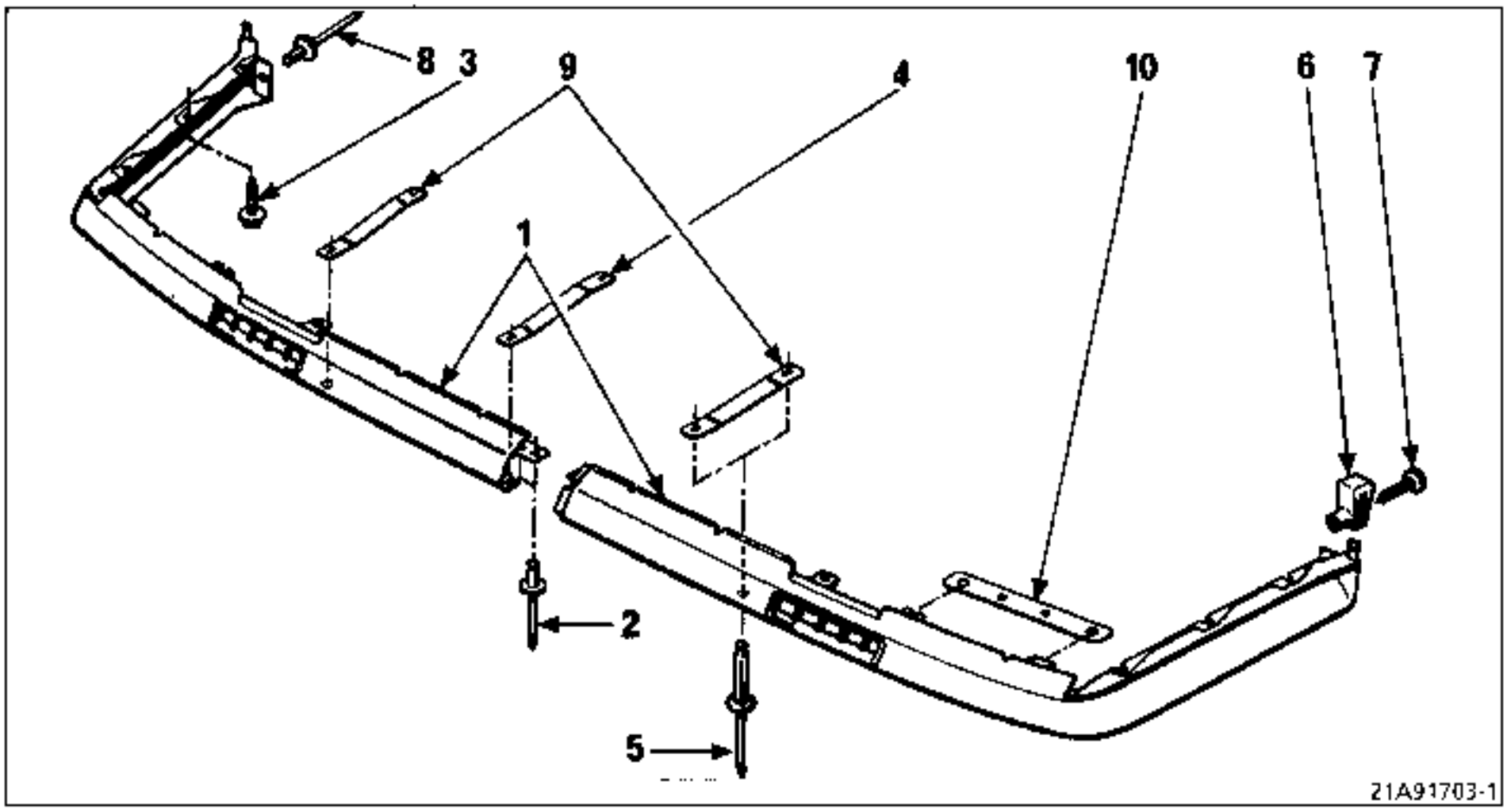


Secure the spoiler at the ends using the two screws (5).

ASSEMBLY

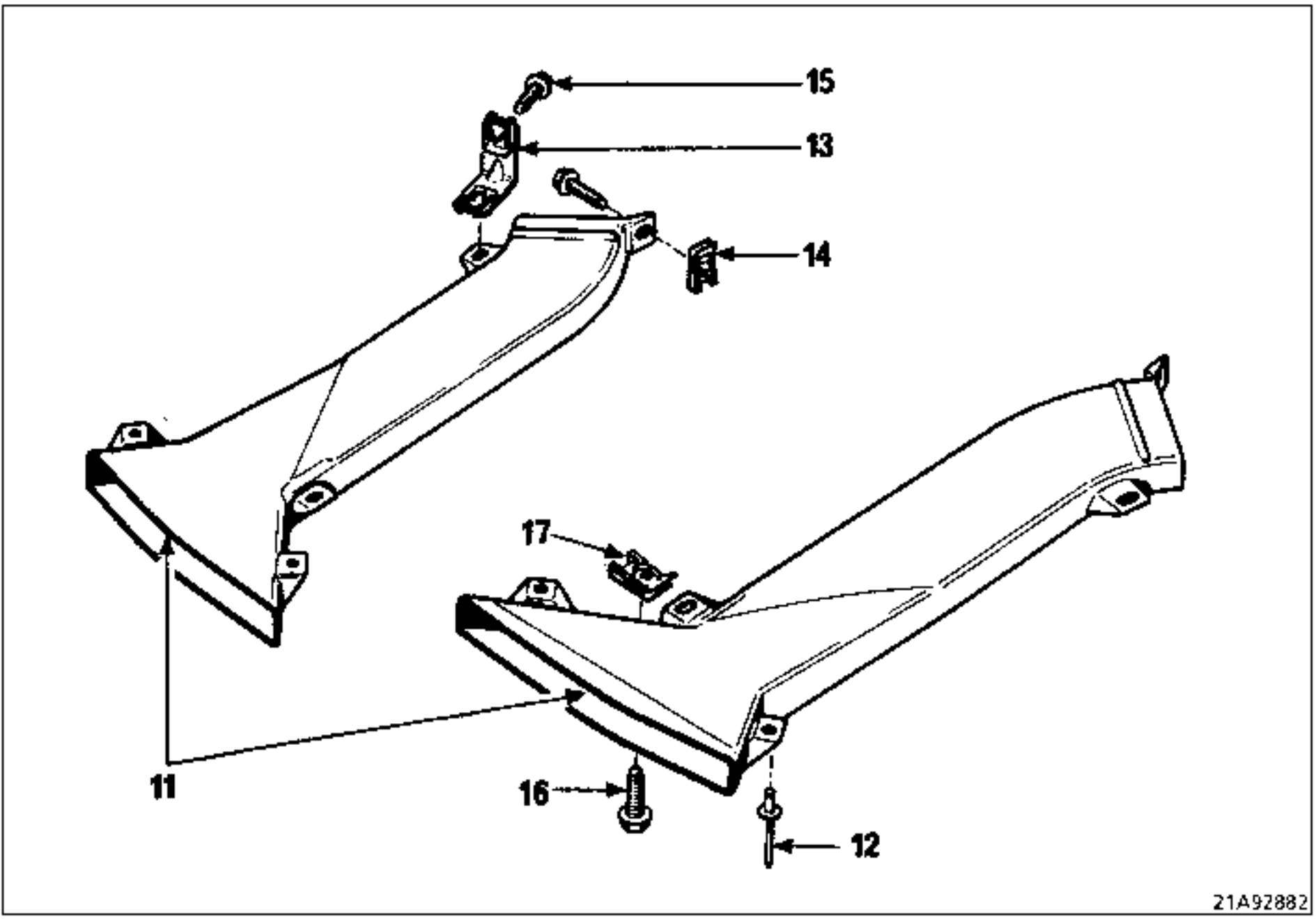
Contents of the kits :

Spoiler (Part No : 77 01 465 493).



		Quantity
1	Left-hand and right-hand spoiler components	1 | 1
2	4.8 mm diameter-12 rivet for assembling the 2 sides of the spoiler	2
3	Captive bolt with washer for securing the spoiler to the shield	16
4	Lug for the connection between the spoiler and lower cross member (black)	1
5	4.8 mm diameter rivet for securing connection lugs	8
6	4.2 mm diameter plastic nut for securing spoiler to shield	2
7	4.2 mm diameter-16 sheet metal screw	2
8	Rivet for securing spoiler to protective shield	2
9	Lugs for connection between spoiler and lower cross member (gold)	2
10	Lug for securing air ducts to spoiler	2

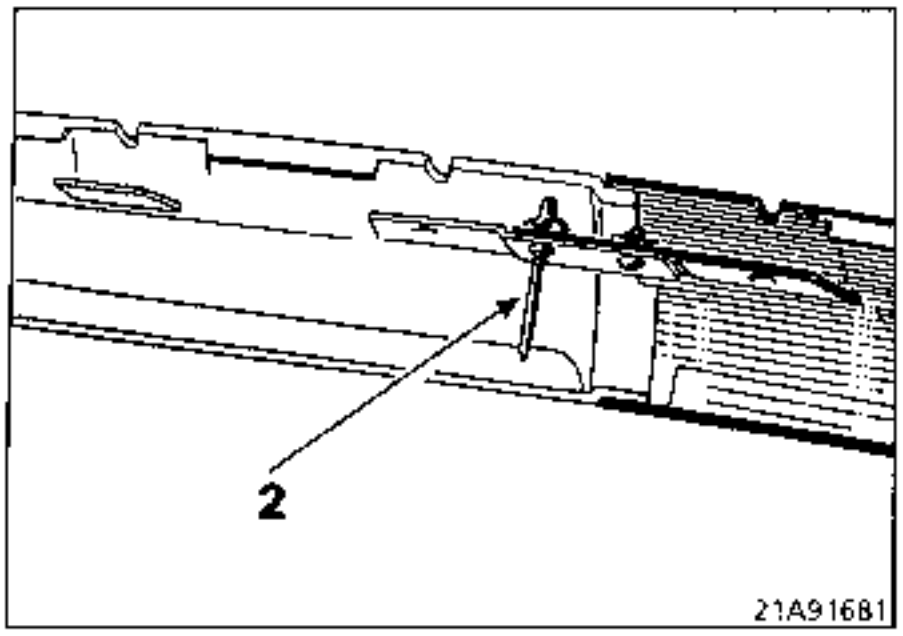
Air ducts :



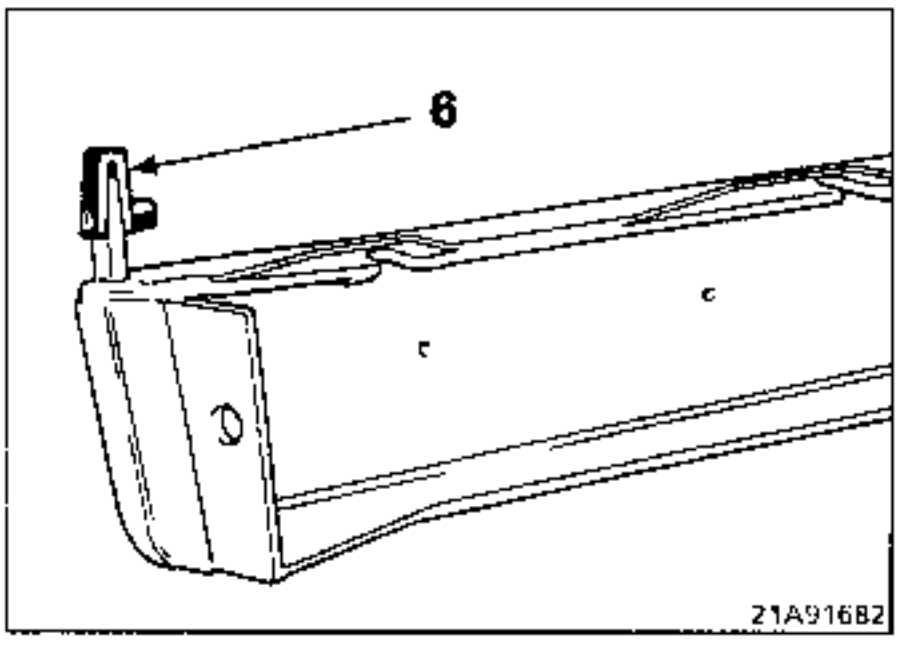
		Quantity
11	Right-hand and left-hand side air duct	1 – 1
12	Rivet for mounting duct on spoiler	2
13	Corner piece for connection with protective shield	2
14	**M6** sheet metal nut	6
15	**M6** base screw	6
16	**M8** base screw	2
17	**M8** sheet metal nut	2

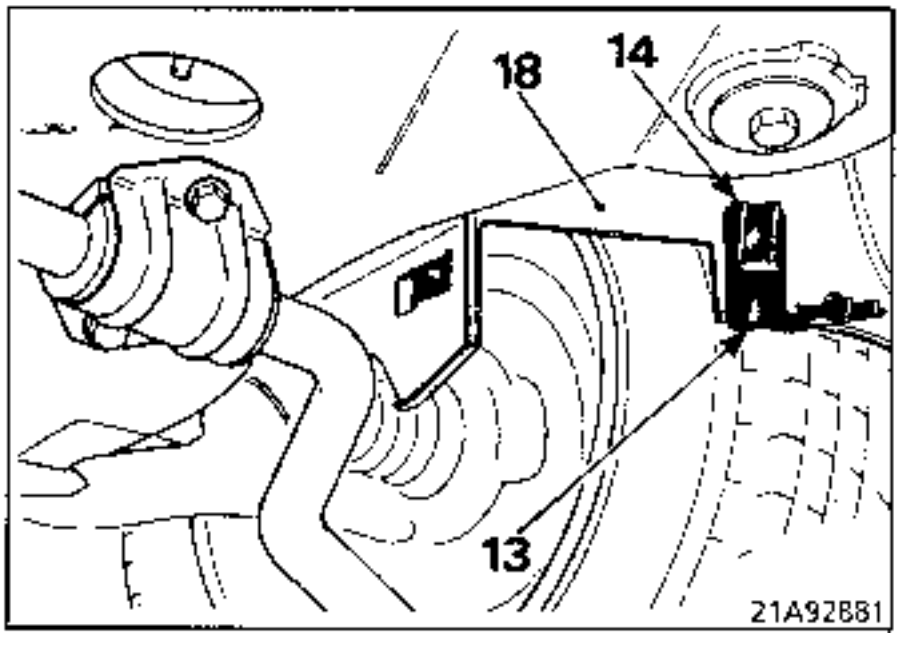
PREPARING THE PARTS BEFORE ASSEMBLY

Assemble the 2 left-hand and right-hand sides of the spoiler using rivets (**2**).



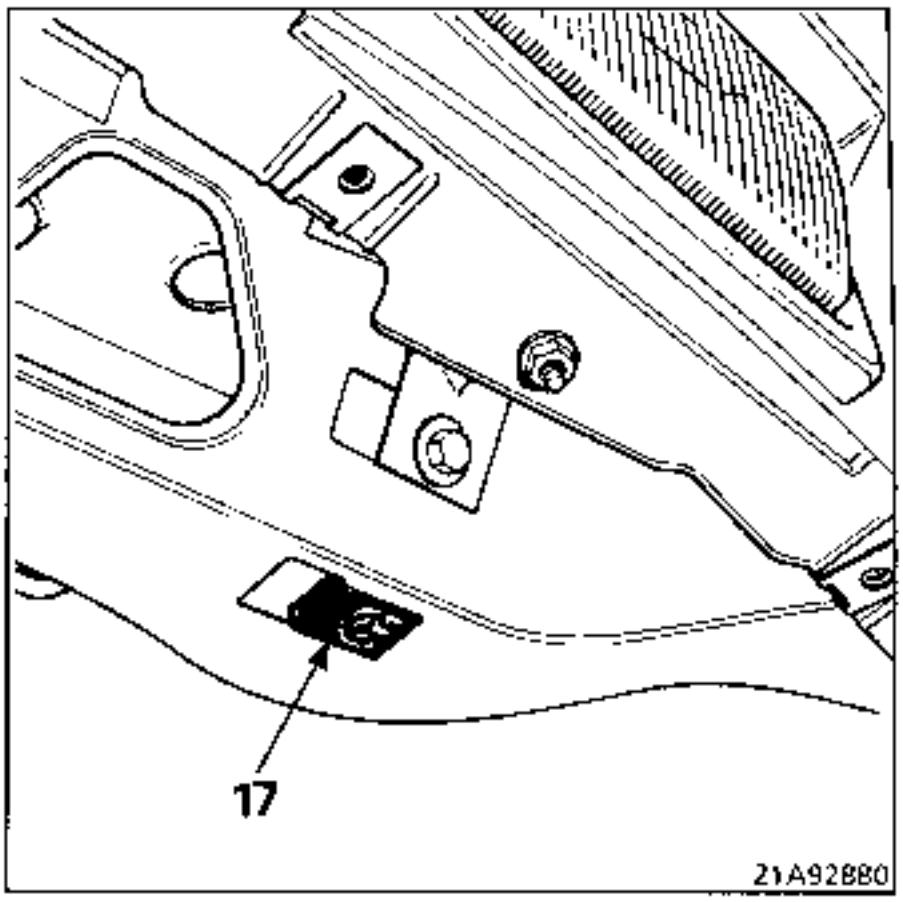
Fit retaining clips (**6**) at the 2 ends of the spoiler.





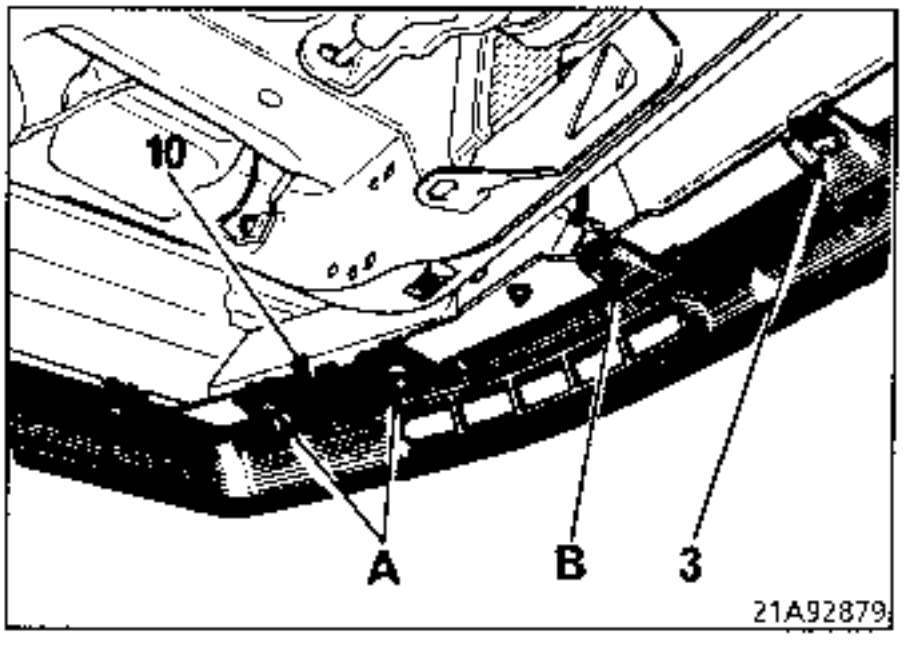
Assemble the sheet metal nuts (**14**) on the corner pieces (**13**).

Fit the corner pieces to the 2 protective screens (**18**).



Fit the sheet metal nuts (17) to the front lower cross member

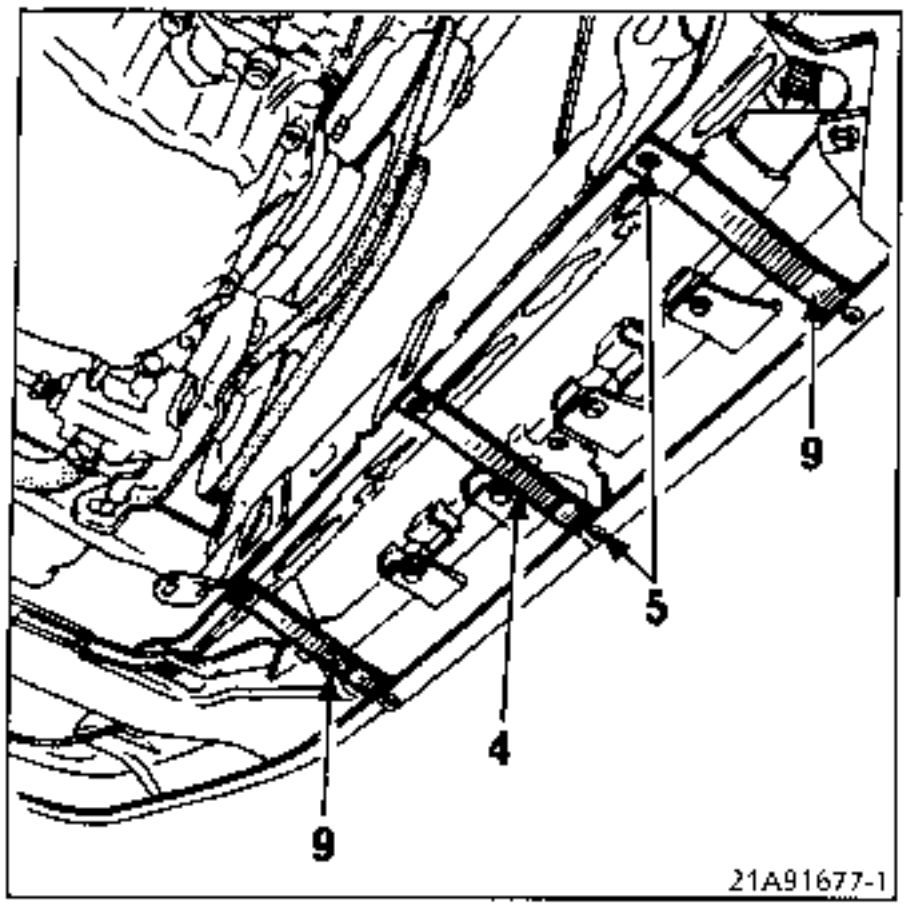
ASSEMBLY



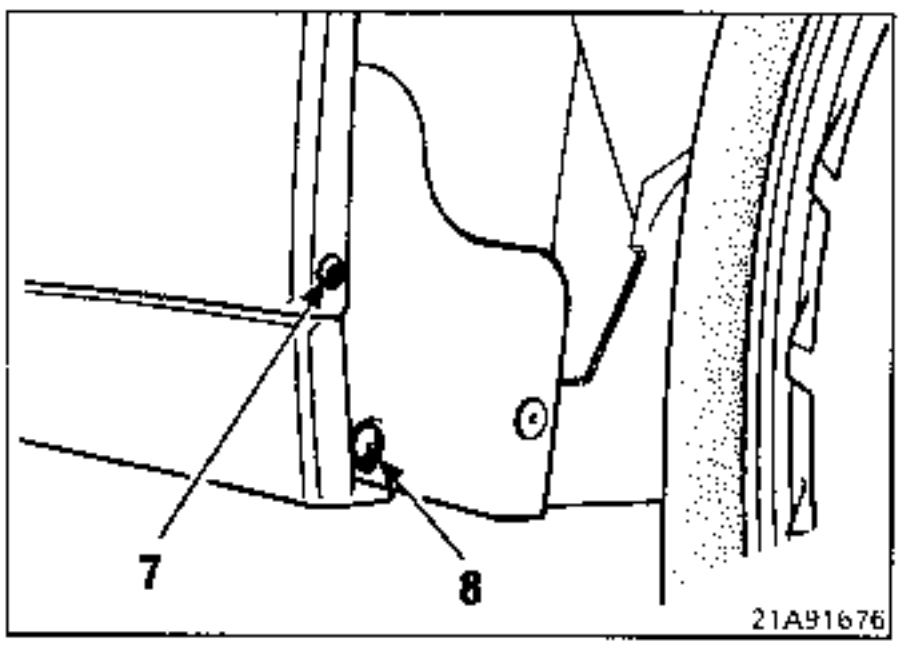
Fit the spoiler to the vehicle and secure it using the captive washer bolt (**3**).

Place lug (**10**) at **A** between the mounting bolts and the spoiler.

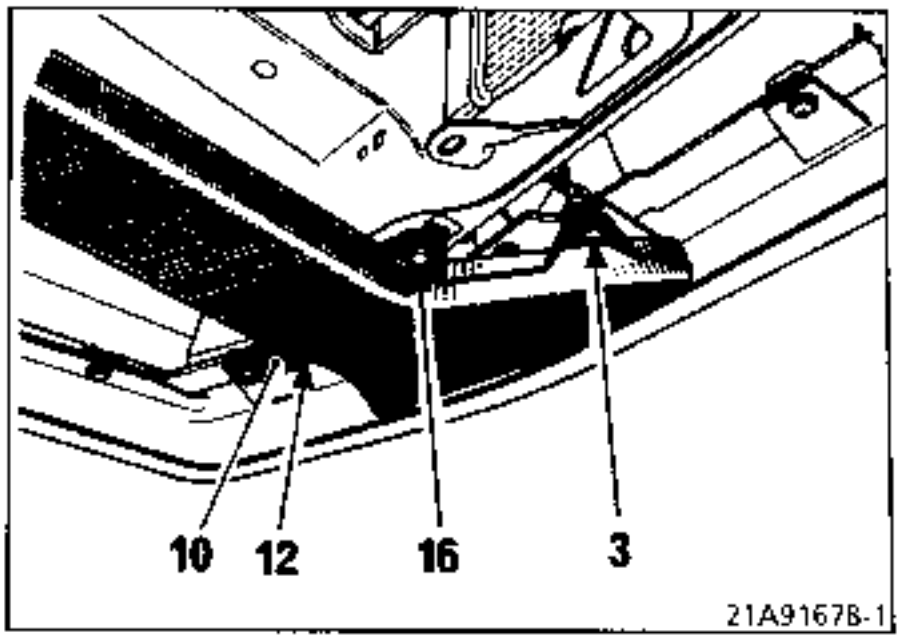
Fit the air duct before securing the spoiler at B.



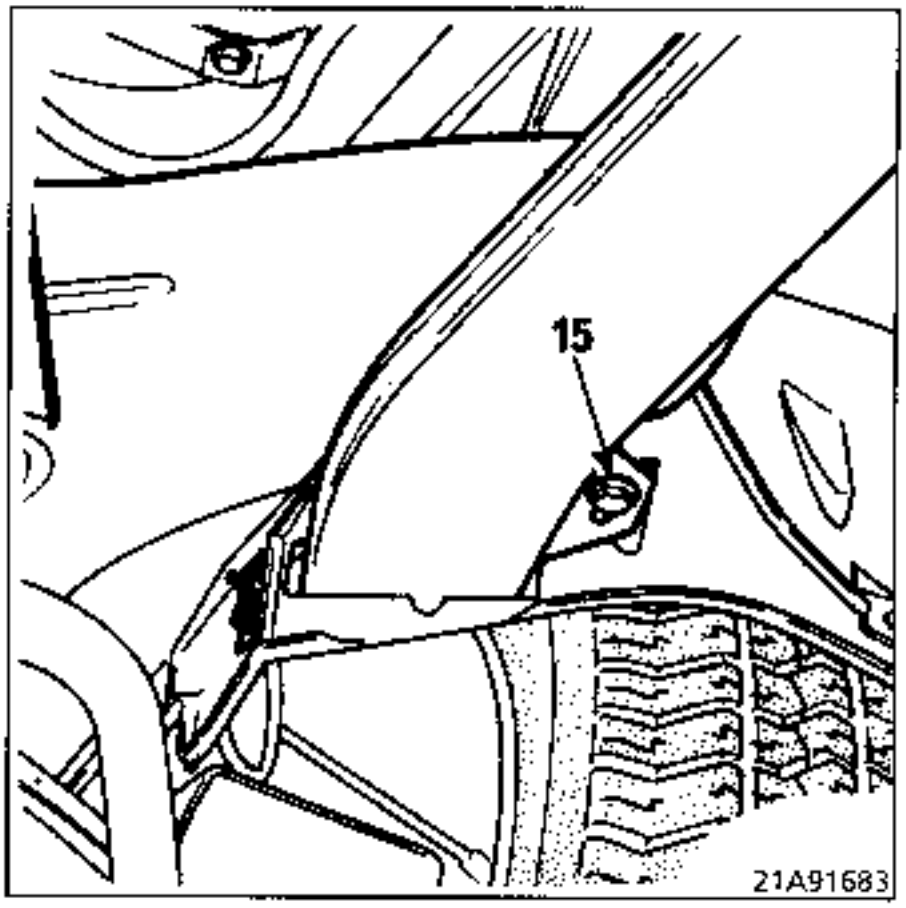
Fit the 3 connecting lugs (4) and (9) connecting the spoiler to the lower cross member by rivets (5).



Secure the ends of the spoiler using sheet metal screws (7) and rivets (8).

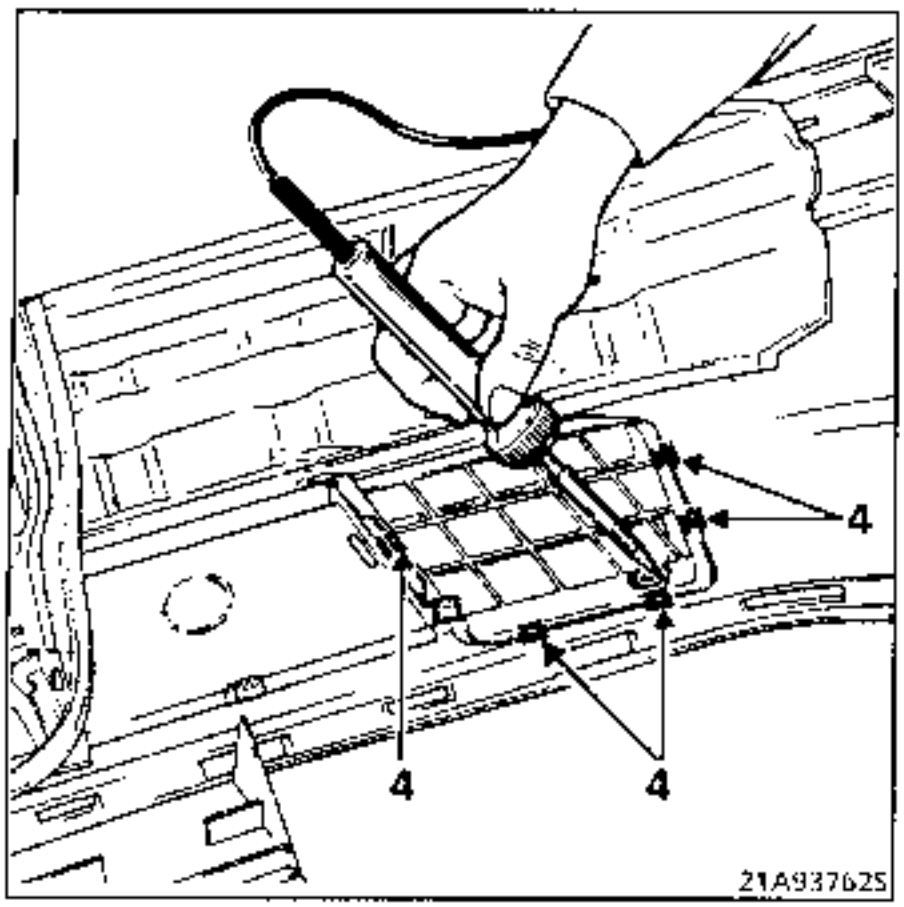


Offer up the air ducts and secure them using rivets (12) on lugs (10), screws (16) on the lower cross member and screws (3) on the spoiler.



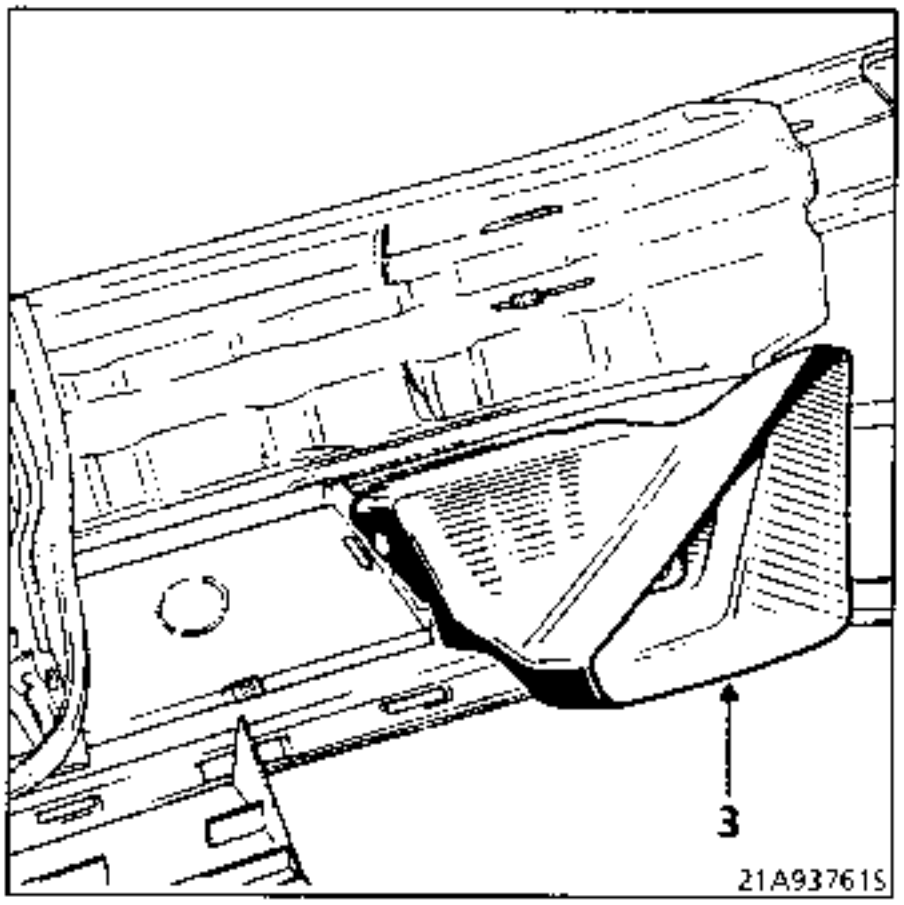
Secure the rear part to the protective shield using bolts (15).

FITTING THE GRILLE AND AIR INTAKE CASING

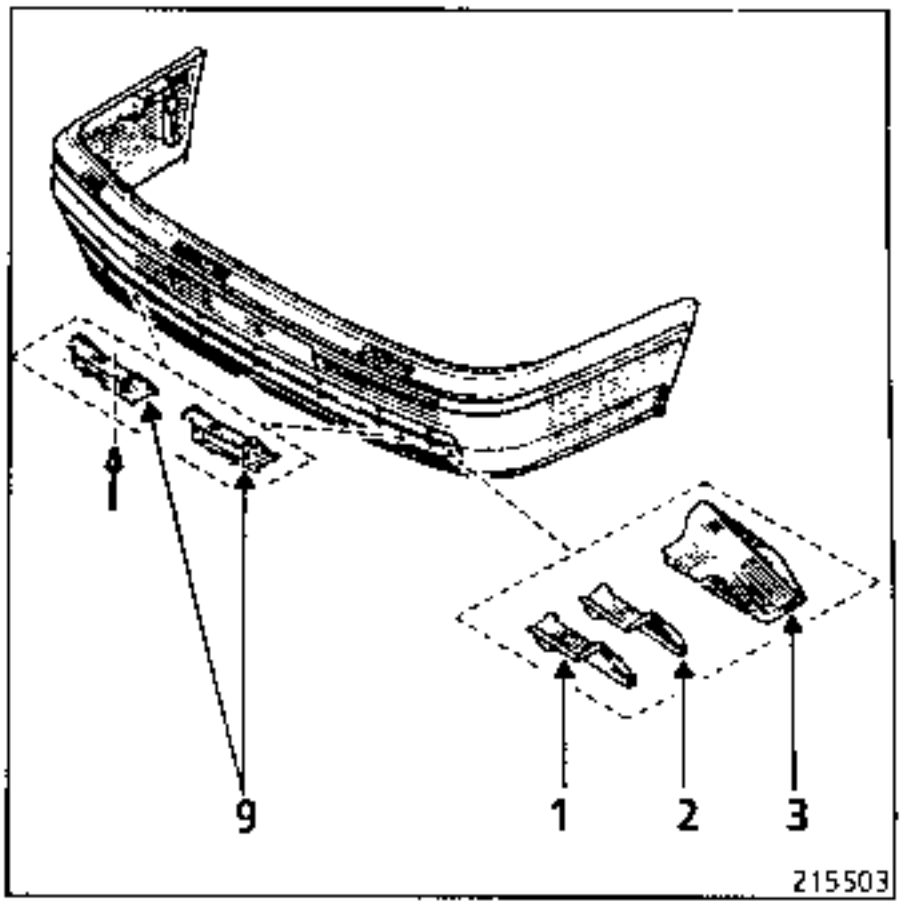


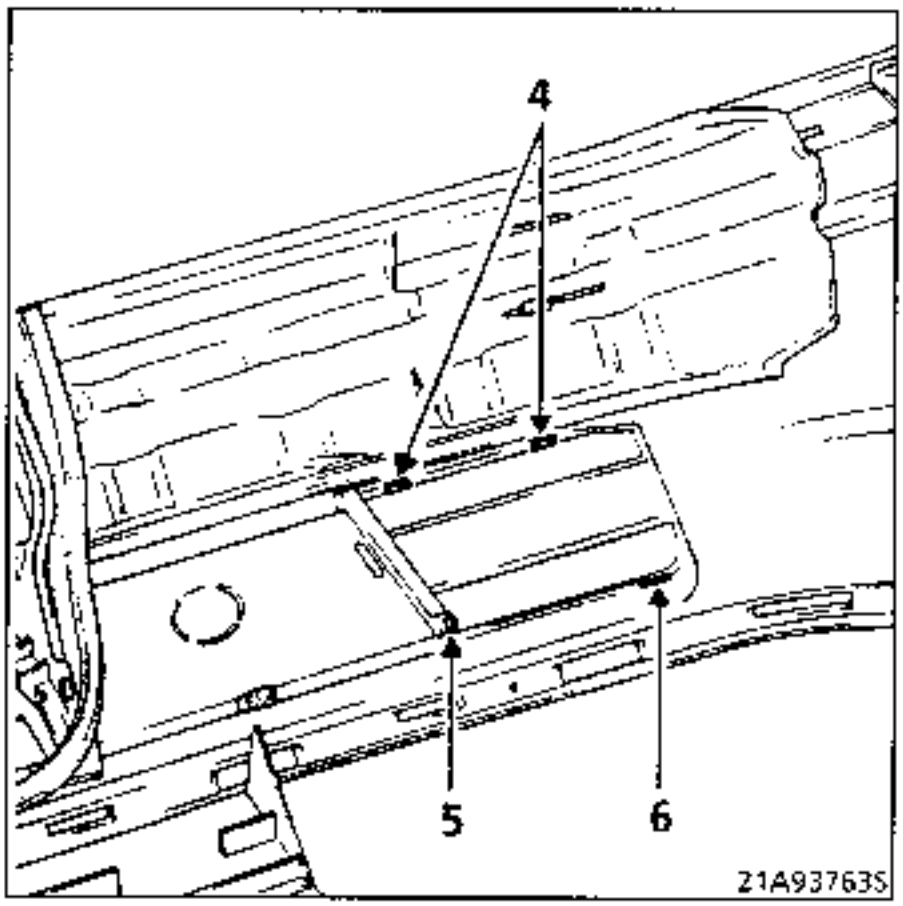
Fit the 5 clips (4) (supplied in the kit containing the grille) around the edge of the grille as shown in the drawing.

Then carry out the same operation for the blanking cover to secure the grille.



Fit the air intake casing (3)over the grille and fit it down onto the clips (4) to secure it in place.

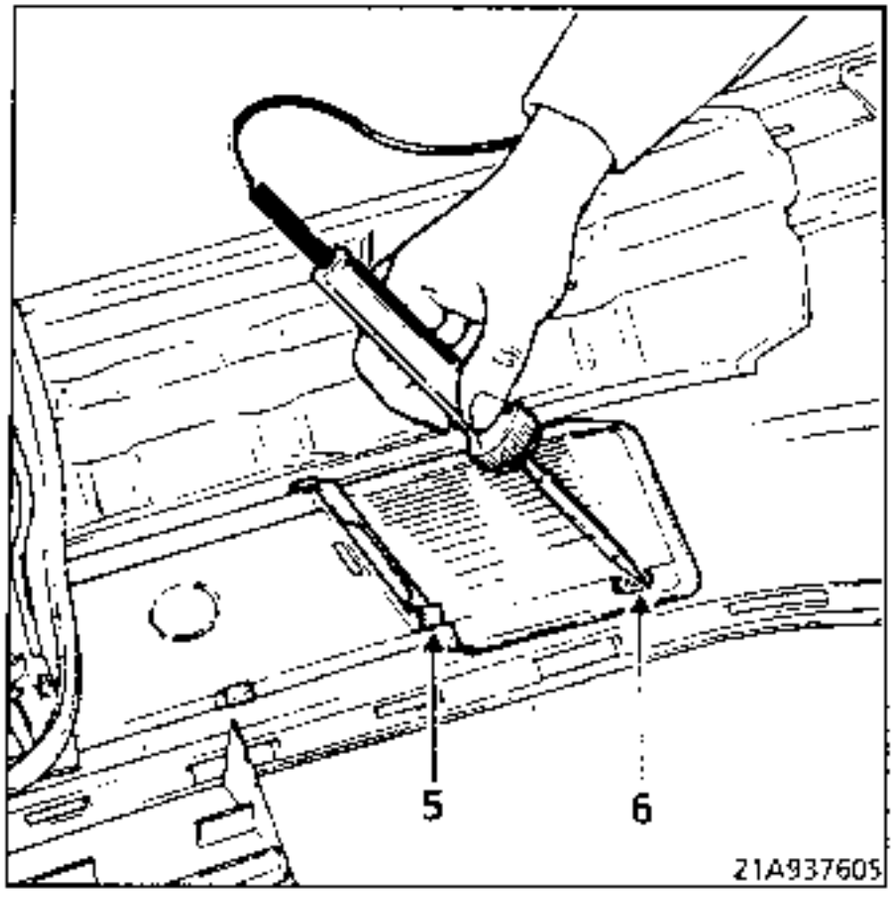




The front bumper supplied by the Parts Department comes fitted with 2 clips (4) which are used to secure the blanking cover (1) or the grille (2).

To enable these parts to be fitted, the two lugs (5) and (6) are not soldered in place.

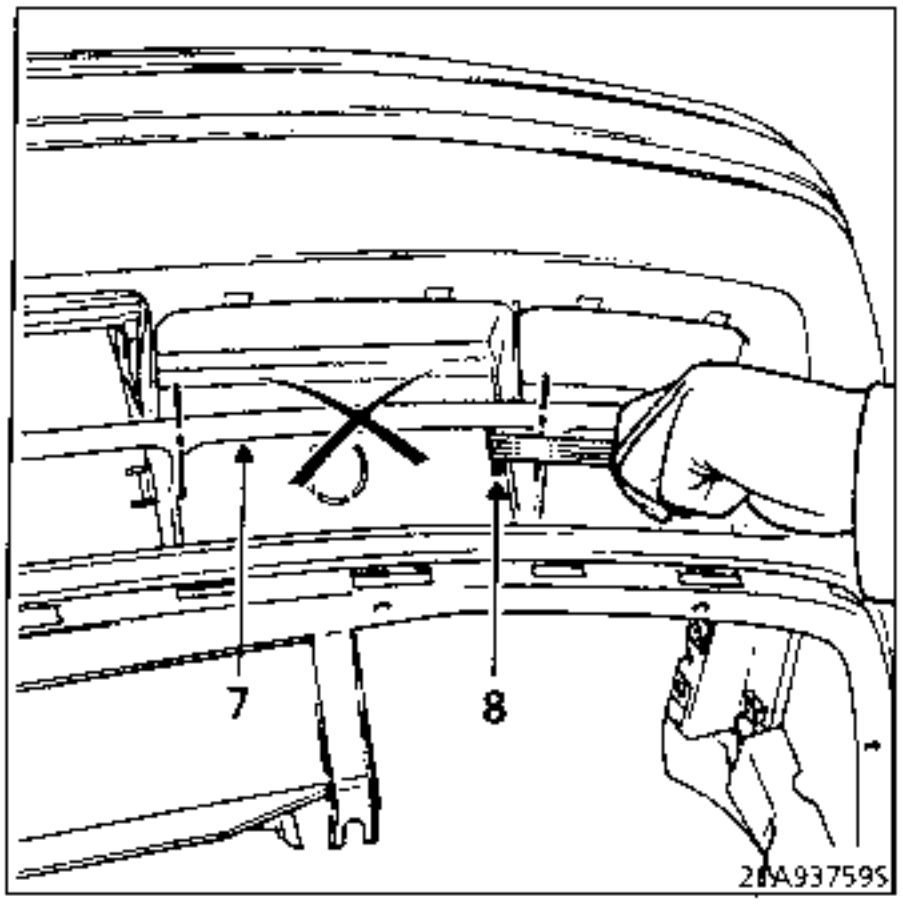
FITTING THE BLANKING COVER



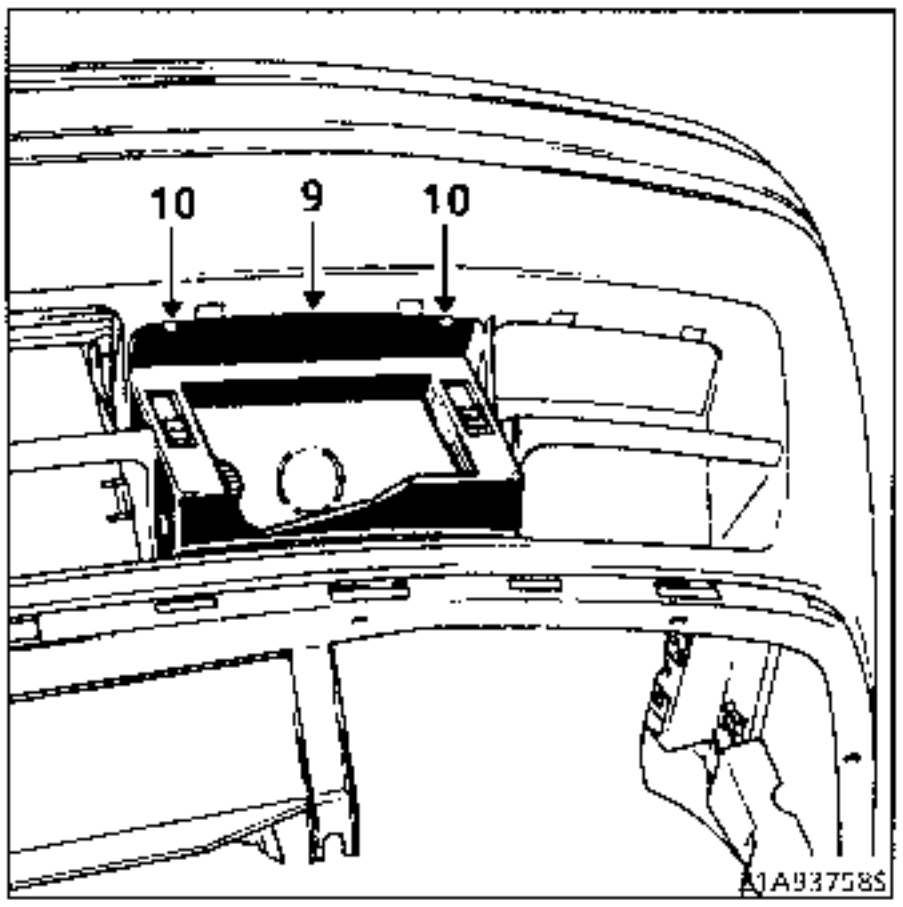
Fit the blanking cover by engaging it in the two clips (4) and on the plastic lugs (5) and (6).

Using a soldering iron which has first been dipped in some grease or wax to prevent the plastic sticking, solder the two lugs (5) and (6).

FITTING BRACKETS FOR ADDITIONAL LIGHTS

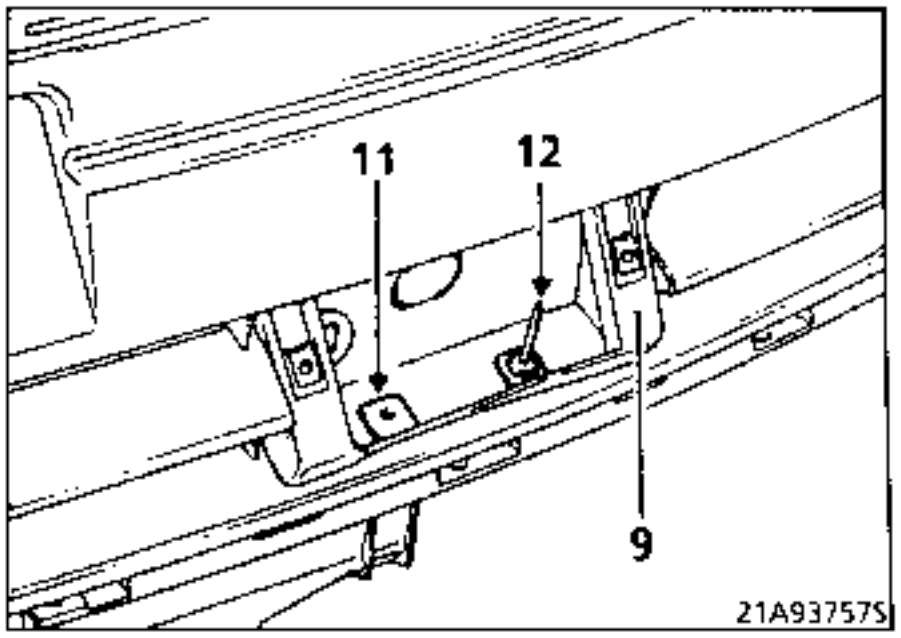


Using a hacksaw blade, cut the plastic bar (7) making use of the two oblong holes (8) situated at the bottom of the fitting location.



Clip the empty light bracket (9) into its fitting location.

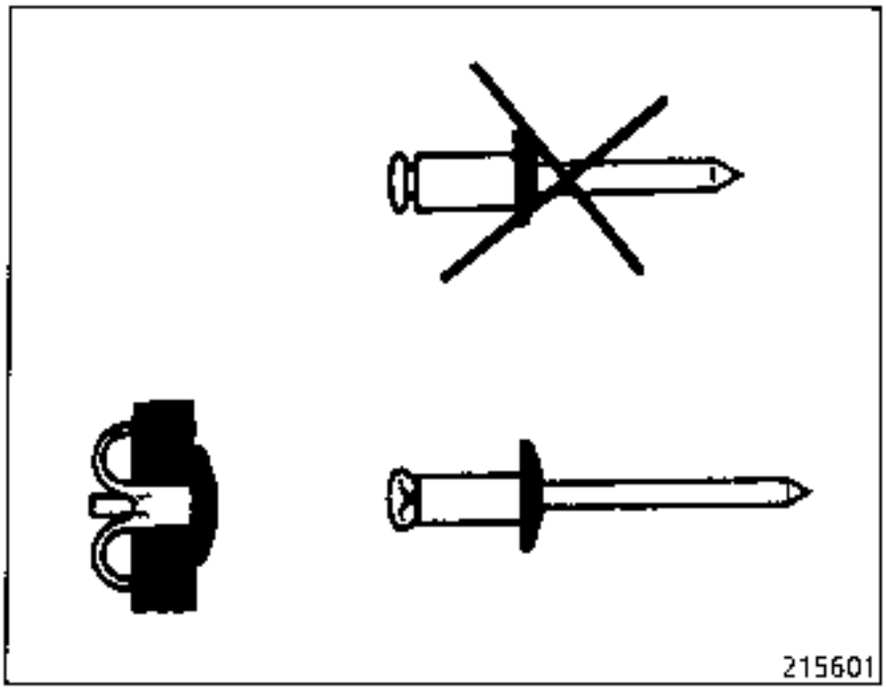
Mark the position of the two upper securing points (10) on the bumper.



Mark the position of the two lower securing points (11) on the bumper.

Remove the bracket (9) and drill the four securing points to a diameter of 4.5 mm.

Refit the bracket and secure it using 4 rivets (12), Part No : 7 03 072 152.



Black anodised rivets (sachet of 83) Diameter **4 mm x Length 10 mm,** Part No : **77 01 406 442**.

Recommended dimensions : 520 x 110 mm

In view of the mounting material (plastic) and its thickness, use **10 mm** rivets of the exploded or fan type which give an excellent hold, to secure the number plates.

IMPORTANT NOTE : L48 phase 1

When drilling the number plate mounting, all the necessary precautions must be taken to ensure that the drilling depth does not exceed **5 - 10 mm** beyond the thickness of the mounting. This is to prevent damage to the panel of the boot lid (risk of corrosion).

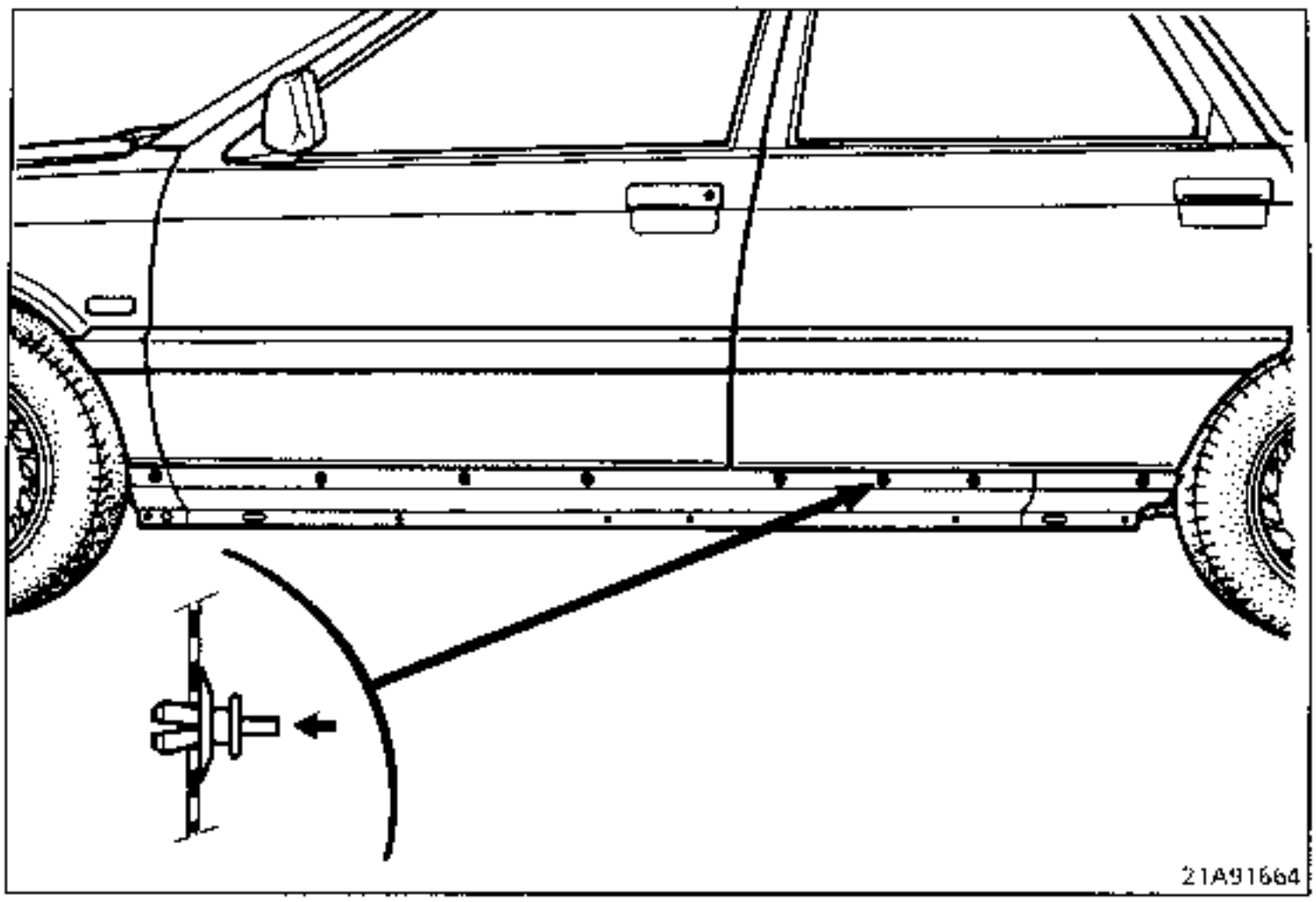
NOTE : L48 phase 2

Renault 21 Phase 2 vehicles are provided with a pre-drilled number plate mounting. Suitable plates must therefore be used - see **NT 147** and **NT 174.**

For drilling dimensions, see Section 4 "Valence".

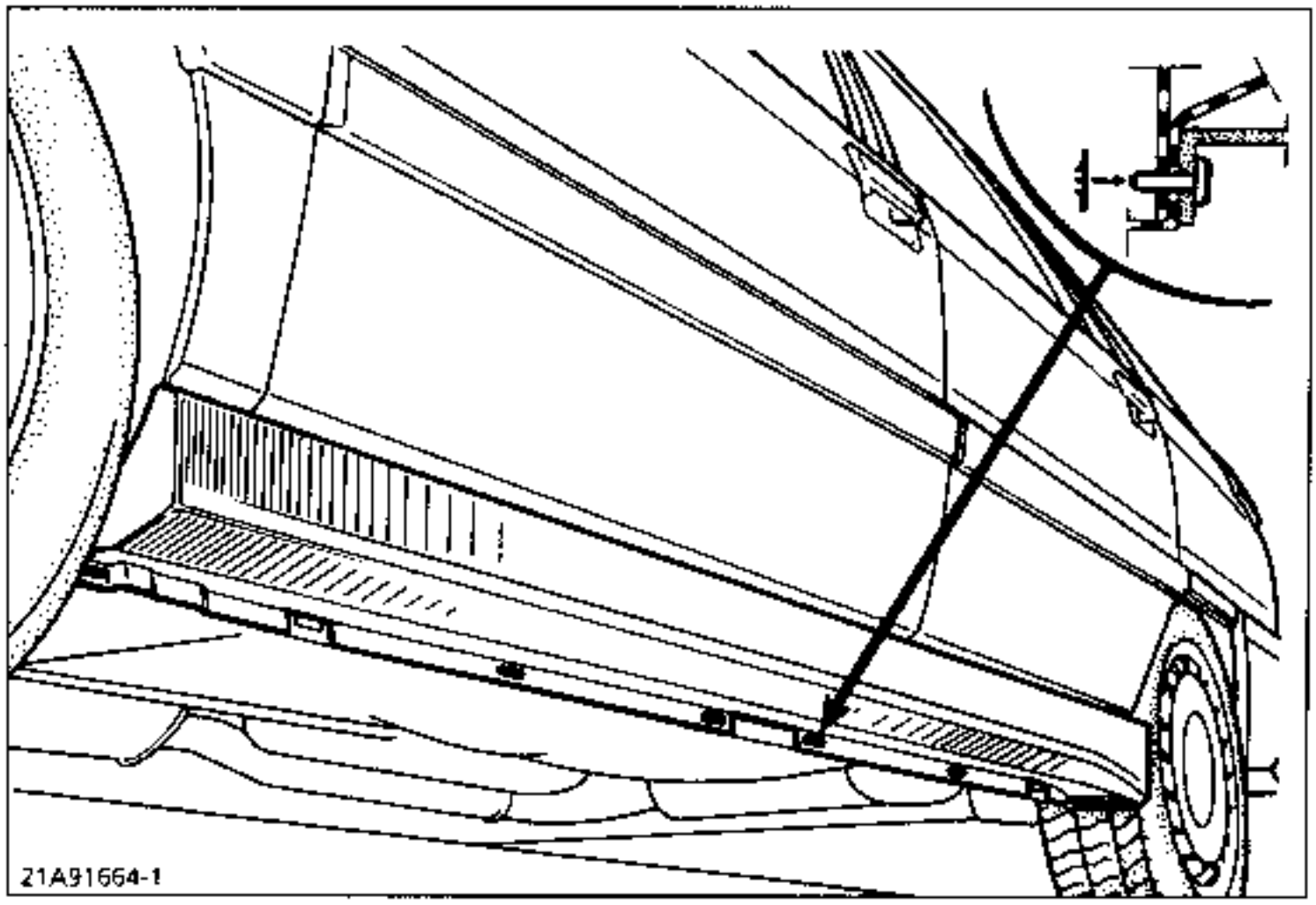
FITTING

Fit :
- the 8 plastic clips in the upper holes,

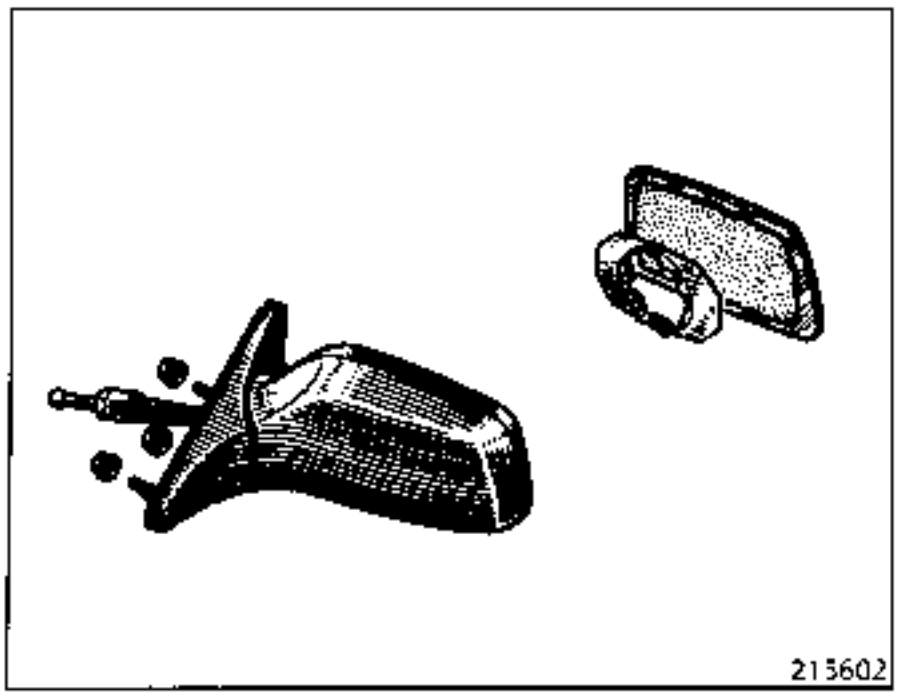


- the skirt, clipping its upper section and pulling it towards the rear of the vehicle.

Secure the sill skirt by clipping its lower section in place.

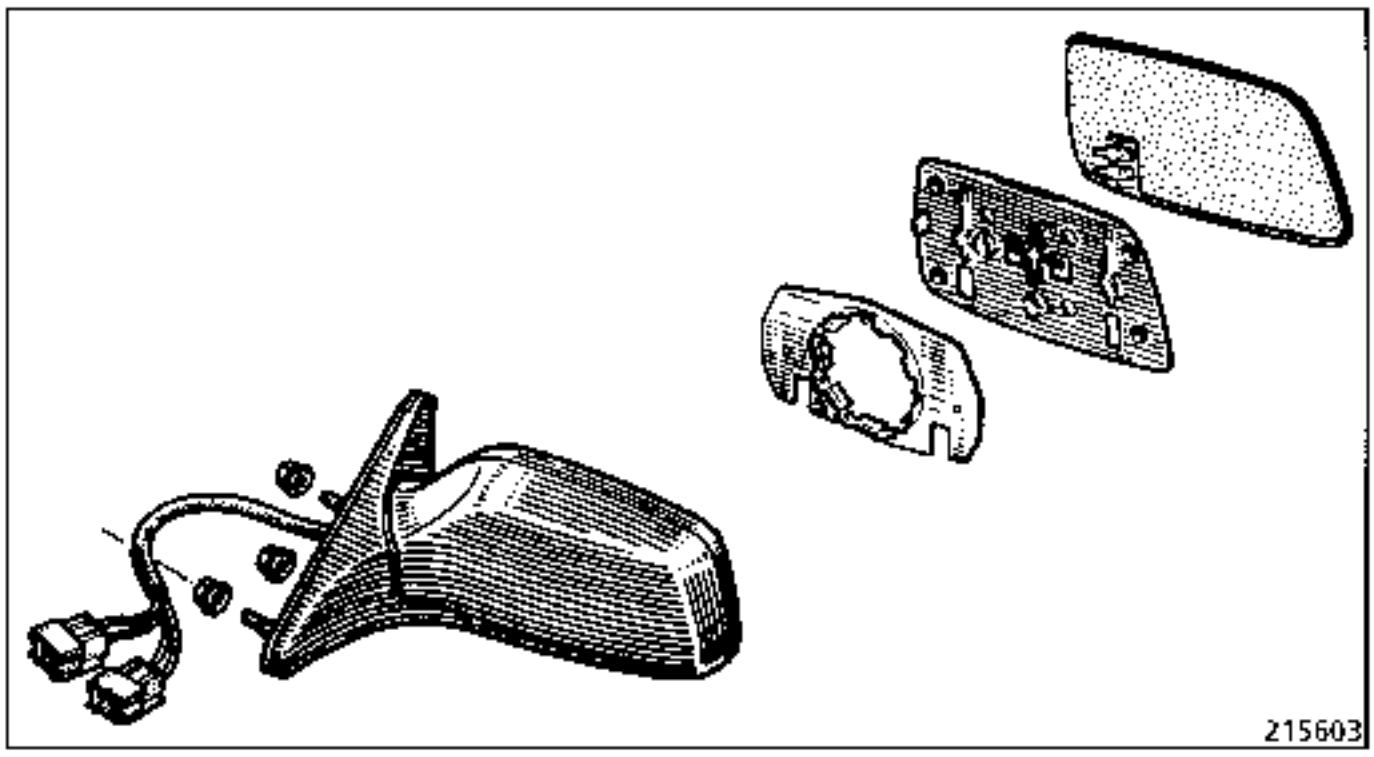


The skirt is removed by unpicking the lower plastic pins and pulling the skirt towards the front of the vehicle.

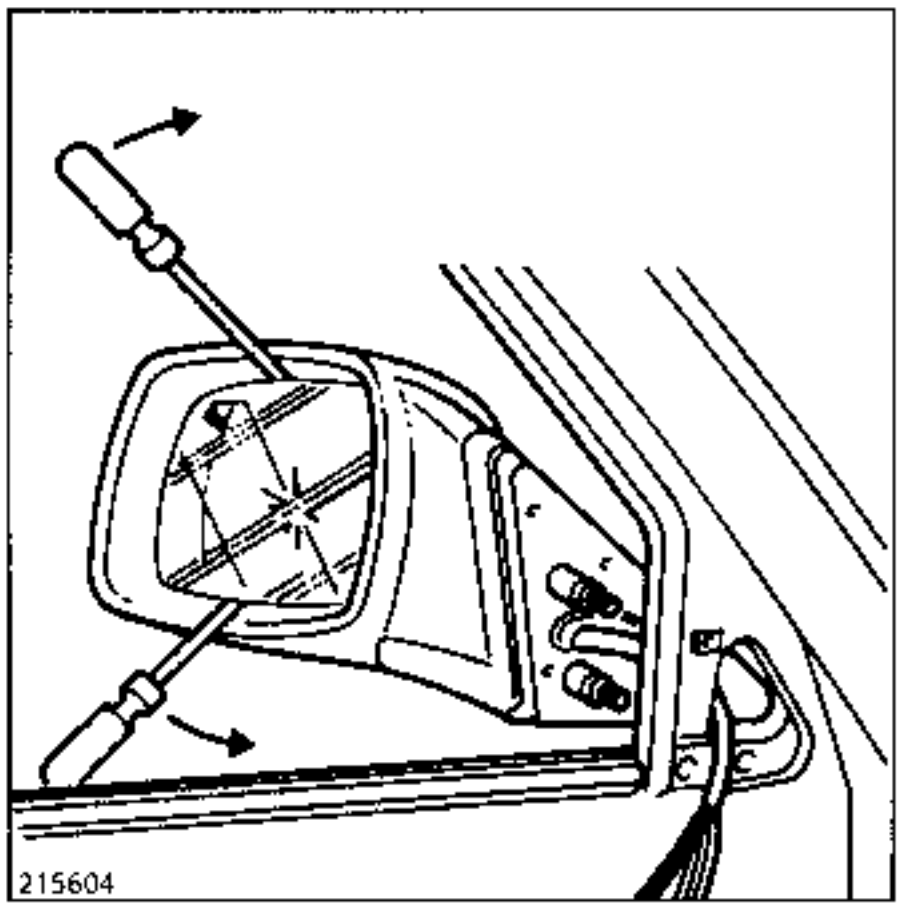


Rear view mirror with manual control.

Rear view mirror with electric control.



Method for removing a damaged mirror glass.

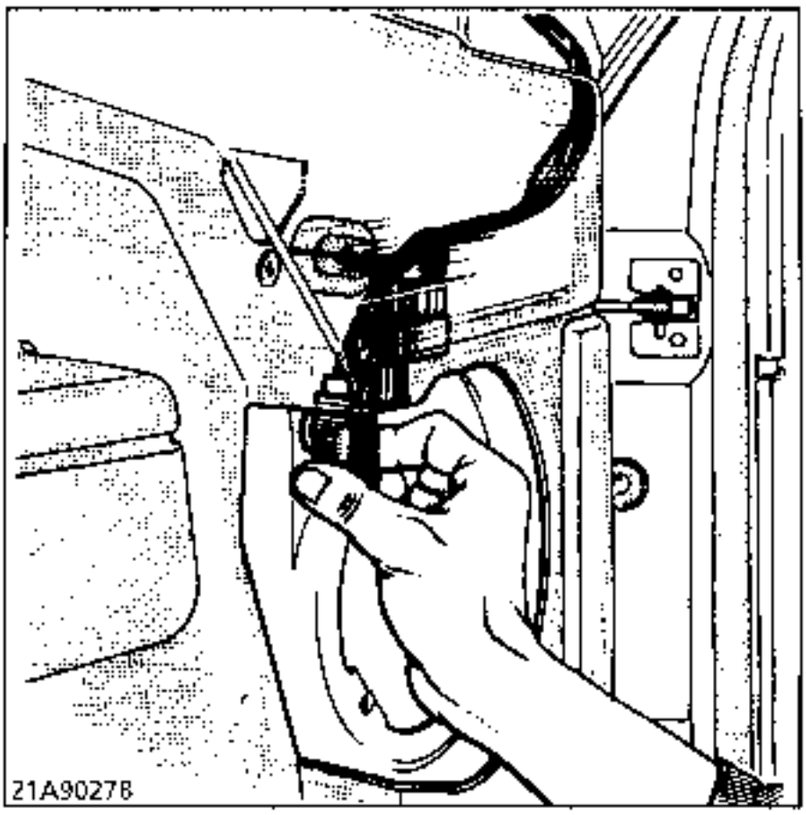


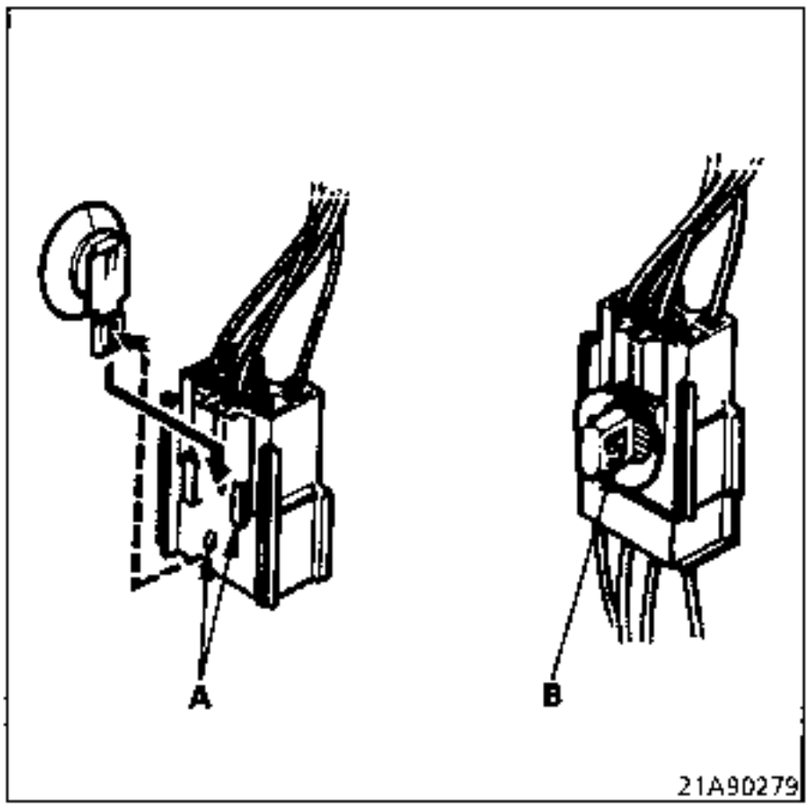
Use a suction pad to remove a mirror which has not been damaged (see section on **"Tooling"**).

REMOVAL

The electric rear view mirror may be dismantled (without removing the trim) after the speaker and its mounting have been removed.

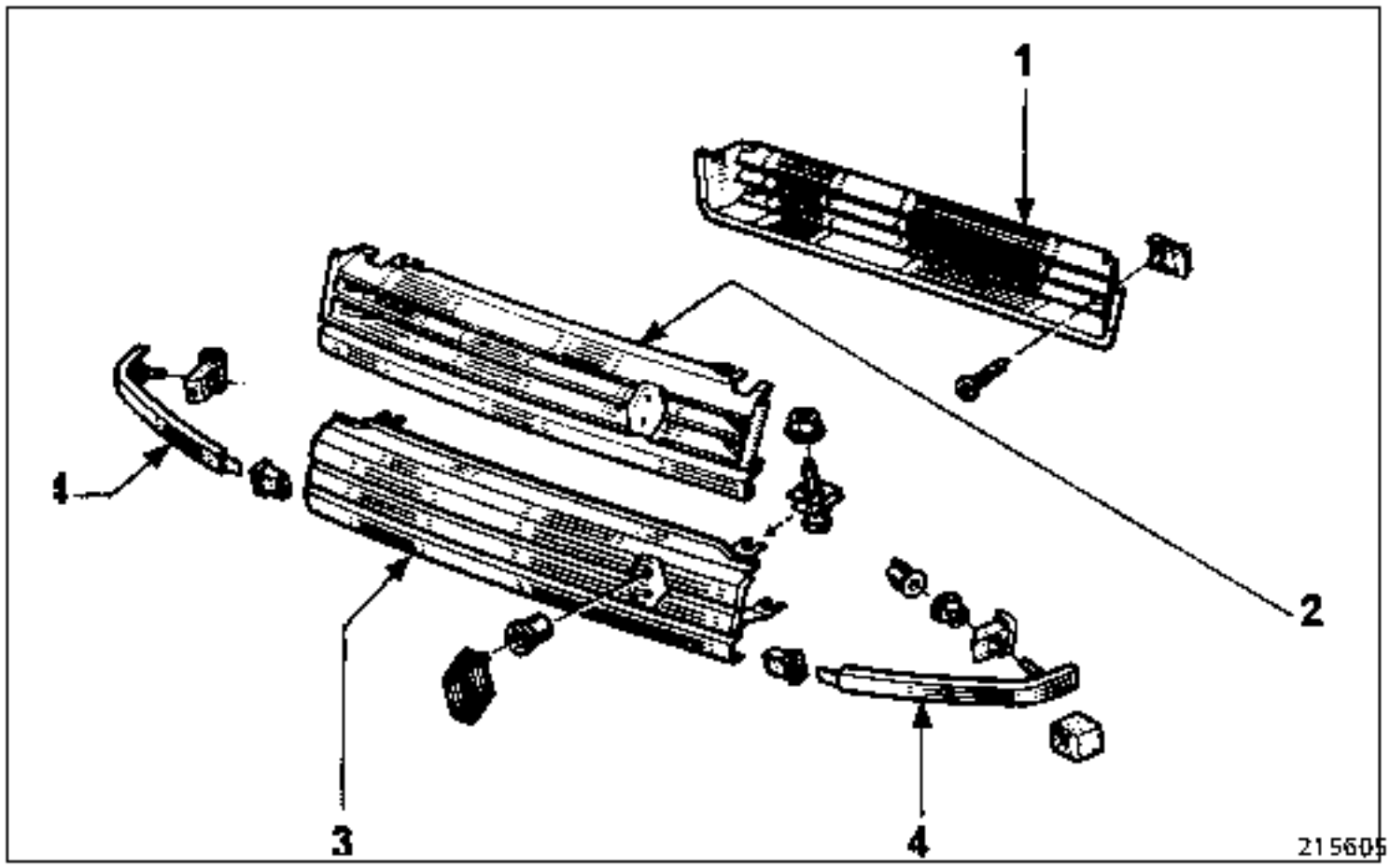
Disconnect the wiring harness and slide it between the trim and the door.





A Female socket mounting on door

B Male socket connecting tab



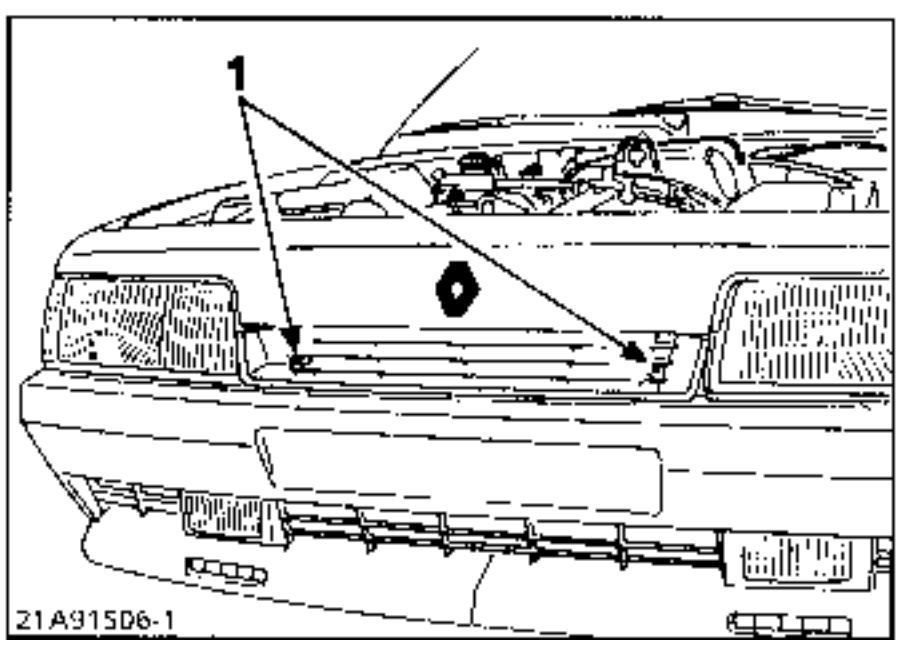
(1) (2) - ABS material

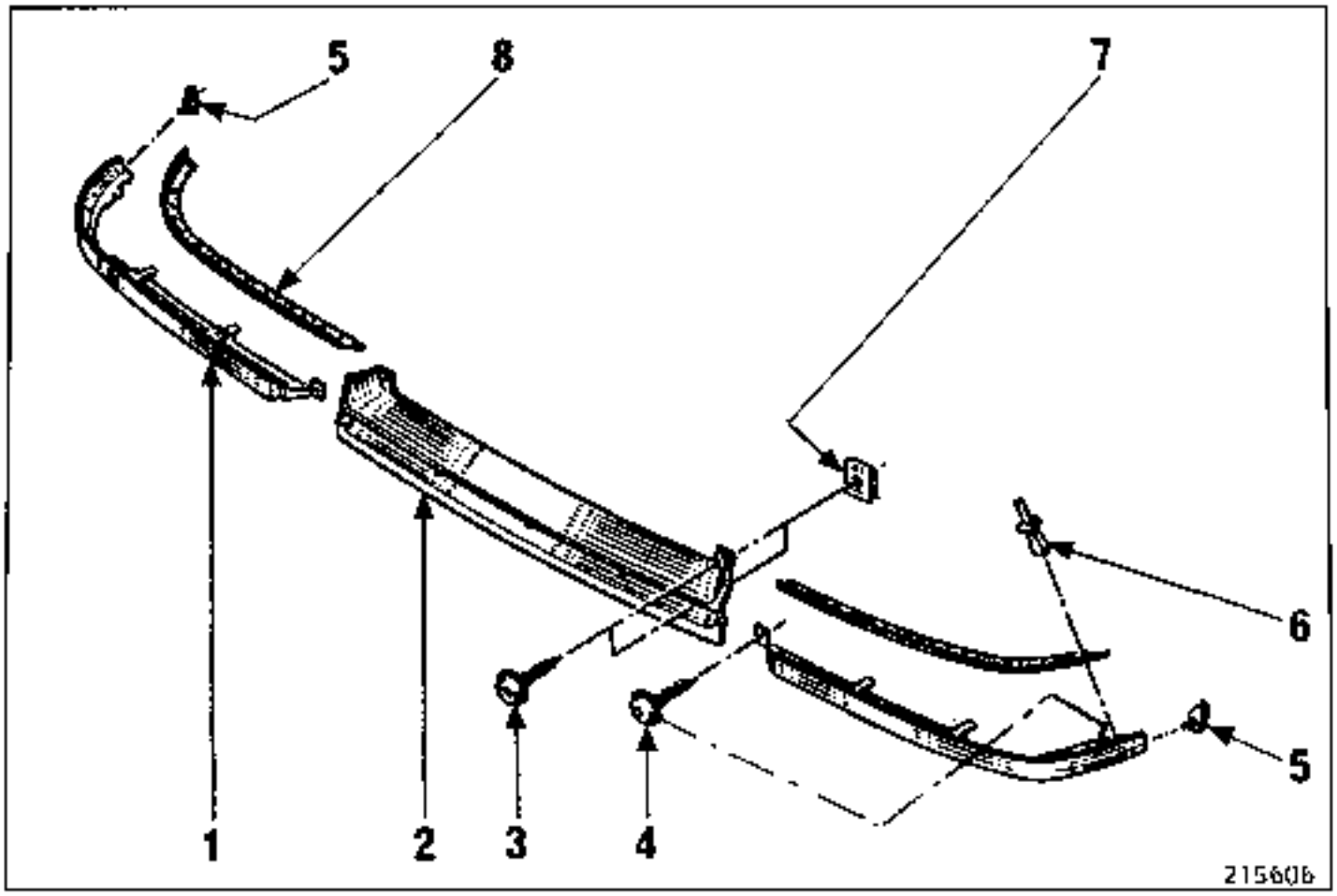
(3) (4) - sheet metal

L485

REMOVAL

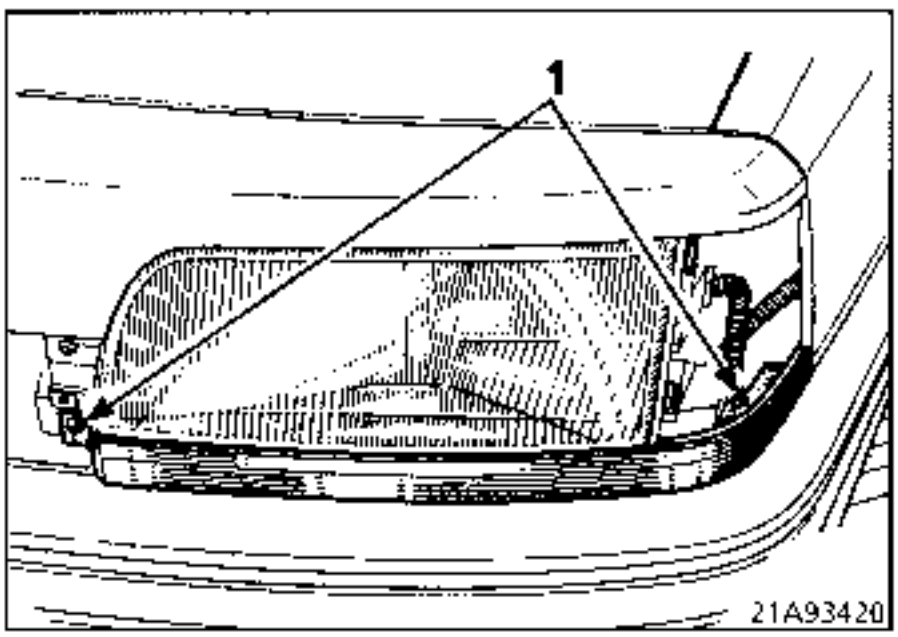
Remove the 2 screws (1) and tilt the grille to take it out.





1 Front end moulding
2 Radiator grille
3 Sheet metal screw
4 Sheet metal screw
5 Front end moulding stop
6 Plastic pin
7 Sheet metal screw clip
8 Front end moulding adhesive seal

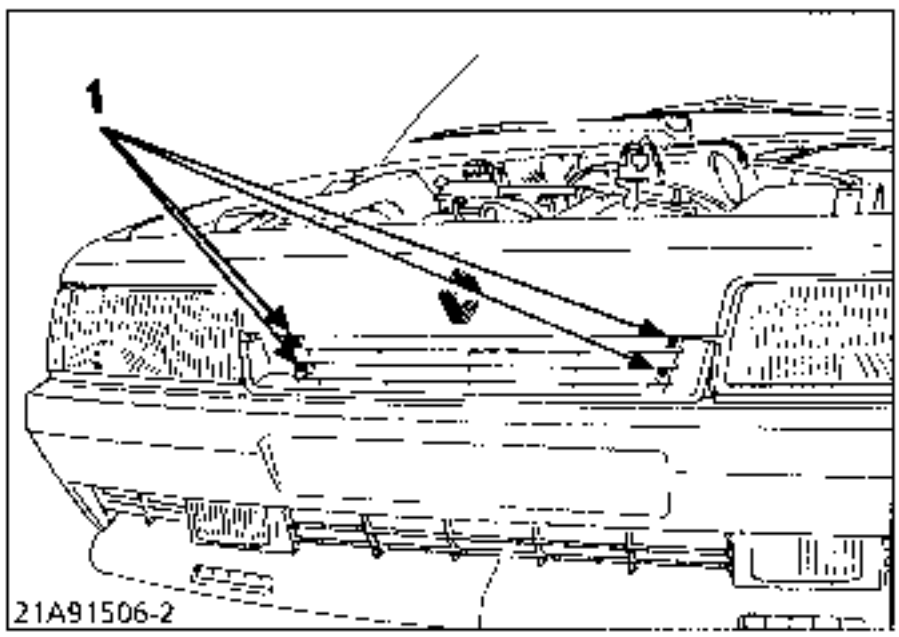
REMOVAL



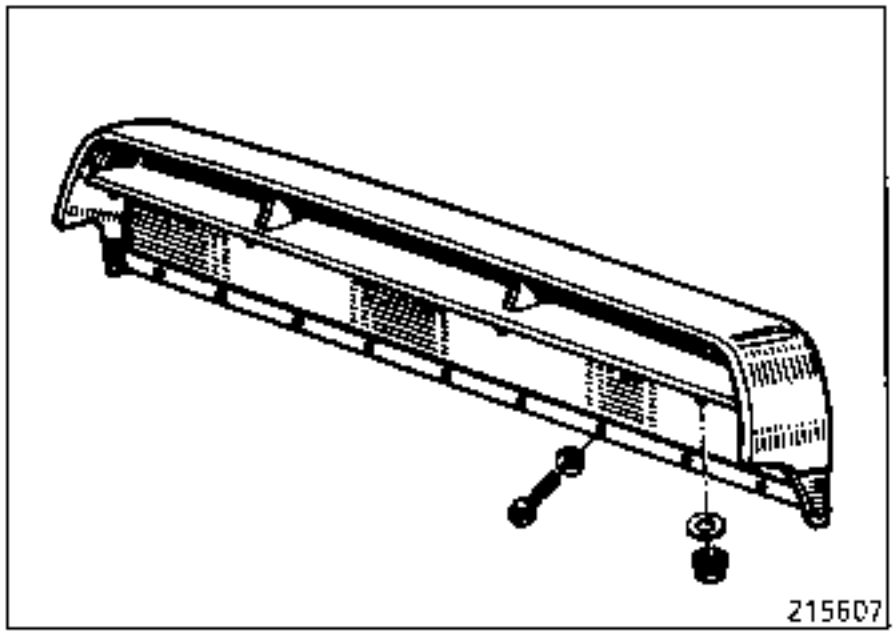
Remove :

- the radiator grille,
- the direction indicator,
- the two **Torx** type screws **(4)** and pull the moulding towards the front.

REMOVAL

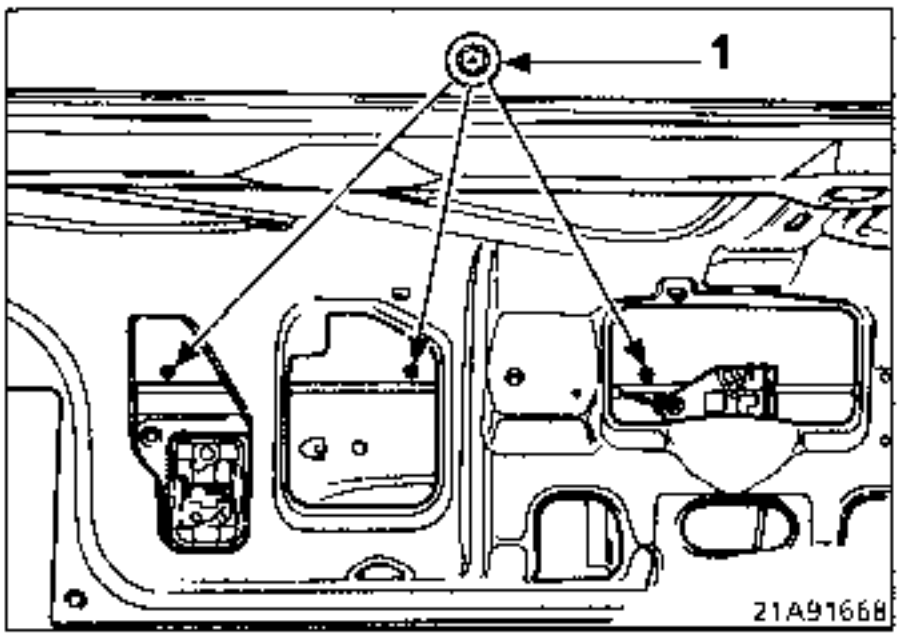


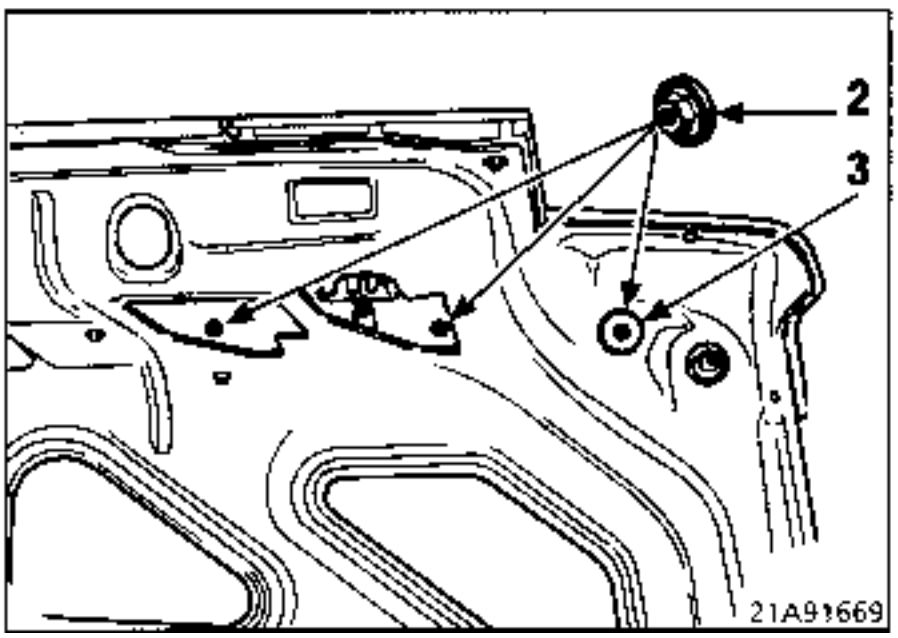
Remove the four **Torx** type screws (3) and free the grille from its location.



Material : Polyurethane (P.U.)

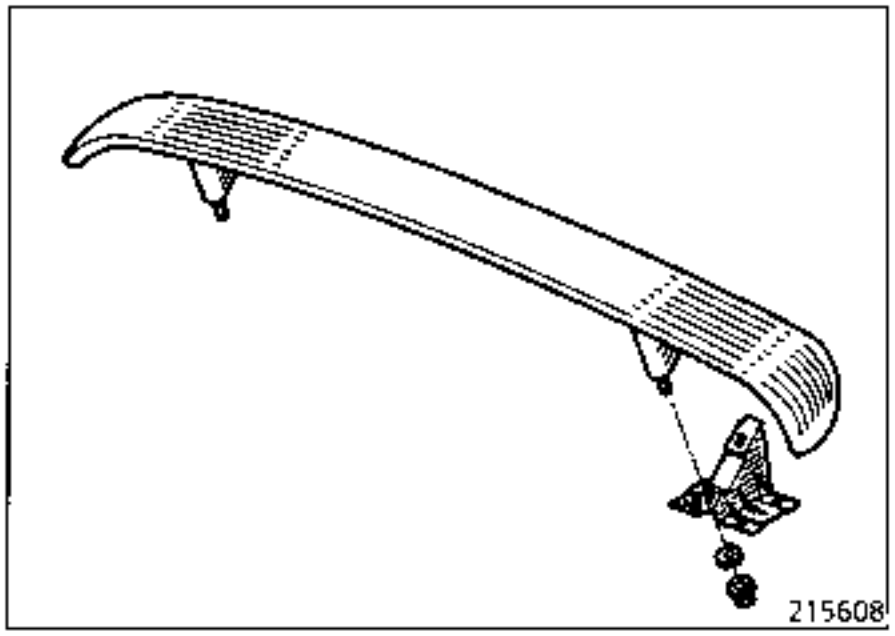
For drilling dimensions for the boot lid, please refer to Section 4.





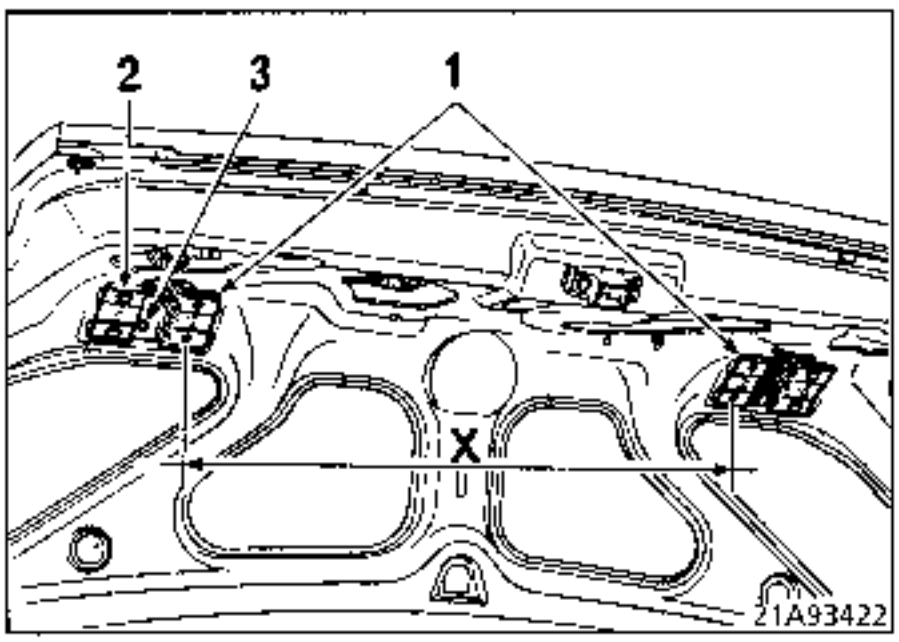
IMPORTANT :

The boot lid is balanced by special compensating springs owing to the heavy weight of the boot lid spoiler. If the boot lid has to be replaced, it is recommended that it is stripped after removal. Otherwise, if the boot lid without the spoiler is opened, great care must be taken and it must be held while it is raised.



Material : Polyurethane (P.U.)

FITTING



Fit in place the two strengtheners (1) using screws (2), but do not tighten them. Centre them and adjust the distance X between them to the dimension shown in the drawing :

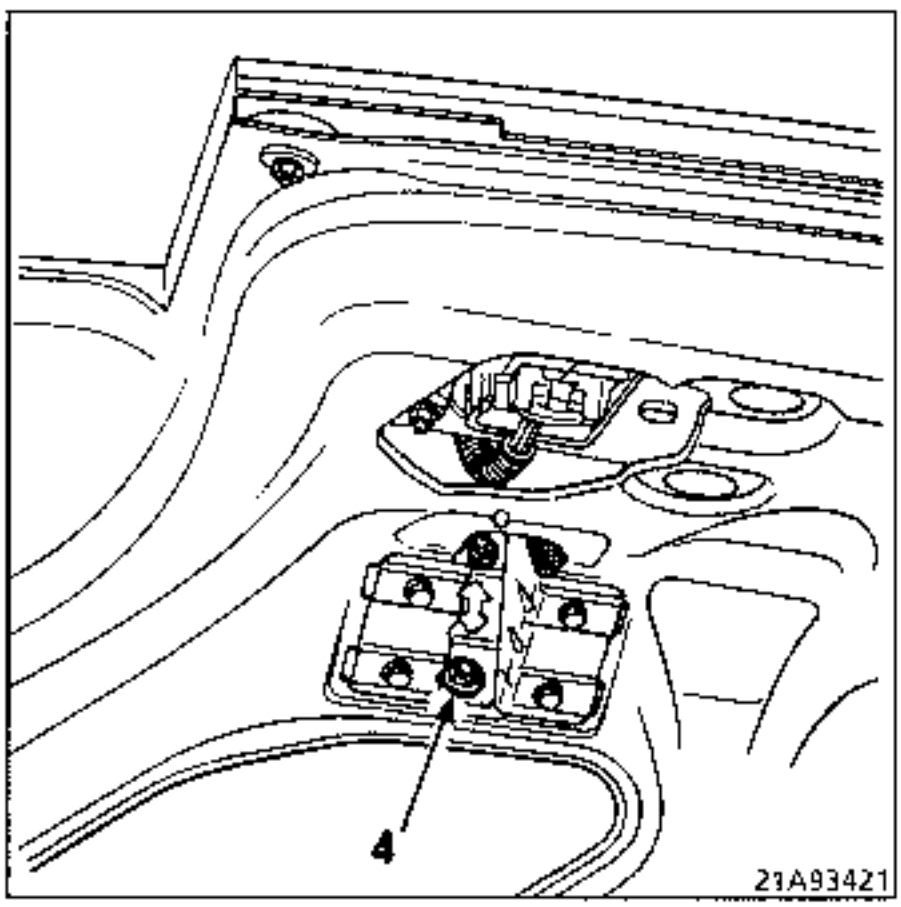
X = 640 mm.

Using a centre punch, mark the location of the four points (3) for mounting the boot lid spoiler.

Remove the two strengtheners.

From the outside drill the four holes (3) to a diameter of 8 mm.

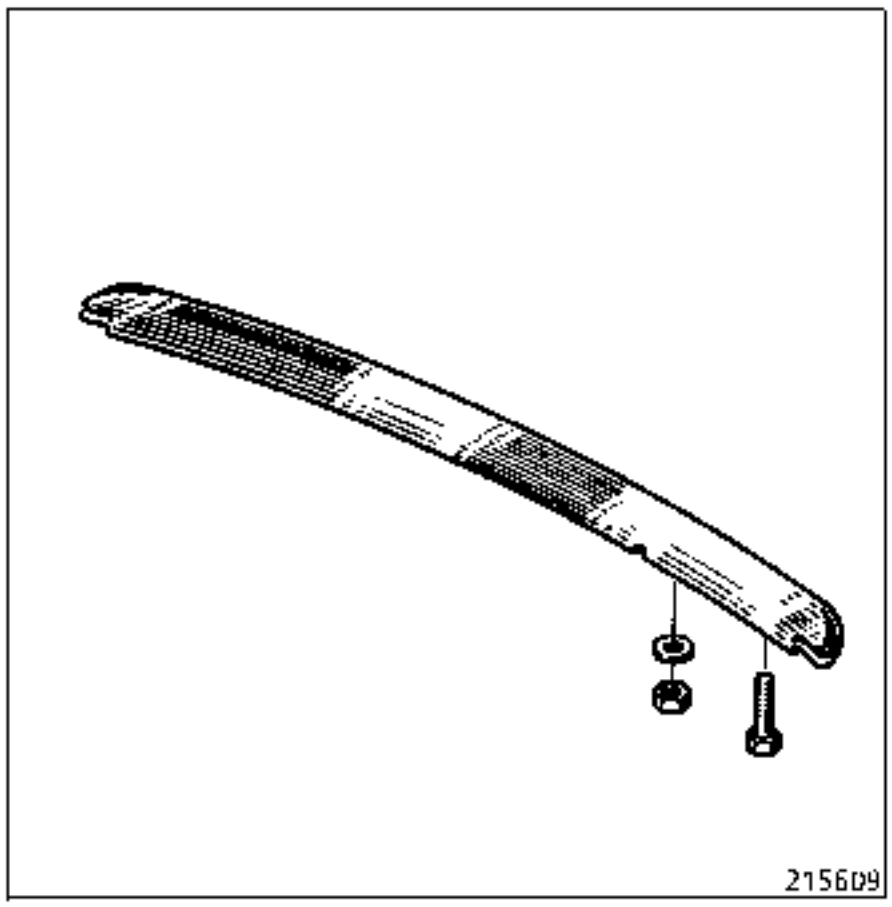
NOTE : In service exchange the rear boot lid is supplied without the strengtheners.



Refit the two strengtheners.

From the outside, apply sealing mastic to the edge of the mounting holes.

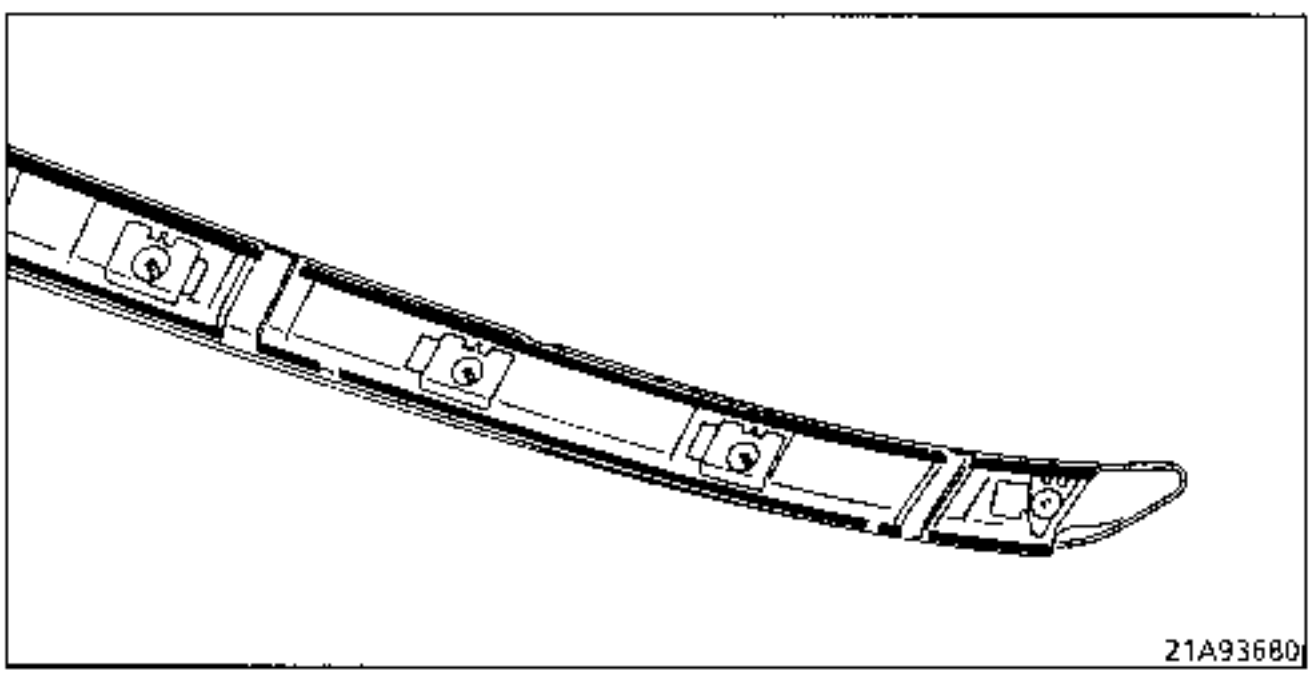
Fit the spoiler and secure it using the four nuts (4).



The rear screen wiper (motor) and the tailgate lock motor mounting must be removed in order to remove the tailgate spoiler.

NOTE :
In the event of removal/refitting without replacement of the spoiler, all the adhesive tape must be removed from the spoiler and the tailgate.

Carefully degrease the spoiler using an acetone type solvent.



Refit double-sided tape to the spoiler taking great care to keep the drain holes clear.

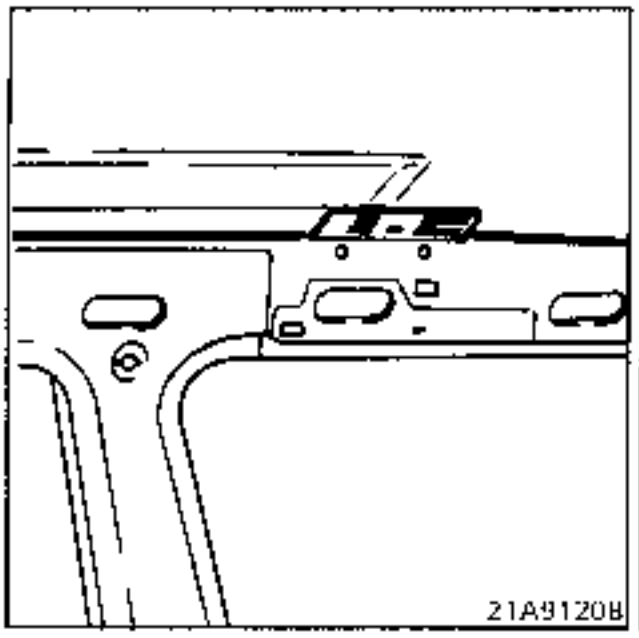
1 - FITTING THE ROOF RACK BARS

It is not possible to assemble the roof rack mounting strengtheners to the service exchange body during production.

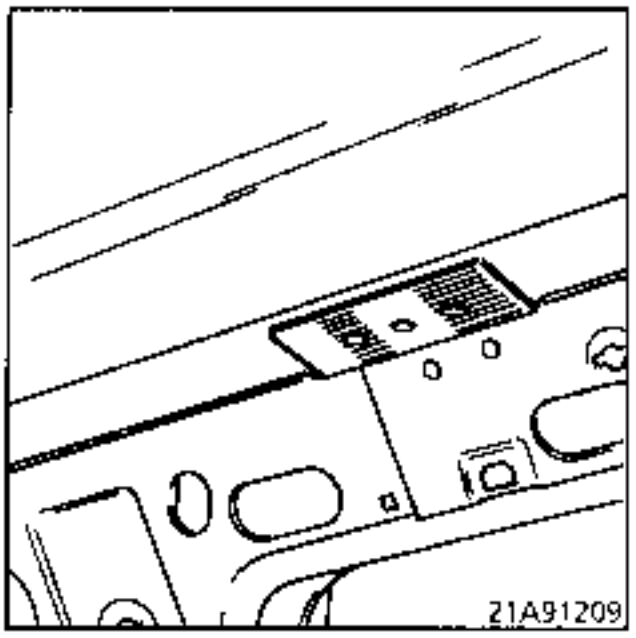
In service, therefore, when replacing a body shell or a roof on a vehicle with a roof rack, these strengtheners will have to be assembled.

This operation is to be performed when the vehicle is being painted.

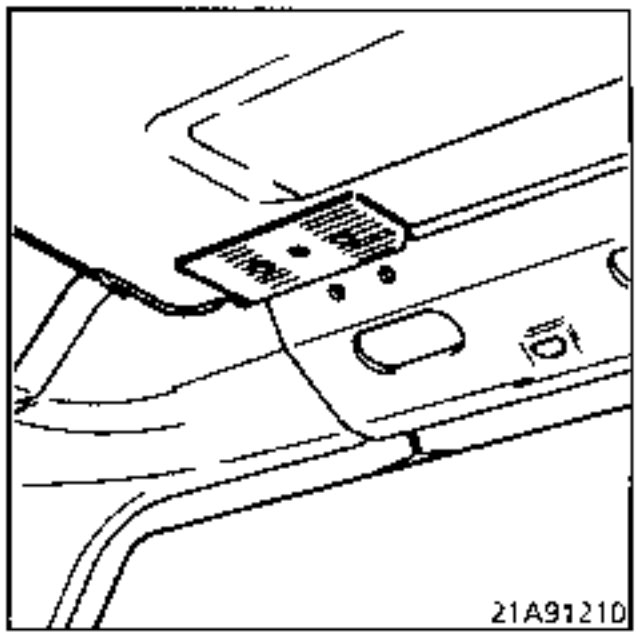
- Part Number for strengtheners : **77 00 783 932** quantity 6
- Part number for bonding mastic for metal : **77 01 406 775** quantity 1



Front mounting strengthener



Centre mounting strengthener



Rear mounting strengthener

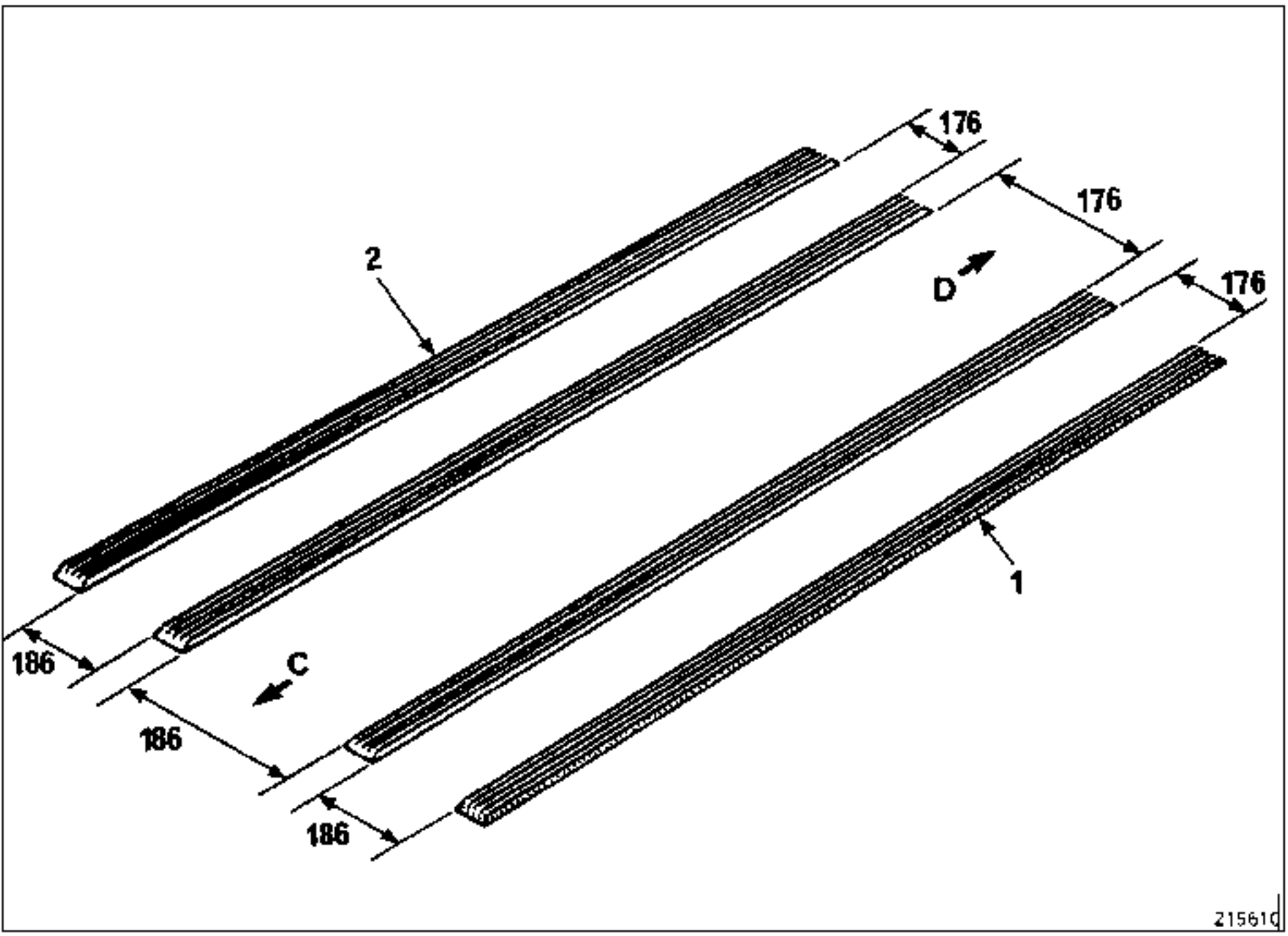
ASSEMBLY METHOD

Drilling the mountings :

- Drill the mountings for the side bars using the templates **1** and **2** supplied with this document.
- Drill the centre mounting using the roof rack bar as a guide.

Bonding the six strengtheners :

- Clean the bonding faces of the strengtheners and the roof.
- Prepare the bonding mastic for metal.
- Apply the required quantity of mastic to each strengthener.
- Fit the strengtheners in place and retain them by means of nuts and side bars (run the bolts up by hand without tightening them to a torque of 500 g).
- Leave the bonding mastic for metal to polymerise.

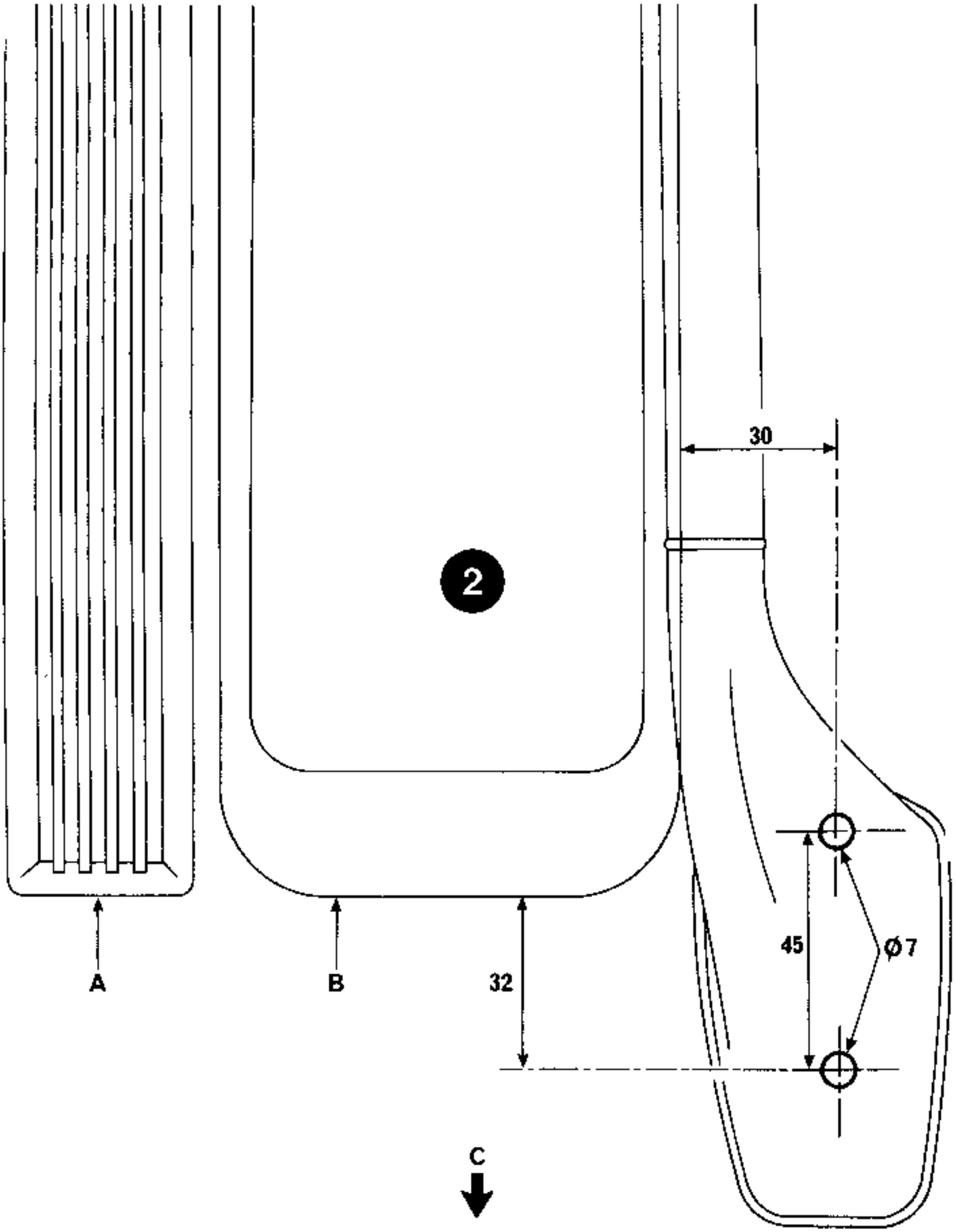


C Front of vehicle

D Rear of vehicle

Dimensions for sticking on the self-adhesive strips.

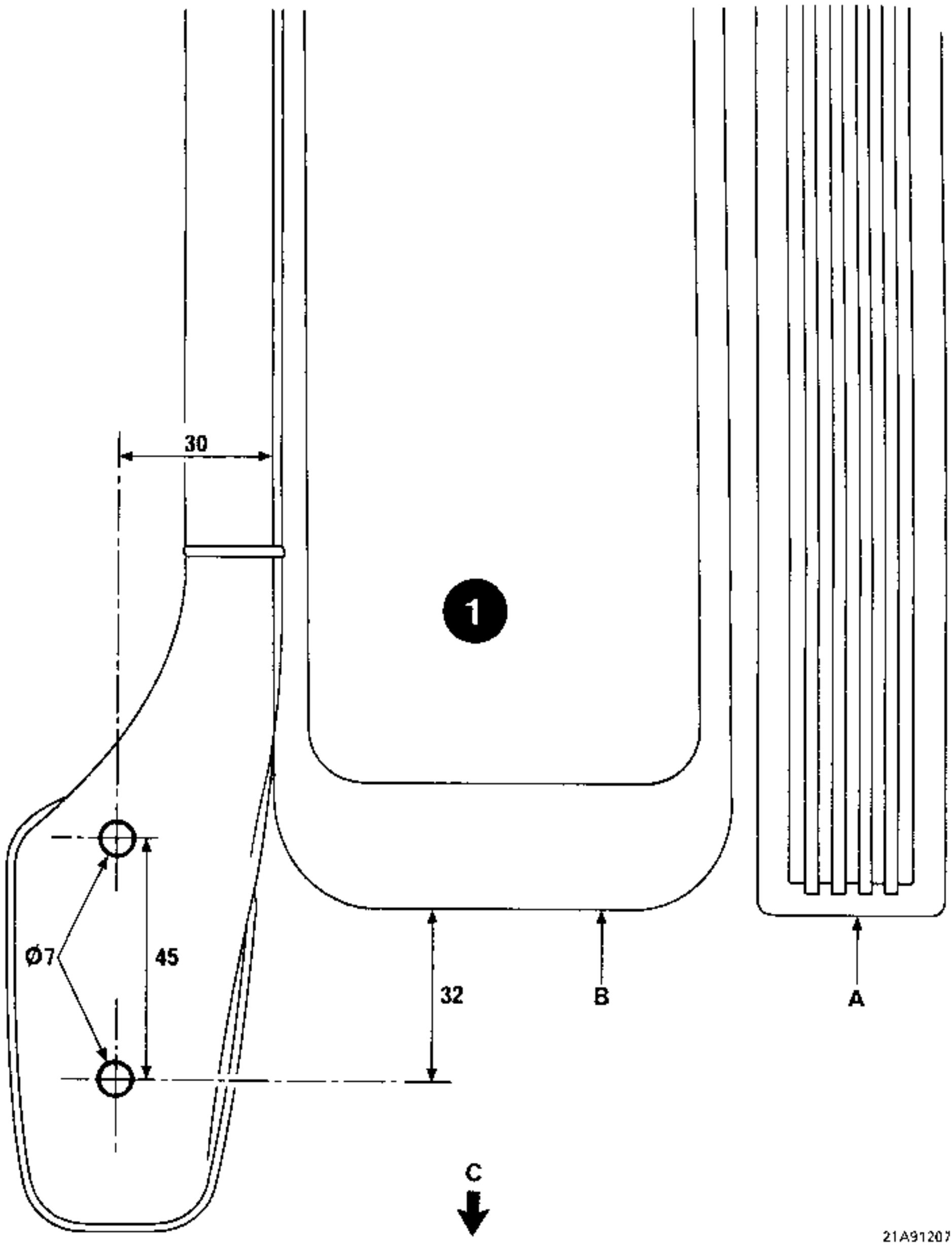
See the template for positioning strips **1** and **2**.



21A91201

A Self-adhesive strip
B Roof moulding rib
C Front of vehicle

(2) FRONT LEFT-HAND MOUNTING DRILLING TEMPLATE
(right-hand side symmetrical)

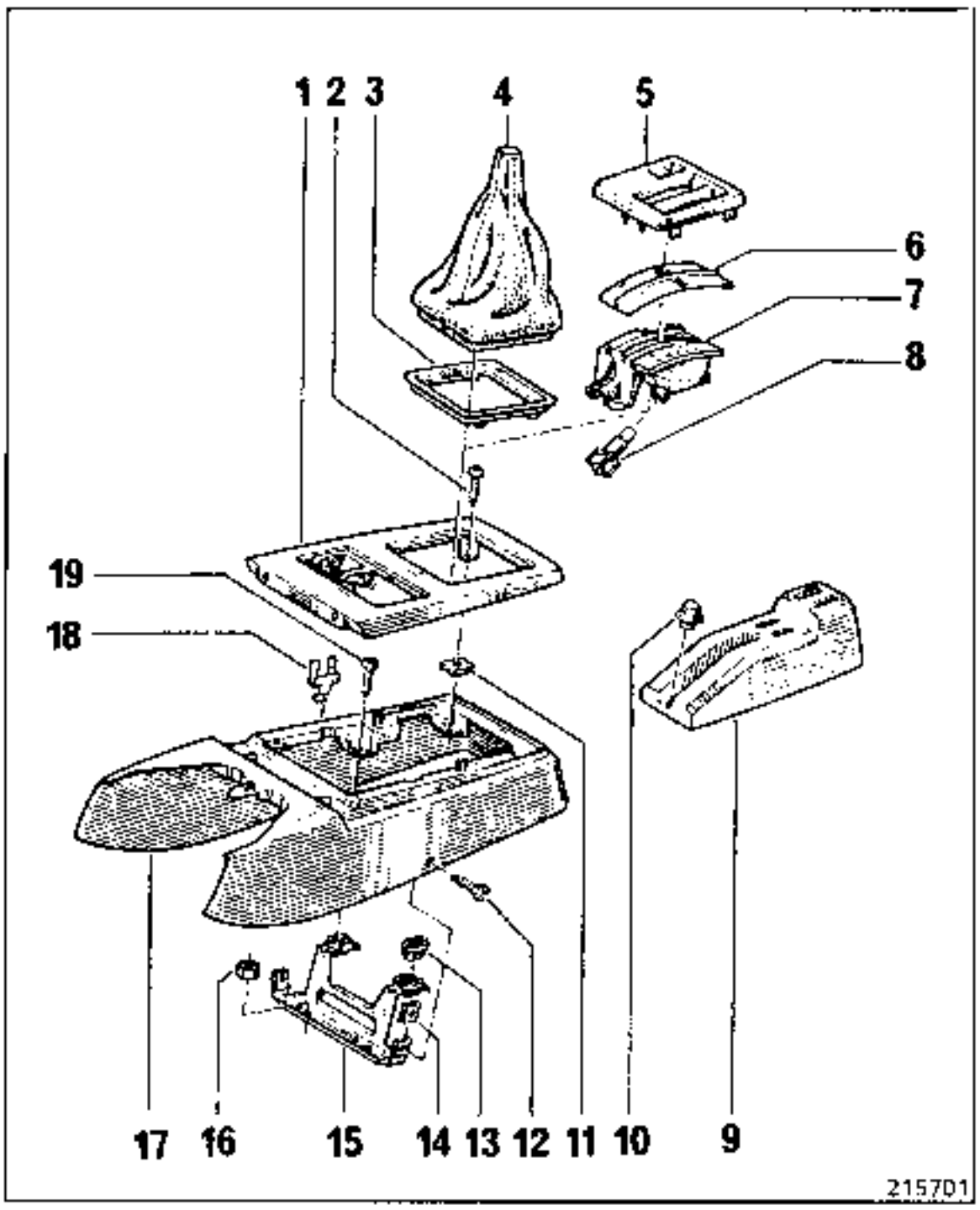


21A91207

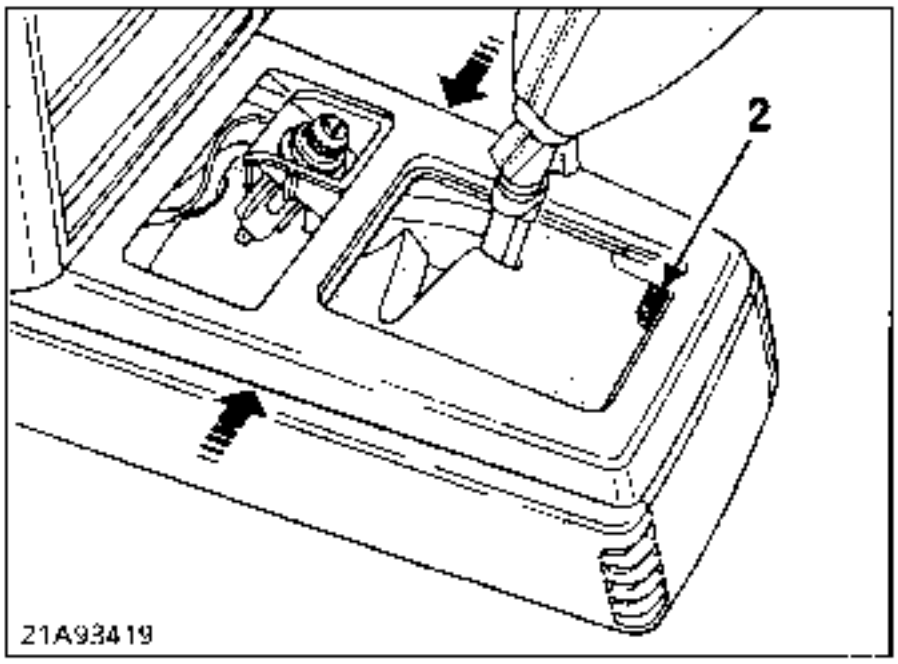
A Self-adhesive strip
B Roof moulding rib
C Front of vehicle

(2) FRONT LEFT-HAND MOUNTING DRILLING TEMPLATE
(right-hand side symmetrical)

1 Upper face
2 Face mounting screw
3 Gaiter plastic frame
4 Gaiter
5 Upper face (automatic transmission)
6 Sliding cover
7 Gear indicating plate
8 Bulb
9 Handbrake console
10 Handbrake console nut
11 Clip for metal screw
12 Milled metal screw
13 Plastic clip for metal screw
14 Clip for metal screw
15 Console mounting
16 Mounting securing nut on tunnel
17 Centre console
18 Clip
19 Console mounting screw



Removal

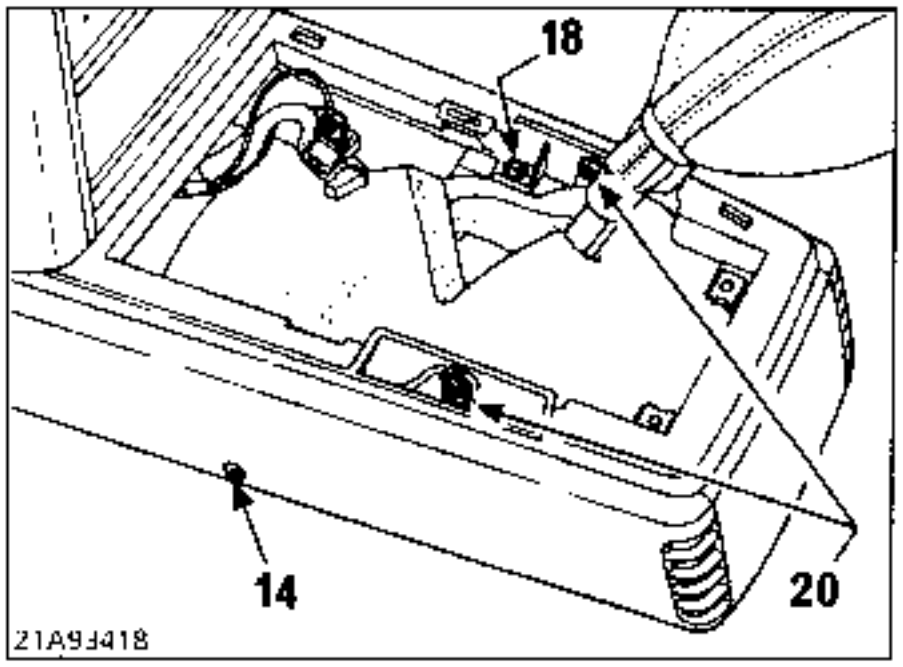


Remove the ash tray.

Disconnect the cigar lighter.

Disengage the gear lever gaiter.

Remove :
- the two screws (2) and unclip the upper face from the console to remove it,



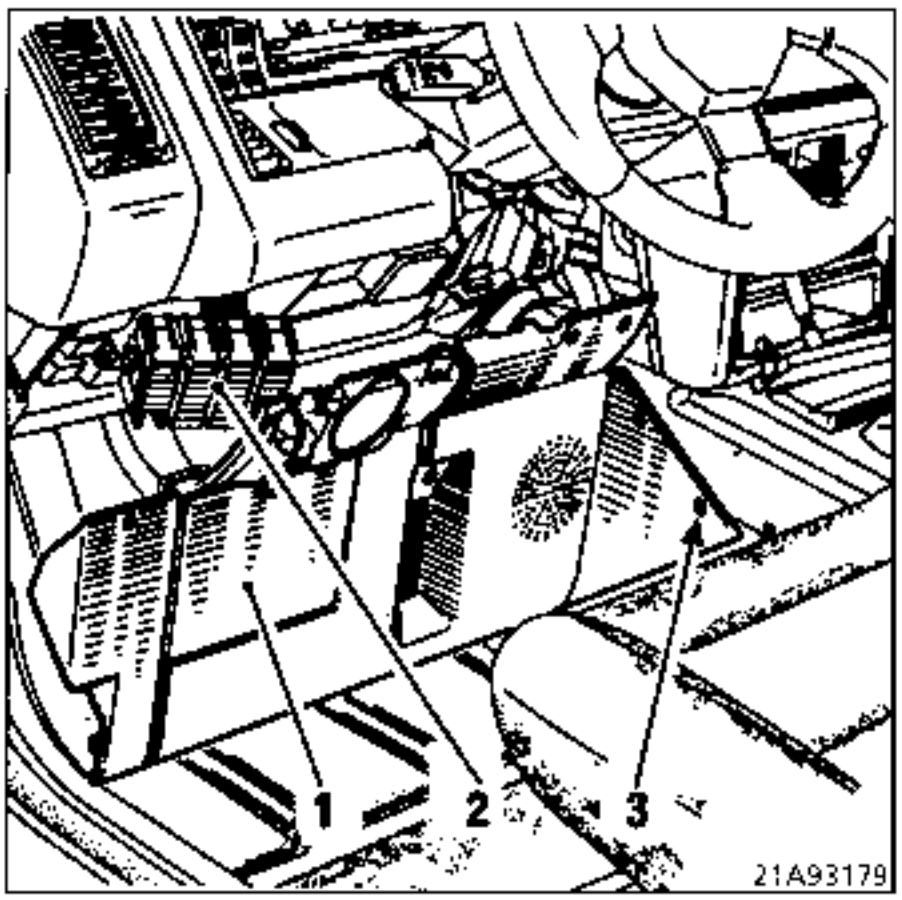
- the two screws (20) securing the air ducts,
- the four screws (14) and (18) securing the console.

Pull on the handbrake lever and the console lifting towards the rear to remove it.

Removal

Disconnect the battery.

Remove :
- the centre console,
- the lower trim on the left and right-hand body sides,
- the steering wheel, after first marking its position,
- the lower and upper half shells from the steering wheel which are secured to one another by four screws.



Open flap (1).

Unclip the fuse box (2).

Raise the steering wheel height adjusting control lever.

Remove :

- the nine screws (3) securing the trim under the steering wheel and tilt the trim to remove it,

- the trim on the left-hand side of the glovebox.

COLD START DEVICE (DEPENDING ON VERSION)

Removal

Unclip the cable from the carburettor.

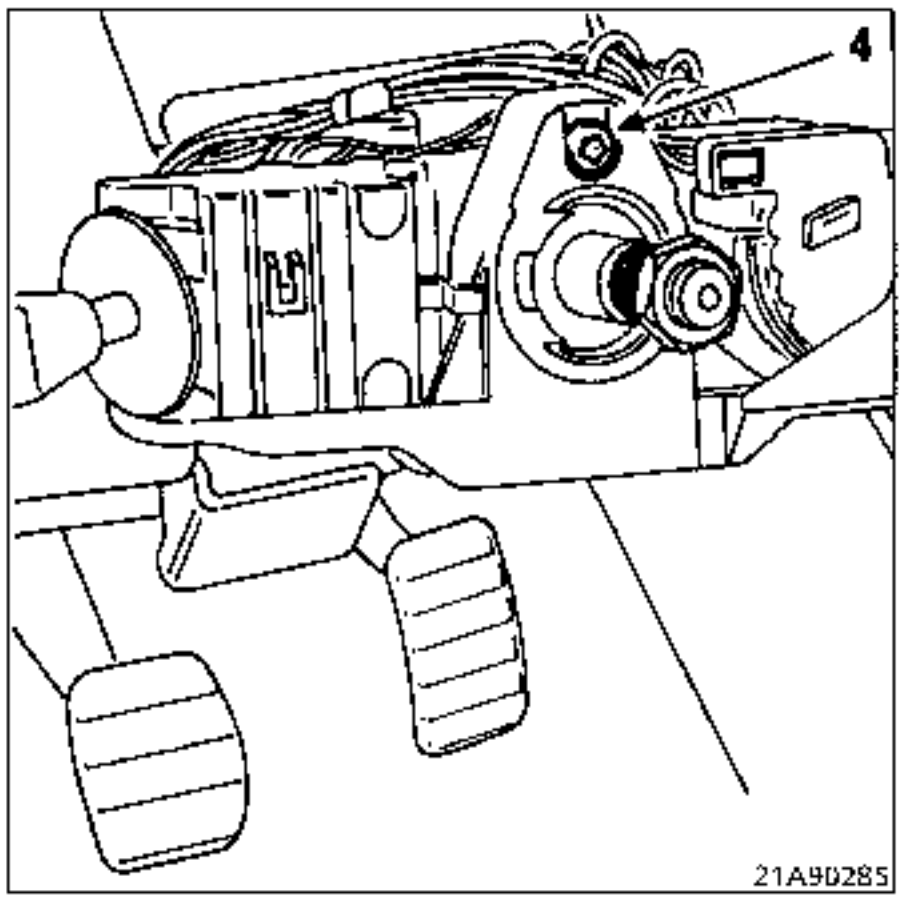
Remove the two anti-noise foam pads located on the control sheath.

Unclip :

- the warning light connector,
- the choke know from the dashboard and remove the entire control equipped with the sheathing and the cable.

STEERING COLUMN

Removal



Slacken screw (4) but do not remove it, then push it in so as to release the tightening cone.

Disconnect :
- the connectors and remove all the controls,
- the starter switch.

Fit in place the steering wheel without securing it and turn it so that the universal joint mounting bolt can be reached.

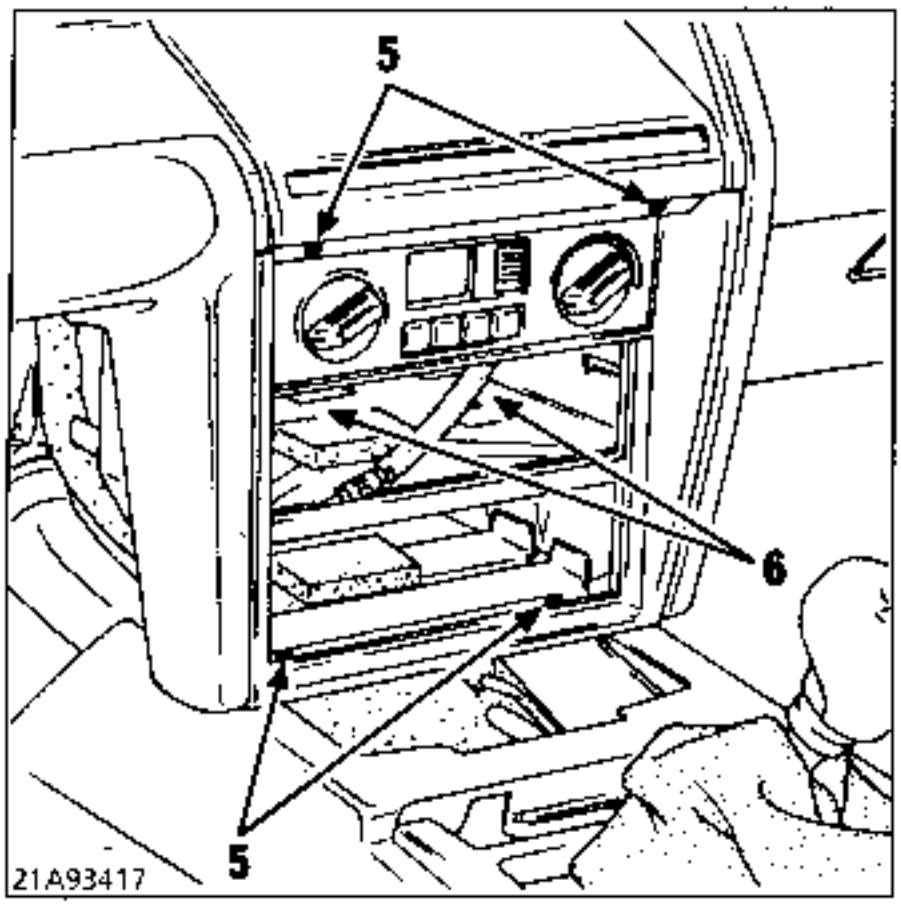
Remove the universal joint mounting bolt.

Remove the ignition key and lock the starter switch.

Remove the five steering column mountings (two hexagon head bolts, two nuts and a Torx type bolt).

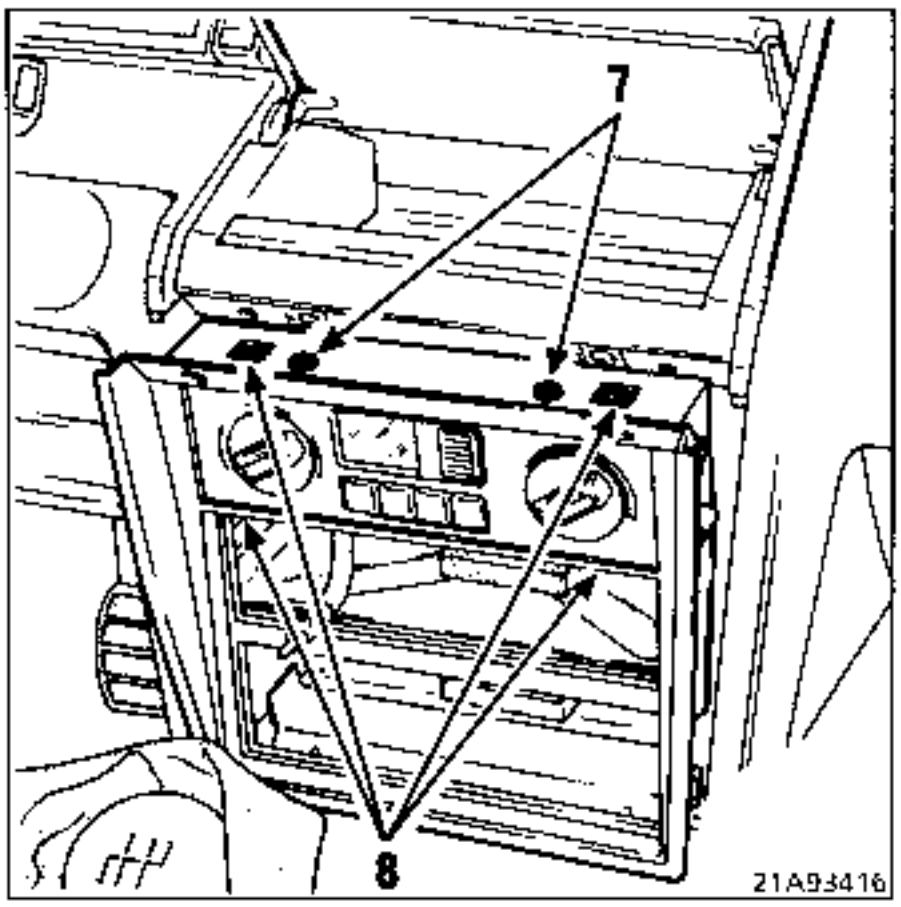
Tilt the steering column downwards and pull it to remove.

HEATING/VENTILATION CONTROL PANEL AND RADIO MOUNTINGS



Remove :

- the radio or the radio compartment moulding,
- the lower compartment unit,
- the four screws (5) holding the front panel.
- the two nuts (6) securing the base of the mounting.

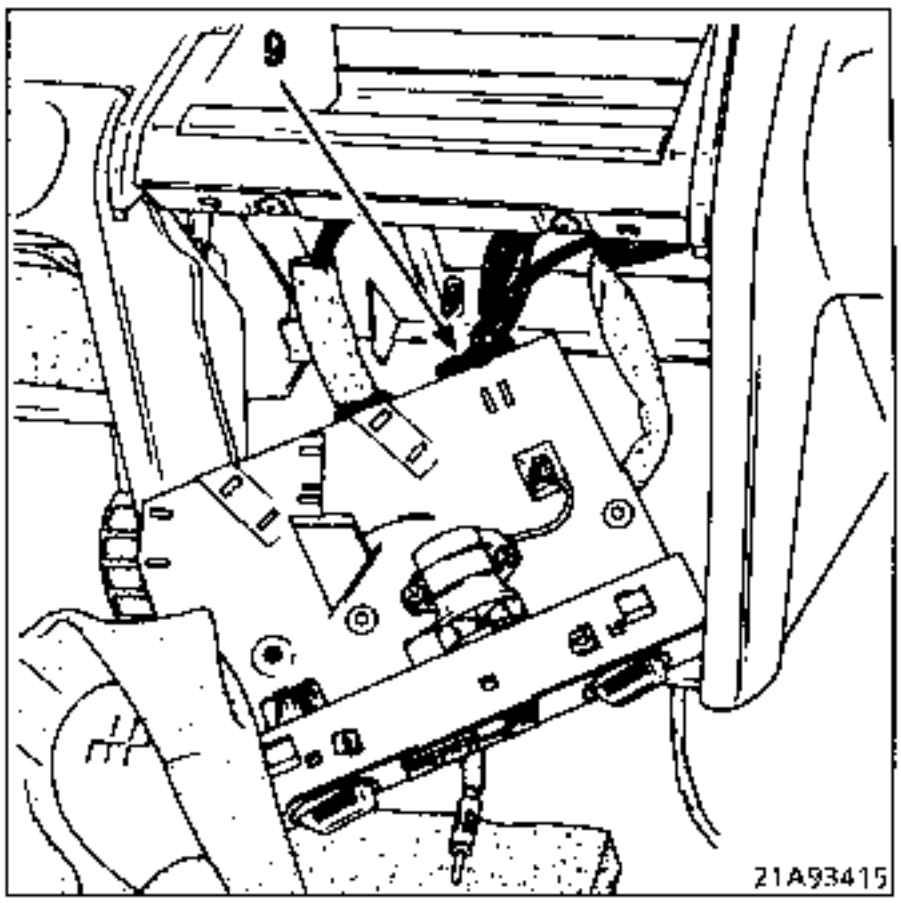


Gently take out the dashboard mounting.

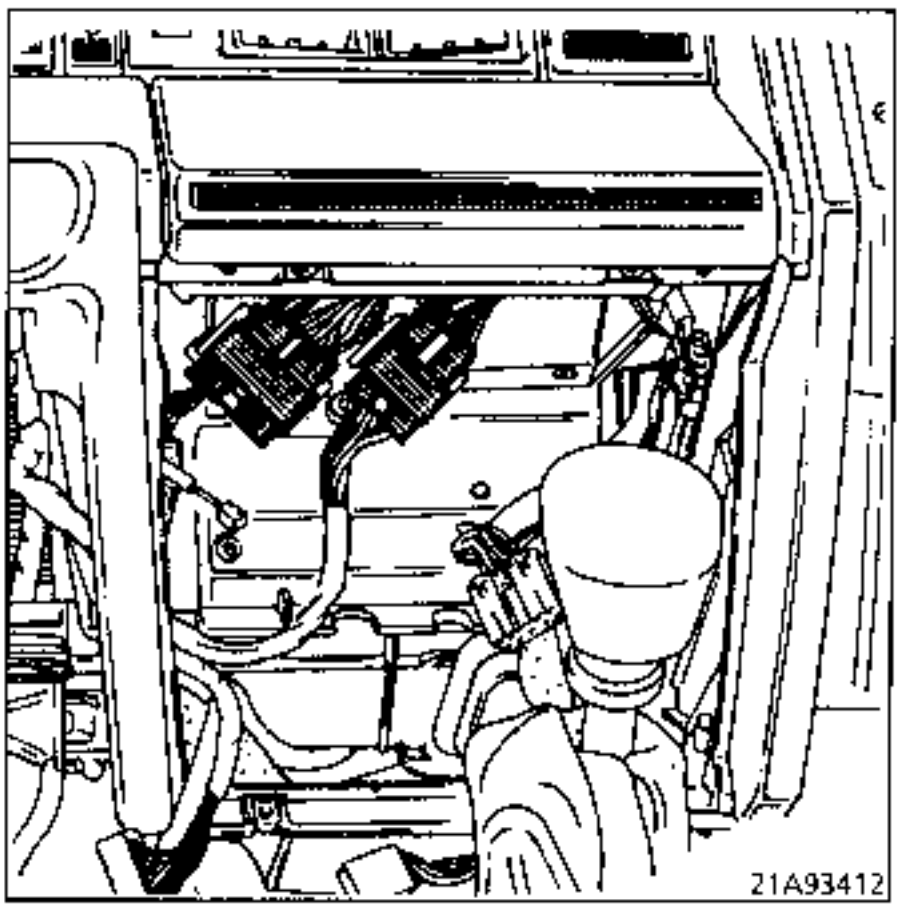
Remove the two screws (7) holding the control panel on its mounting.

Unclip the four lugs (8) holding the panel and push the panel inwards.

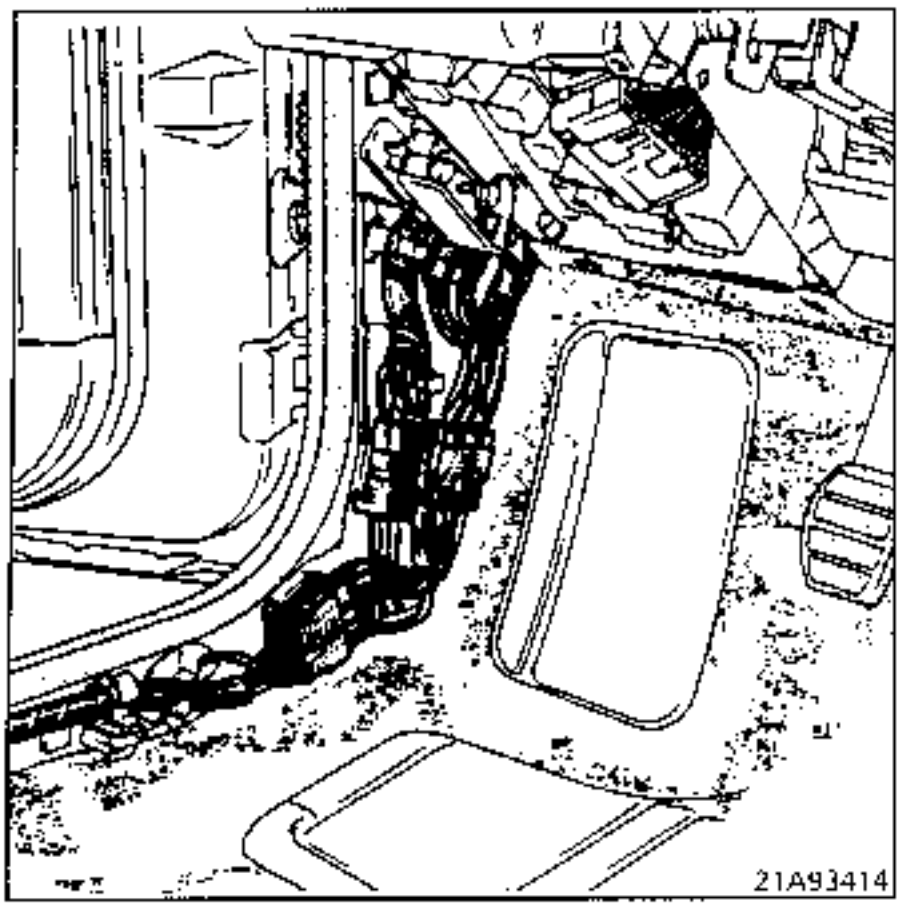
Remove the mounting bracket by tilting it downwards.

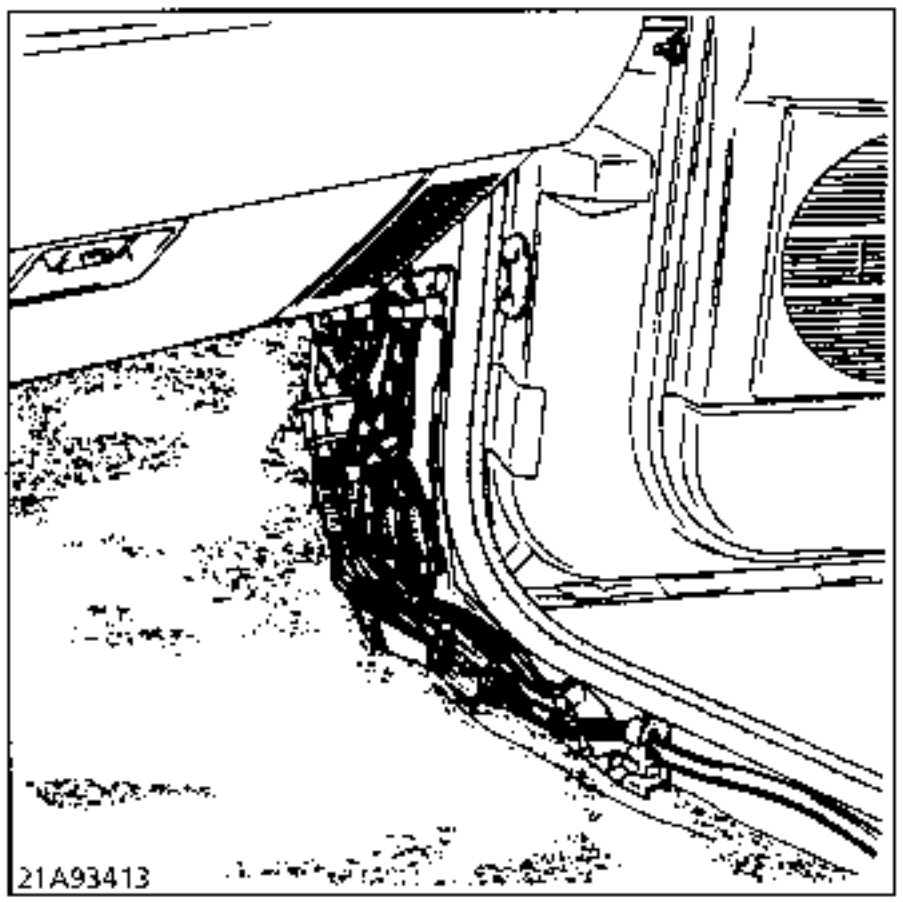


Disconnect the electric feed connector (9) (colour brown) from the dashboard without removing it.



Disconnect the two connectors located on the air distribution unit.

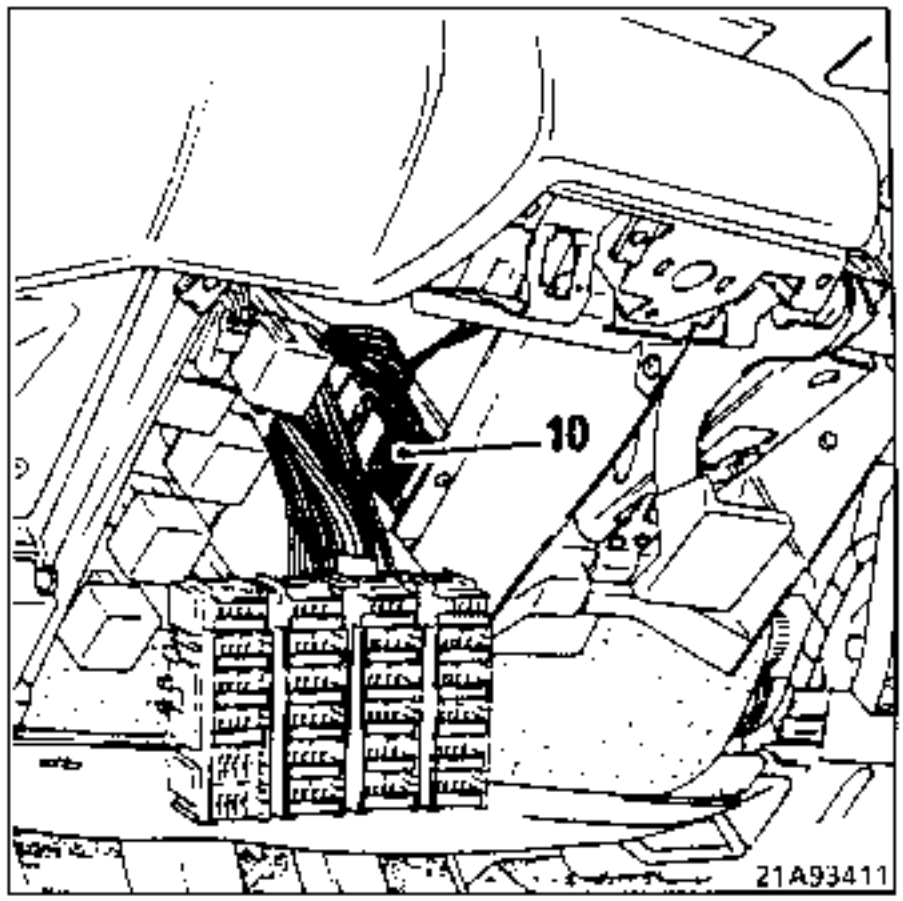




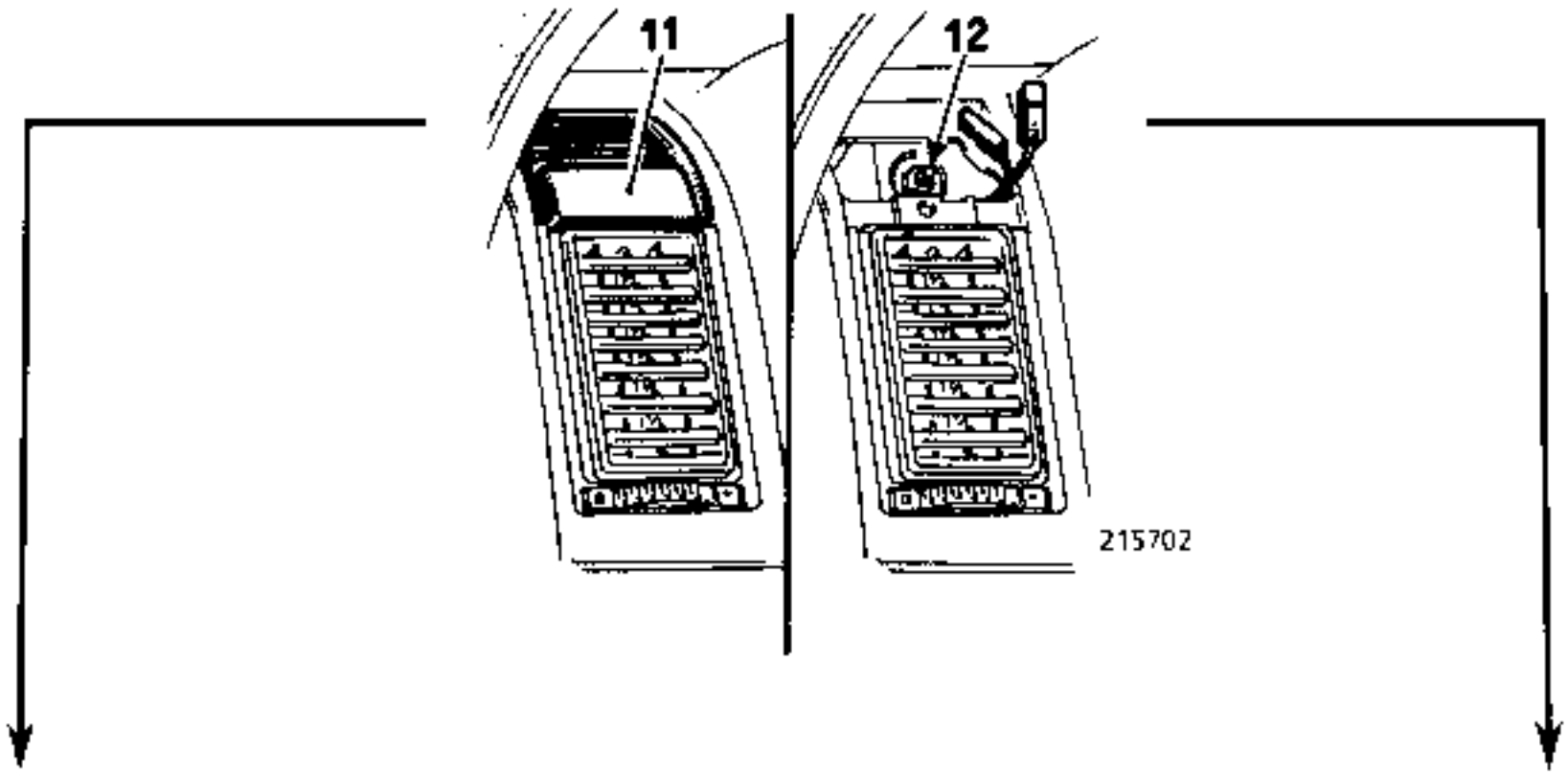
Disconnect the connectors from the front left-hand and right-hand pillars and remove the mounting bolts from the earth terminals.

Disconnect :

- the speedometer cable,
- the pulse generator located on the speedometer cable (depending on version),



- connector (**10**) from the scuttle panel harness.



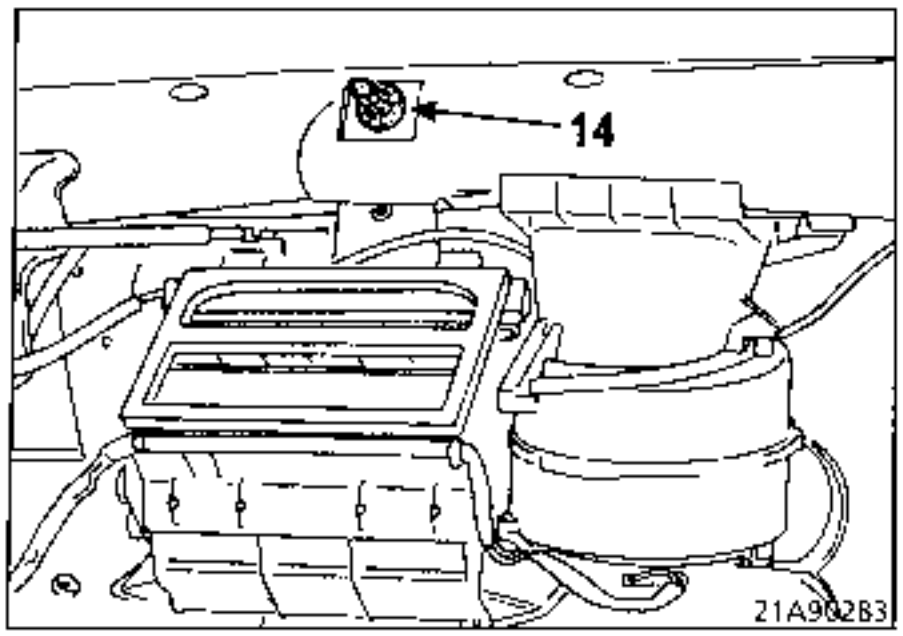
On the left and right-hand sides :

Unclip moulding (11).

Remove :

- the speaker grille,
- the two lower mounting bolts (13),
- the two upper mounting nuts (12),
- the dashboard.

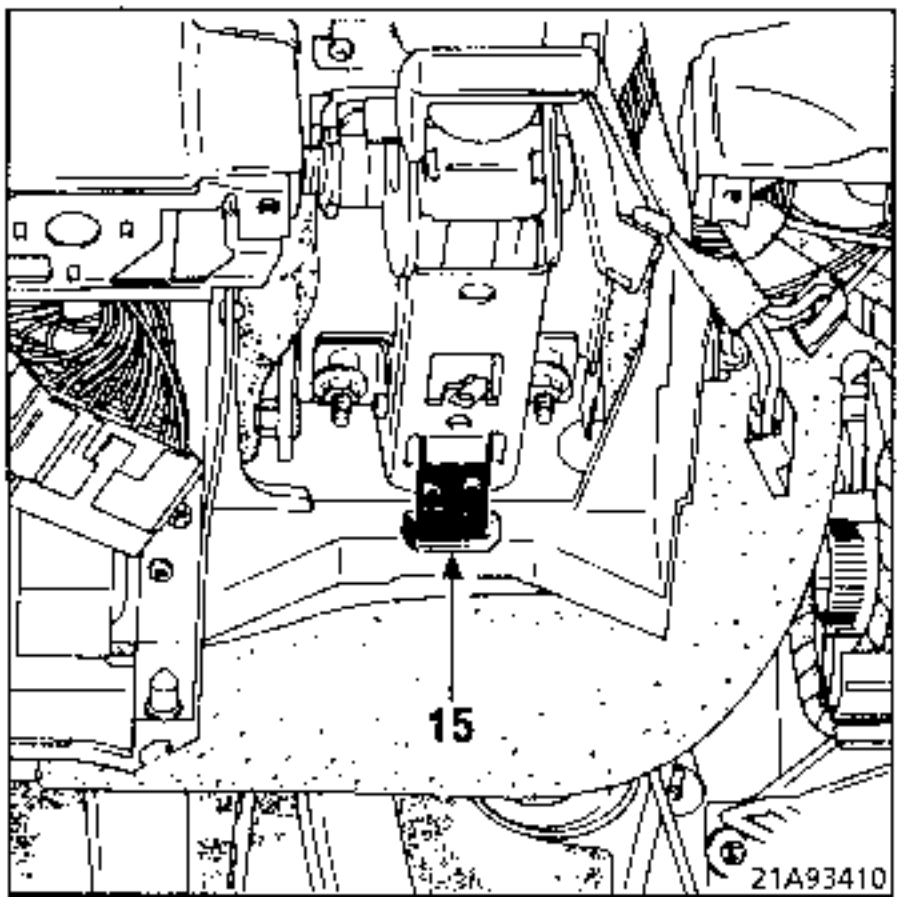
Refitting



Check that the plastic locating device (14) is fitted.

Fit the dashboard on the locating device and the four mounting points (make sure that the wiring harness and the steering intermediate shaft are routed correctly).

Secure the dashboard.



Offer up the steering column, engaging tab (15) in its location and the steering shaft in the universal joint.

Secure the steering column.

Fit the universal joint mounting bolt but do not tighten it.

When refitting the steering wheel, adjust the depth to which the steering wheel shaft is inserted and tighten the universal joint bolt.

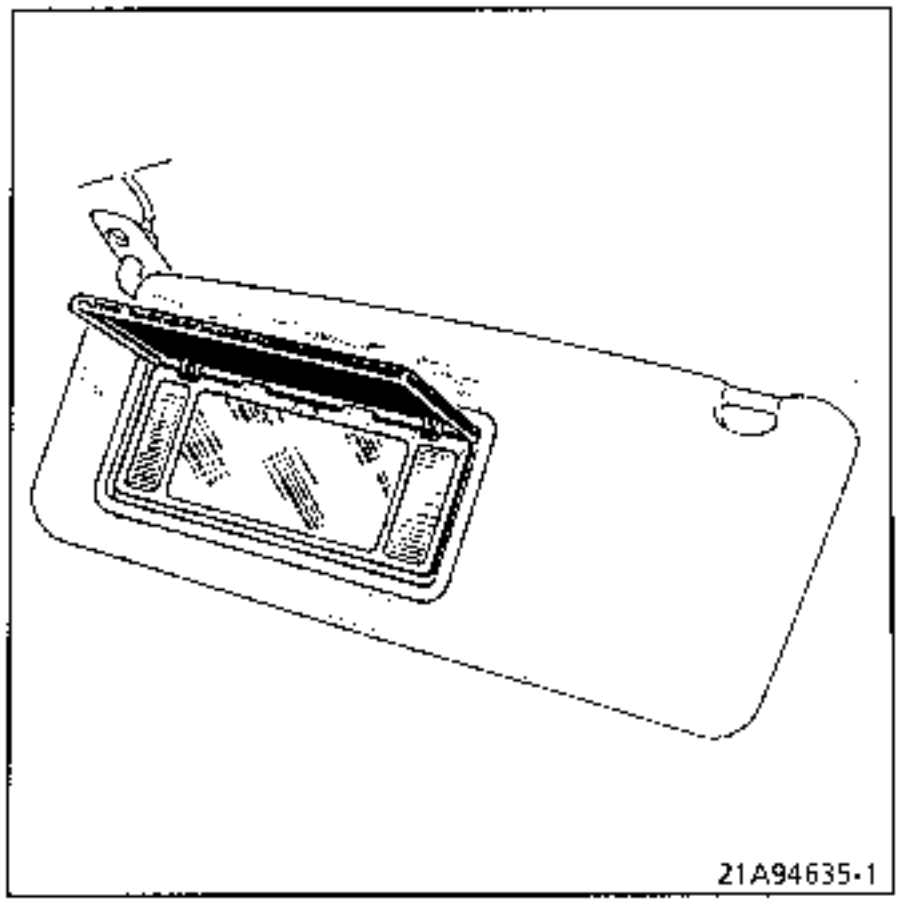
Refit :

- the radio mounting,
- the heating/ventilation control panel.

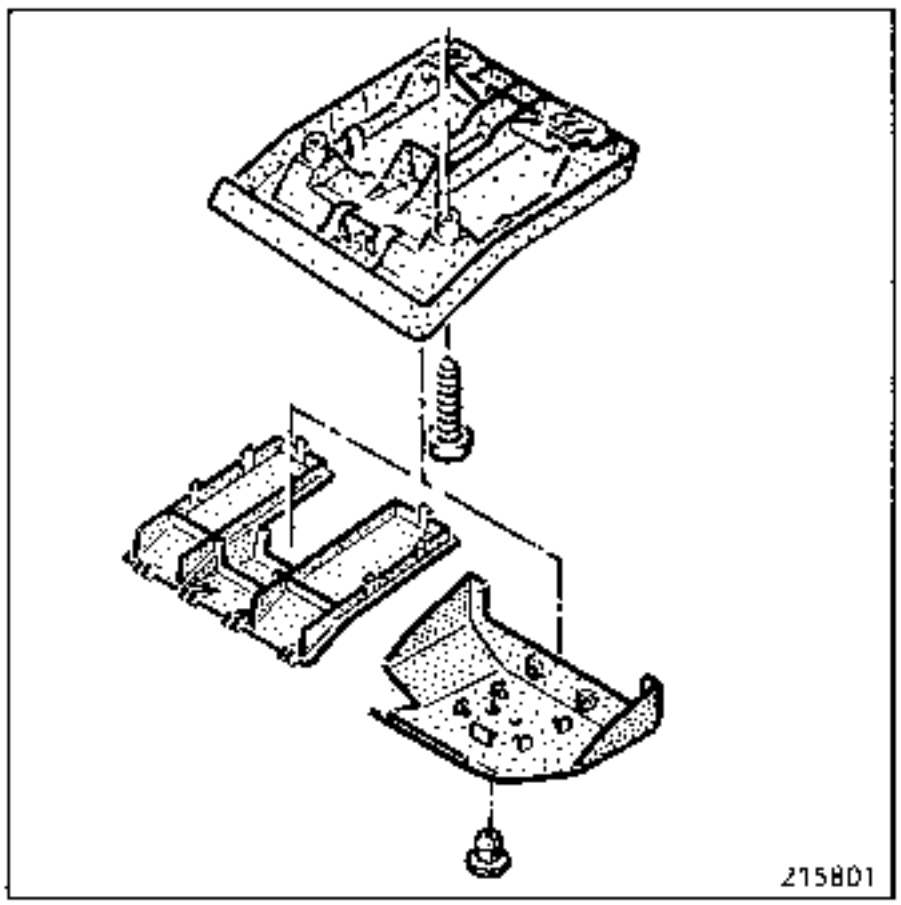
Reconnect :

- the speedometer cable,
- all the connectors and earth leads.

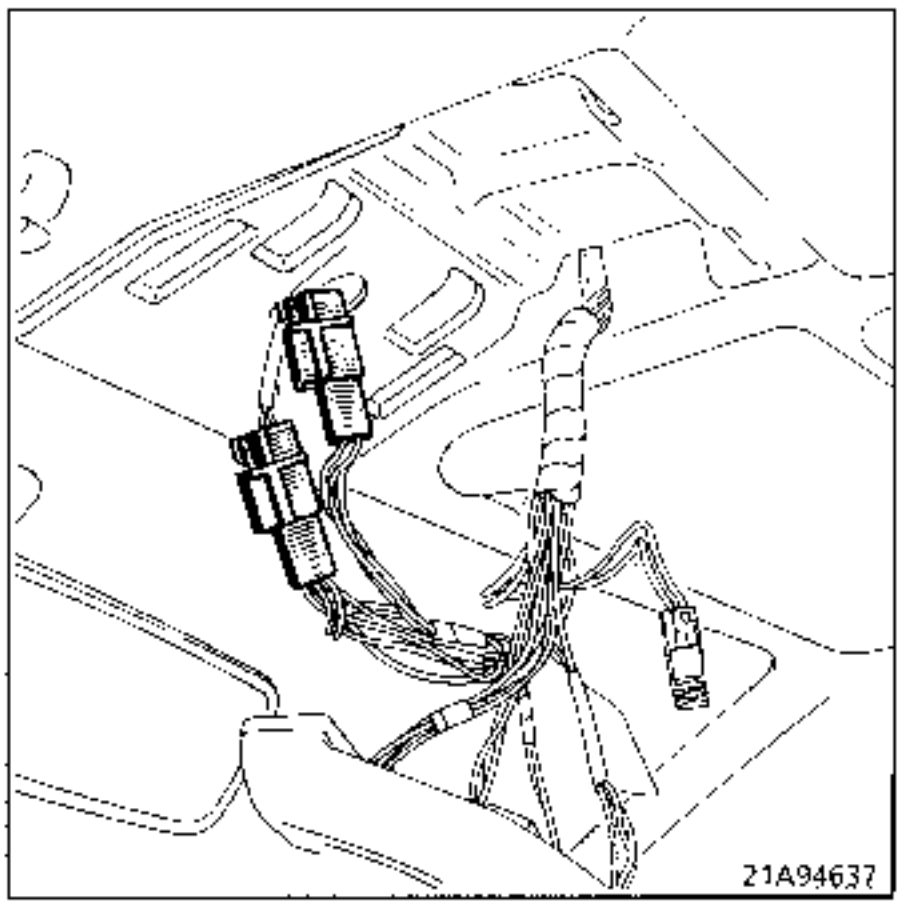
Connect the battery, with the ignition switched off and check all functions before refitting the trim.



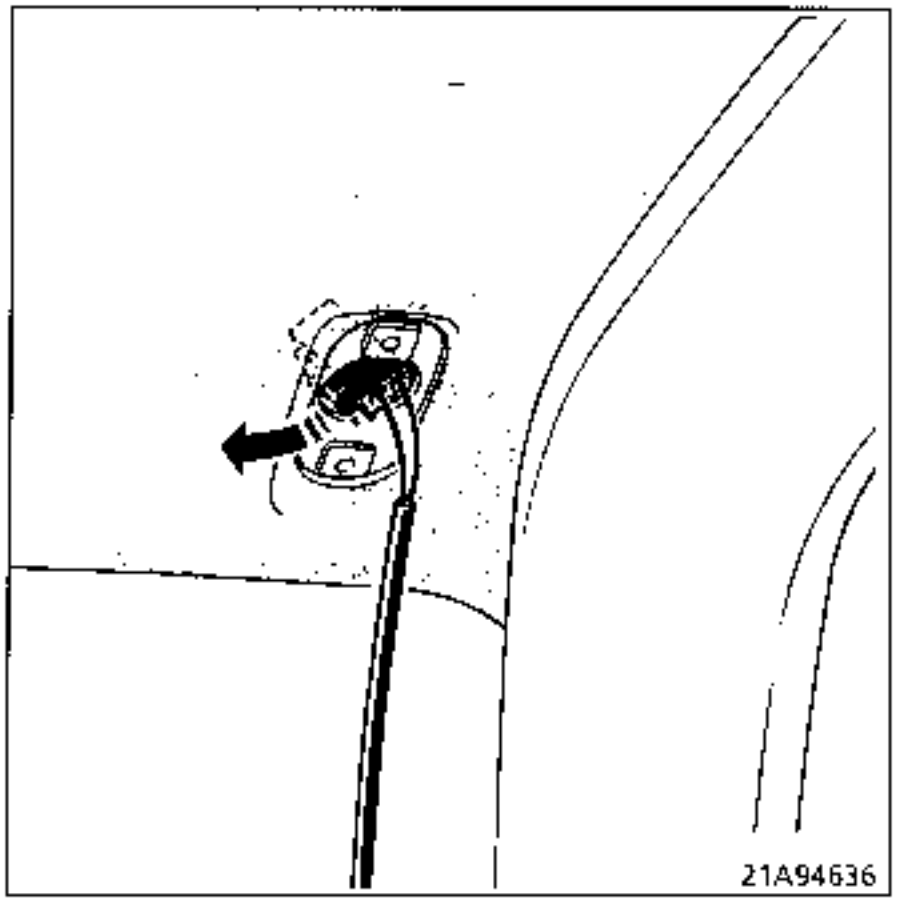
REMOVAL



Remove the roof panel console.



Disconnect the harness for the sun visor concerned.

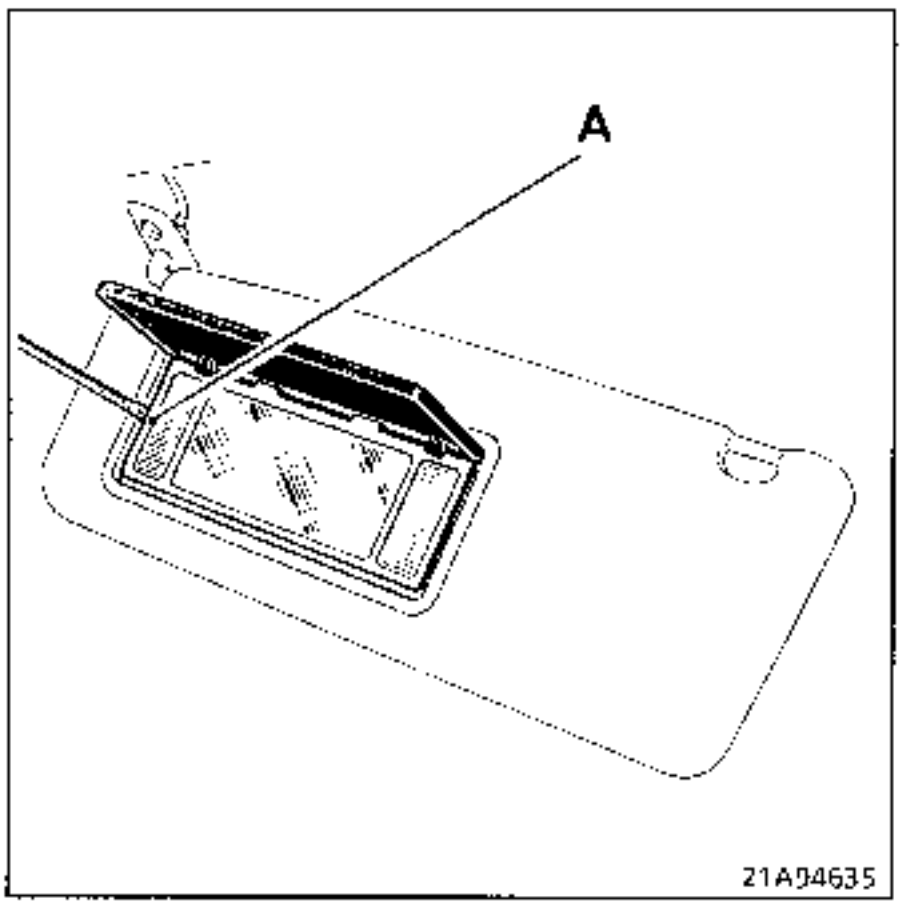


Remove the sun visor screws.

Take out the connector from the position shown above.

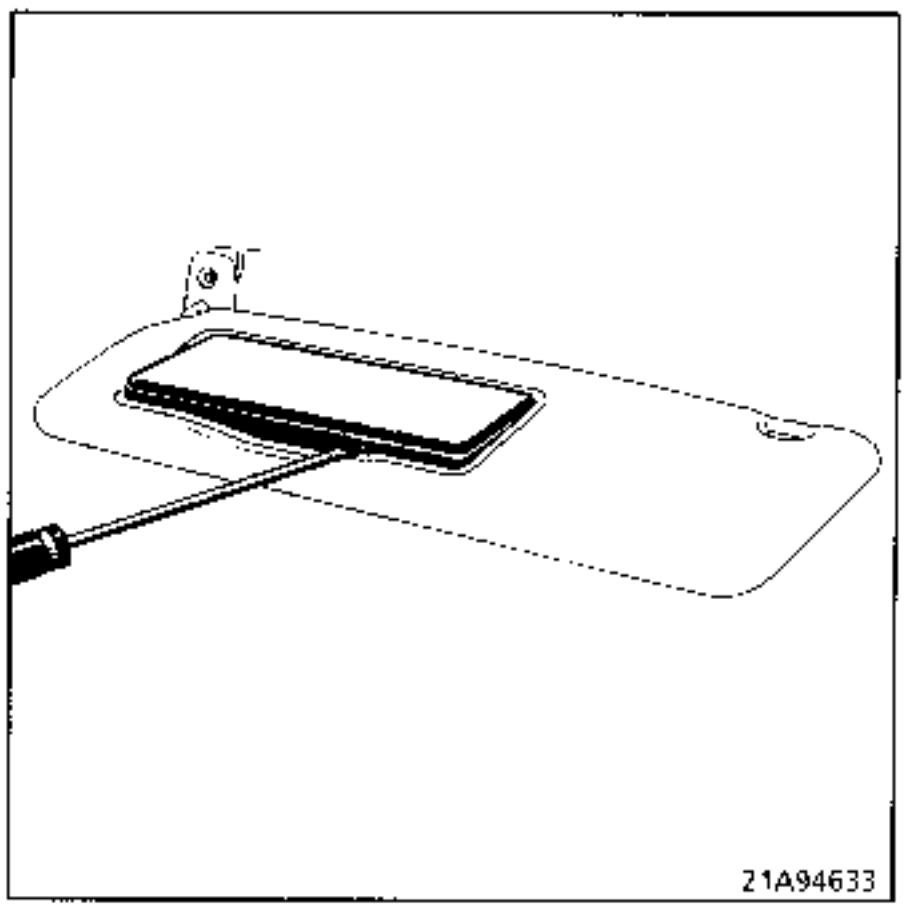
Sun visor bulbs

REMOVING A BULB



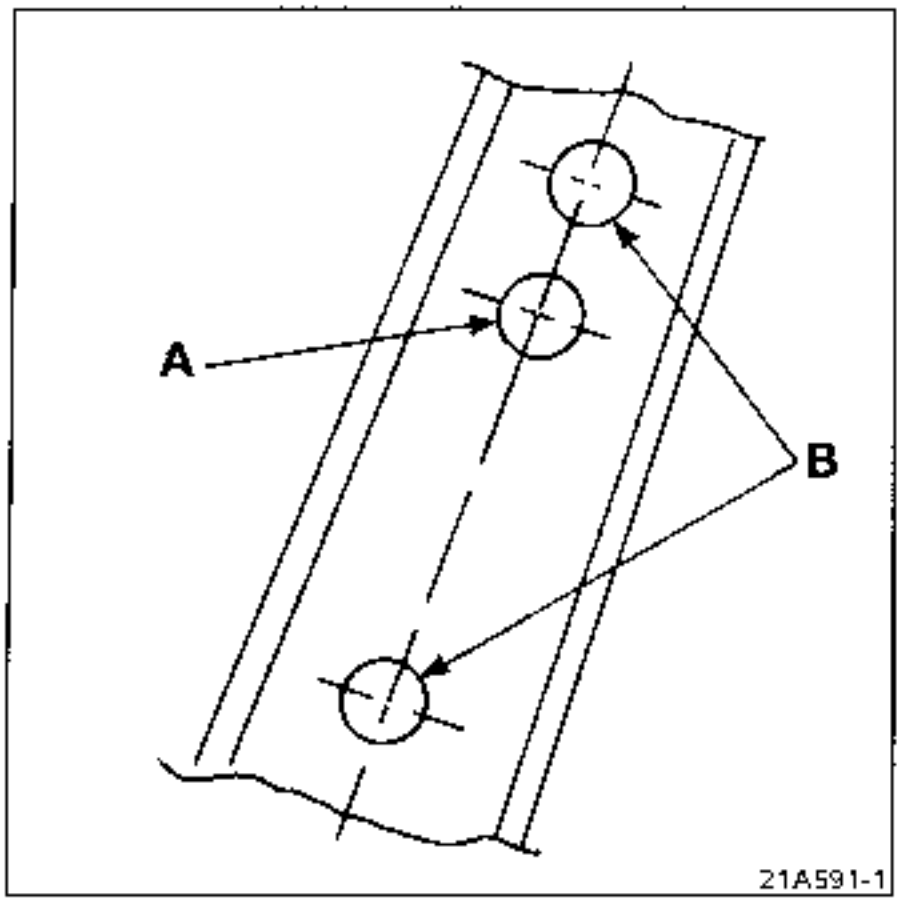
Open the courtesy mirror cover.

Unclip the sides of the mirror assembly (A).



Close the mirror cover back down to prevent the springs from falling out.

Finish unclipping the assembly.



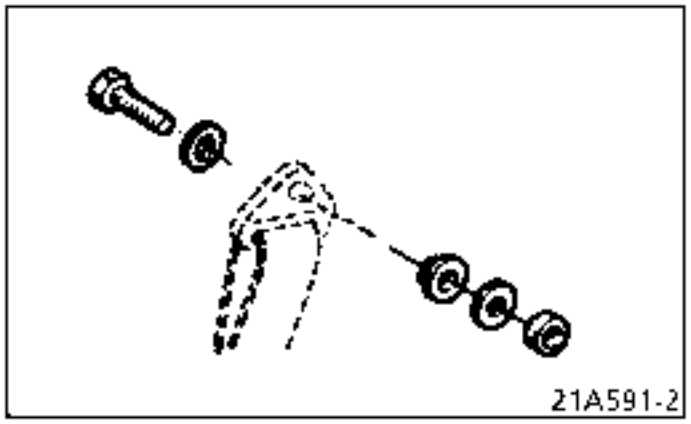
ATTENTION

(A) : X48 phase 1

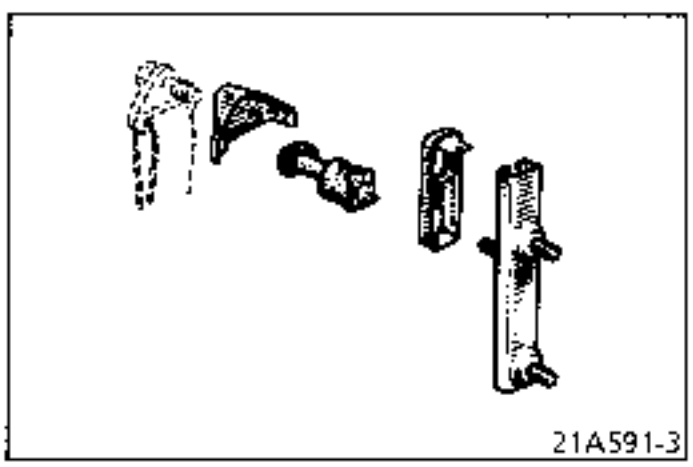
"Only anchorage point for seat belt which may be used to secure a fixed mounting".

(B) : X48 phase 2

"These two anchorage points for the seat belts are reserved exclusively for fitting the adjustable seat belt system".



⇦ Seat belt with fixed mounting.

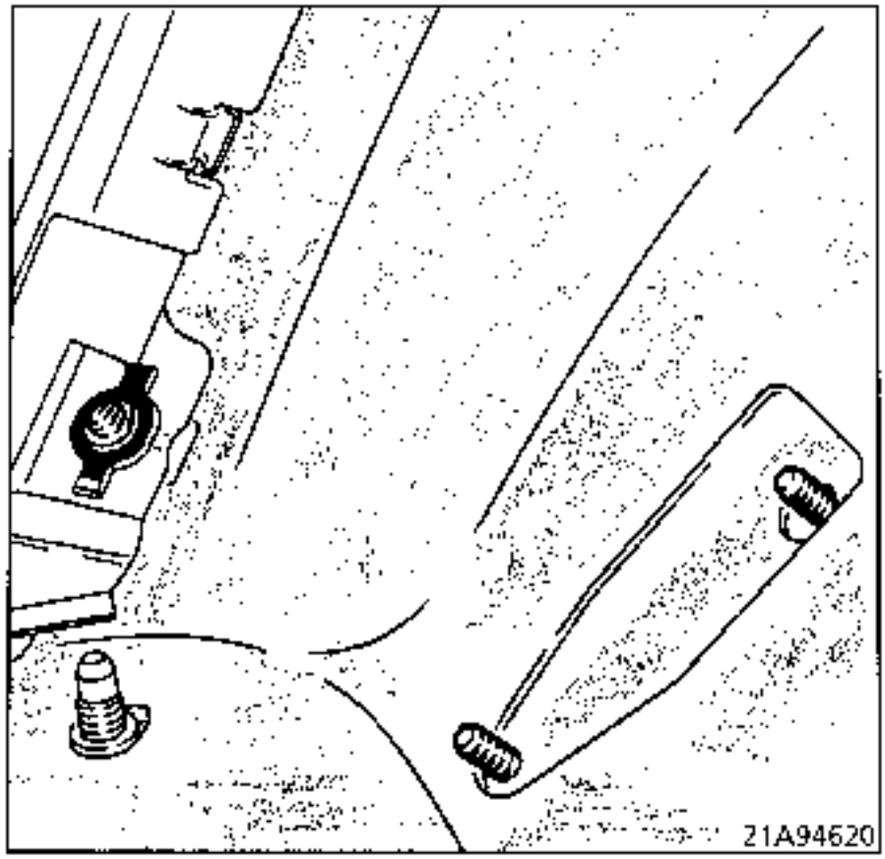


⇦ Seat belt with height adjustable mounting.

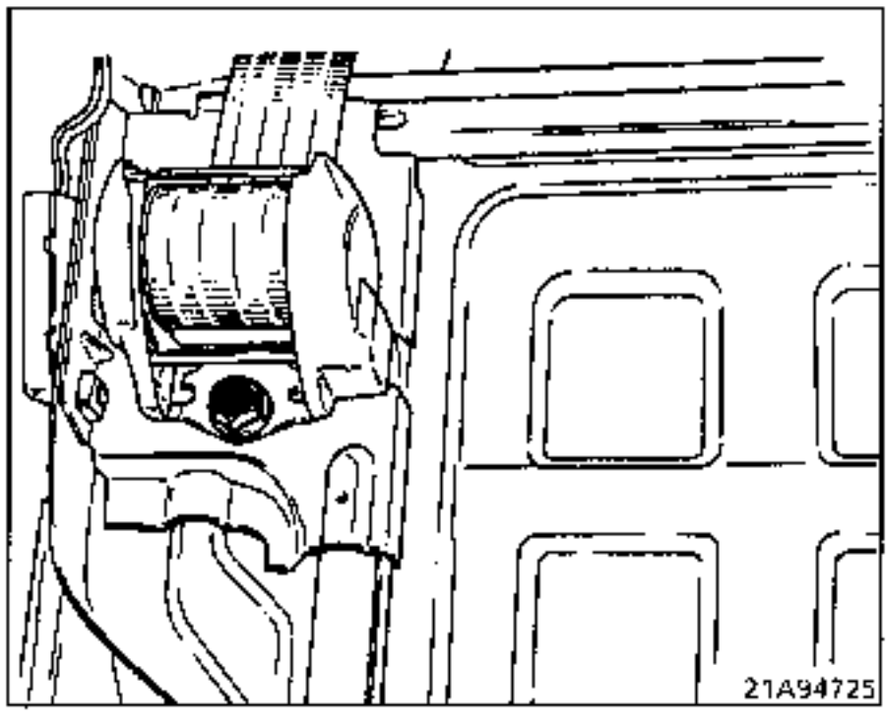
In service exchange, the Parts Department only supplies centre pillars comprising three nuts for securing the safety belts.

IMPORTANT :

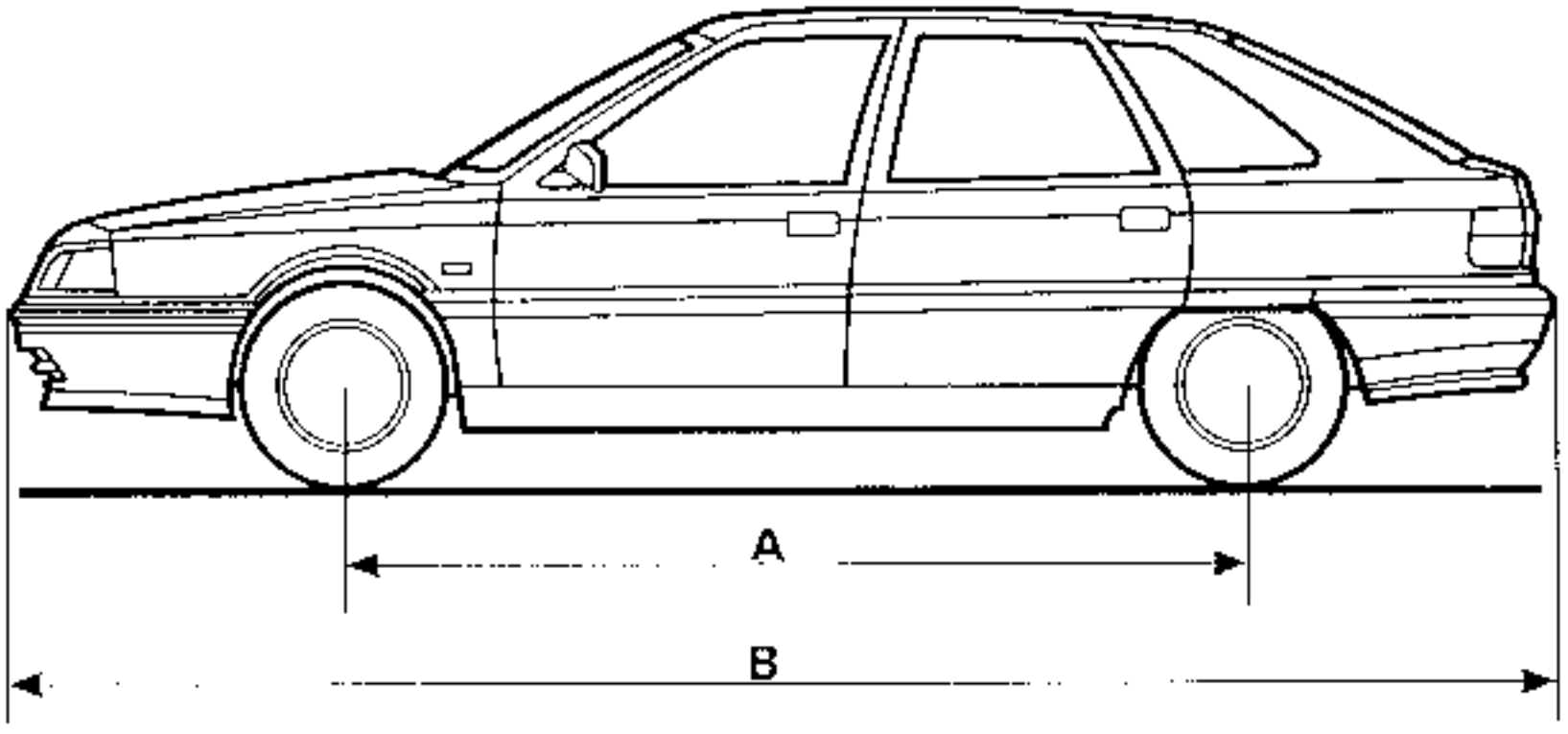
When replacing a centre pillar on vehicles equipped with safety belts having fixed shoulder strap mountings (eg- **X48 phase 1**), it is essential to mount the safety belt as it was originally mounted on the pillar (see diagram above).

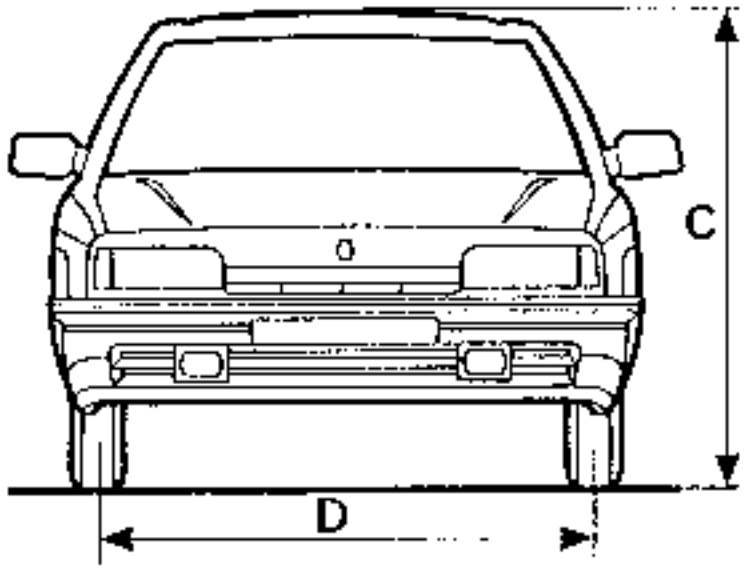


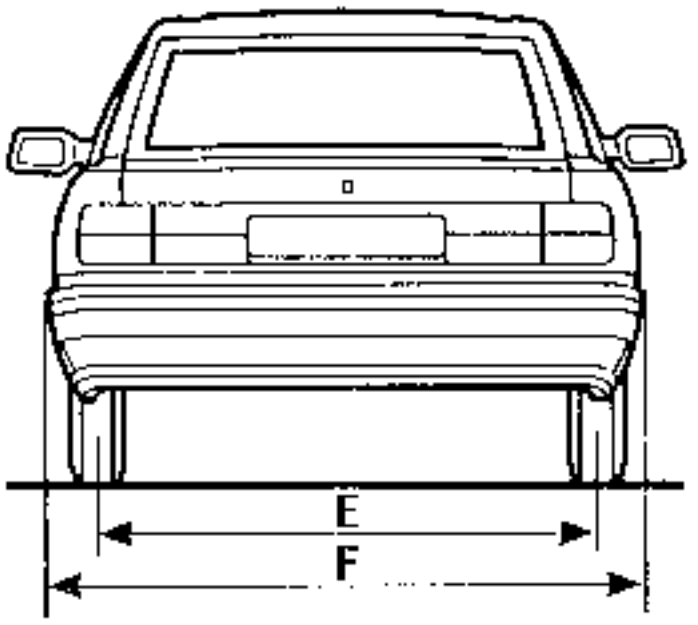
Remove the lower securing bolts on the body..



After removing the seat back trim, remove the seat belt mounting.

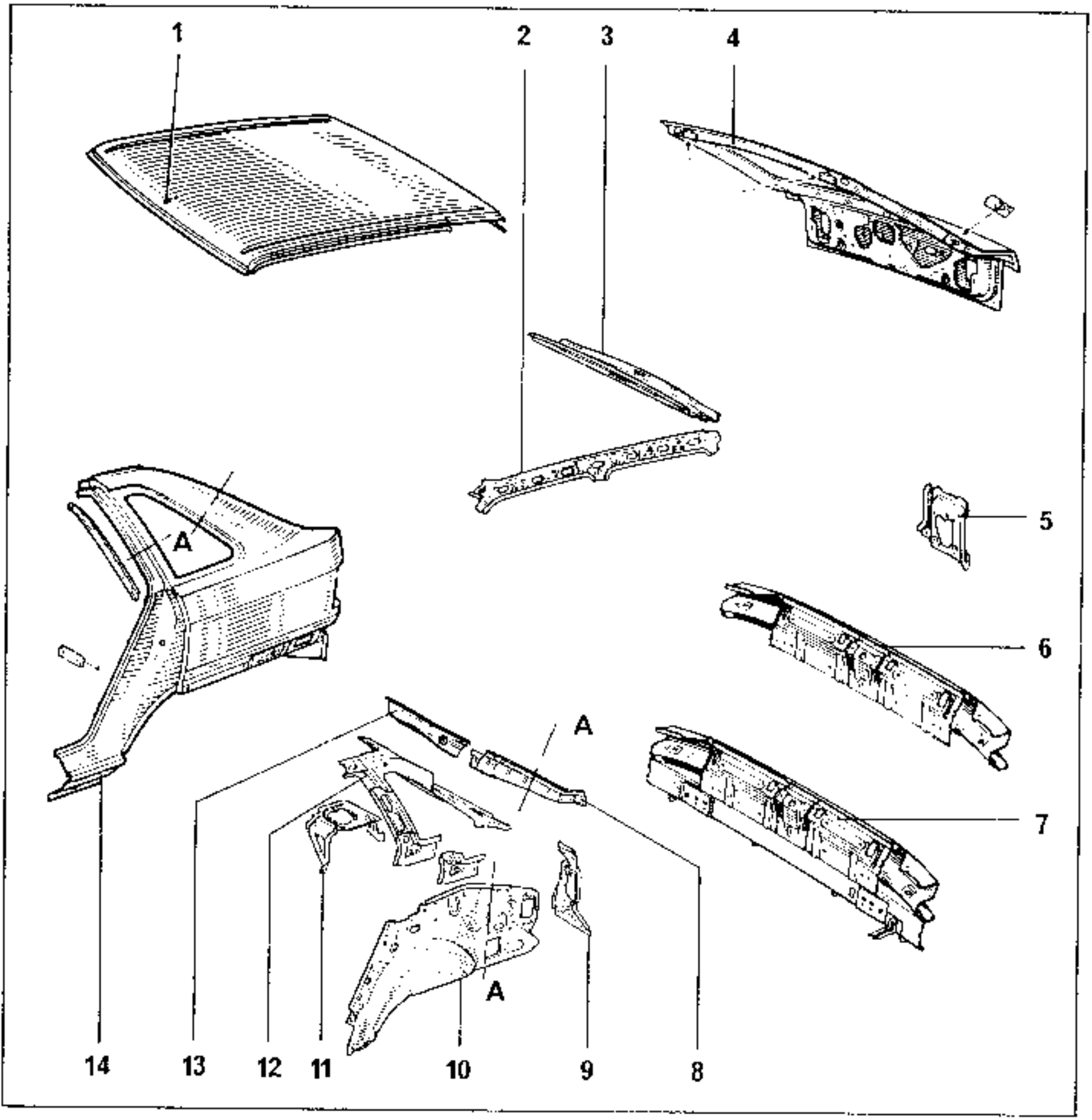




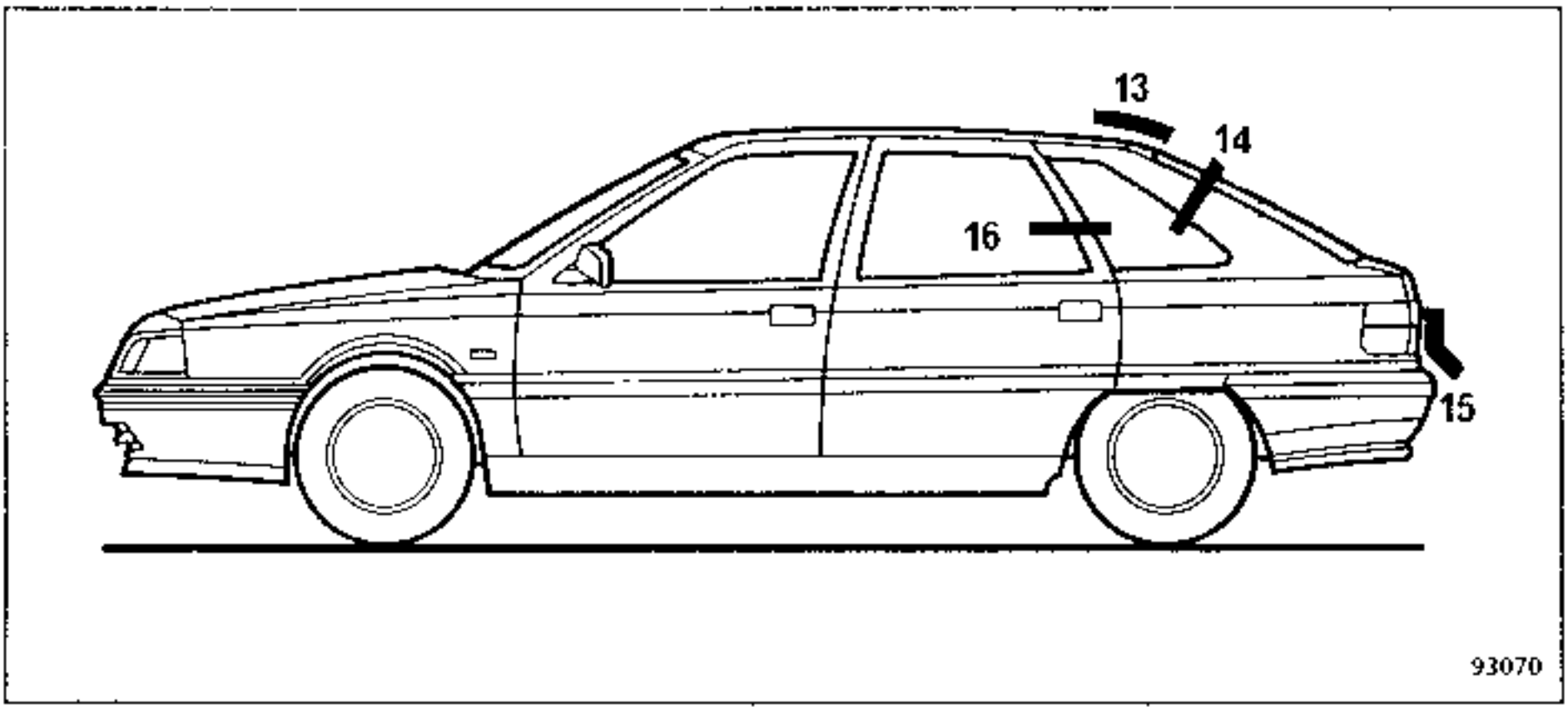


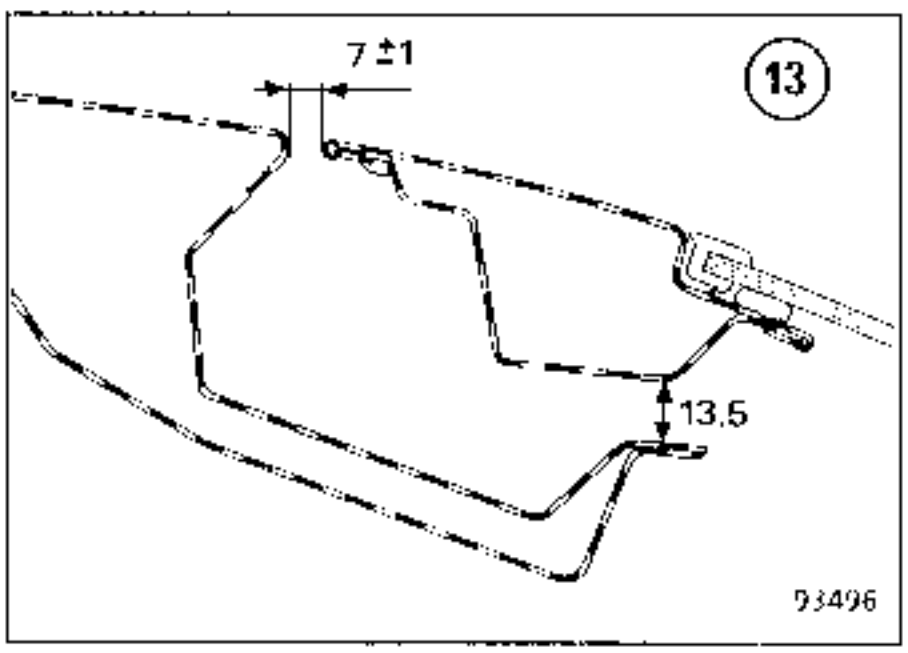
93070

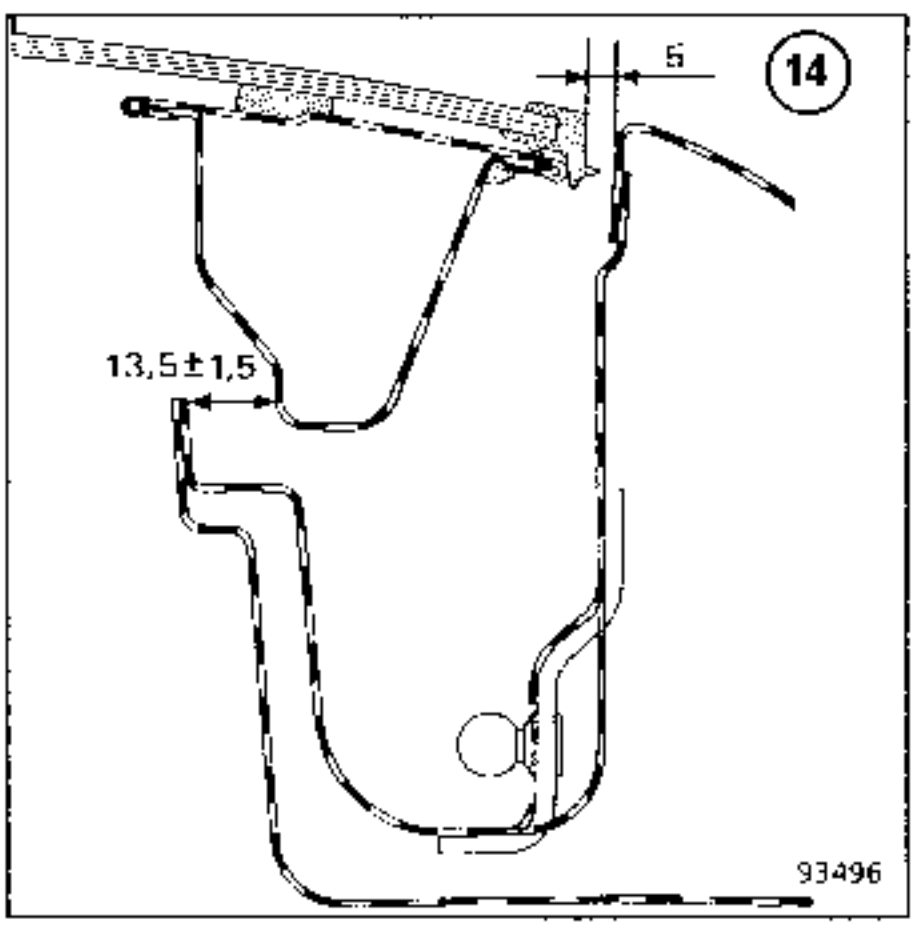
Item	Dimensions in meters			
	Transverse	Longitudinal		4 x 4
A	2659	2600		2594
B	4461			
C	1400	1390	TURBO D	1425
			1395	
D	1435	1454		
E	1400	1400	ABS	ABS
			1408	1423
F	1726			

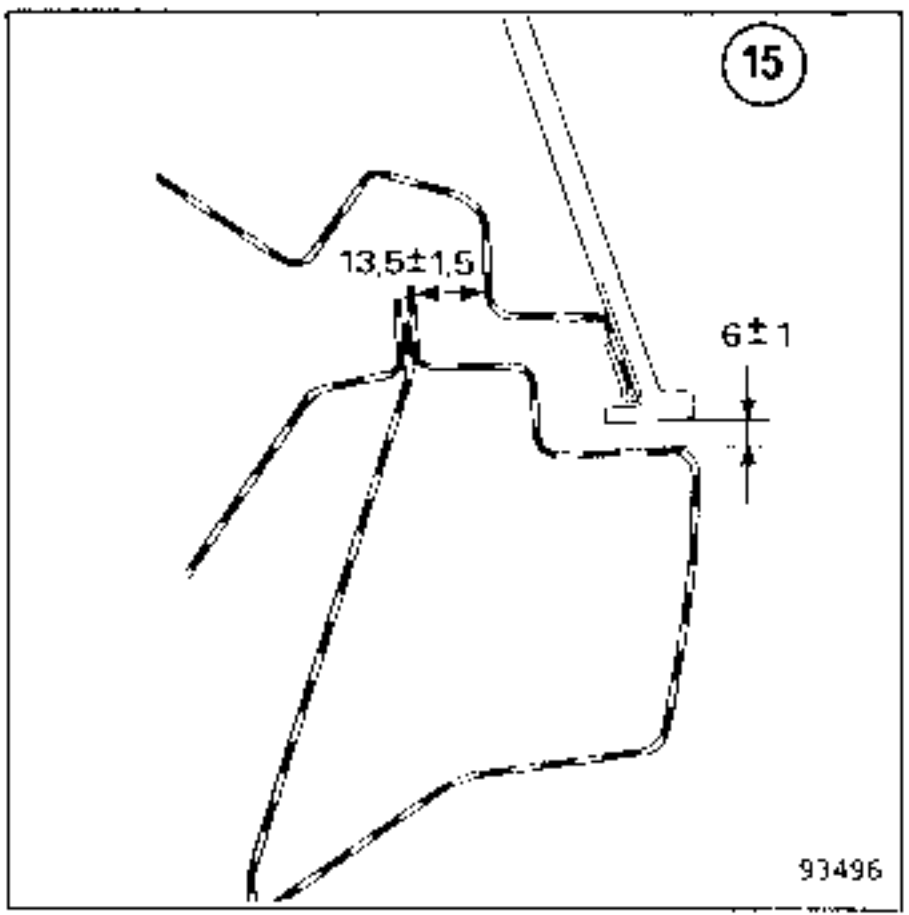


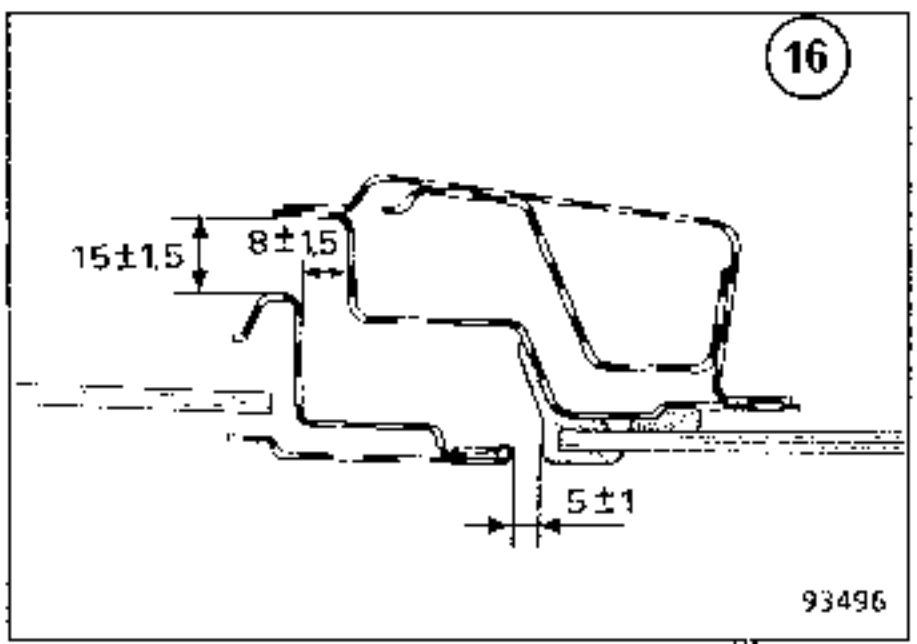
1 - Roof
2 - Contrail lining
3 - Roof rear cross member
4 - Tailgate
5 - Rear light support panel
6 - Rear end panel with lining
7 - Rear end panel assembly
8 - Side channel
8A - Part of side channel
9 - Rear end pillar lower lining
10 - Outer wheel arch
10A - Part of an outer wheel arch
11 - Rear cross panel support
12 - Quarter panel lining assembly
13 - Side channel upper gusset
14 - Complete wing panel
14A - Part of a wing panel


13
14
16
15
93070


7 ±1
13
13,5
93496


5
14
13,5±1,5
93496

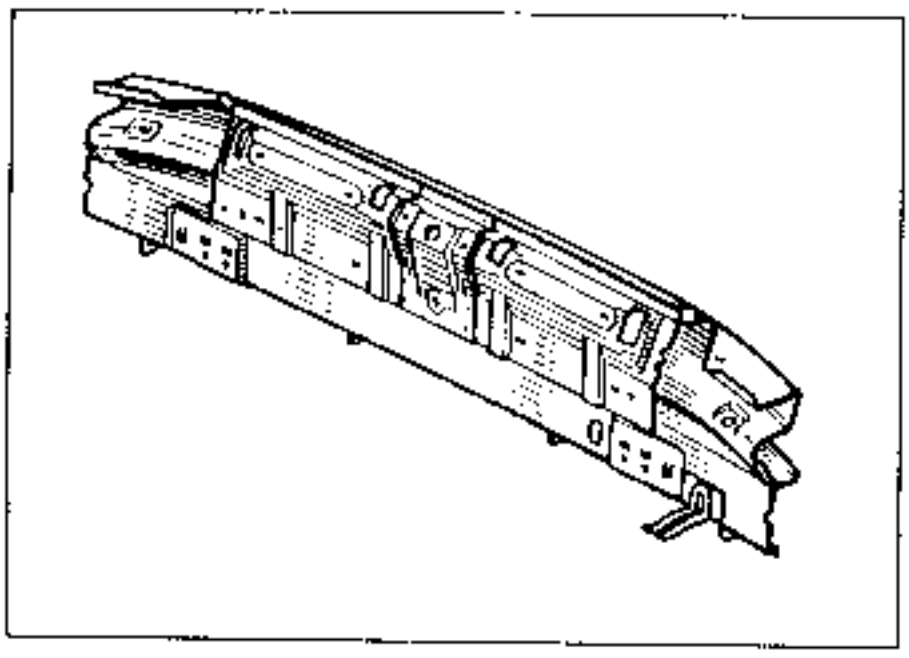

15
13,5±1,5
6±1
93496


16
15±1,5
8±1,5
5±1
93496

COMPOSITION OF PART AS SUPPLIED BY THE PARTS DEPARTMENT

Assembly comprising :

- The floor rear cross member
- The rear end panel
- The rear end panel lining
- The striker plate stiffener

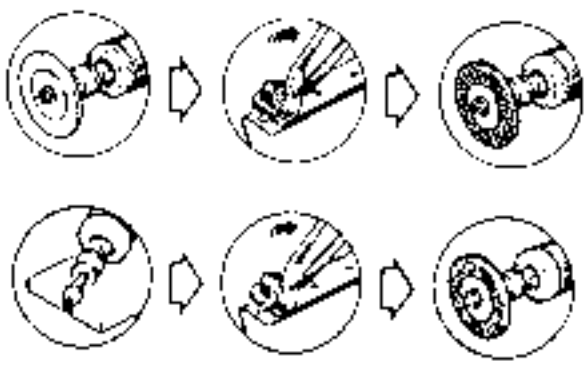


1 CONNECTION WITH REAR LIGHT SUPPORT PANEL

Thicknesses of panelling (in **mm**)

Rear end panel	: **0,67**
Rear light support panel	: **0,87**
Rear end pillar lower lining	: **0,77**

Unpicking

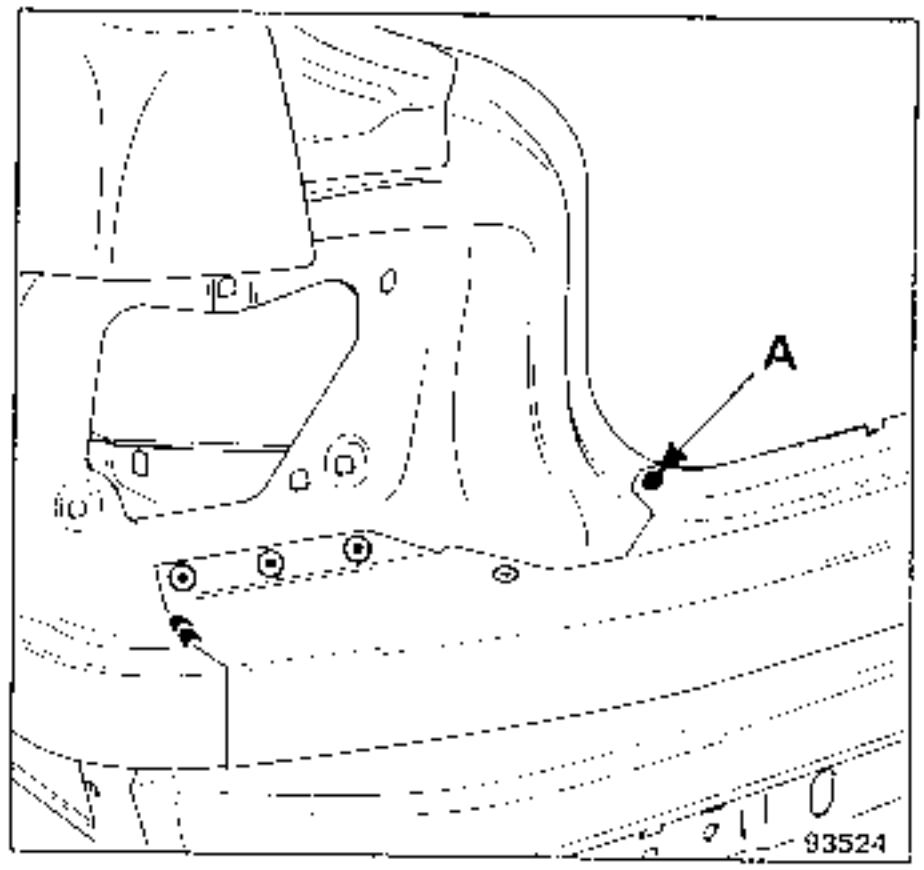


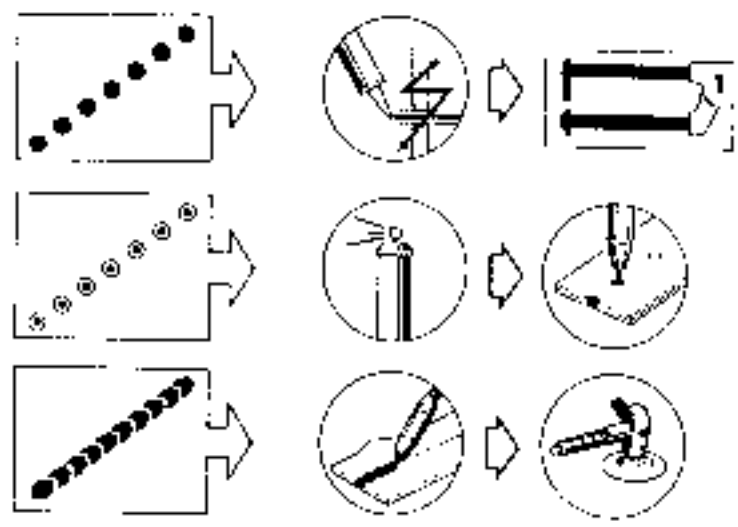
5 + 5 spot welds



1 + 1 brazed fillet 10 mm long

Welding





1 + 1 M.A.G. fillet 10 mm long



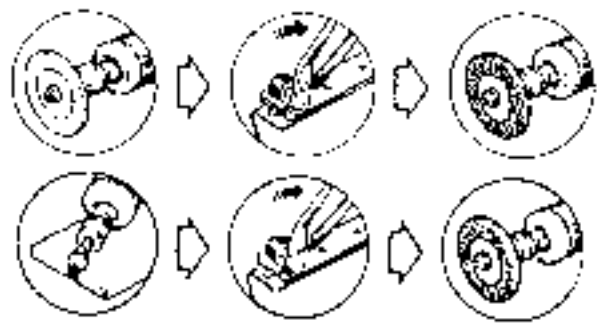
(A) 1 spot weld joining 3 thicknesses

2 JOINT WITH WING PANEL

Thicknesses of panelling (in **mm**)

Rear end panel	: **0,67**
Wing panel	: **0,77**
Lower rear cross member	: **1,20**

Unpicking

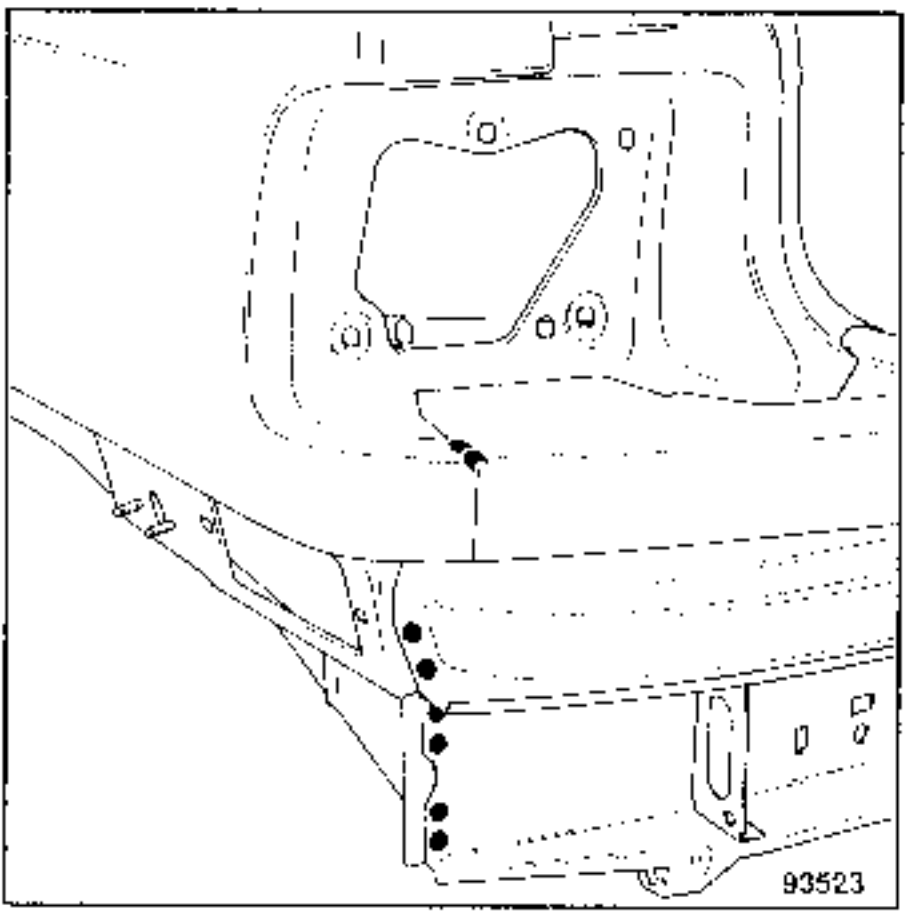


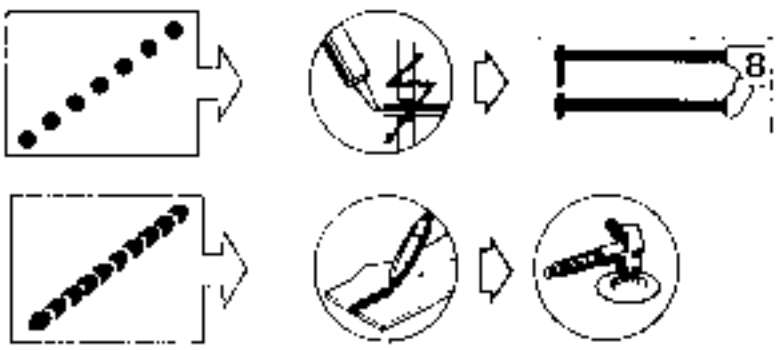
6 + 6 spot welds



1 + 1 brazed fillet 10 mm long

Welding





1 + 1 M.A.G. fillet 10 mm long

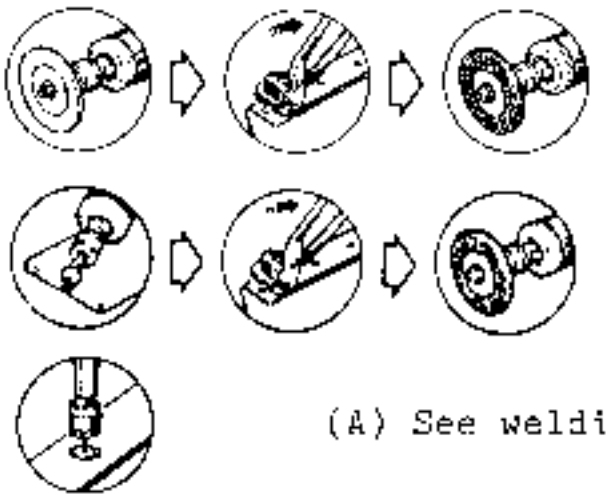


3 CONNECTION WITH REAR END PILLAR LOWER LINING

Thickness of panelling (in mm)

Rear end panel	:	**0,67**
Rear end panel lining	:	**0,67**
Rear end pillar lower lining	:	**0,77**
Lower rear cross member	:	**1,20**

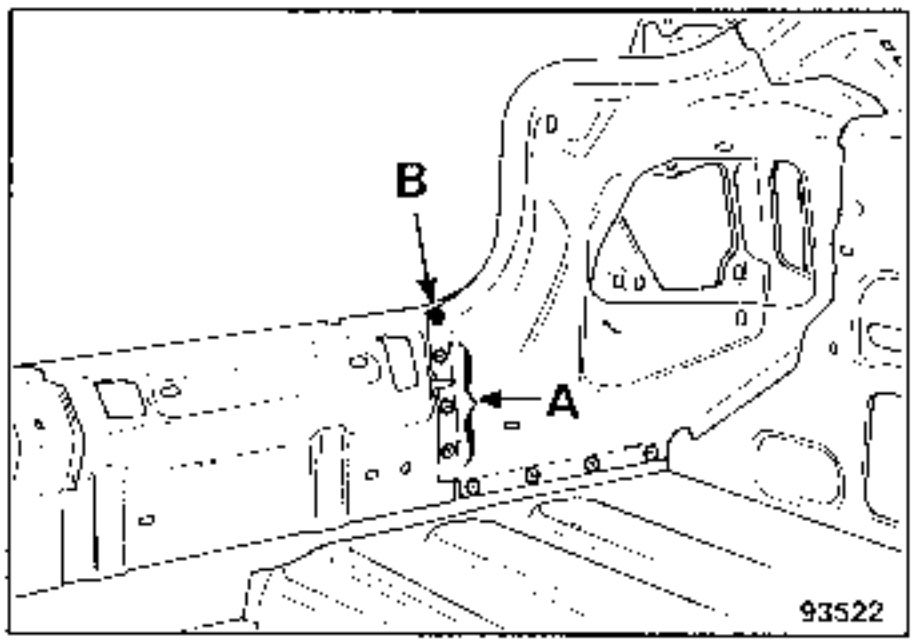
Unpicking



(A) See welding

8 + 8 spot welds

Welding





(B) 1 spot weld joining 3 thicknesses





4 CONNECTION WITH REAR SIDE MEMBER

Thickness of panelling (in mm)

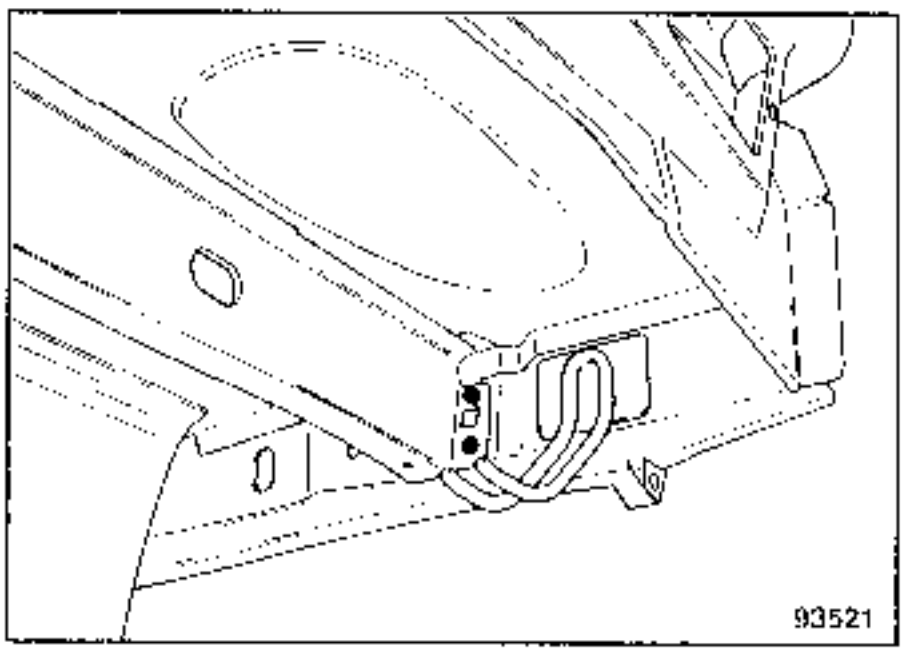
Lower rear cross member : **1,20**
Rear side member : **1,50**

Unpicking



2 + 2 spot welds

Welding





5 CONNECTION WITH REAR FLOOR PANEL, REAR SECTION

Thickness of panelling (in mm)

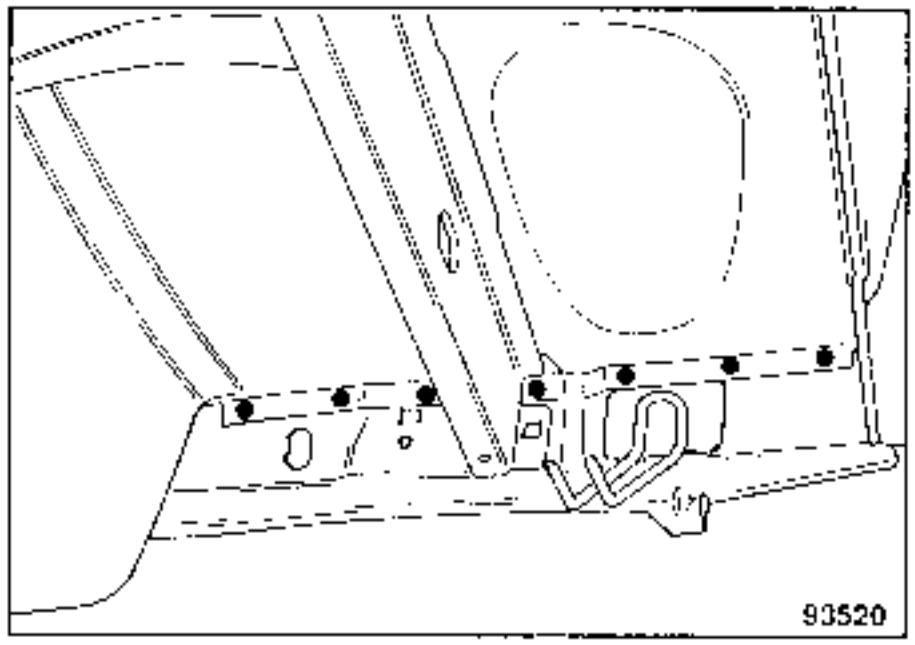
Lower rear cross member : **1,20**
Floor section closing panel : **0,62**
Rear floor,rear section : **0,60**

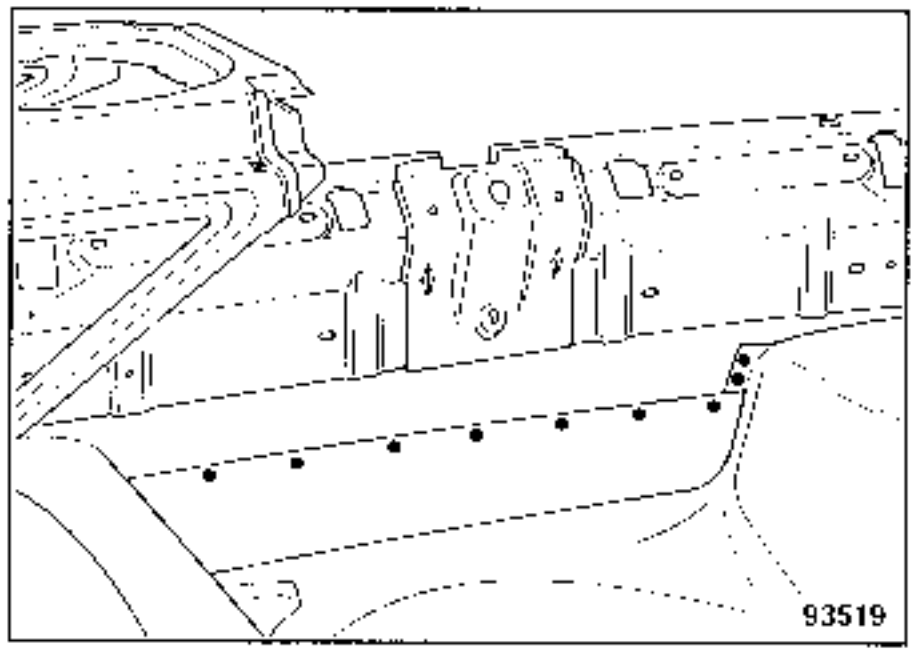
Unpicking



26 spot welds

Welding



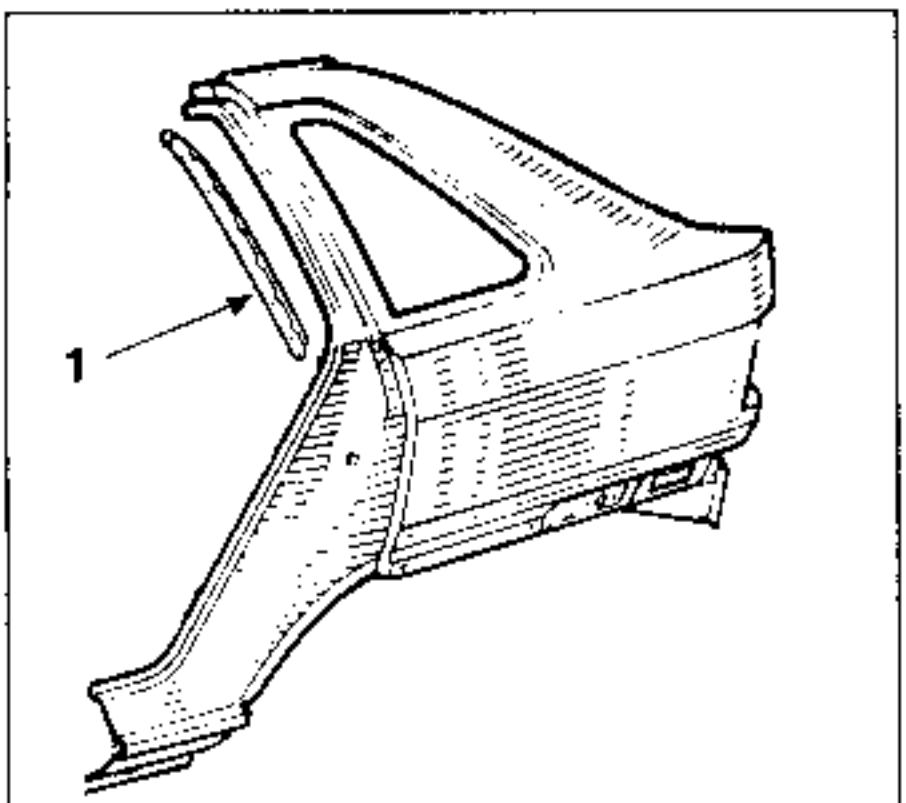




The roof must be removed before commencing this operation.

COMPOSITION OF PART AS SUPPLIED BY THE PARTS DEPARTMENT

One piece. The seal support (1) is to be ordered separately.

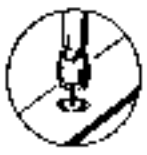


1 CONNECTION WITH THE UPPER BODY

Thickness of panelling (in mm)

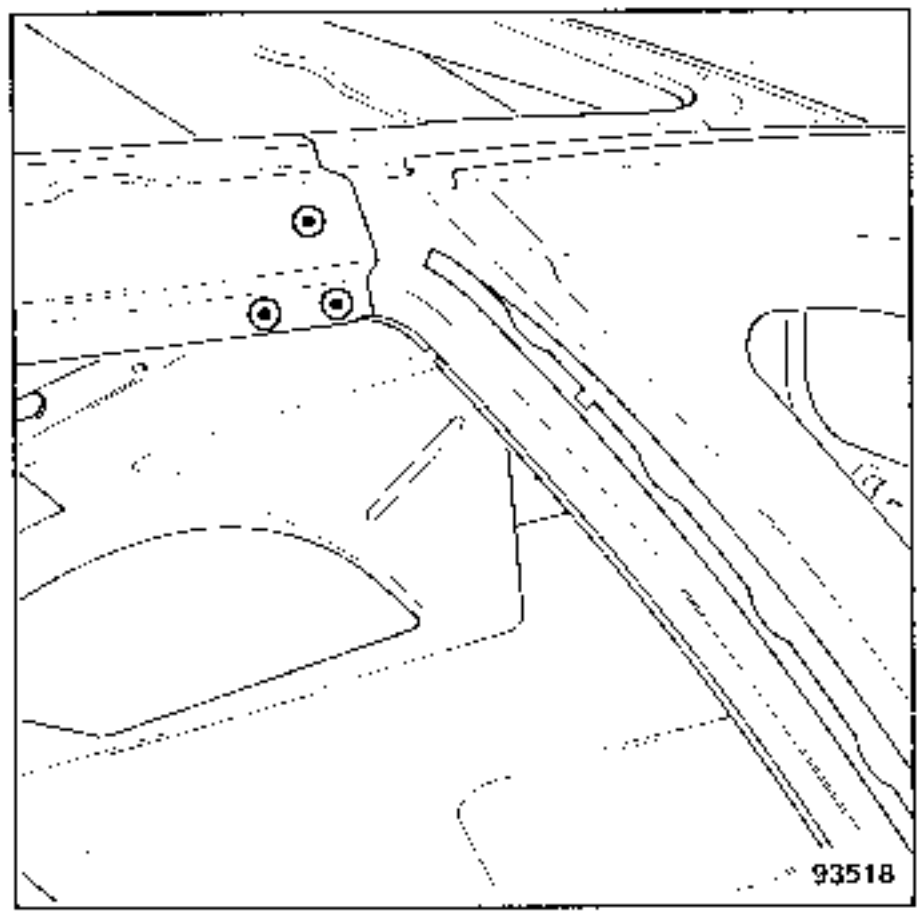
Wing panel	: **0,77**
Body side	: **0,77**
Cant rail lining	: **0,67**
Upper stiffener	: **0,97**

Unpicking



3 spot welds

Welding







2 CONNECTION WITH UPPER SIDE CHANNEL GUSSET

Thickness of panelling (in mm)

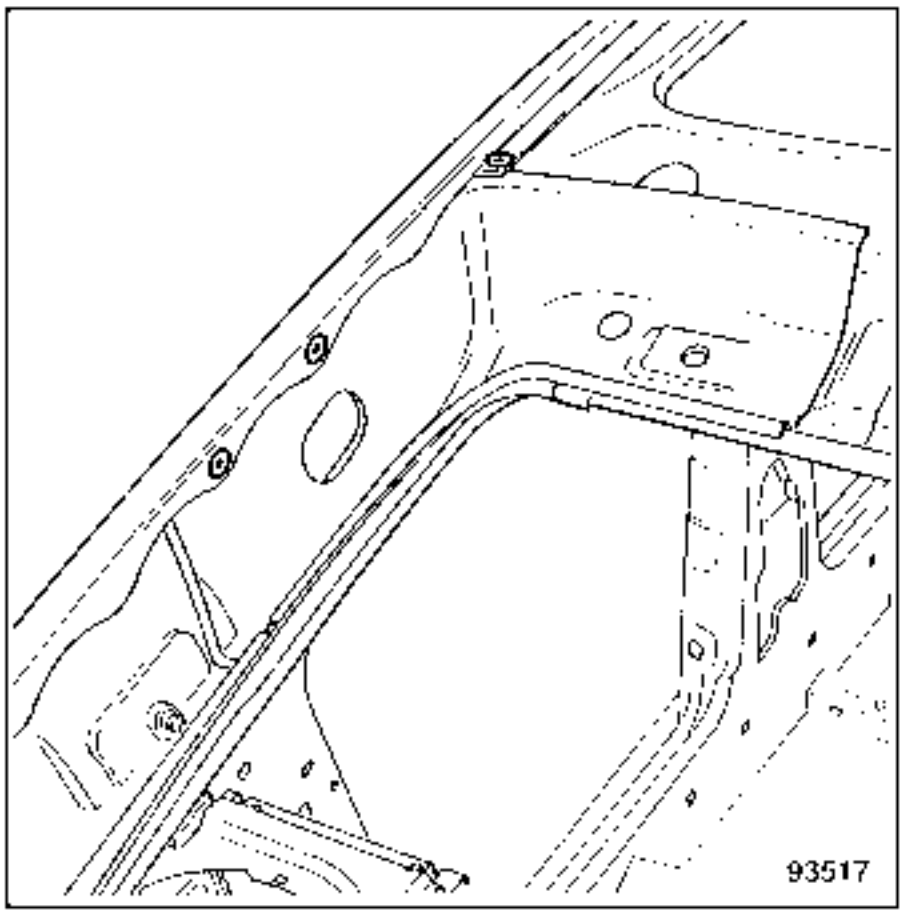
Wing panel	: **0,77**
Side channel upper gusset	: **1,50**

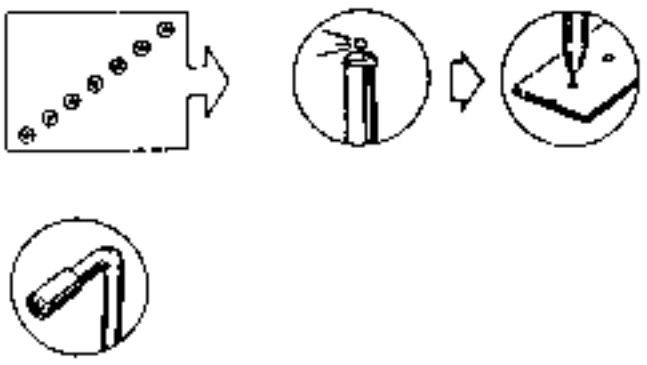
Unpicking



3 spot welds

Welding





3 CONNECTION WITH QUARTER PANEL LINING

Thickness of panelling (in mm)

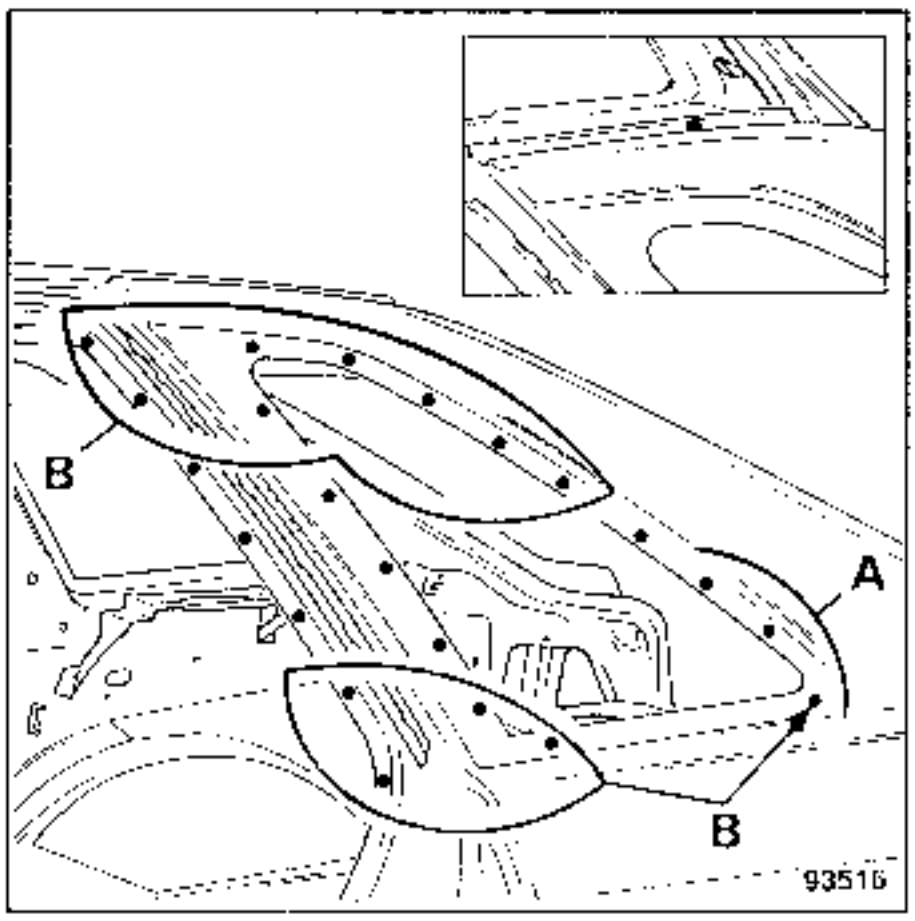
Wing panel	: **0,77**
Quarter panel lining	: **0,67**
Upper stiffener	: **0,97**
Rear end pillar upper lining	: **0,77**
Outer wheel arch	: **0,67**
Seat securing point stiffener	: **1,50**

Unpicking

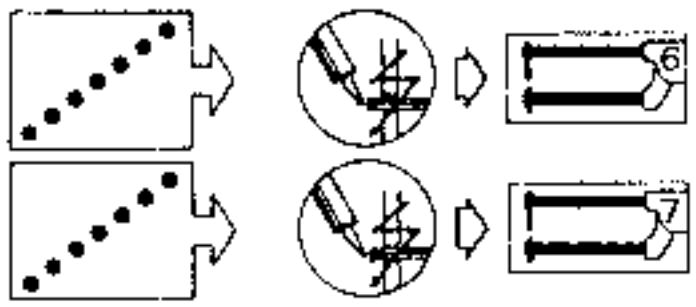


23 spot welds

Welding



(A)



(B) : 13 spot welds joining 3 thicknesses

4 CONNECTION WITH SIDE CHANNEL

Thickness of panelling (in mm)

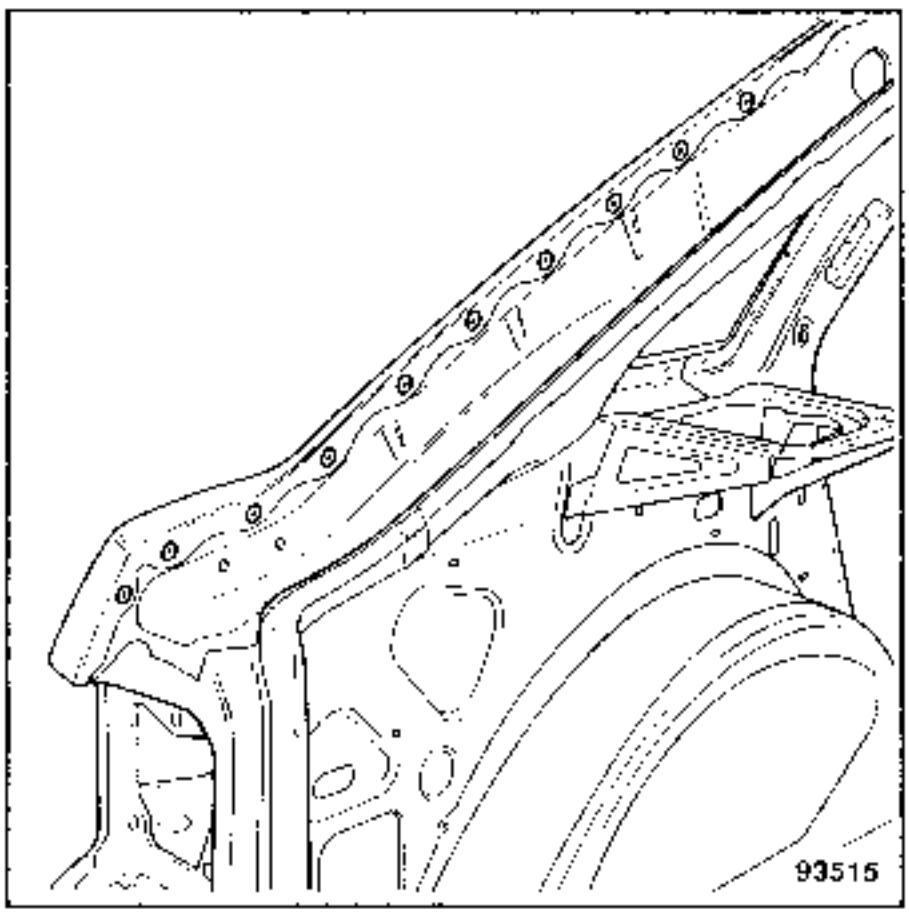
Wing panel : **0,77**
Side channel : **0,77**

Unpicking



10 spot welds

Welding







5 CONNECTION WITH REAR LIGHT SUPPORT PANEL

Thickness of panelling (in mm)

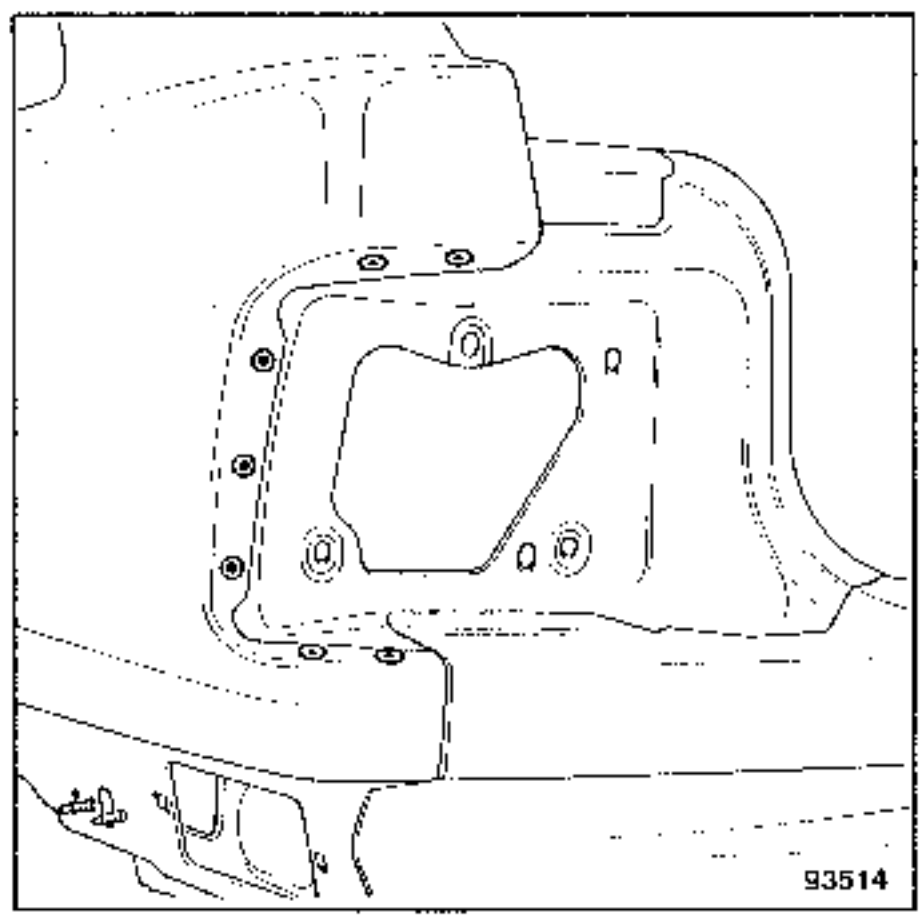
Wing panel : **0,77**
Rear light support panel : **0,87**

Unpicking



7 spot welds

Welding







6 CONNECTION WITH REAR END PANEL

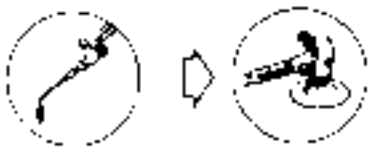
Thickness of panelling (in mm)

Wing panel : **0,77**
Rear end panel : **0,67**

Unpicking

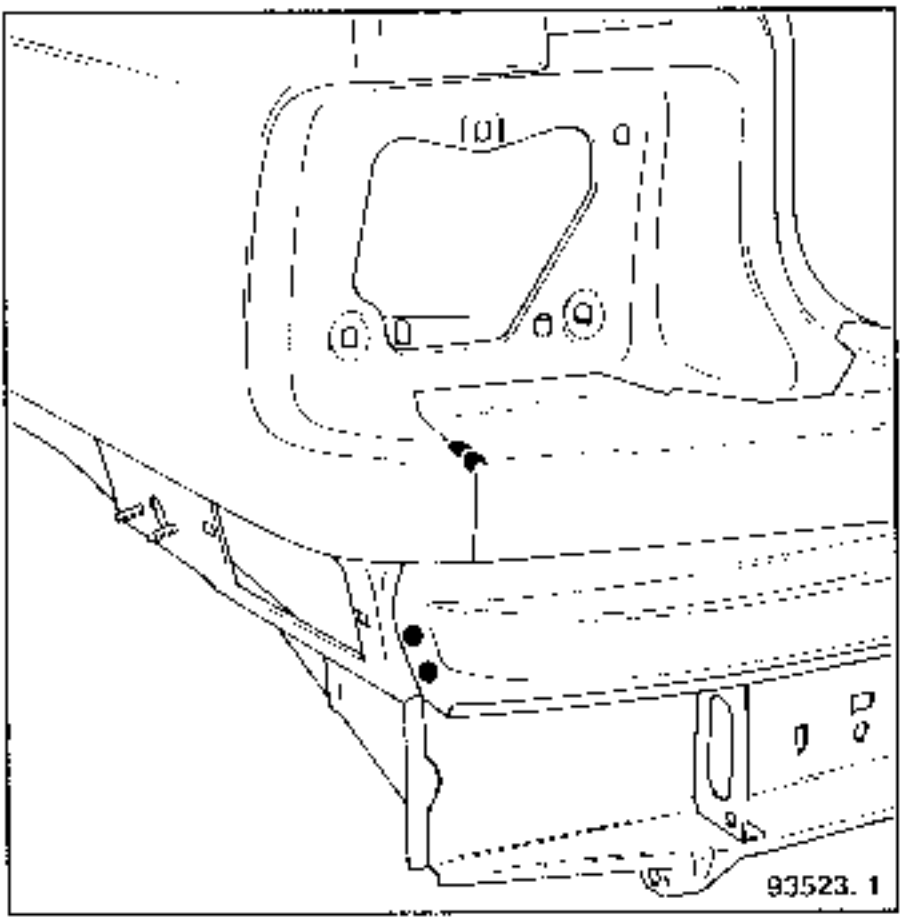


2 spot welds



1 brazed fillet 10 mm long

Welding







1 M.A.G. fillet 10 mm long



7 CONNECTION WITH LOWER REAR CROSS MEMBER

Thickness of panelling (in mm)

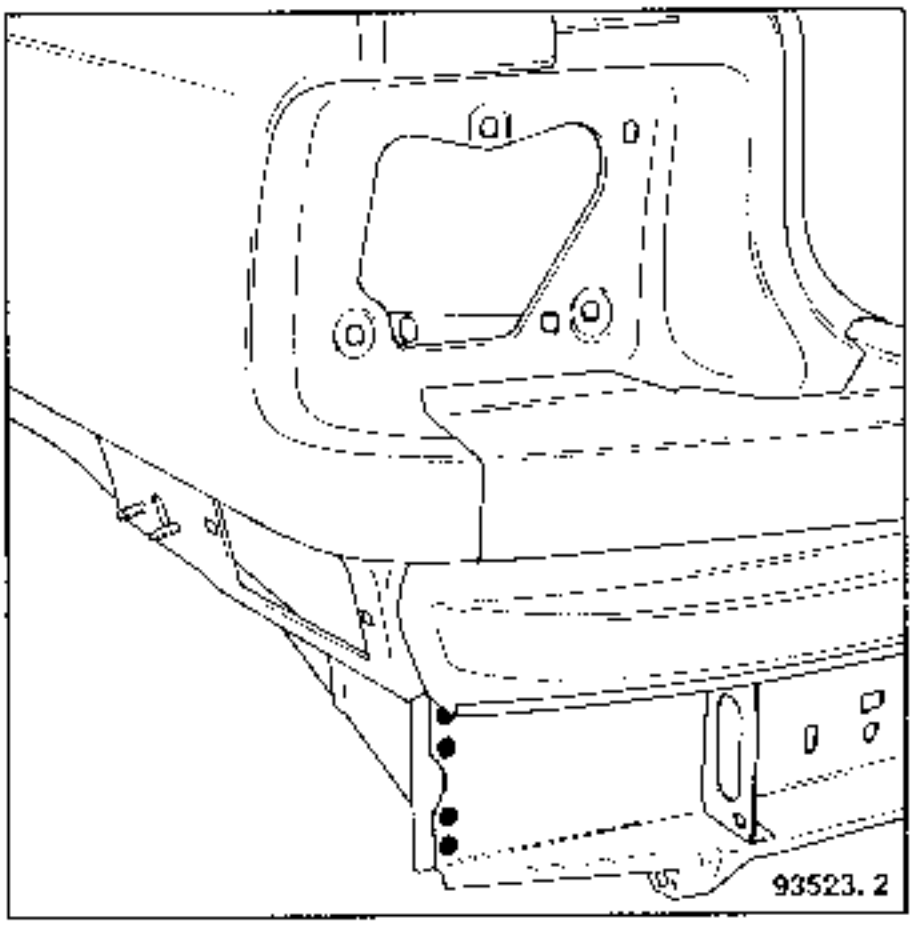
Wing panel : **0,77**
Lower rear cross member : **1,20**

Unpicking



4 spot welds

Welding





8 CONNECTION WITH REAR FLOOR, REAR SECTION

Thickness of panelling (in mm)

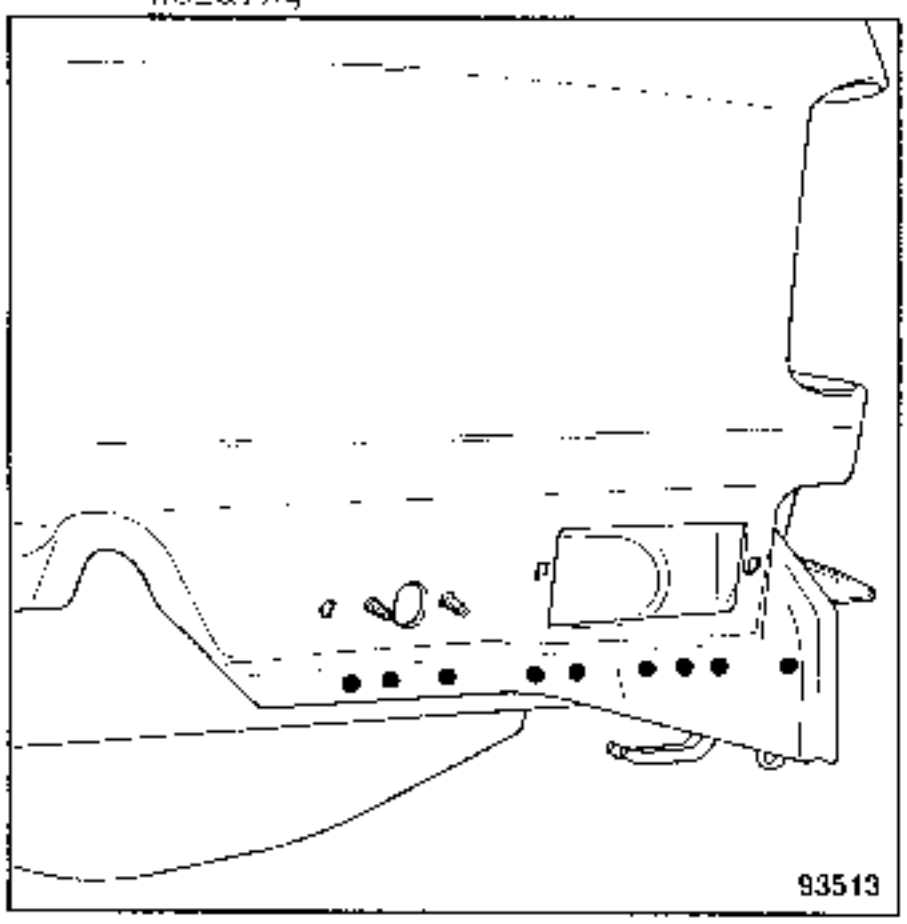
Wing panel : **0,77**
Outer wheel arch : **0,67**
Rear floor, rear section : **0,60**

Unpicking



9 spot welds

Welding





9 spot welds

9 CONNECTION WITH OUTER WHEEL ARCH

Thickness of panelling (in mm)

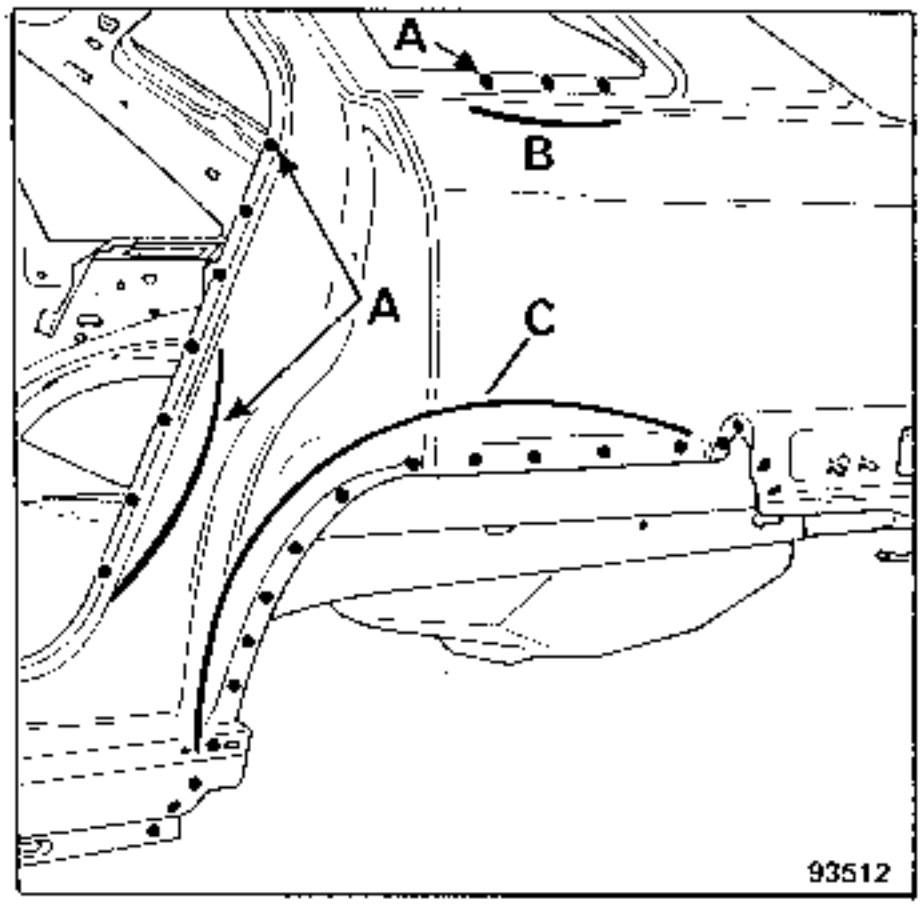
Wing panel	:	**0,77**
Outer wheel arch	:	**0,67**
Seat fastening stiffener	:	**1,50**
Rear door pillar stiffener	:	**0,97**

Unpicking



28 spot welds

Welding



(A)



6 spot welds joining 3 thicknesses

(B)



Electrode with ball joint for 11 visible spot welds

(C)



10 CONNECTION WITH THE BODY SILL COVER PANEL

Thickness of panelling (in mm)

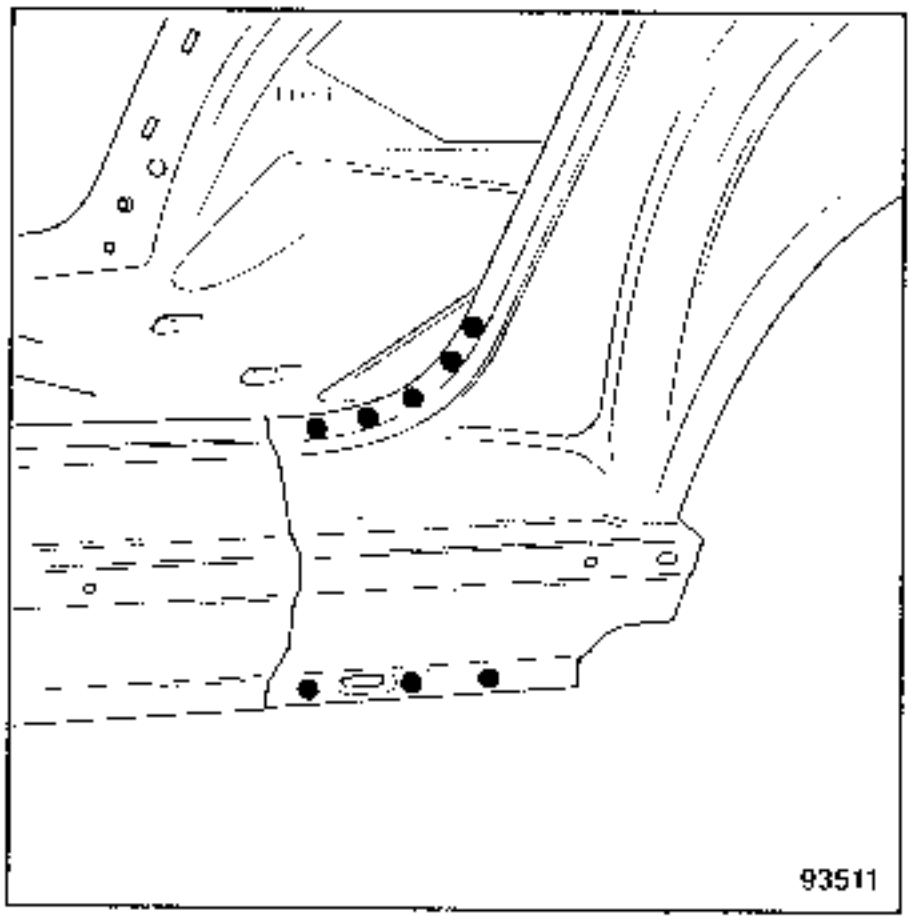
Body sill cover panel	:	**1,50**
Wing panel	:	**0,77**
Rear door pillar stiffener	:	**0,97**

Unpicking



8 spot welds

Welding





8 spots joining 3 thicknesses

11 CONNECTION WITH BODY SILL

Thickness of panelling (in mm)

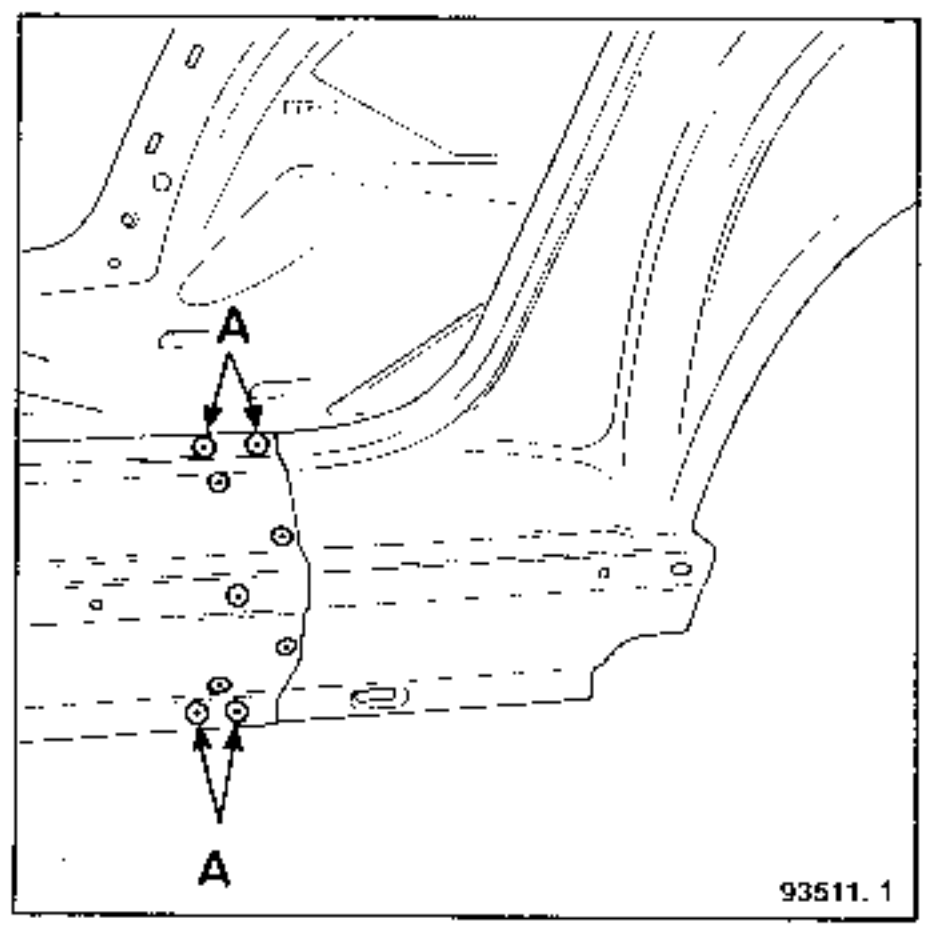
Wing panel	: **0,77**
Body sill	: **0,77**
Body sill cover panel	: **1,50**

Unpicking



9 spot welds

Welding





(A) 4 plug welds joining 3 thicknesses



12 CONNECTION WITH ROOF

Thickness of panelling (in mm)

Roof panel	: **0,77**
Wing panel	: **0,77**
Body side	: **0,77**

Unpicking



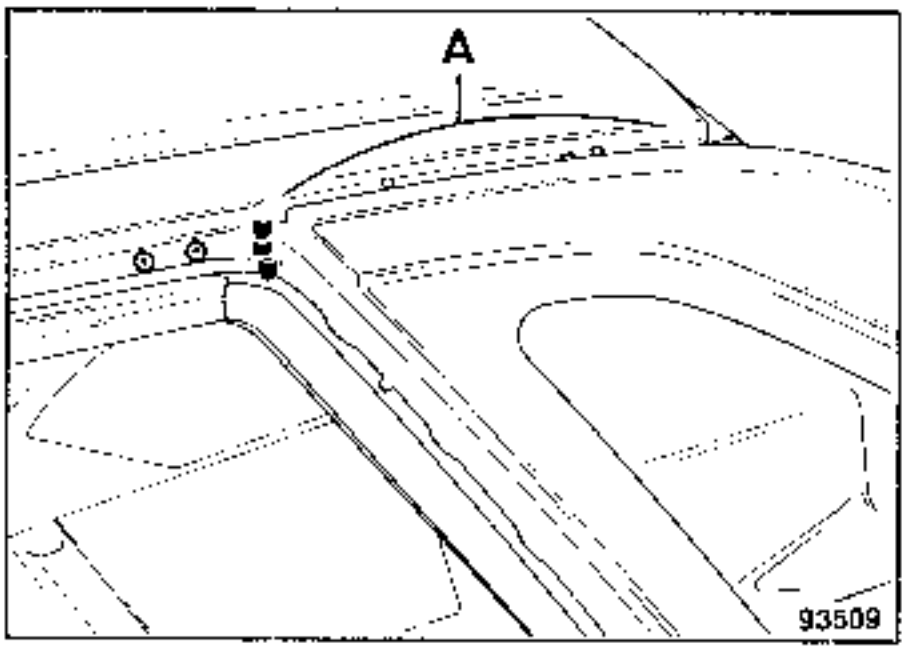
2 spot welds

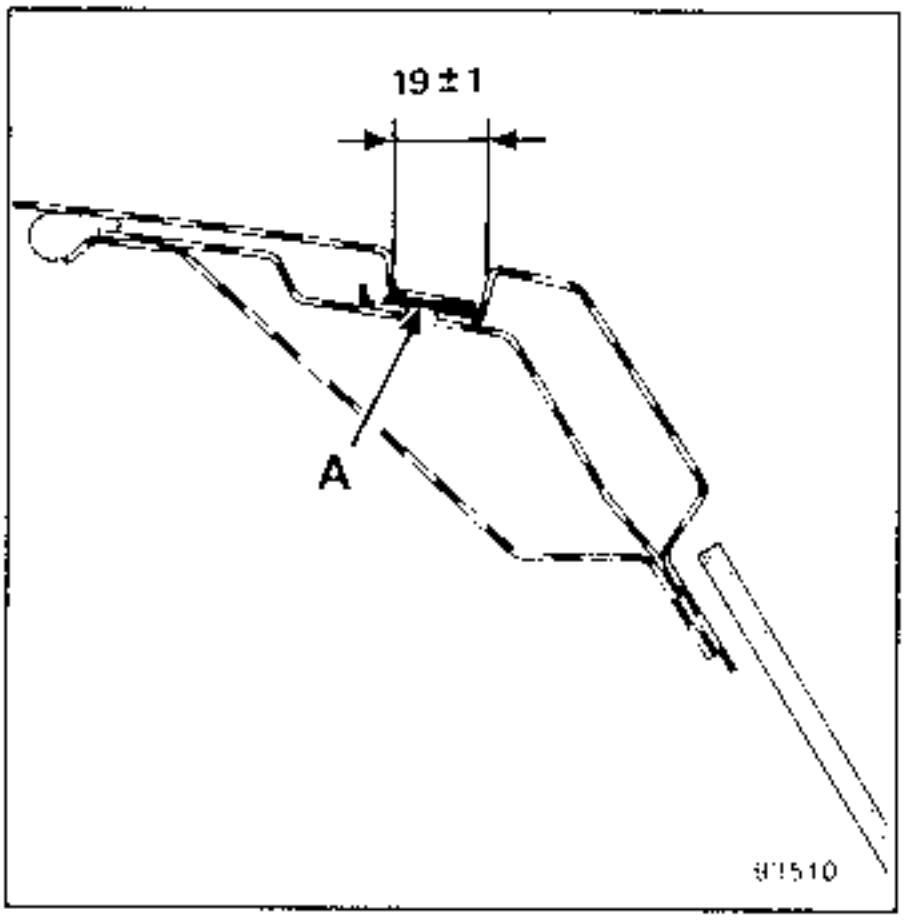


1 brazed fillet 50 mm long

The roof panel is bonded to the wing panel at (A) (see welding). Separate these 2 parts with a hot air torch.

Welding



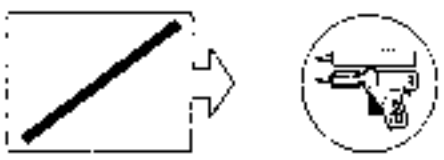




Plug welds joining 3 thicknesses



1 M.A.G. fillet 50 mm long



(A) 1 fillet of panel beater's adhesive mastic 250 mm long.



13 **CONNECTION WITH SEAL SUPPORT**

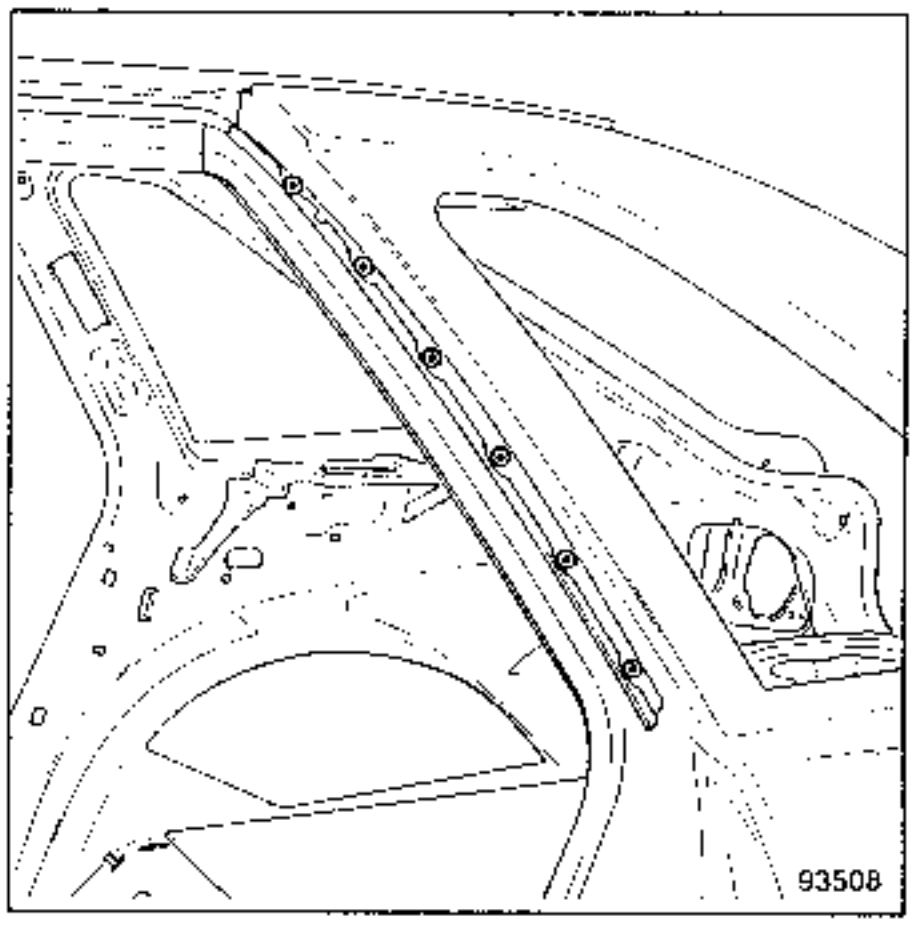
Thickness of panelling (in mm)

Wing panel	: **0,77**
Seal support	: **0,67**

Unpicking

Part that cannot be retrieved which is to be ordered with the wing panel.

Welding





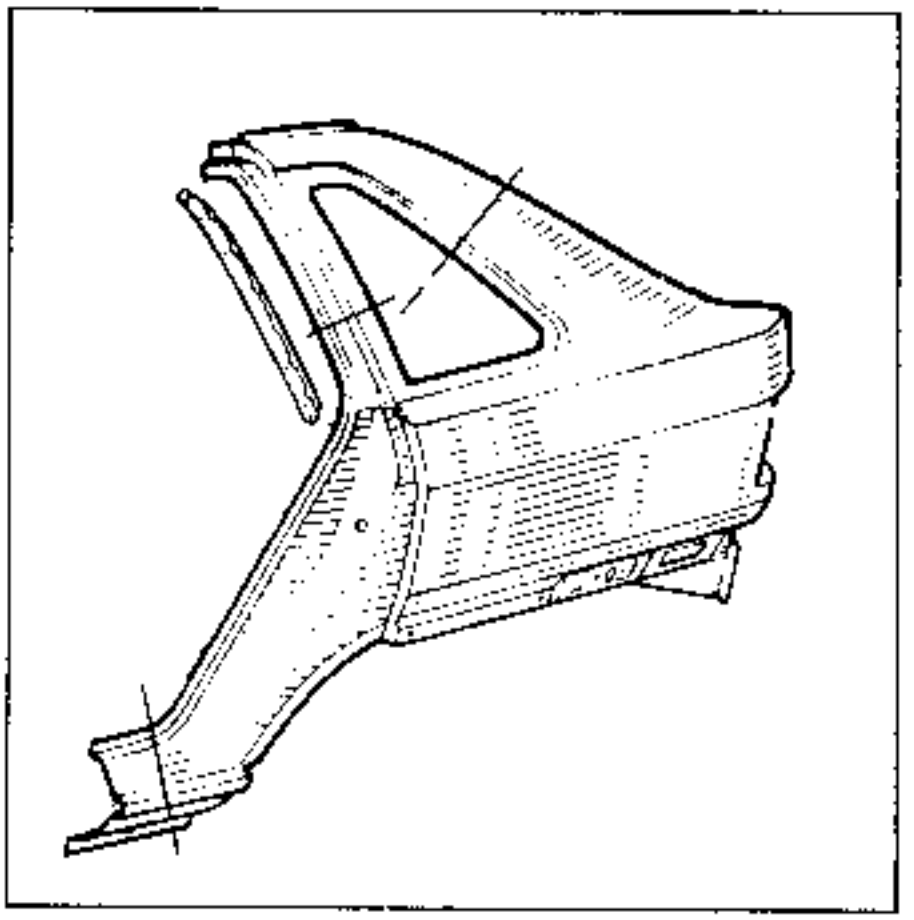
6 plug welds

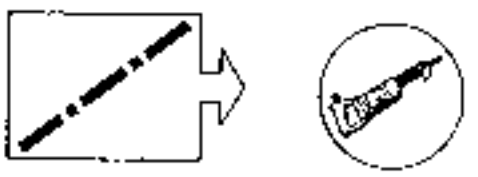


This operation is simply a variation on the one just described. Only the special features will be described below.

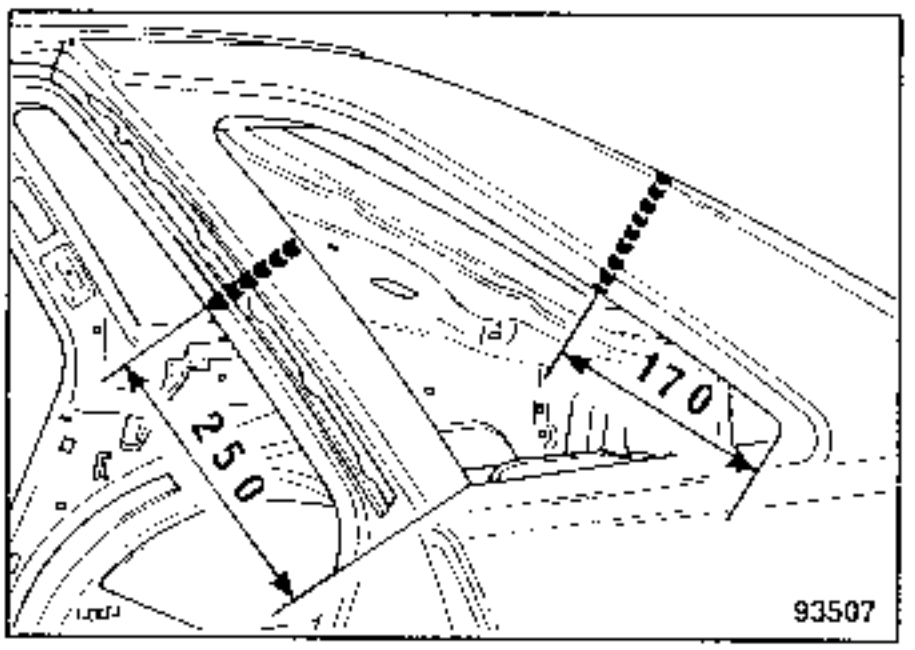
COMPOSITION OF PART AS SUPPLIED BY THE PARTS DEPARTMENT

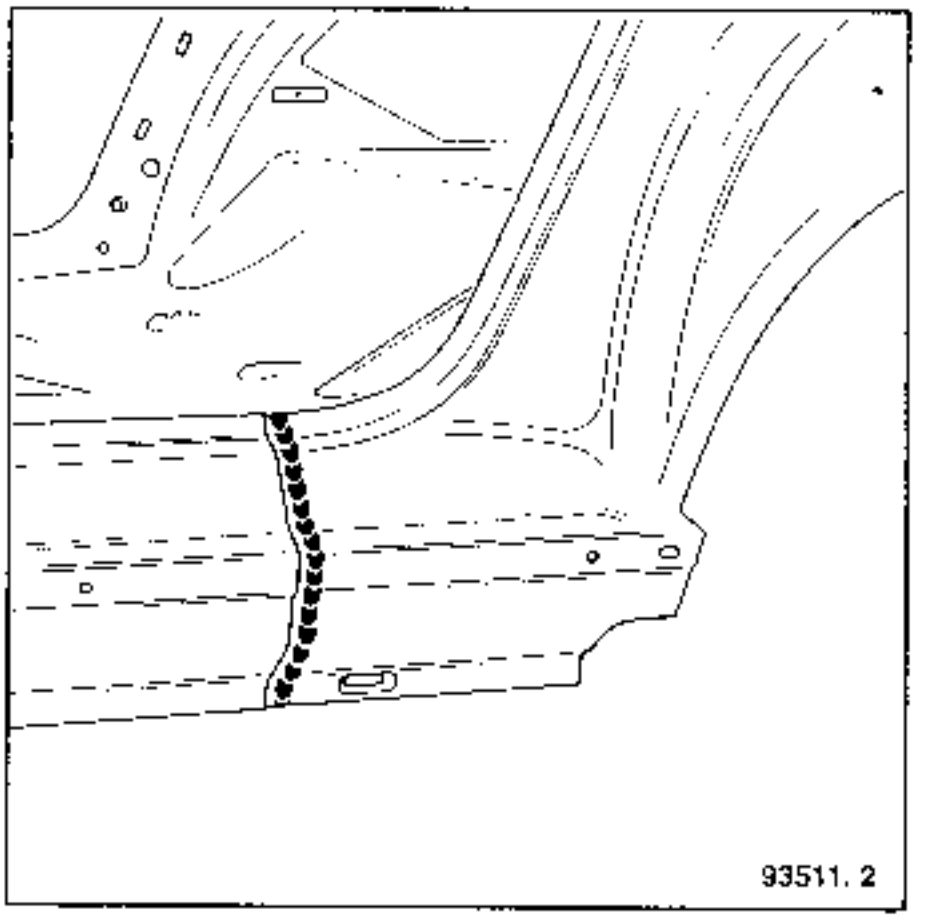
Identical to the previous operation.





Welding





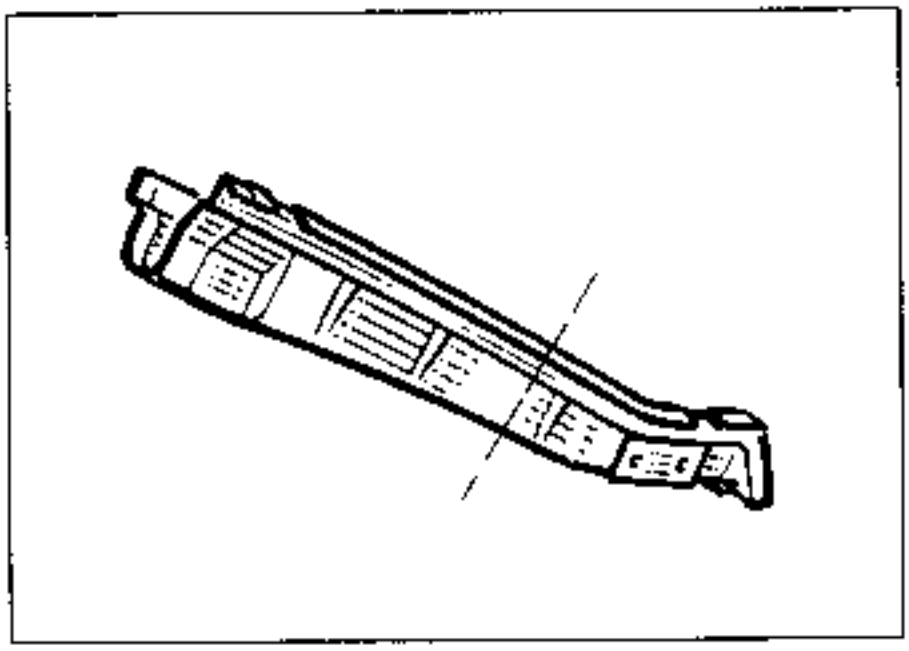


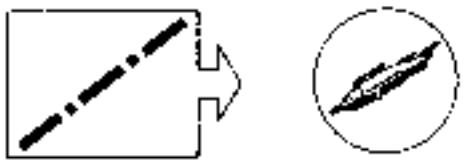


This operation can only be carried out after removal of he wing panel.

COMPOSITION OF THE PART AS SUPPLIED BY THE PARTS DEPARTMENT

Single part.





1 **CONNECTION WITH REAR LIGHT SUPPORT PANEL**
Thickness of panelling (in mm)

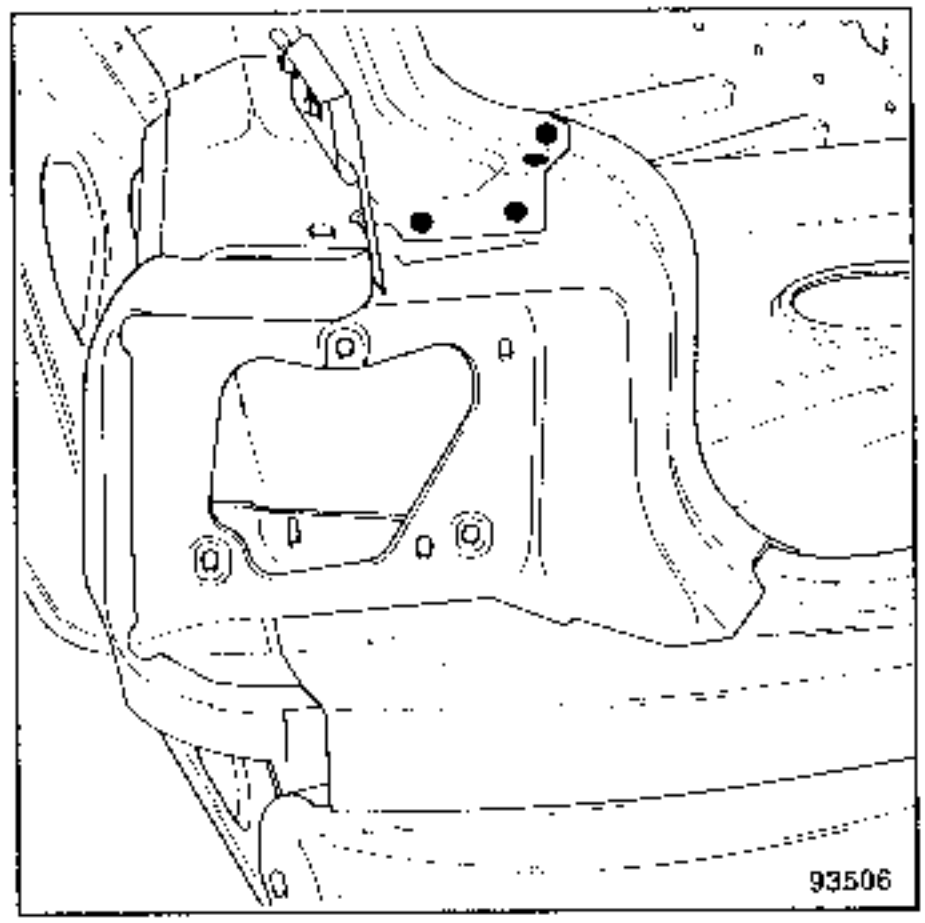
Side channel	: **0,67**
Light support panel	: **0,87**
Rear end pillar lower lining	: **0,77**

Unpicking



4 spot welds

Welding





(A) 1 spot weld joining 3 thicknesses

2 **CONNECTION WITH REAR END PILLAR LOWER LINING**

Thickness of panelling (in mm)

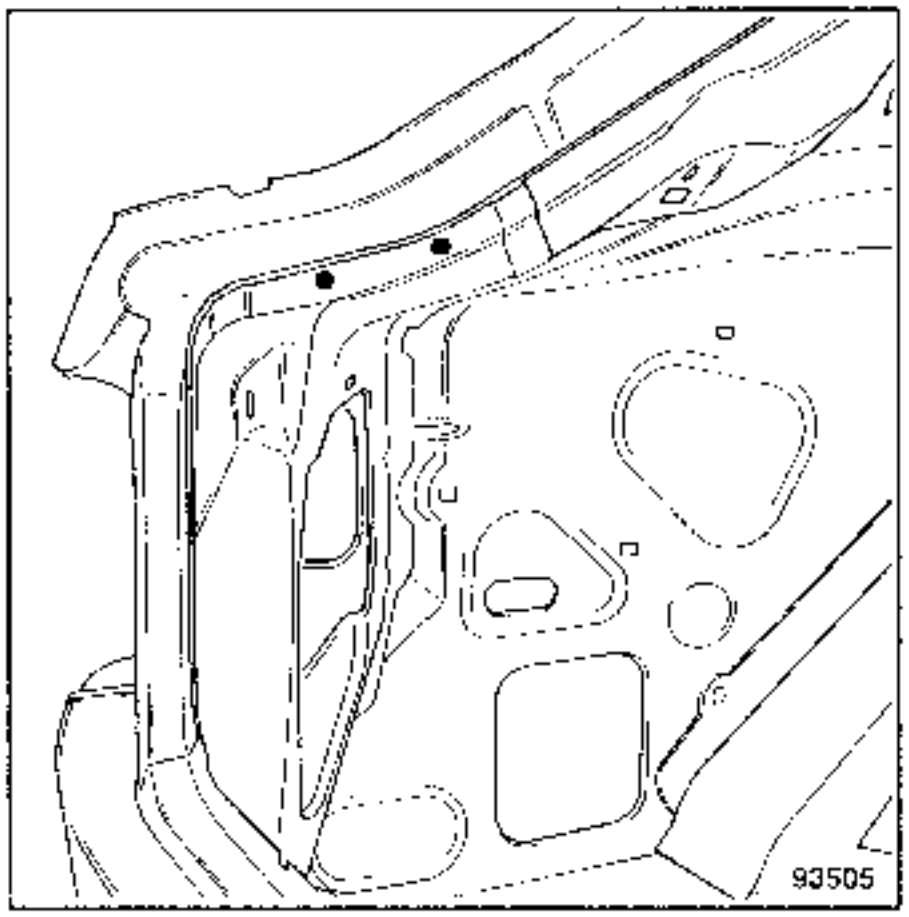
Side channel	: **0,67**
Rear end pillar lower lining	: **0,77**

Unpicking



2 spot welds

Welding





3 CONNECTION WITH QUARTER PANEL LINING AND CUT LINE

Thickness of panelling (in mm)

Rear end pillar upper lining	: **0,77**
Rear end pillar lower lining	: **0,77**
Side channel	: **0,67**

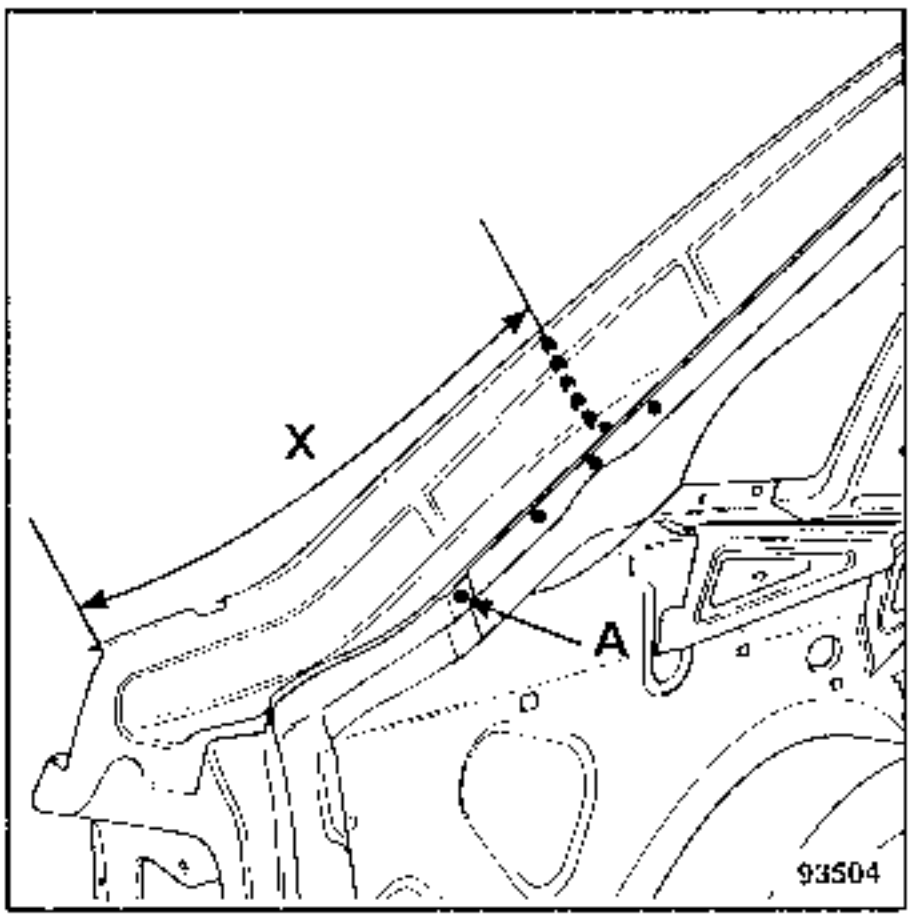
Unpicking



4 spot welds



Welding



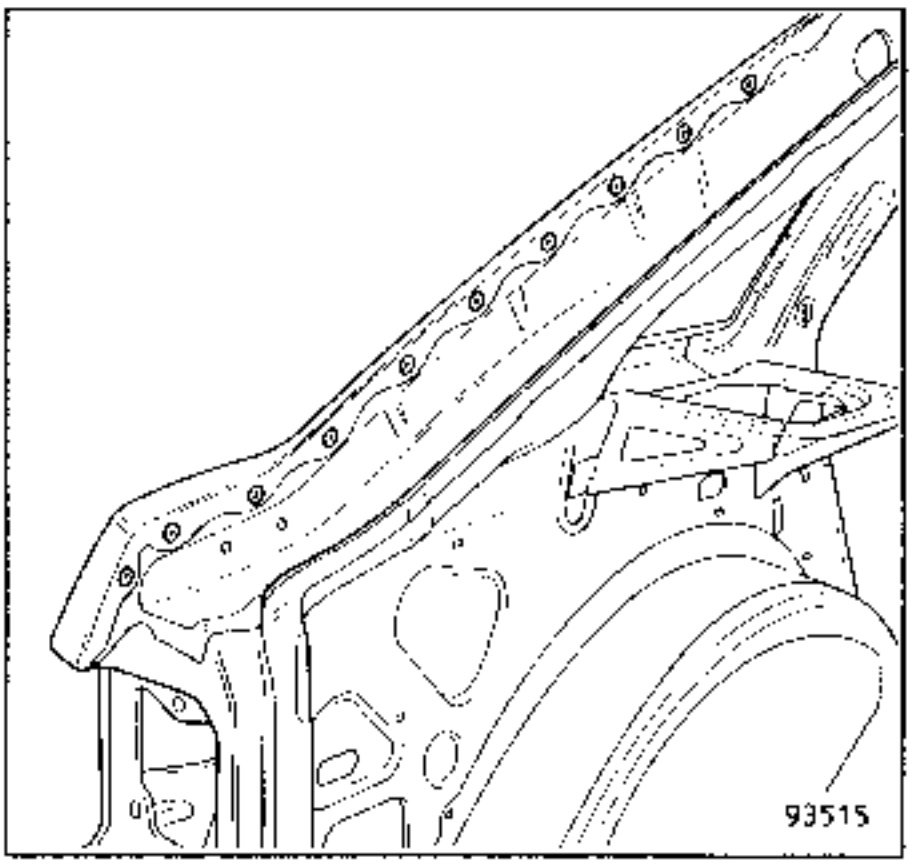


(A) 1 spot weld joining 3 thicknesses
X = 370 mm



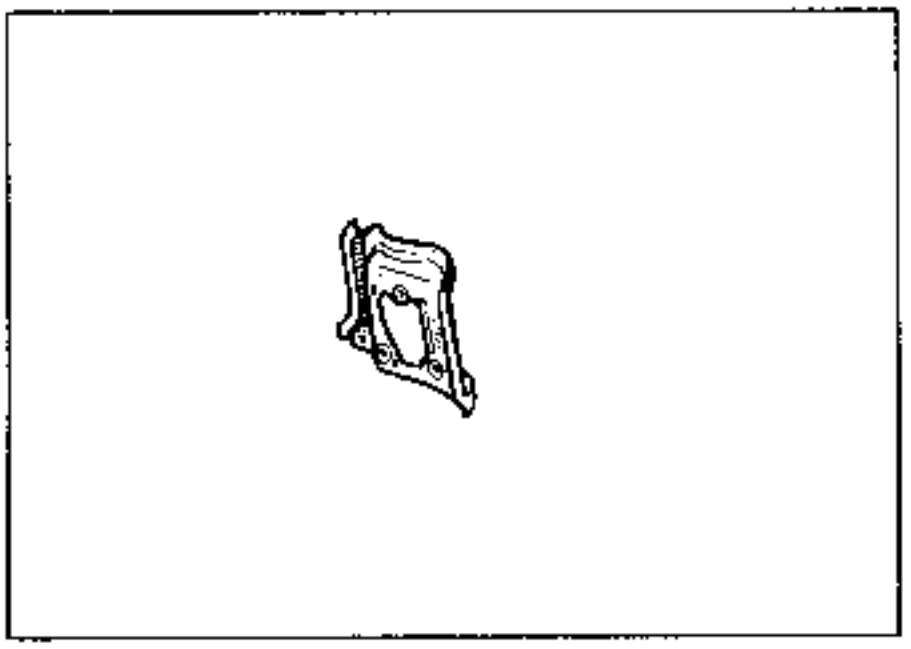
4 CONNECTION WITH WING PANEL

Cross reference : see **44-A-4**



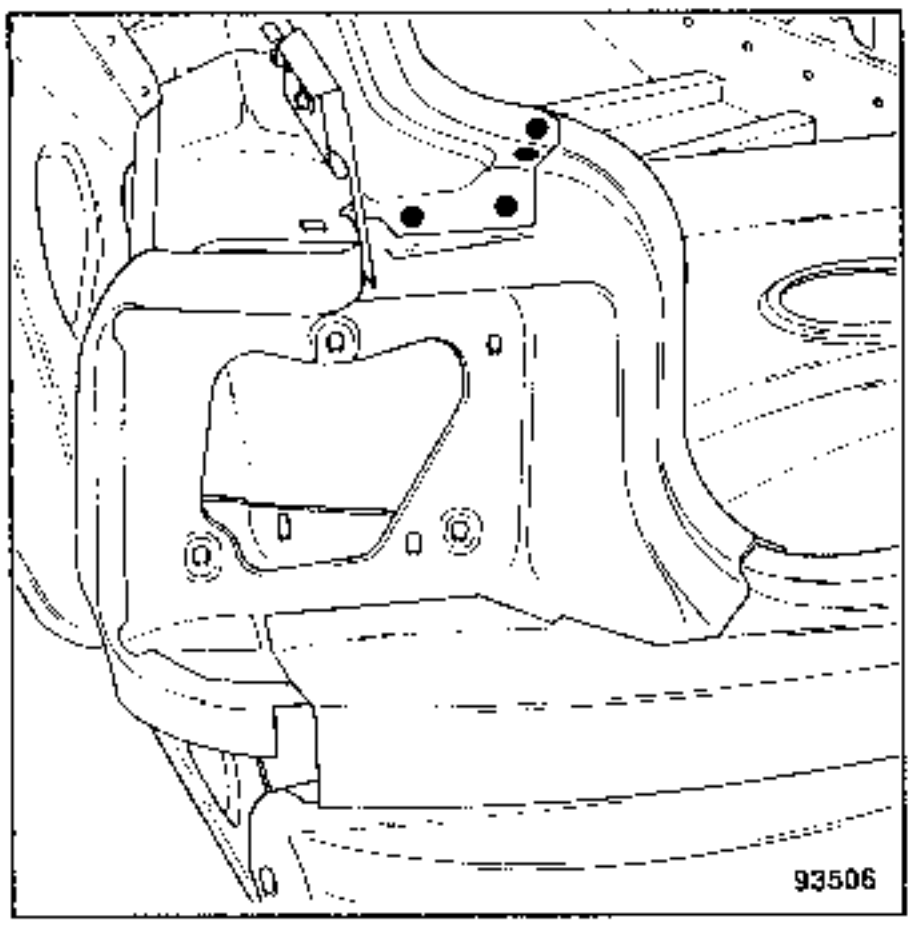
COMPOSITION OF THE PART AS SUPPLIED BY THE PARTS DEPARTMENT

Single part



1 CONNECTION WITH SIDE CHANNEL

Cross reference: see 44-C-1



2 CONNECTION WITH OUTER WHEEL ARCH

Thickness of panelling (in mm)

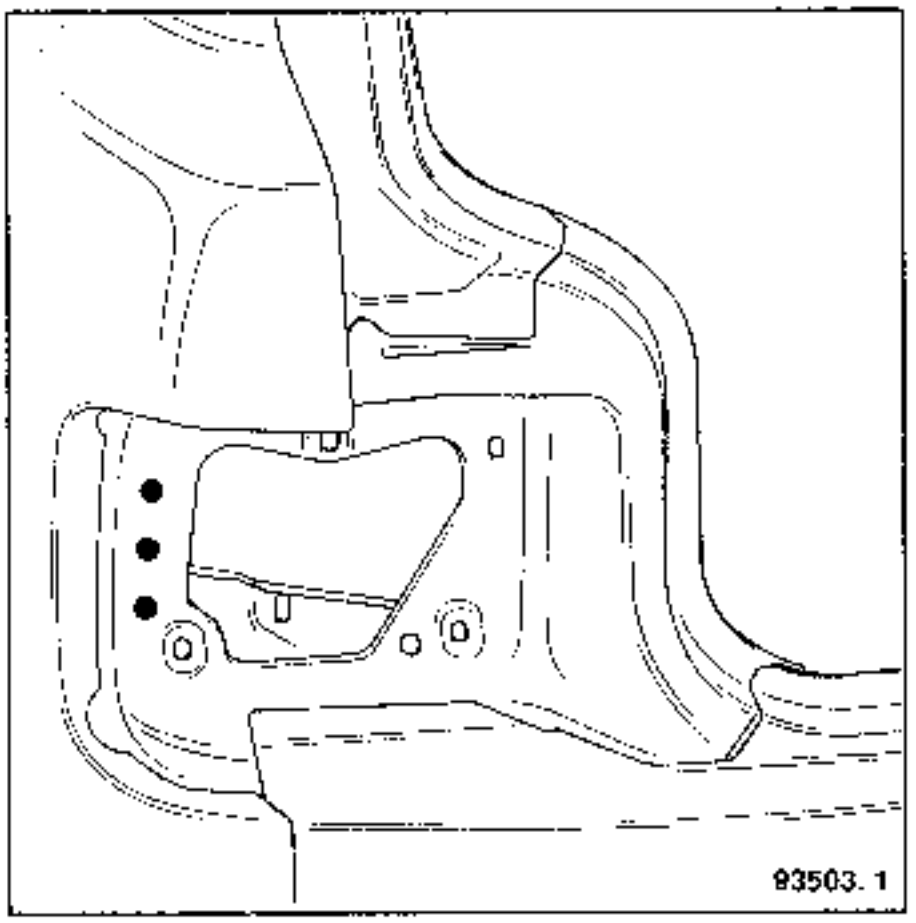
Outer wheel arch	: **0,67**
Rear light support panel	: **0,87**

Unpicking



3 spot welds

Welding





3 CONNECTION WITH REAR END PILLAR LOWER LINING

Thickness of panelling (in mm)

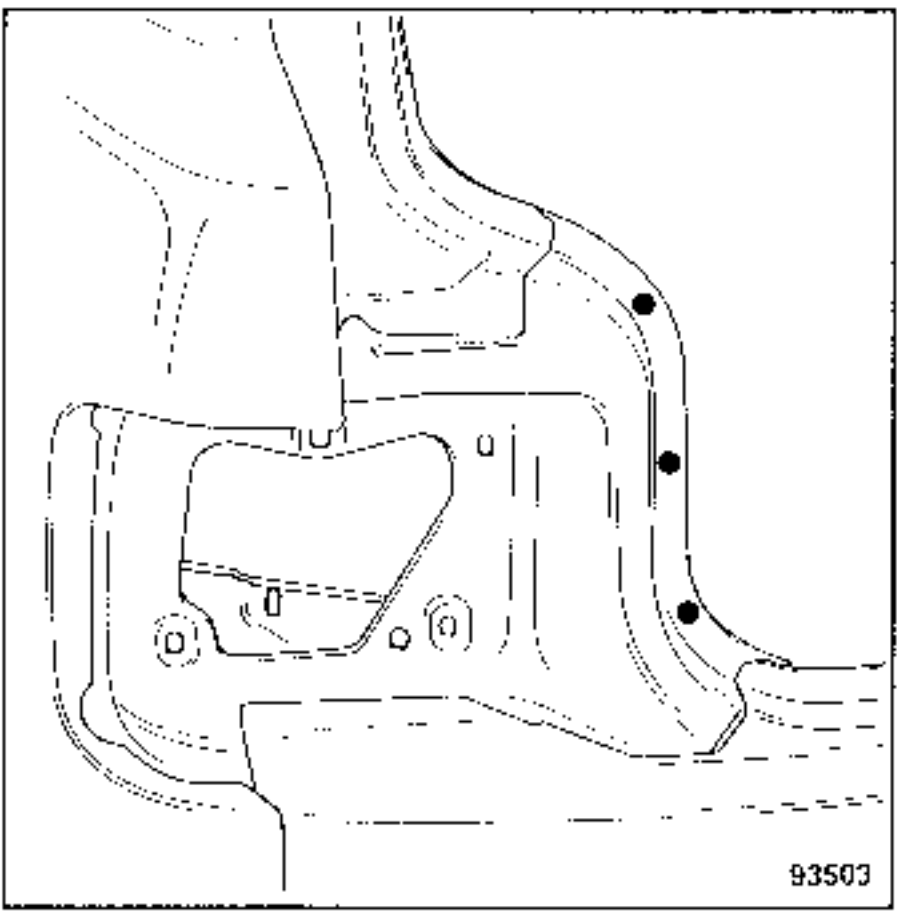
Rear light support panel : **0,87**
Rear door pillar lower lining : **0,77**

Unpicking



3 spot welds

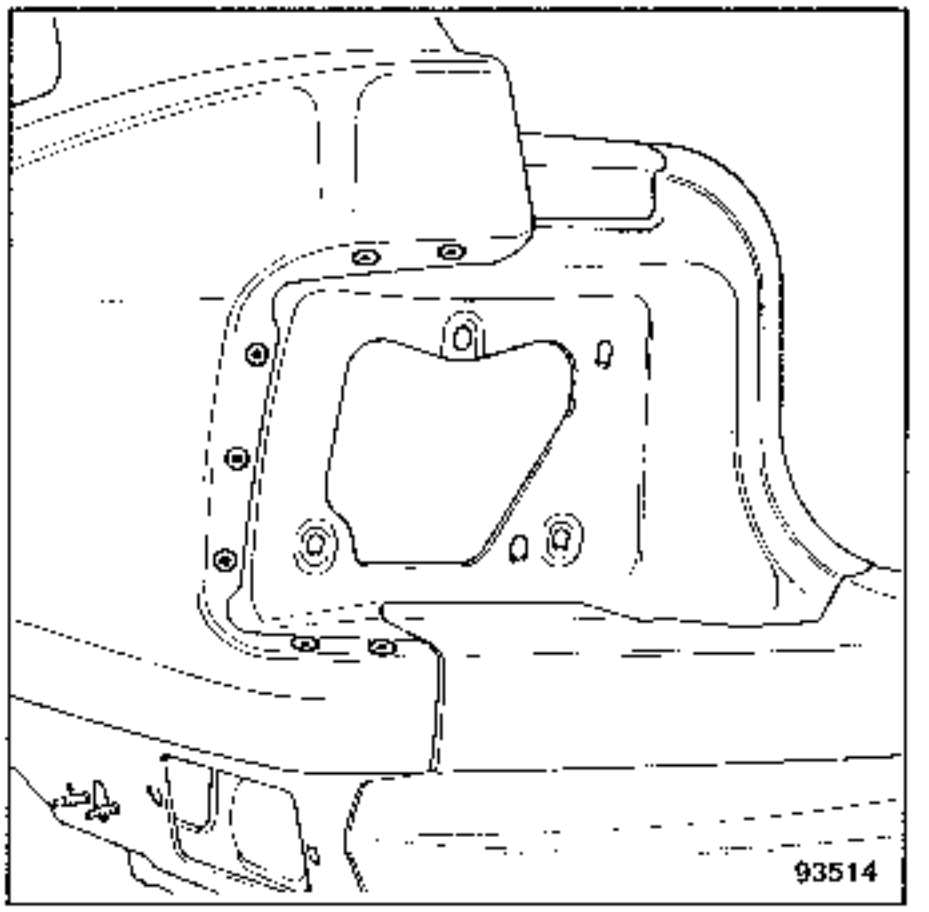
Welding





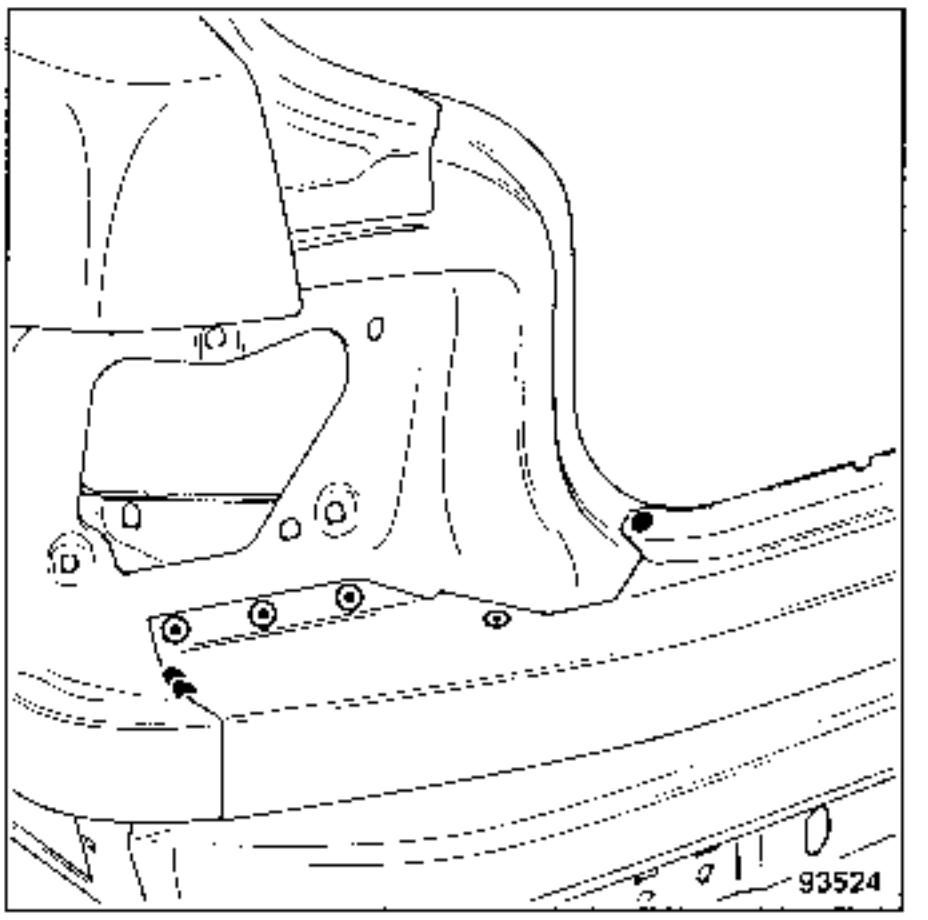
4 CONNECTION WITH WING PANEL

Cross reference: see 44-A-5



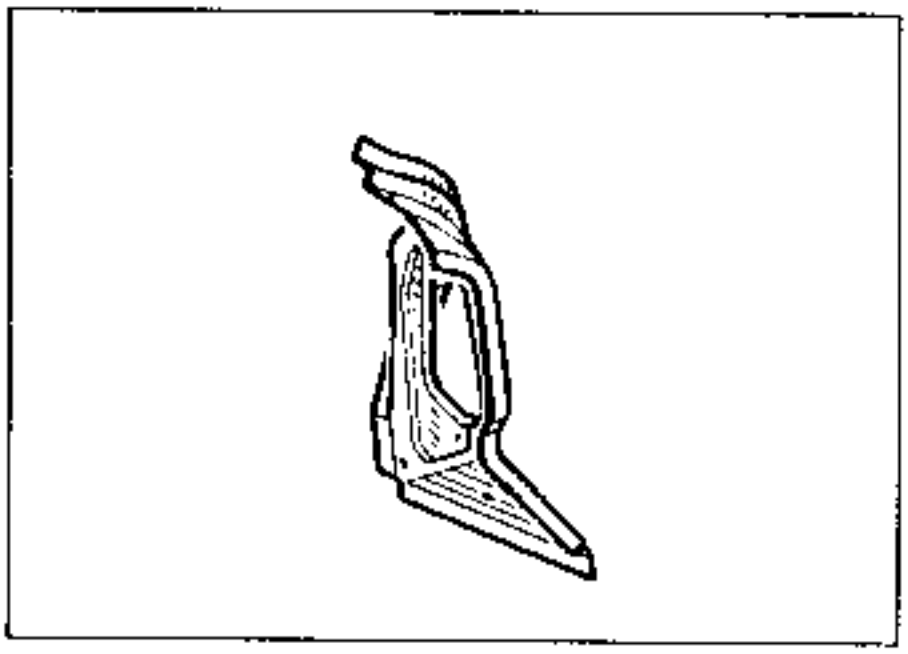
5 CONNECTION WITH REAR END PANEL

Cross reference: see 41-A-1



COMPOSITION OF PART AS SUPPLIED BY THE PARTS DEPARTMENT

Single part



1 CONNECTION WITH QUARTER PANEL LINING

Thickness of panelling (in mm)

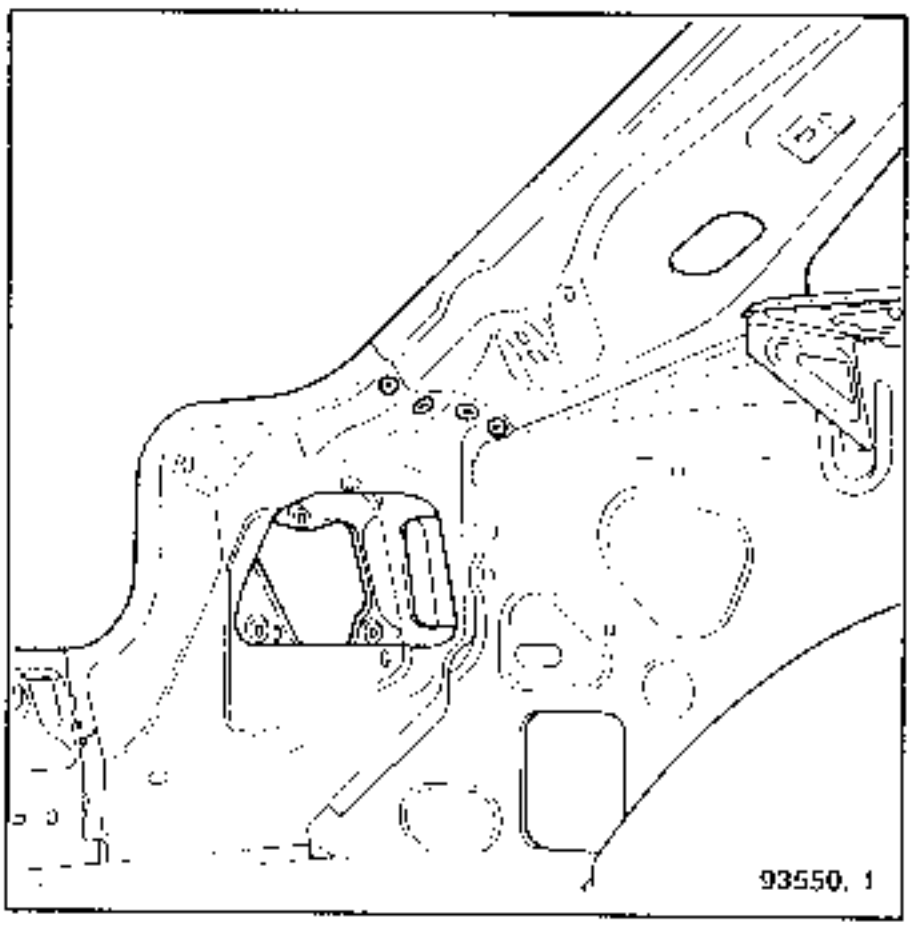
Rear end pillar lower lining	: **0,77**
Rear end pillar upper lining	: **0,77**

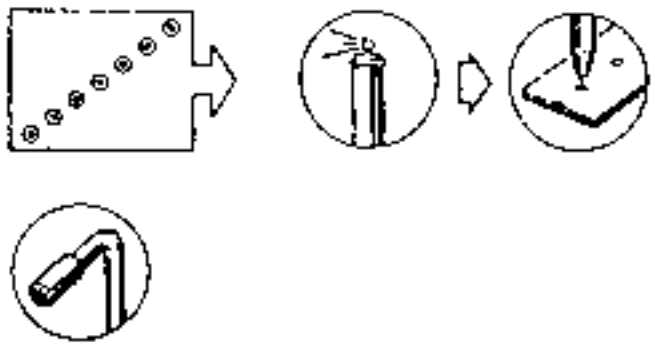
Unpicking



4 spot welds

Welding





2 CONNECTION WITH OUTER WHEEL ARCH

Thickness of panelling (in mm)

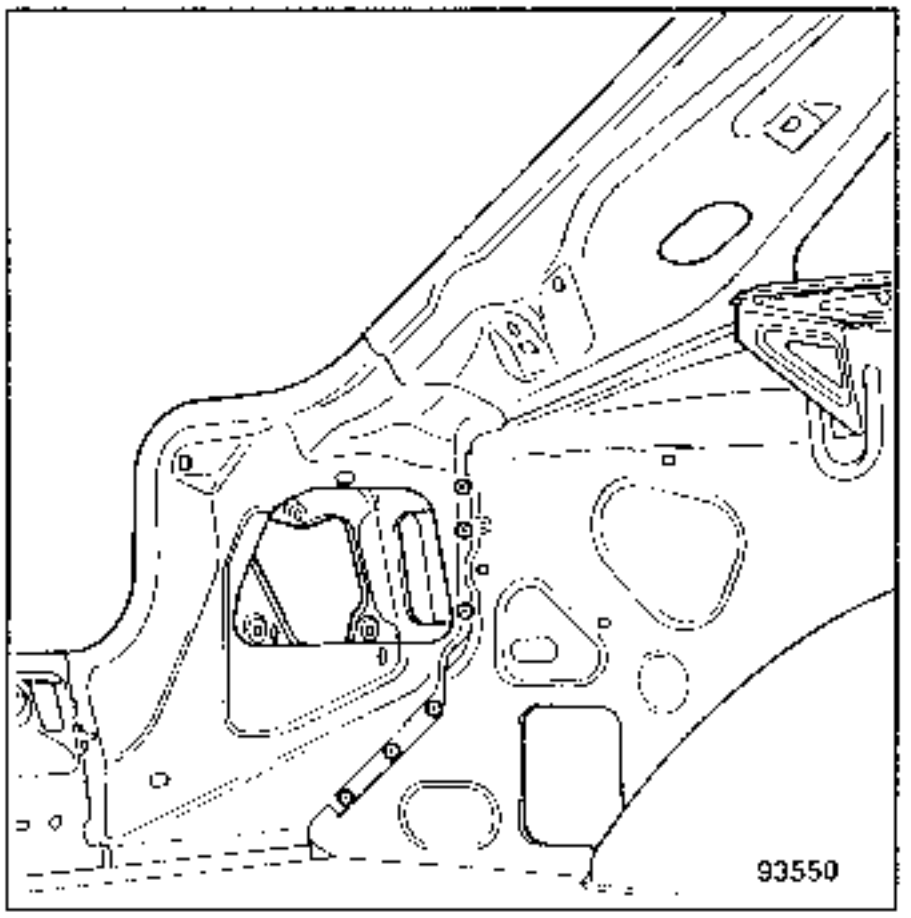
Rear end pillar lower lining	: **0,77**
Outer wheel arch	: **0,67**

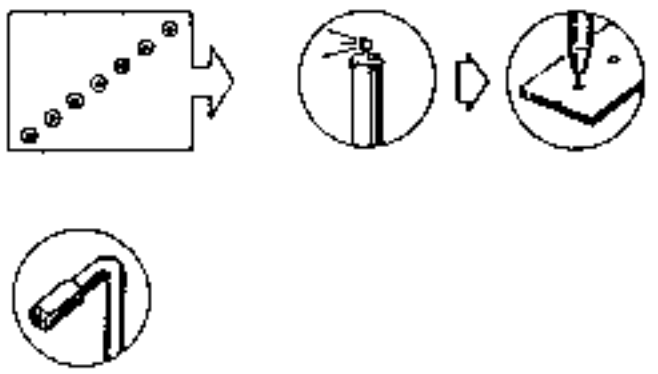
Unpicking



6 spot welds

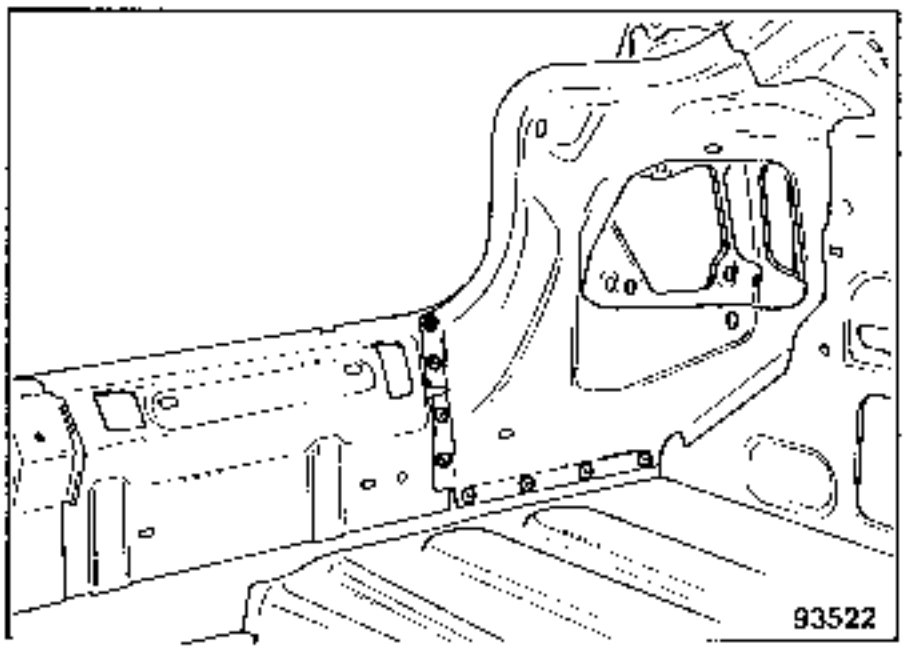
Welding





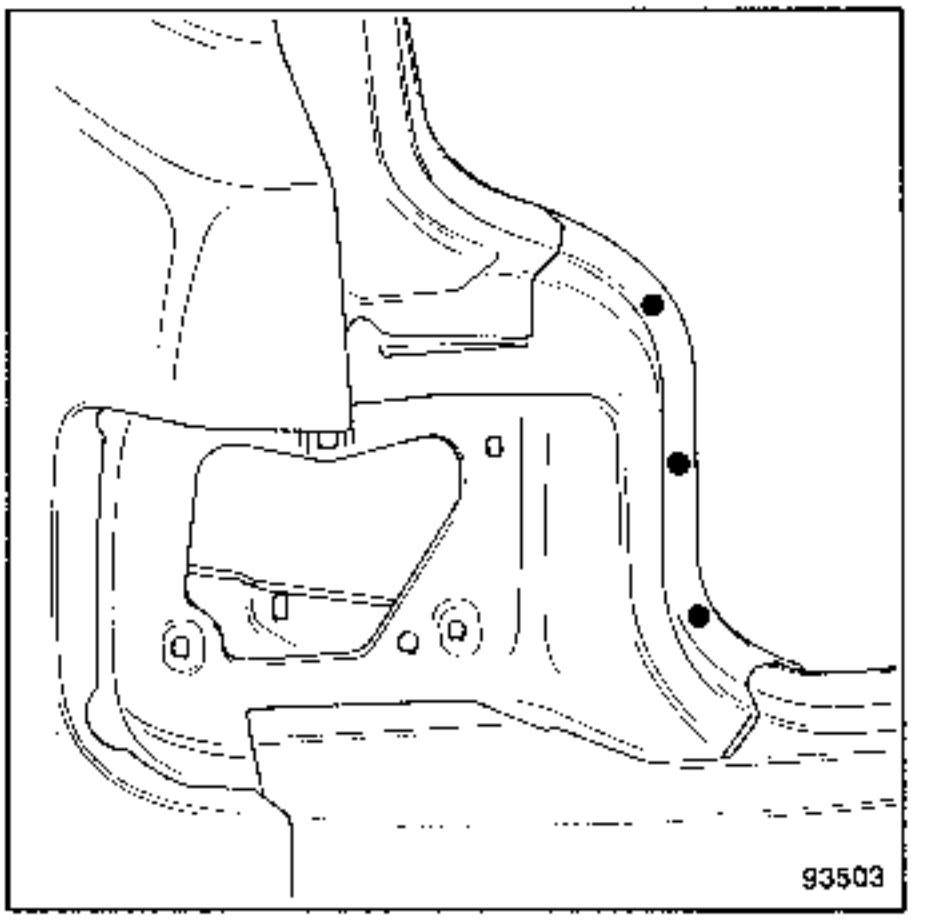
3 CONNECTION WITH REAR END PANEL ASSEMBLY

Cross reference: see 41-A-3



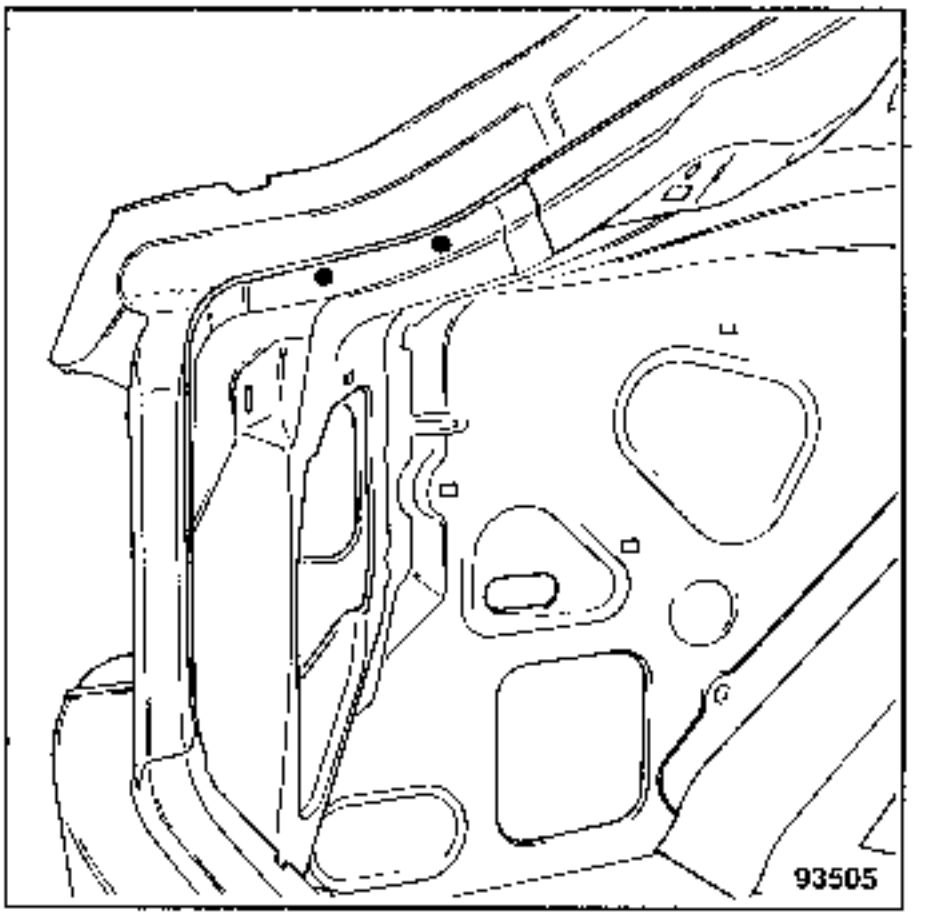
4 CONNECTION WITH REAR LIGHT SUPPORT PANEL

Cross reference: see 44-D-3



5 CONNECTION WITH SIDE CHANNEL

Cross reference: see 44-C-2



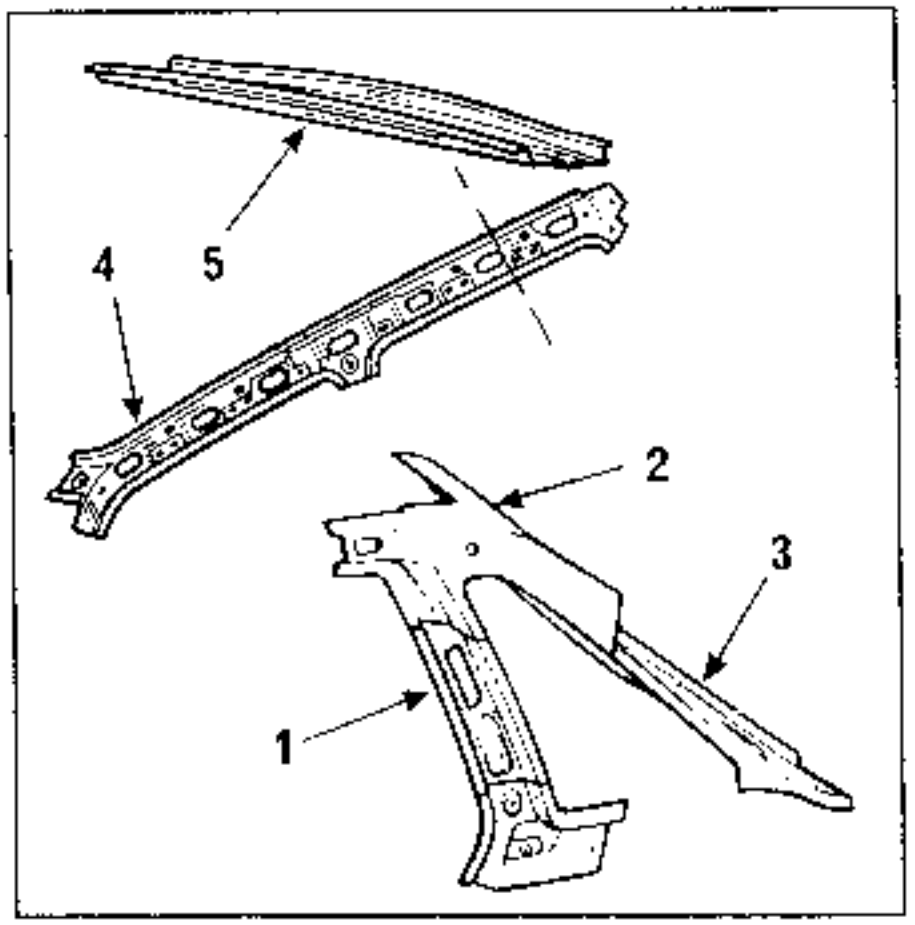
COMPOSITION OF PART AS SUPPLIED BY THE PARTS DEPARTMENT

Assembly comprising :

1 - Quarter panel lining
2 - Upper stiffener
3 - Rear end pillar upper lining

Additional parts to be ordered for this operation:

4 - Cant rail lining
5 - Roof rear cross member.



1 CONNECTION WITH UPPER BODY SECTION

Thickness of panelling (in mm)

Quarter panel lining	: **0,67**
Cant rail lining	: **0,67**
Upper stiffener	: **0,97**
Body side	: **0,77**

Unpicking

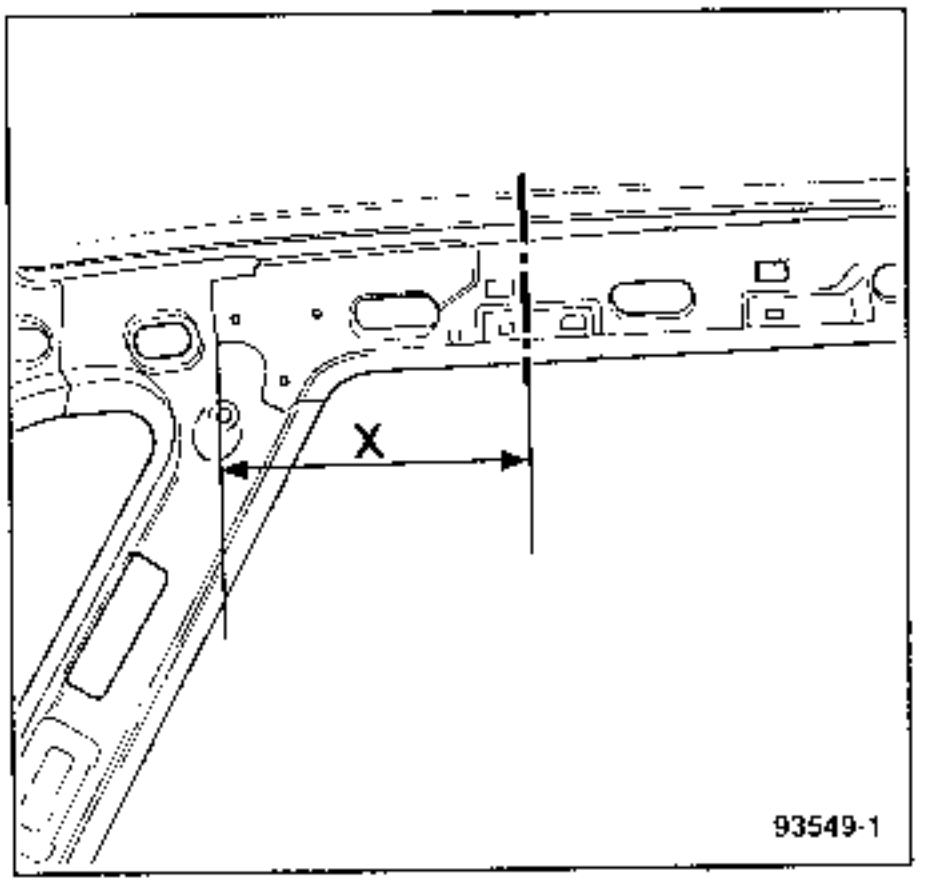


10 spot welds





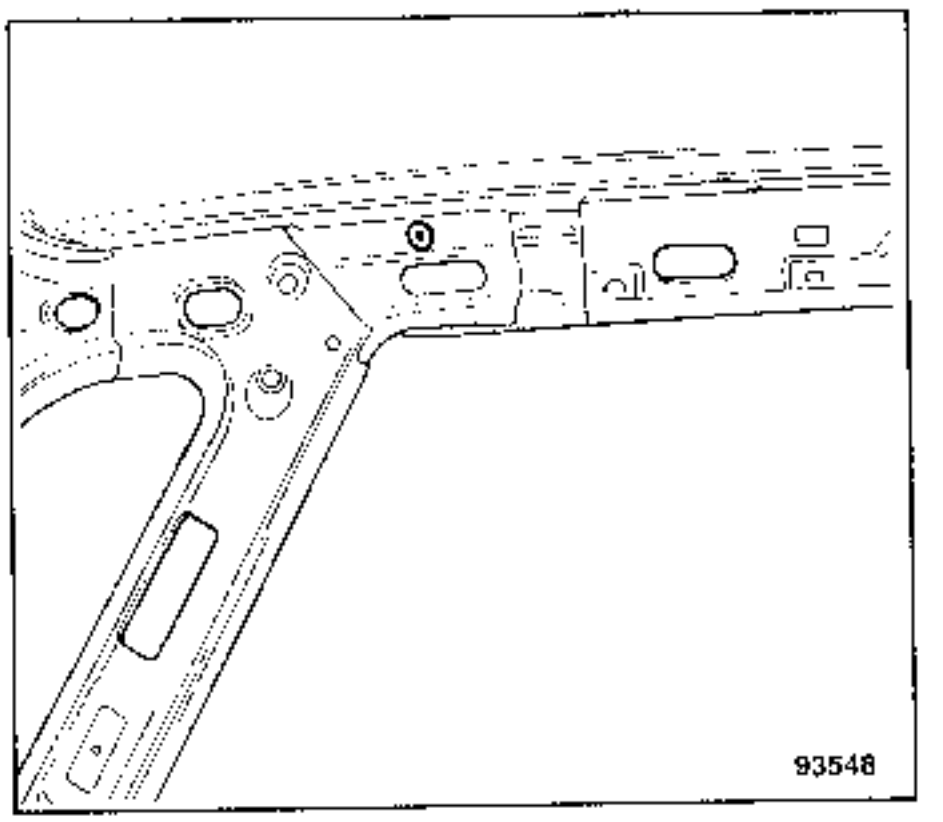
Special features of removing operations



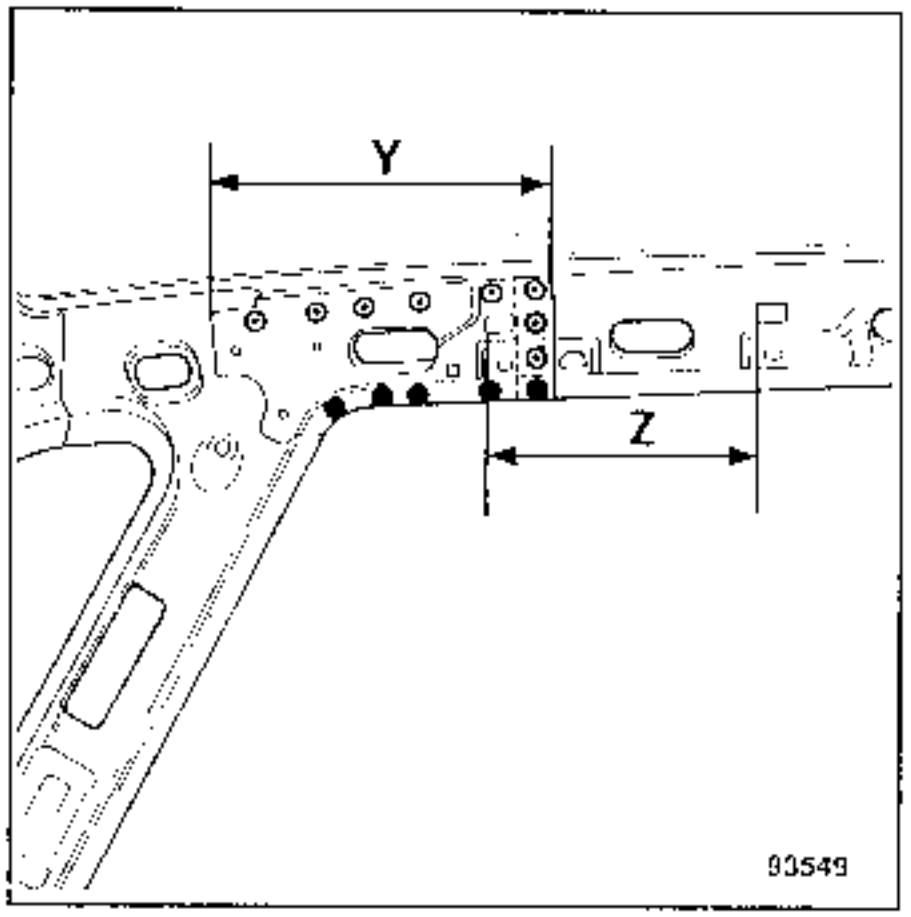
To gain access to the upper stiffener spot weld one must partially remove the cant rail lining.

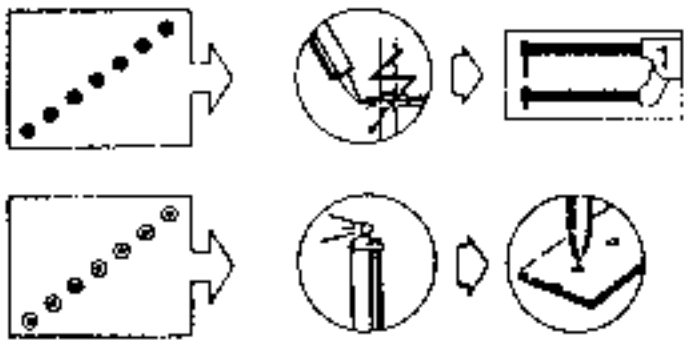
x = 200 mm

Welding











The dotted line on the illustration above shows the line of the cut to be made on the vehicle when unpicking.
Dimension **y** shows the cut to be made on the new part. Dimension **z** will correctly position the new part.

y = 220 mm **z = 170 mm**

2 CONNECTION WITH THE ROOF REAR CROSS MEMBER

Thickness of panelling (in mm)

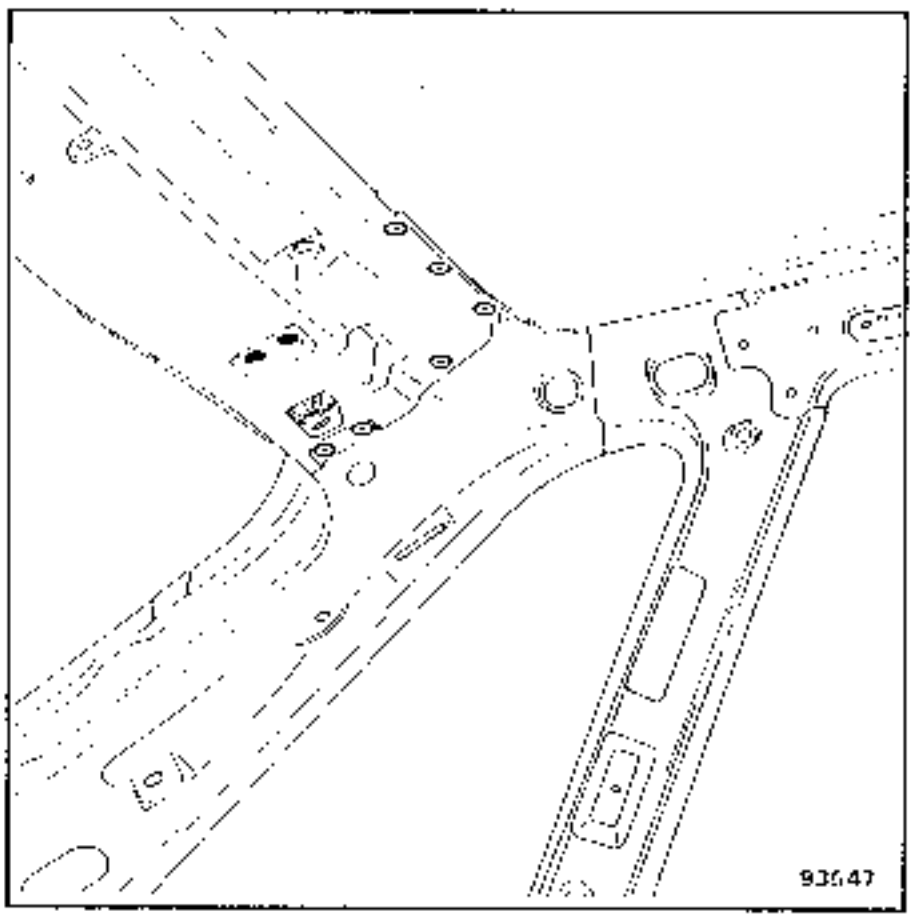
Rear end pillar upper lining	: **0,77**
Roof rear cross member	: **0,67**
Upper stiffener	: **0,97**
Roof panel	: **0,77**
Side channel upper gusset	: **1,50**

Unpicking



8 spot welds

Welding









3 CONNECTION WITH THE OUTER WHEEL ARCH

Thickness of panelling (in mm)

Quarter panel lining	:	**0,67**
Rear end pillar lower lining	:	**0,77**
Outer wheel arch	:	**0,67**
Seat mounting stiffener	:	**1,50**

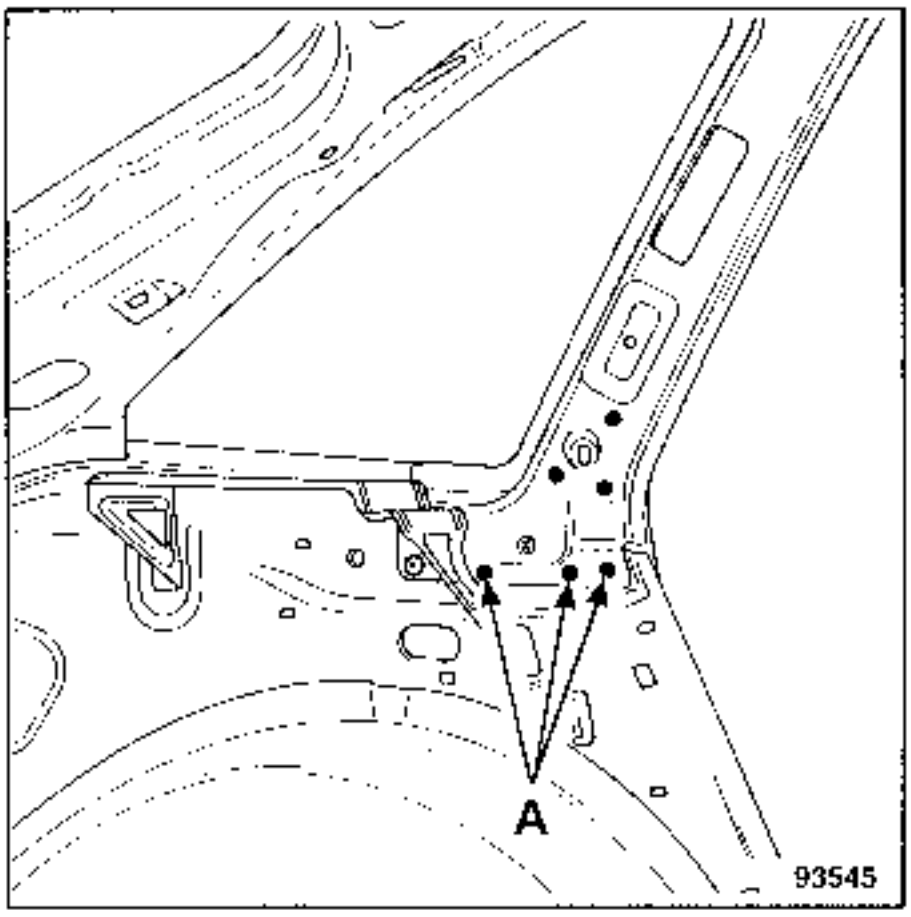
Unpicking

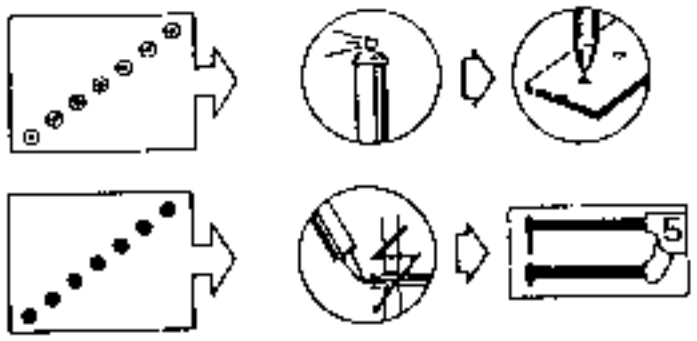




11 spot welds

Welding

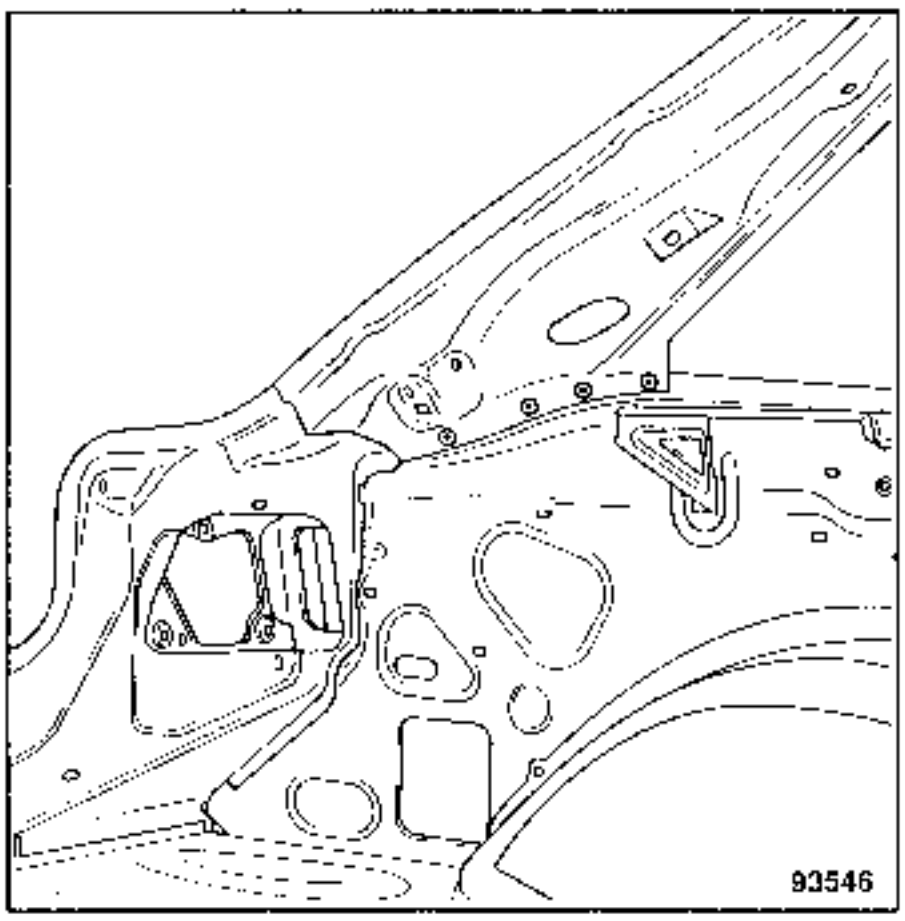


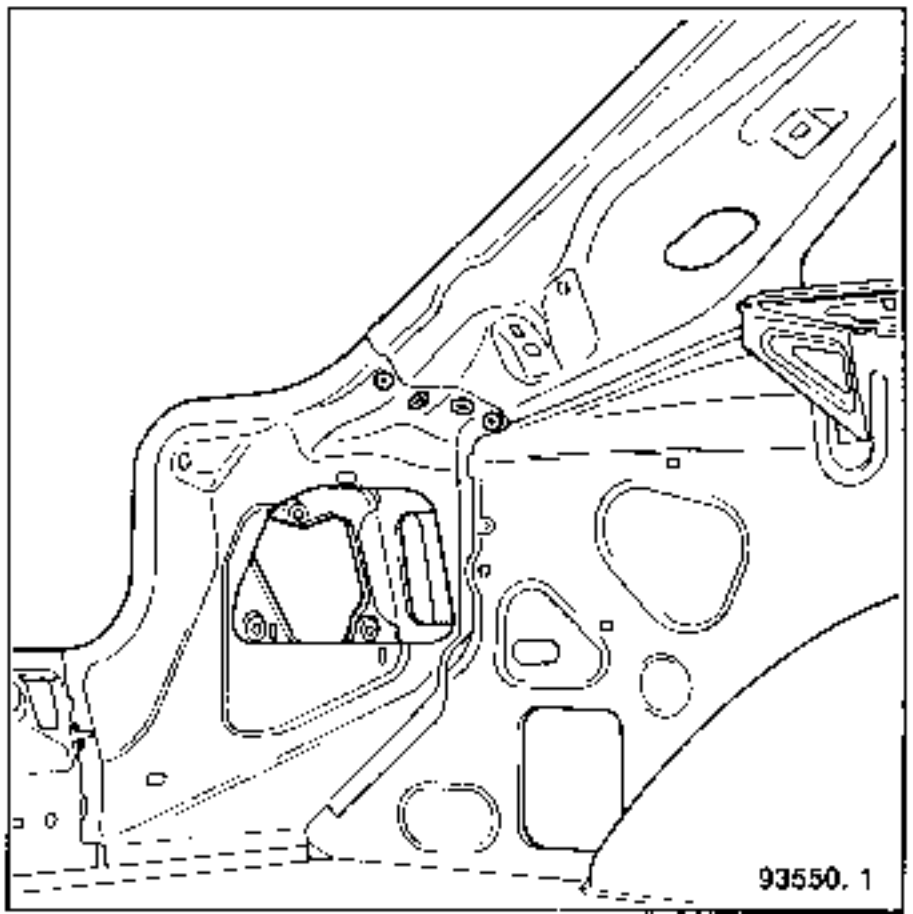


(A) 3 spot welds joining 3 thicknesses

4 CONNECTION WITH REAR END PILLAR LOWER LINING

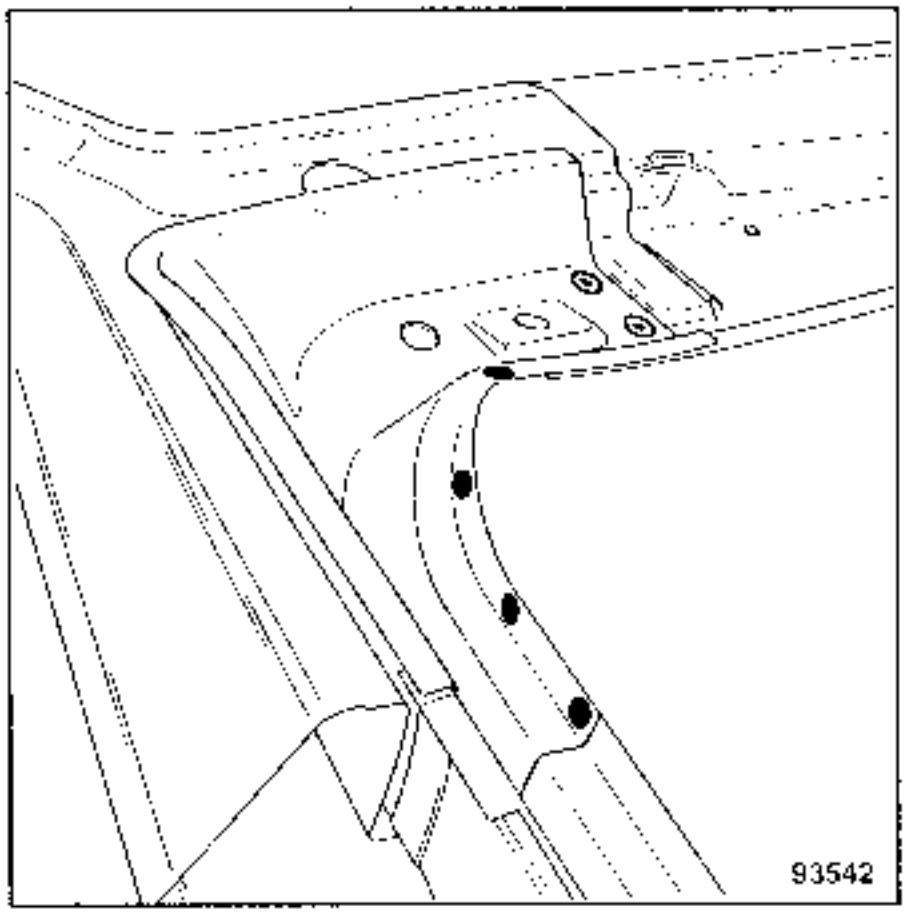
Cross reference: see **44-E-1**





5 CONNECTION WITH SIDE CHANNEL UPPER GUSSET

Cross reference: see **44-G-1**



6 CONNECTION WITH SIDE CHANNEL

Thickness of panelling (in mm)

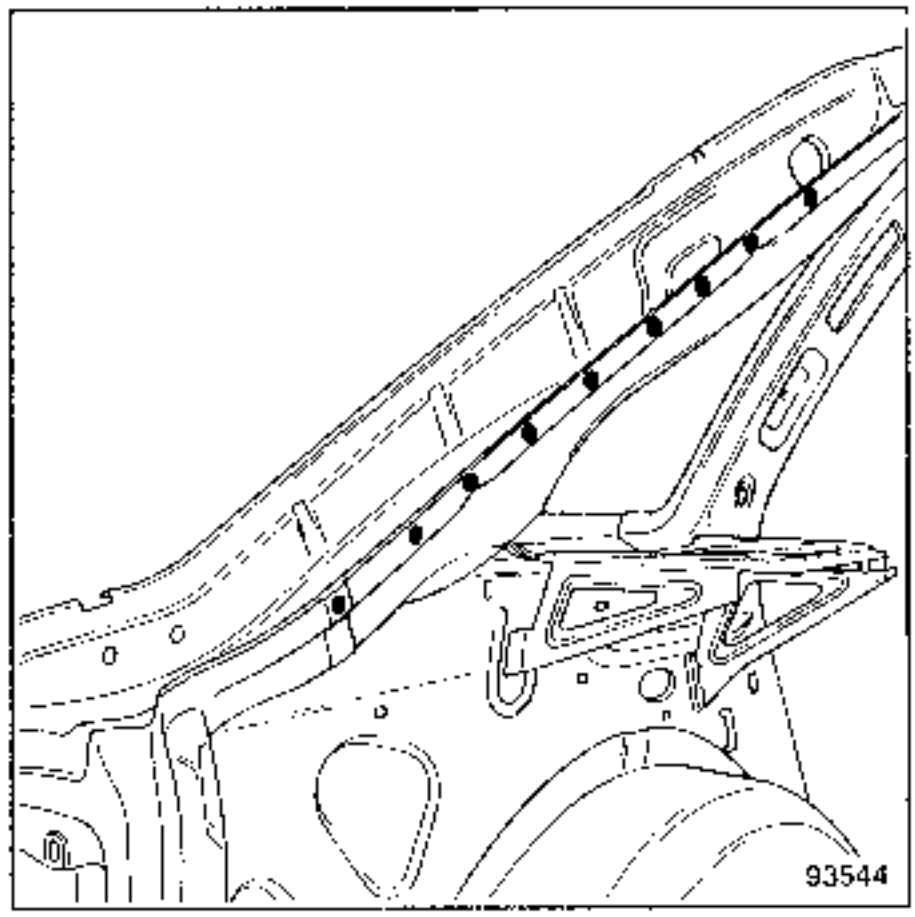
Rear end pillar upper lining	: **0,77**
Rear end pillar lower lining	: **0,77**
Side channel	: **0,67**

Unpicking



9 spot welds

Welding

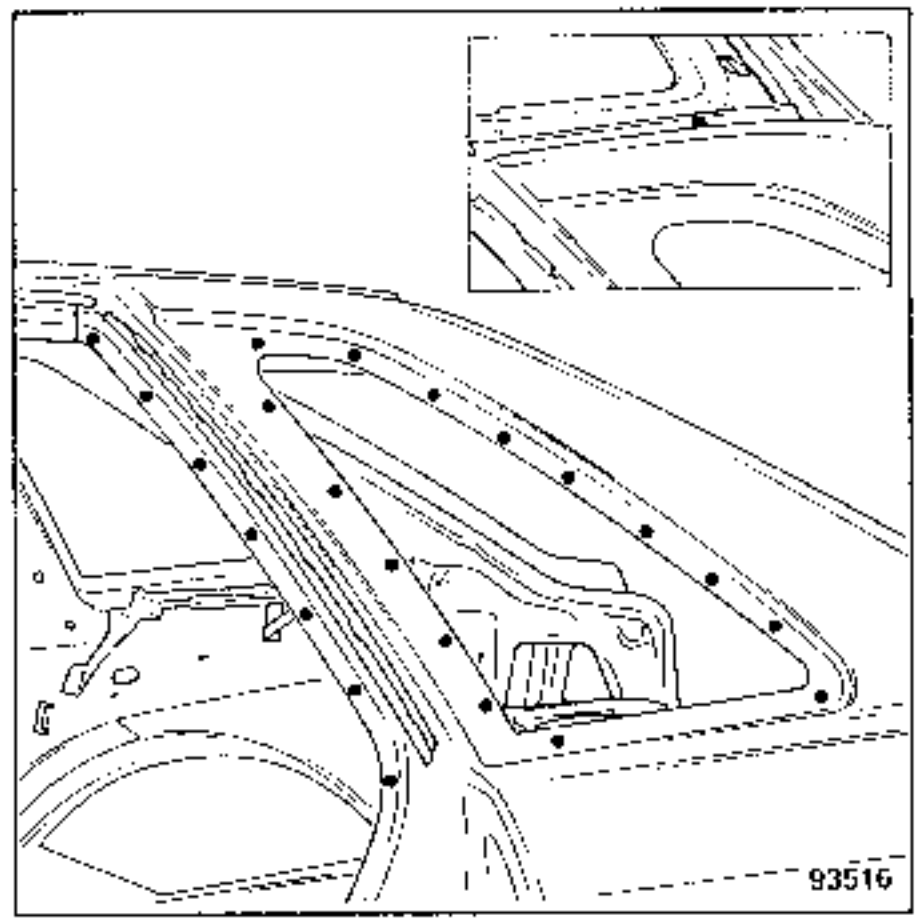




(A) 1 spot weld joining 3 thicknesses

7 CONNECTION WITH WING PANEL

Cross reference : see **44-A-3**



8 CONNECTION WITH ROOF

Thickness of panelling (in mm)

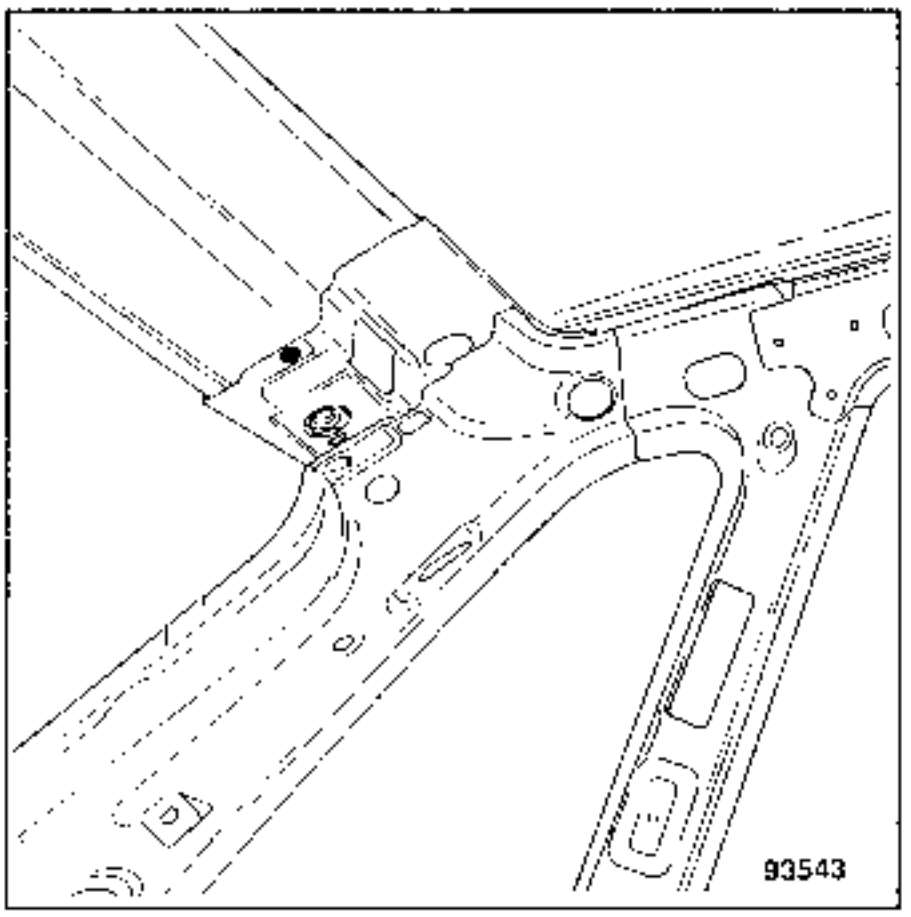
Upper stiffener : **0,97**
Roof panel : **0,77**

Unpicking



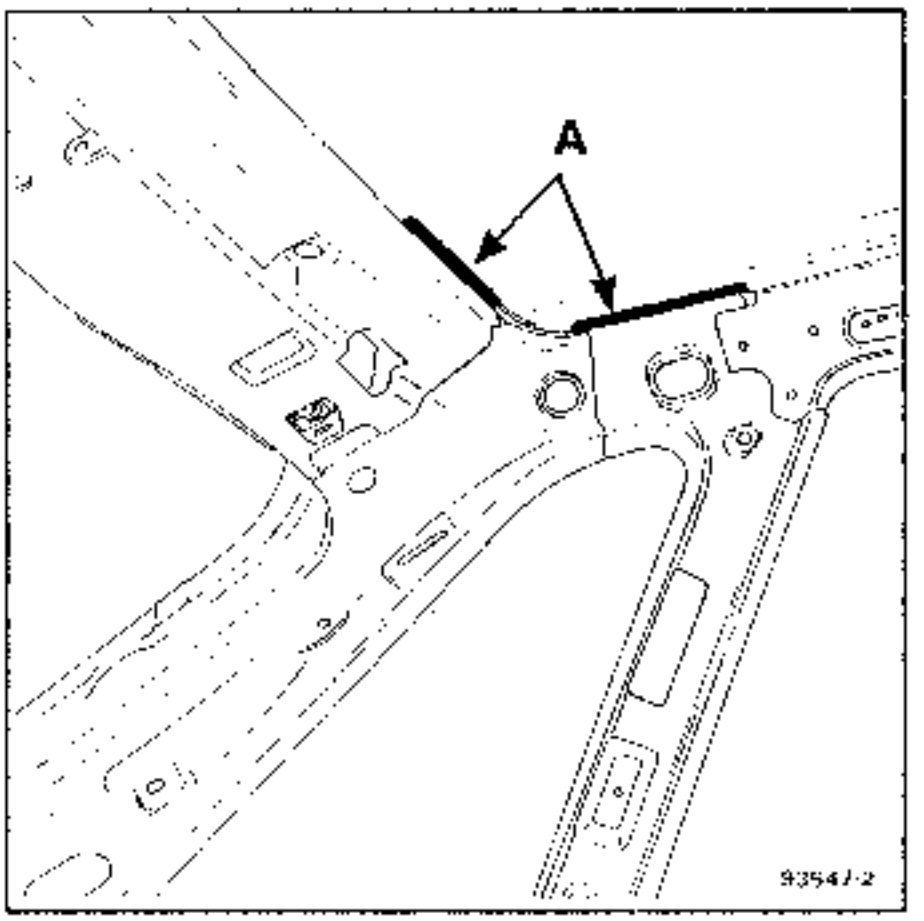
1 spot weld

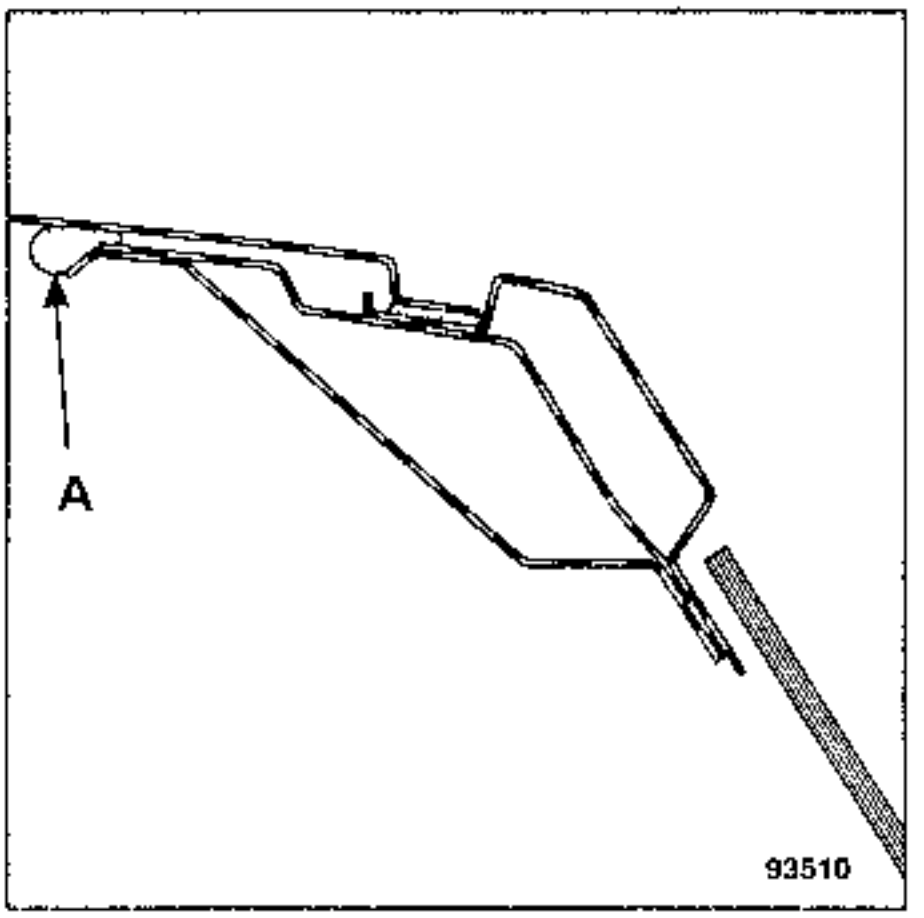
Welding



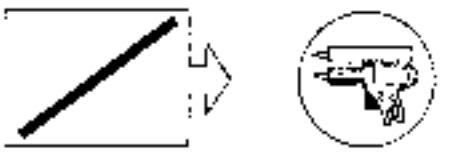


Bonding



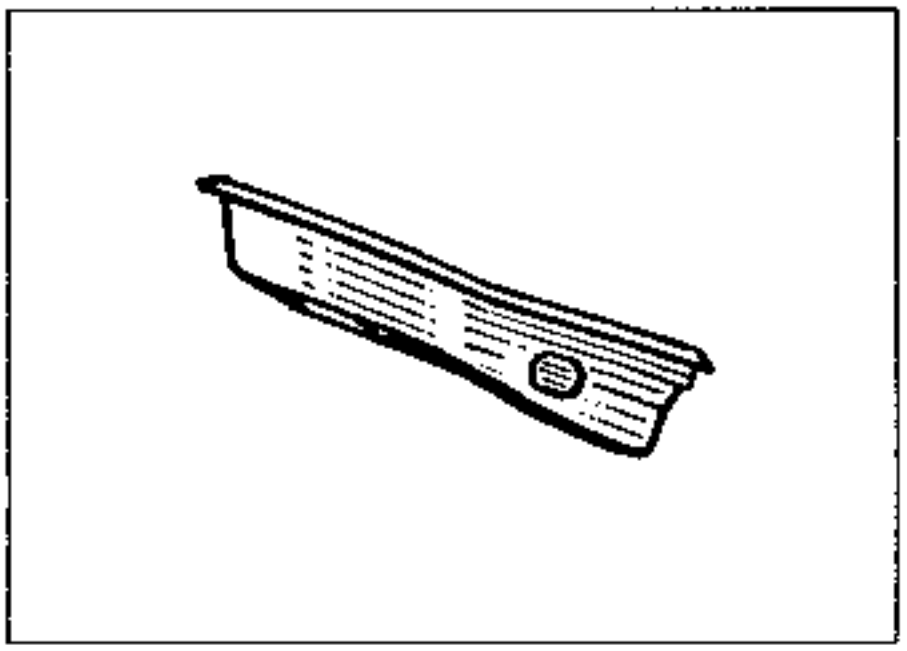


(A)



COMPOSITION OF PART AS SUPPLIED BY THE PARTS DEPARTMENT

Single part.



1 CONNECTION WITH THE QUARTER PANEL LINING

Thickness of panelling (in mm)

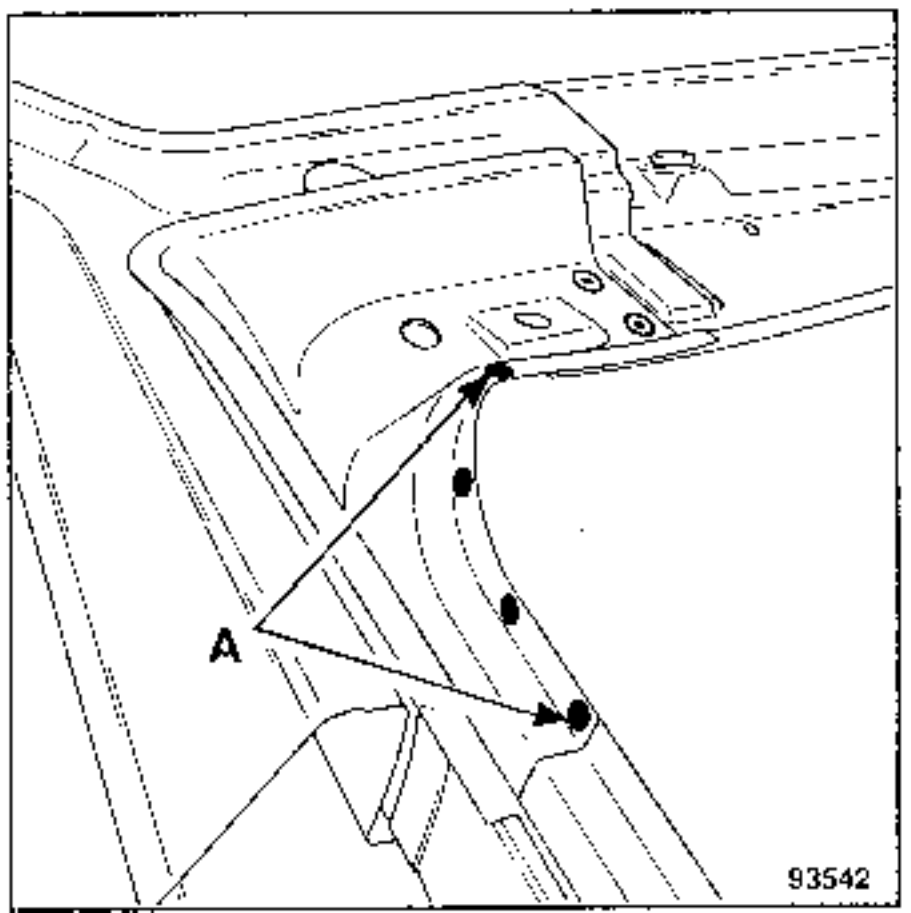
Side channel upper gusset	: **1,50**
Rear end pillar upper lining	: **0,77**
Upper stiffener	: **0,97**
Side channel	: **0,67**

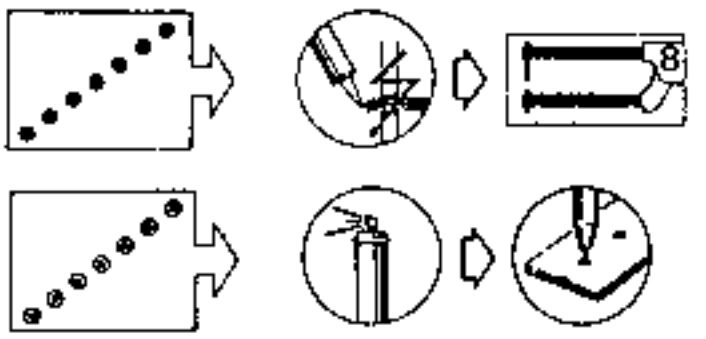
Unpicking



6 spot welds

Welding





(A) 2 spot welds joining 3 thicknesses

2 CONNECTION WITH SIDE GUSSET

Thickness of panelling (in mm)

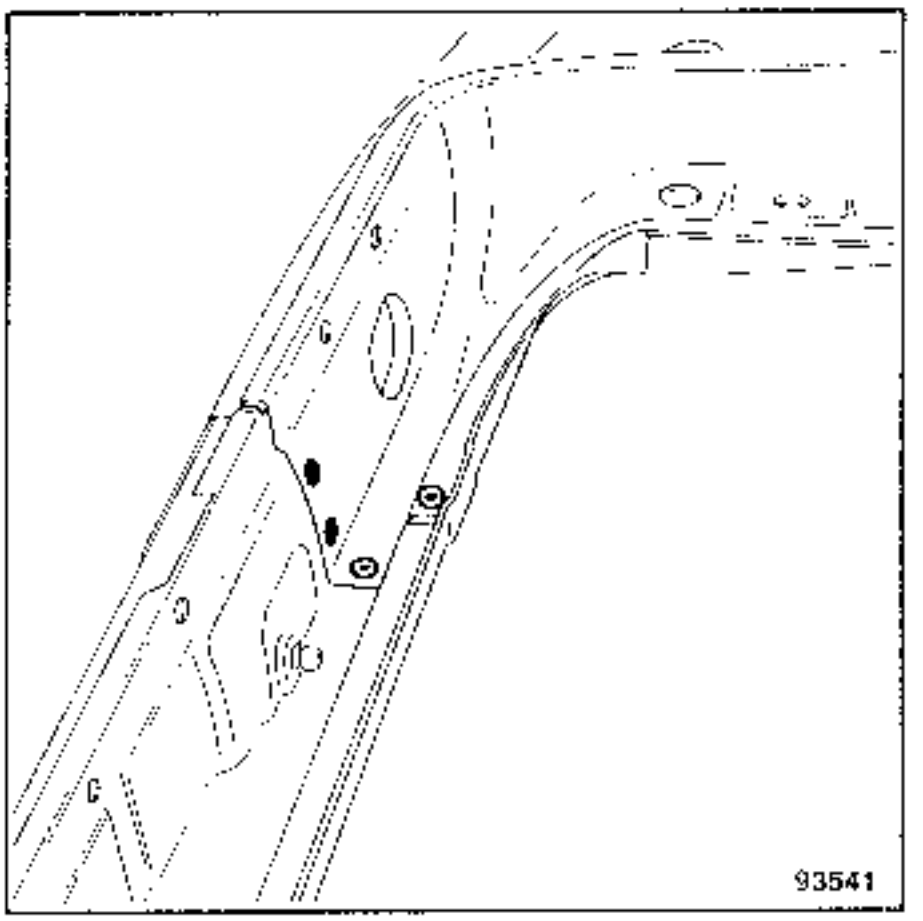
Channel upper gusset	: **1,50**
Side channel	: **0,67**

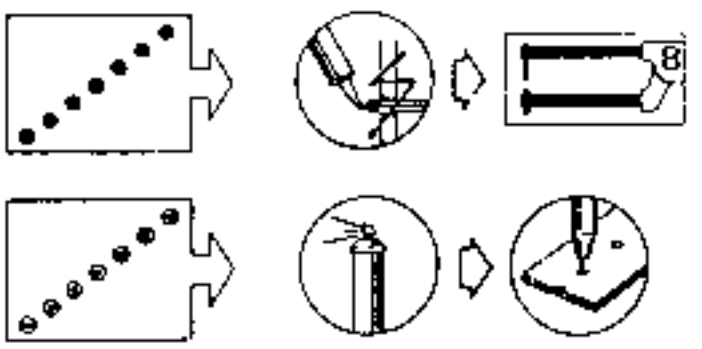
Unpicking



4 spot welds

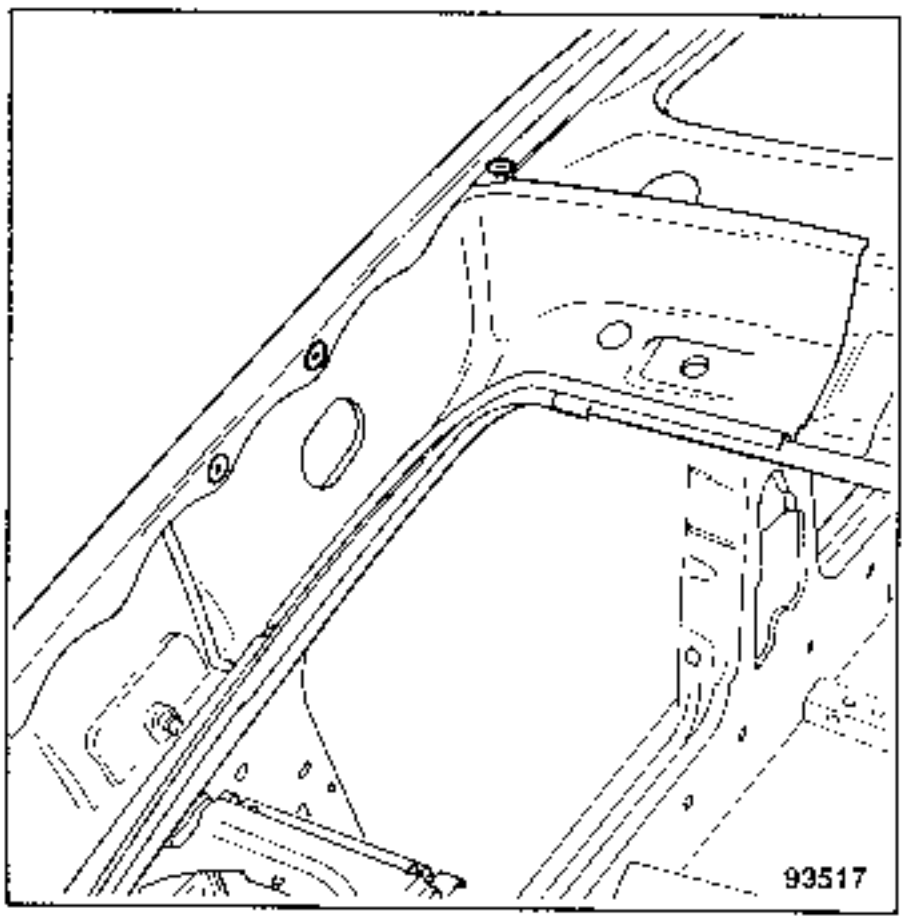
Welding





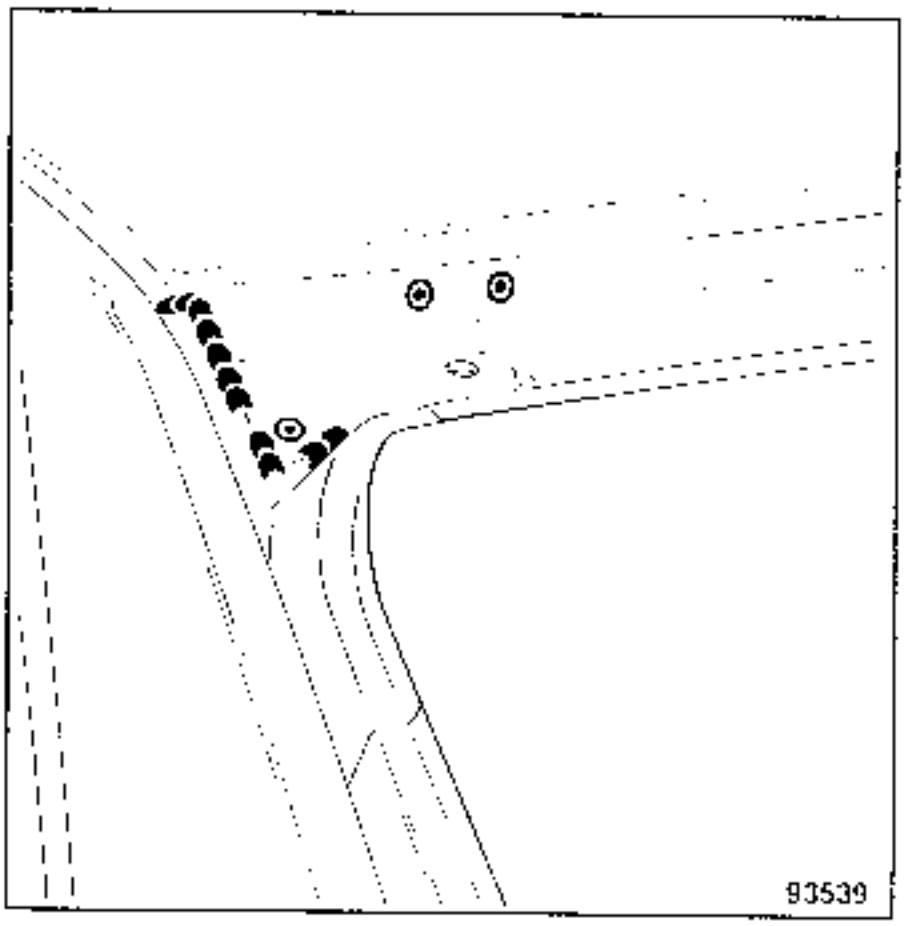
3 CONNECTION WITH WING PANEL.

Cross reference: see 44-A-2



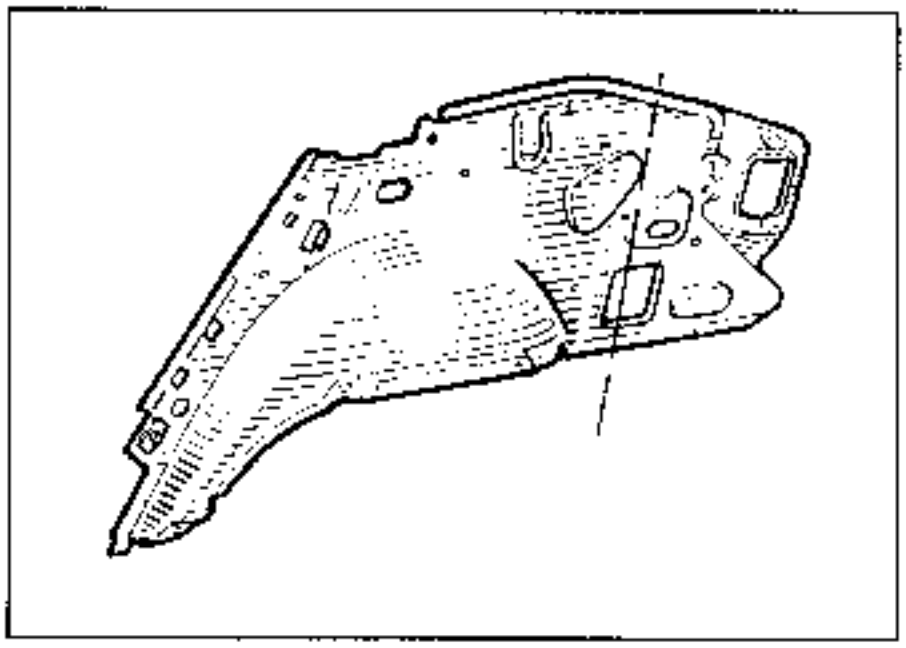
4 CONNECTION WITH ROOF PANEL

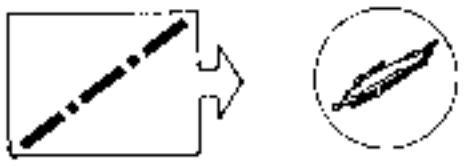
Cross reference: see 45-A-2



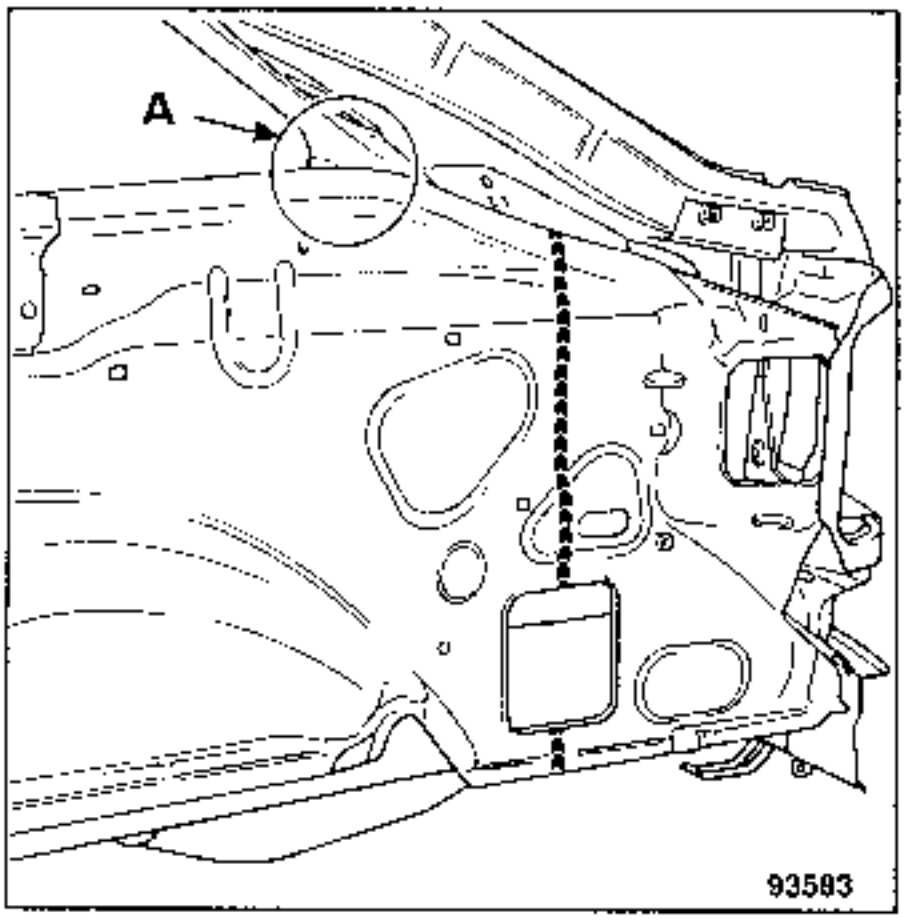
COMPOSITION OF PART AS SUPPLIED BY THE PARTS DEPARTMENT

Single part.





1 CUT LINE

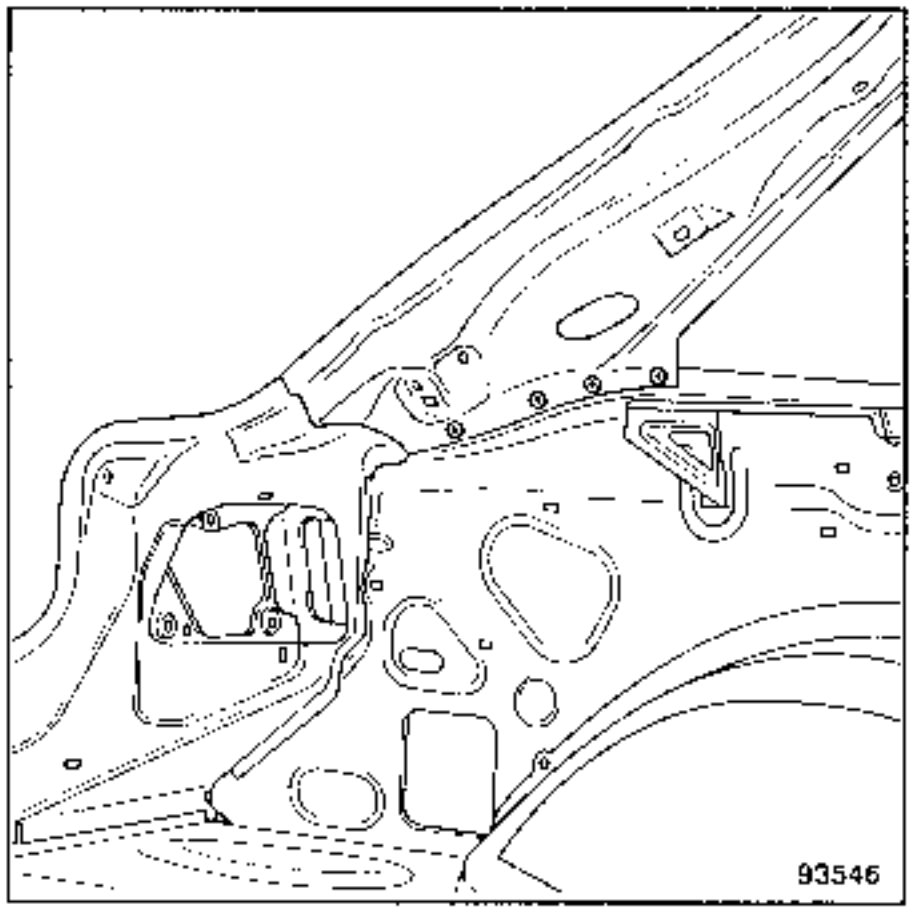




This cut line is only an example. Its exact position will depend on the extent of the damage. What is important is to retain a connection (A) between the outer wheel arch and the rear end pillar upper lining after the part to be replaced has been cut out.

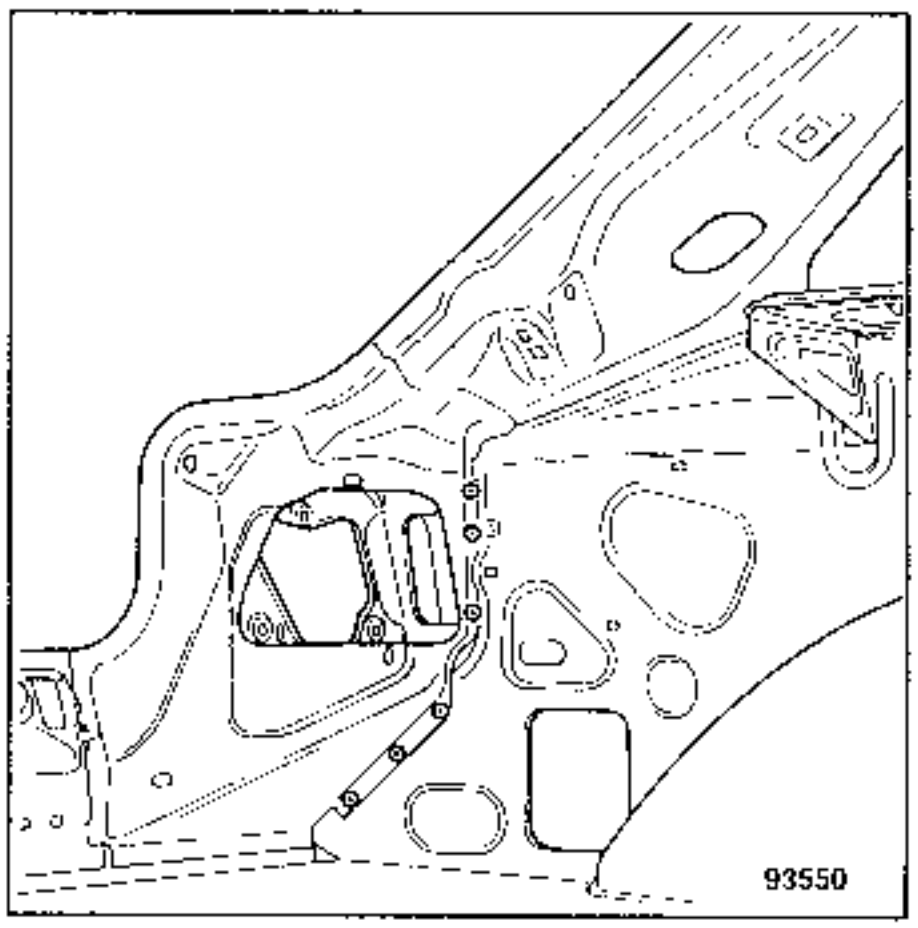
2 CONNECTION WITH QUARTER PANEL LINING

Cross reference: see 44-F-3



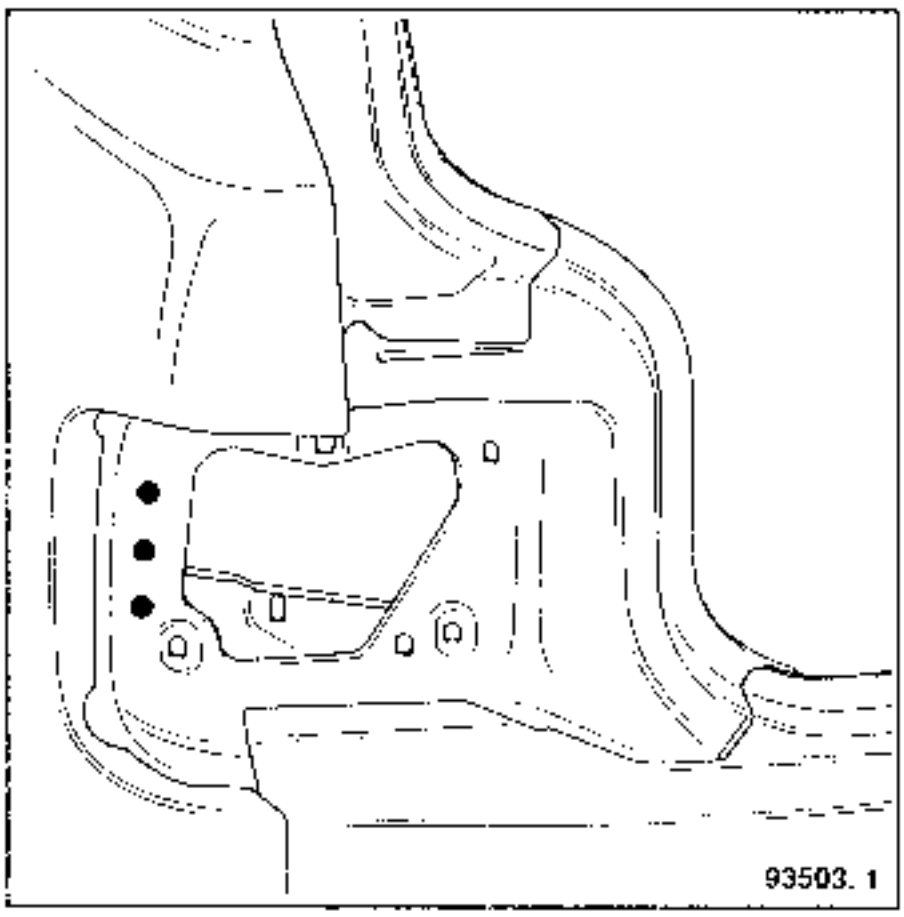
3 CONNECTION WITH REAR END PILLAR LOWER LINING

Cross reference: see 44-E-2



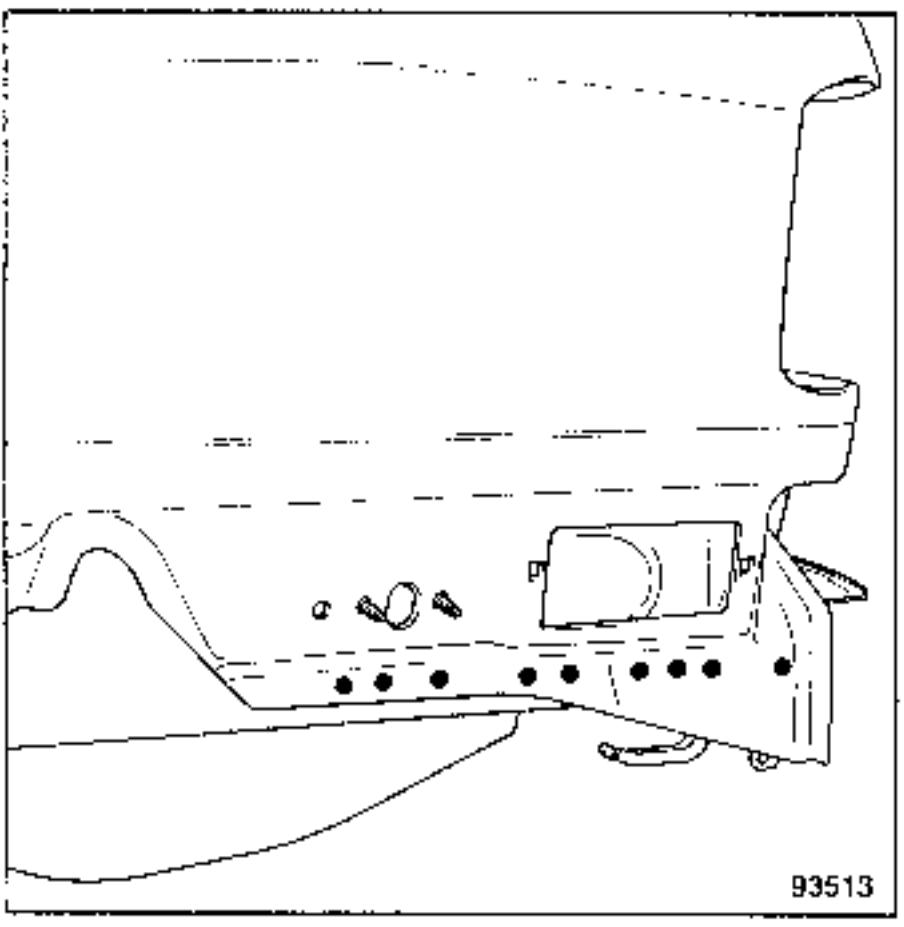
4 CONNECTION WITH REAR LIGHT SUPPORT PANEL

Cross reference: see 44-D-2



5 CONNECTION WITH REAR FLOOR, REAR SECTION

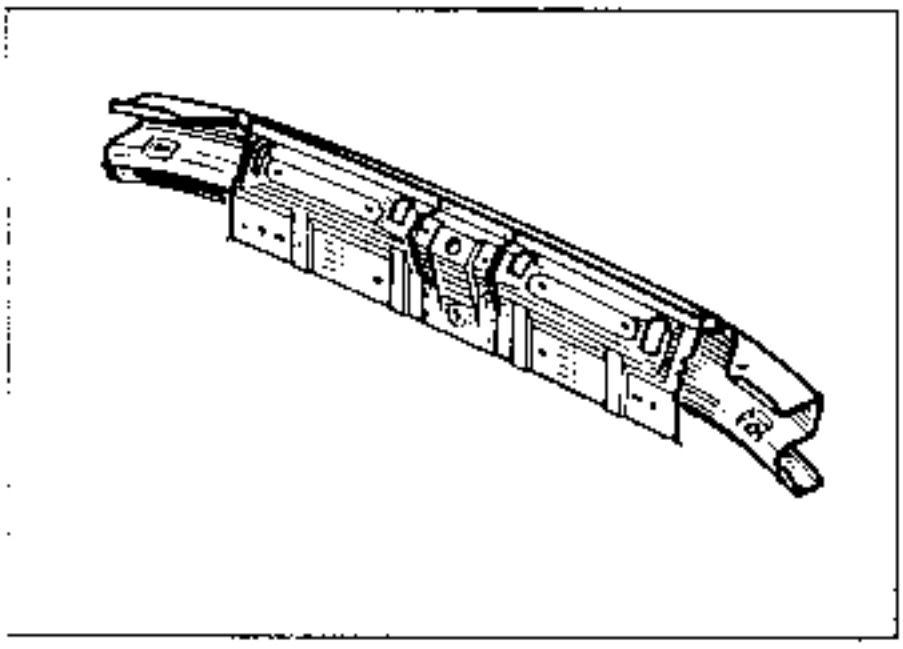
Cross reference: see 44-A-8



COMPOSITION OF THE PART AS SUPPLIED BY THE PARTS DEPARTMENT

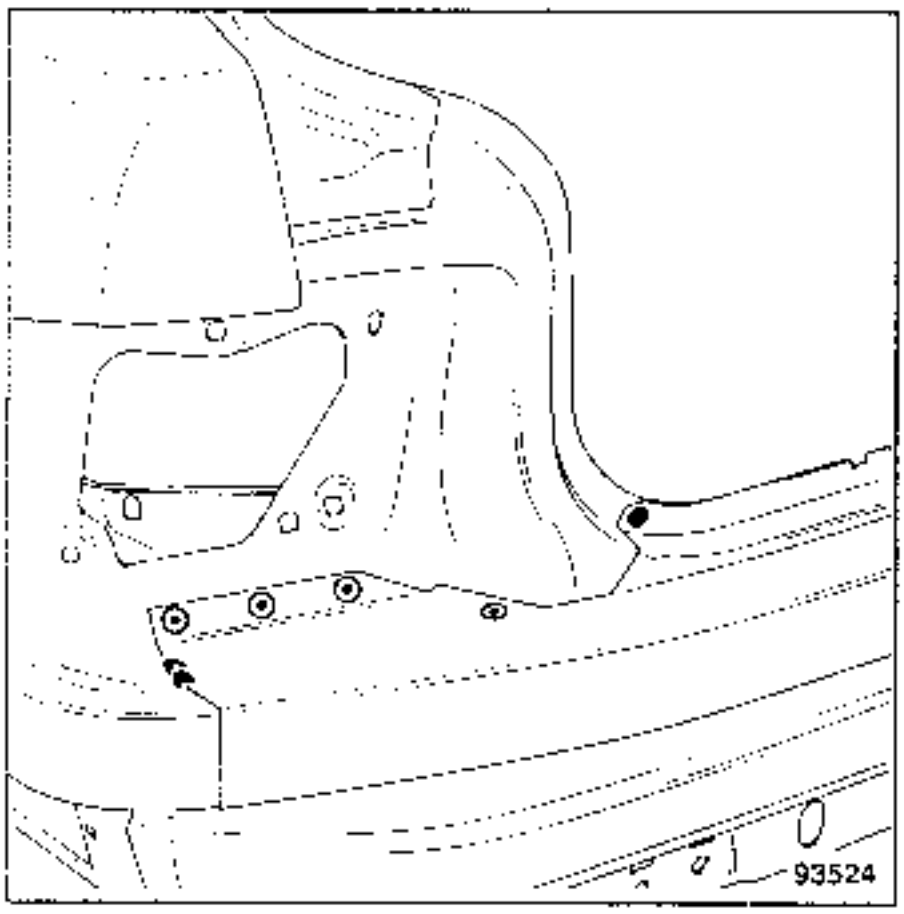
Assembly comprising :

- Rear end panel
- Rear end panel lining
- Striker plate stiffener



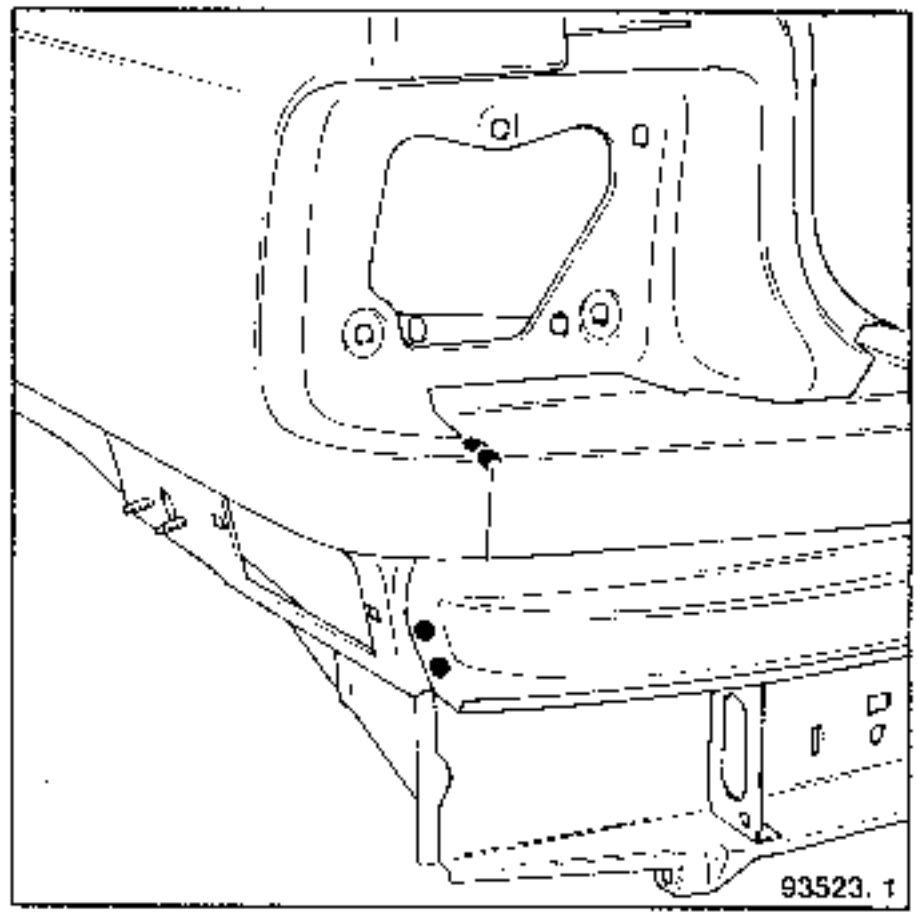
1 CONNECTION WITH REAR LIGHT SUPPORT PANEL

Cross reference: see **41-A-1**



2 CONNECTION WITH WING PANEL

Cross reference: see 44-A-6



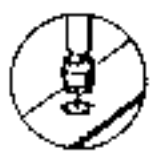
3 CONNECTION WITH REAR END PILLAR LOWER LINING

Thickness of panelling (in mm)

Rear end panel	: **0,67**
Rear end panel lining	: **0,67**
Rear end pillar lower lining	: **0,77**

Unpicking

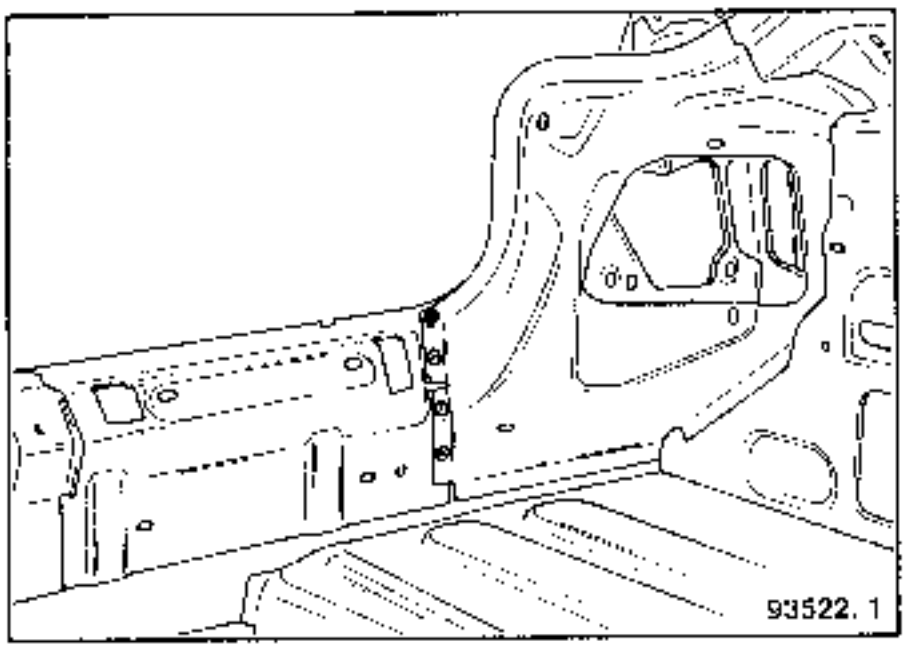


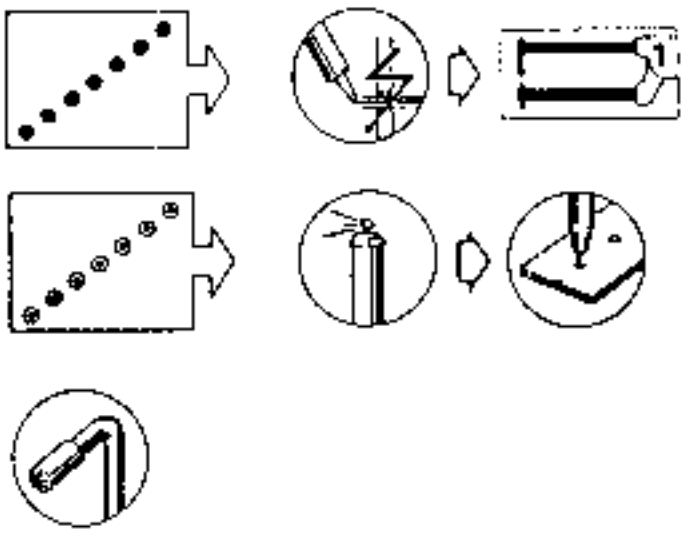


(A) see welding

4 + 4 spot welds

Welding





(2) 1 spot weld joining 3 thicknesses

4 CONNECTION WITH LOWER CROSS MEMBER

Thickness of panelling (in mm)

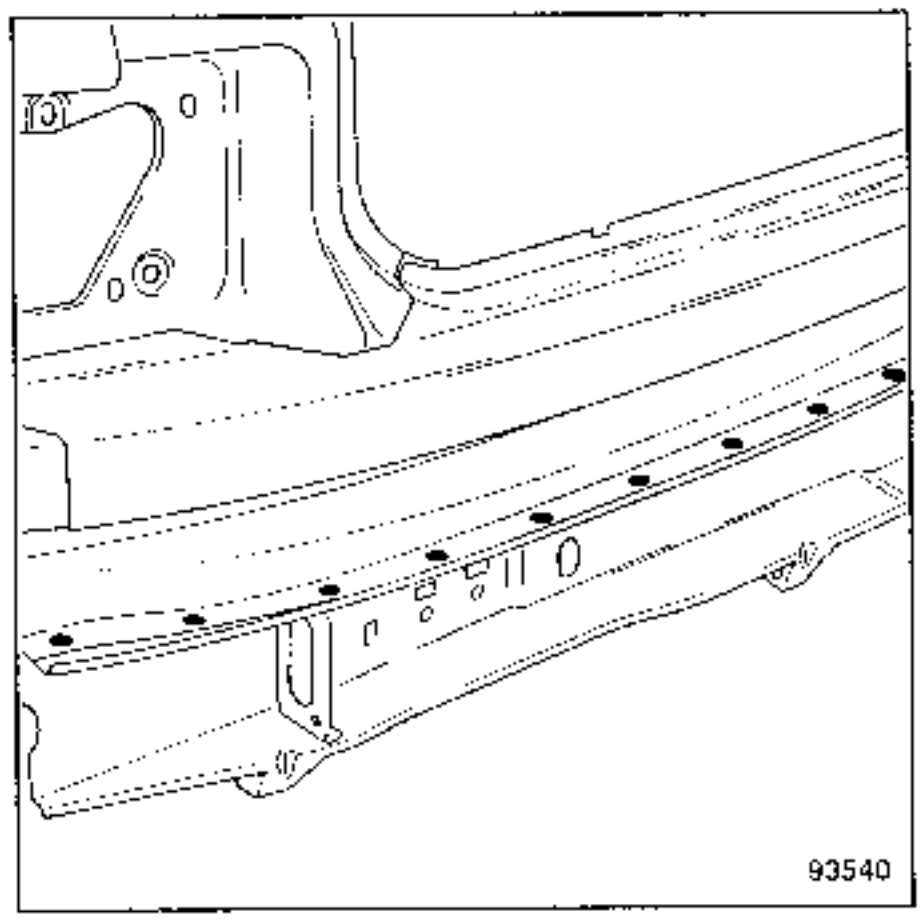
Rear end panel	:	**0,67**
Rear end panel lining	:	**0,67**
Striker plate stiffener	:	**1,20**
Lower rear cross member	:	**1,20**

Unpicking

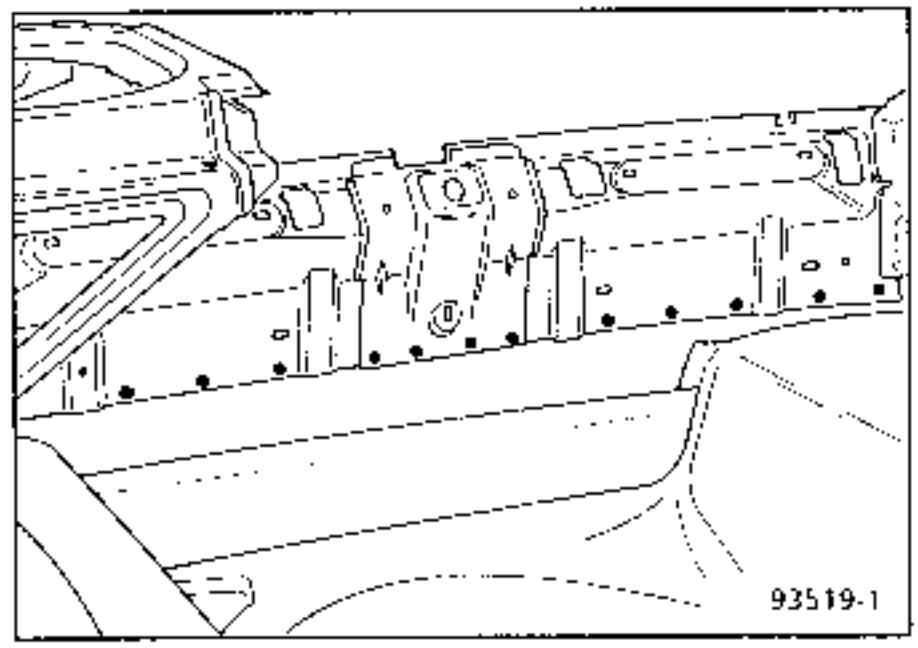


34 spot welds

Welding





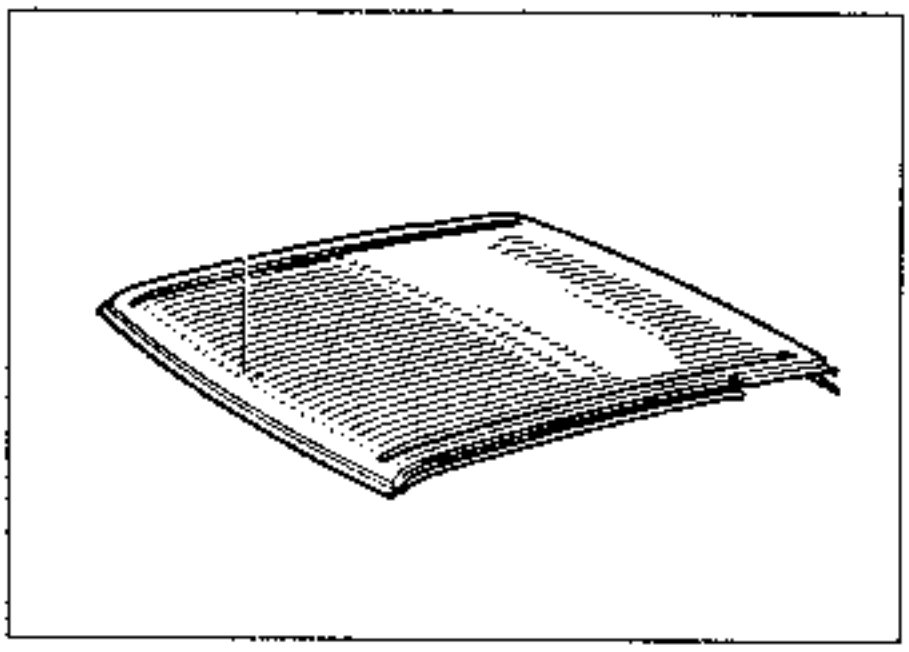


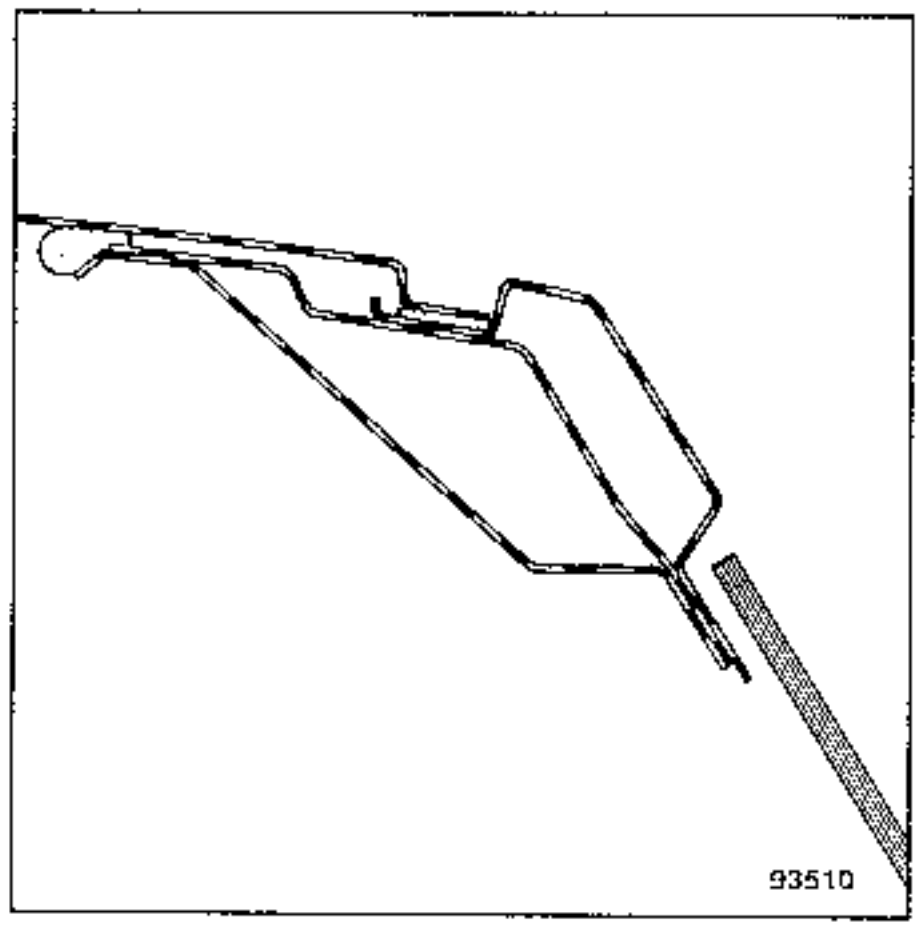


The only items deall with in this operation are those that are special to the B 48. For all the other joints, see Mk 292.

COMPOSITION OF THE PART AS SUPPLIED BY THE PARTS DEPARTMENT

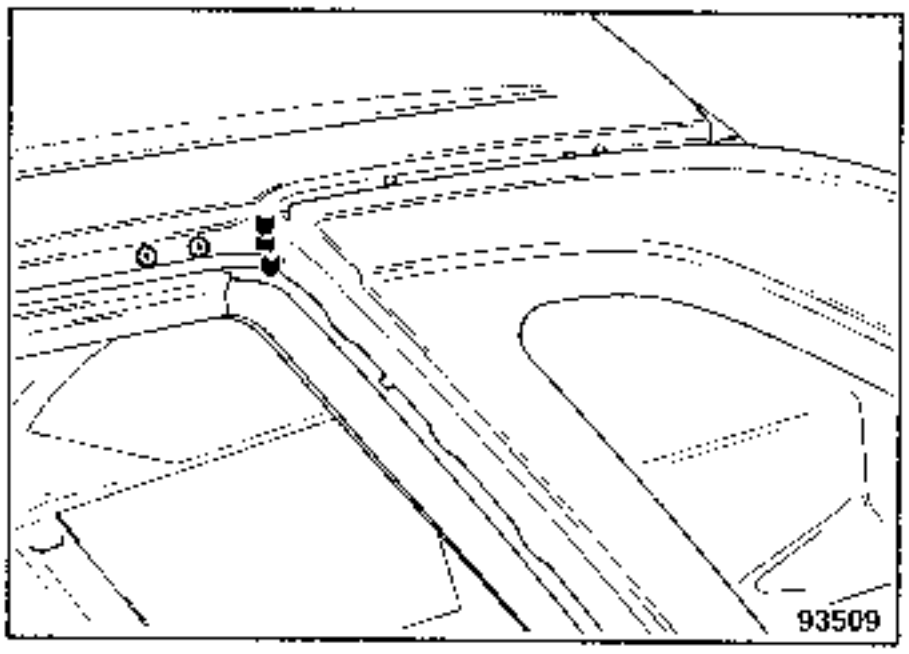
Single part.





1 CONNECTION WITH WING PANEL

Cross reference: see **44-A-12**



2 CONNECTION WITH SIDE CHANNEL UPPER GUSSET

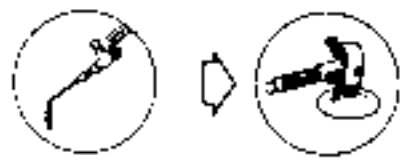
Thickness of panelling (in mm)

Roof panel	: **0,77**
Side channel upper gusset	: **1,50**

Unpicking

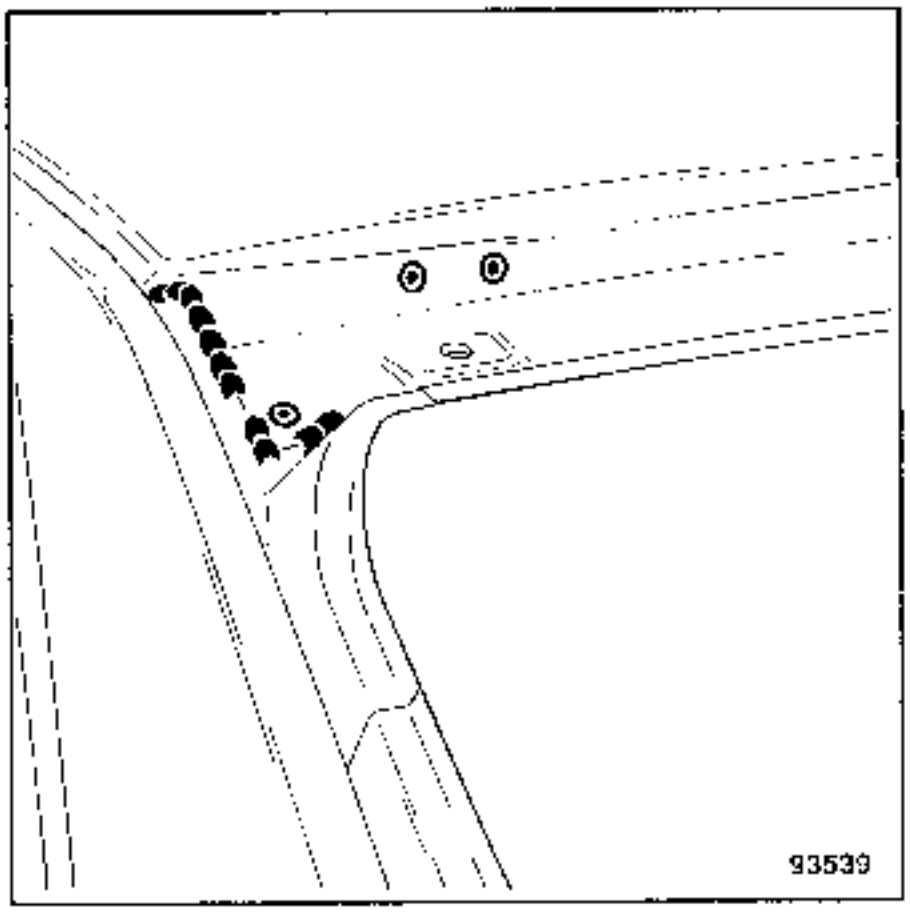


3 spot welds



1 brazed fillet 90 mm long
2 brazed fillets 15 mm long

Welding





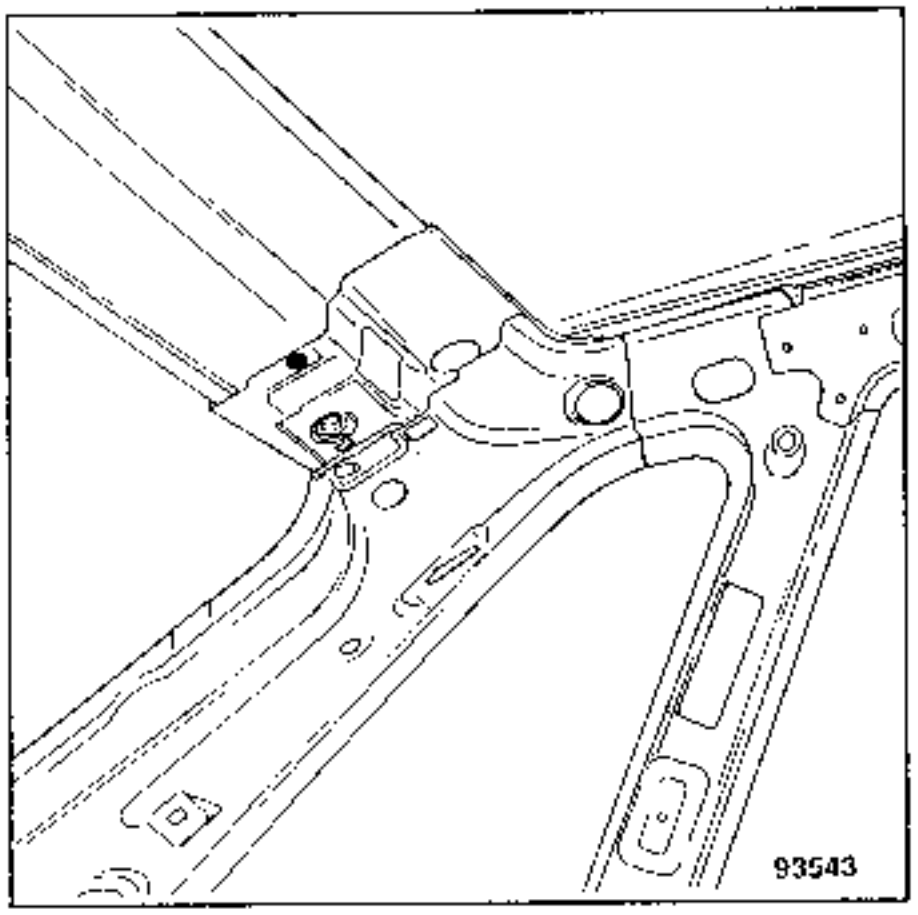


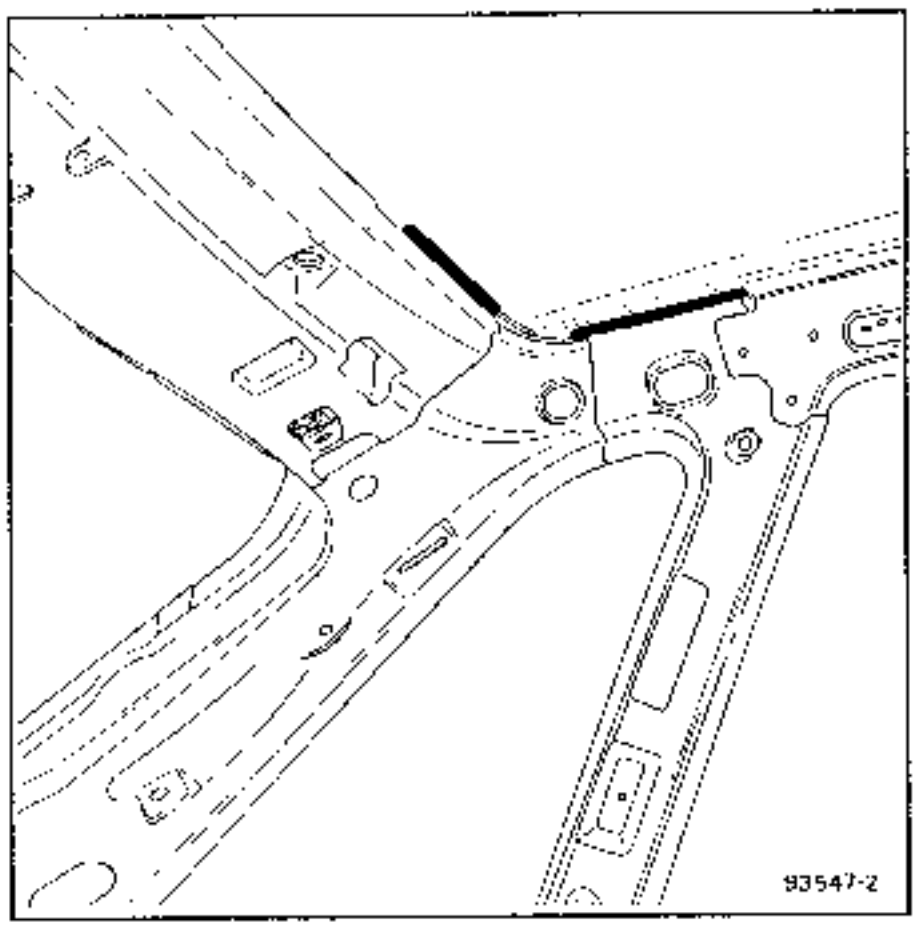
1 M.A.G. welding fillet 90 mm long
2 M.A.G. welding fillets 15 mm long

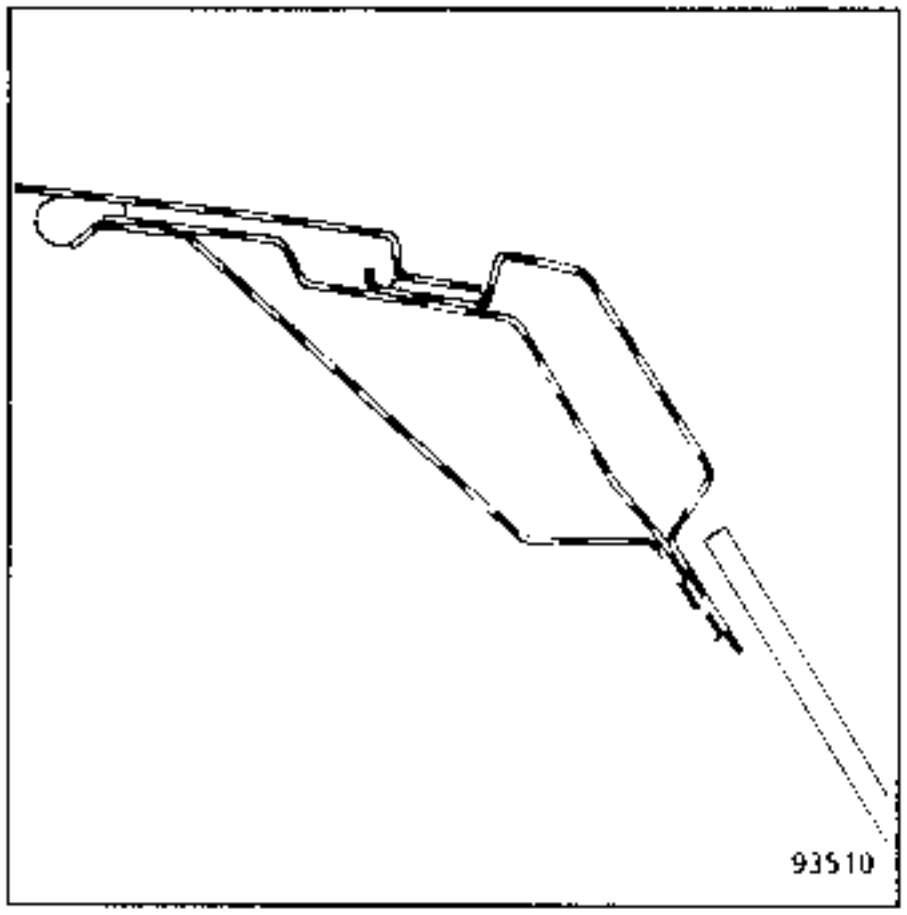


3 CONNECTION WITH QUARTER PANEL LINING ASSEMBLY

Cross reference : see 44-F-8







4 CONNECTION WITH REAR CROSS MEMBER

Thickness of panelling (in mm)

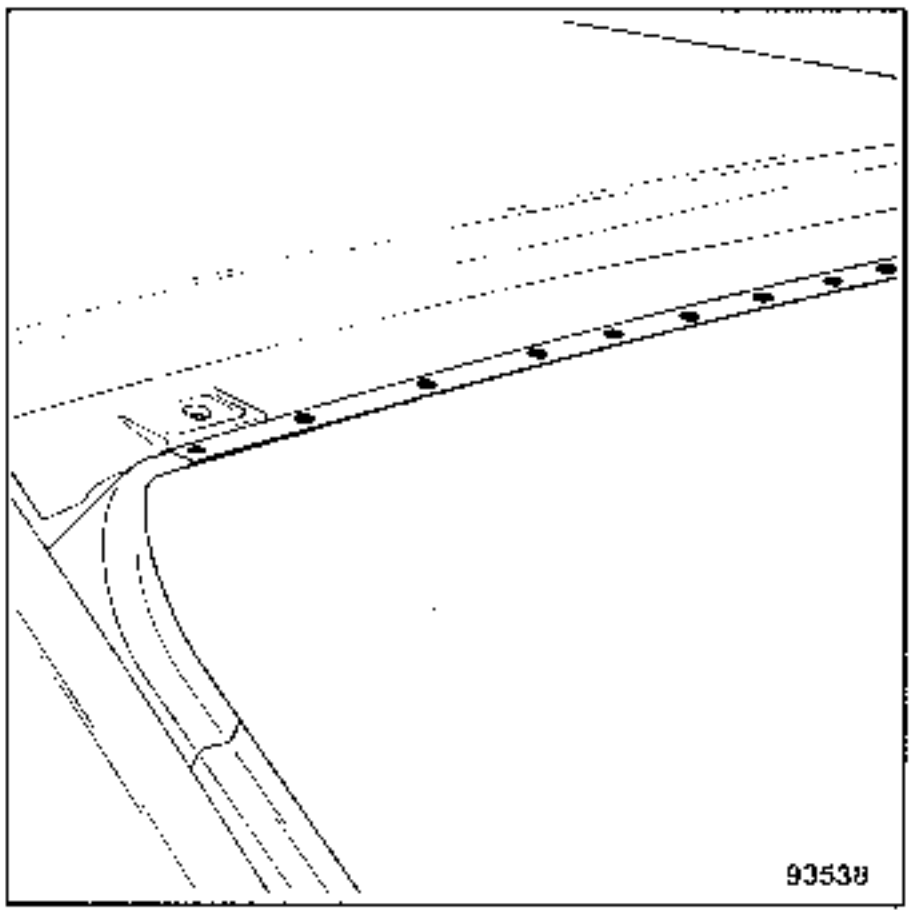
Roof panel	: 0,77
Side channel upper gusset	: 1,50
Roof cross member	: 0,67

Unpicking



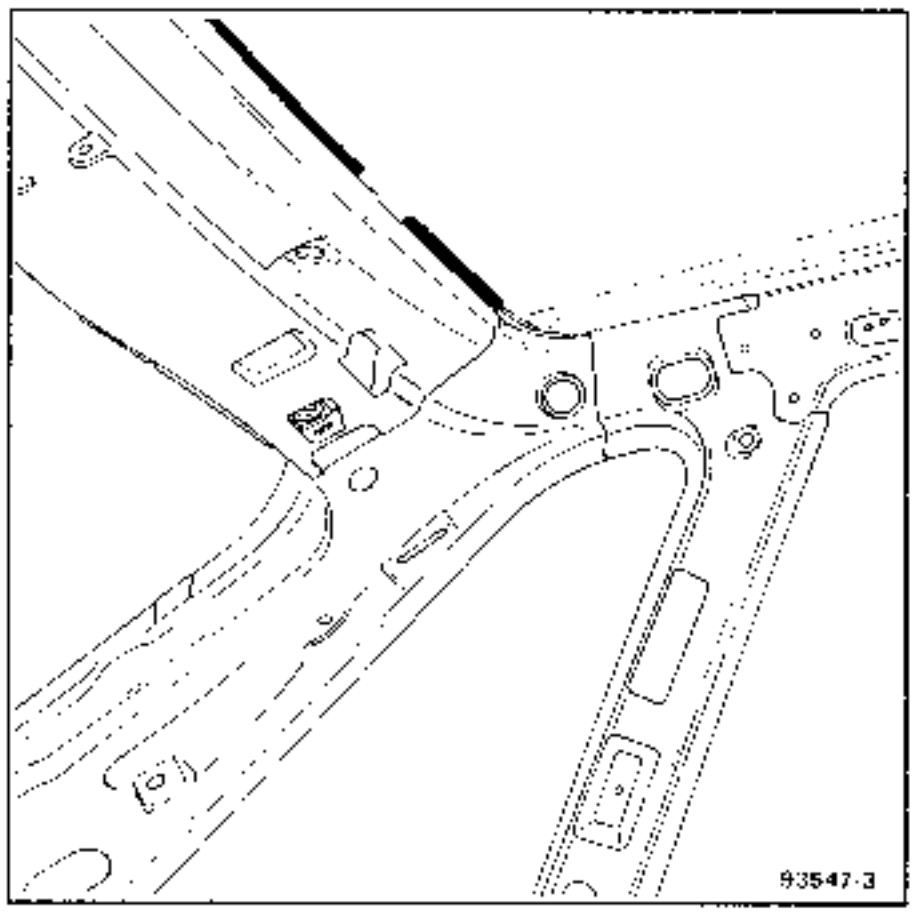
12 spot welds

Welding



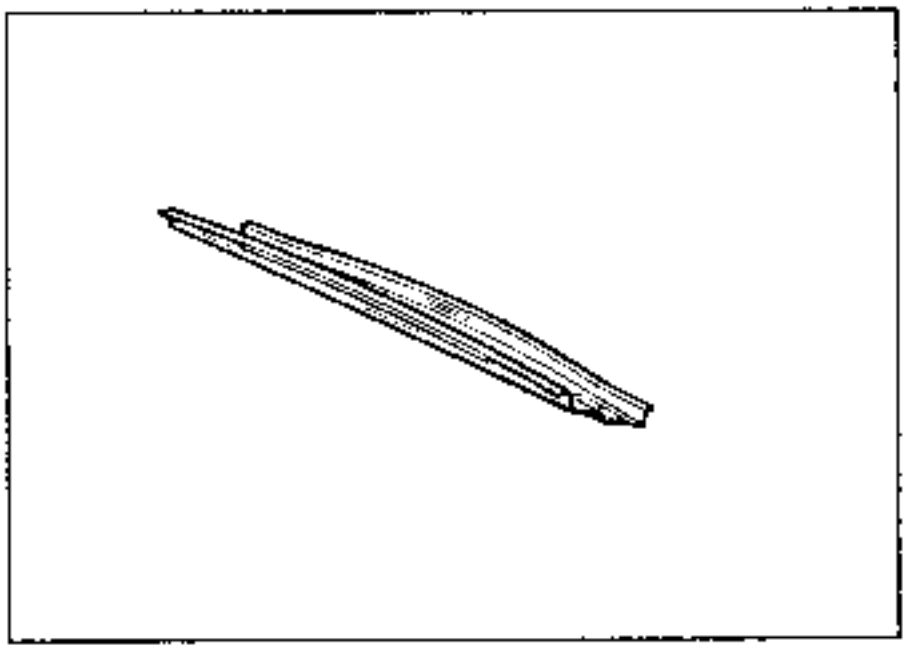


Bonding



COMPOSITION OF PART AS SUPPLIED BY THE PARTS DEPARTMENT

Single part.

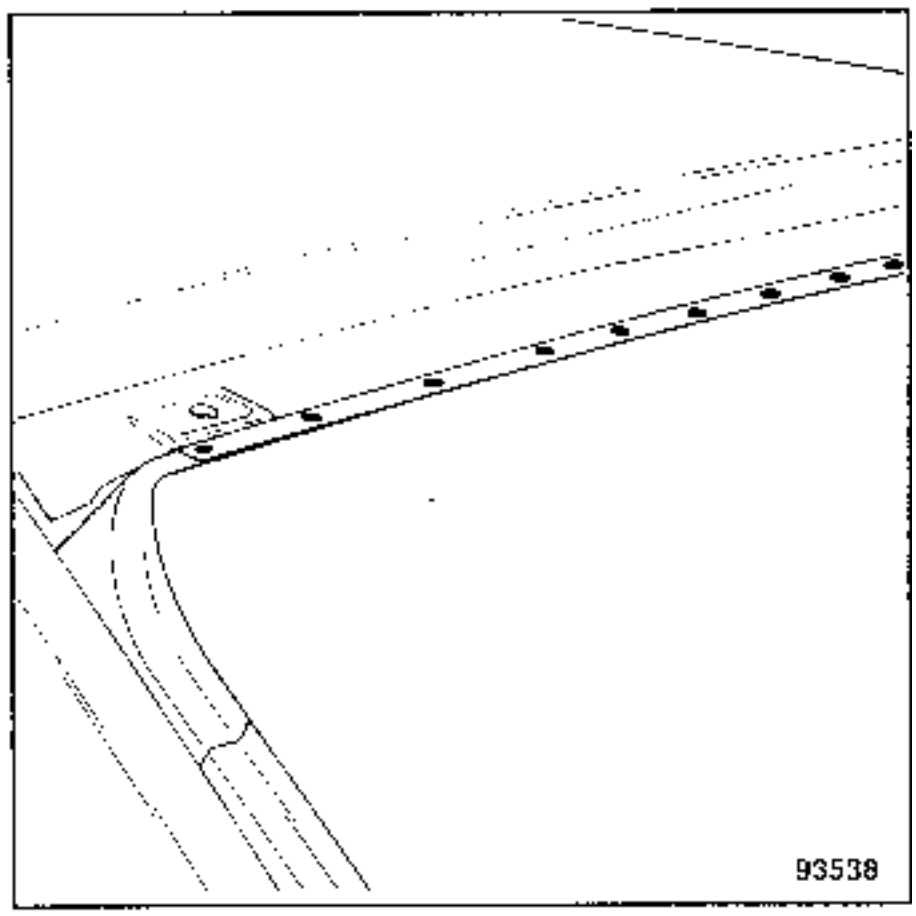


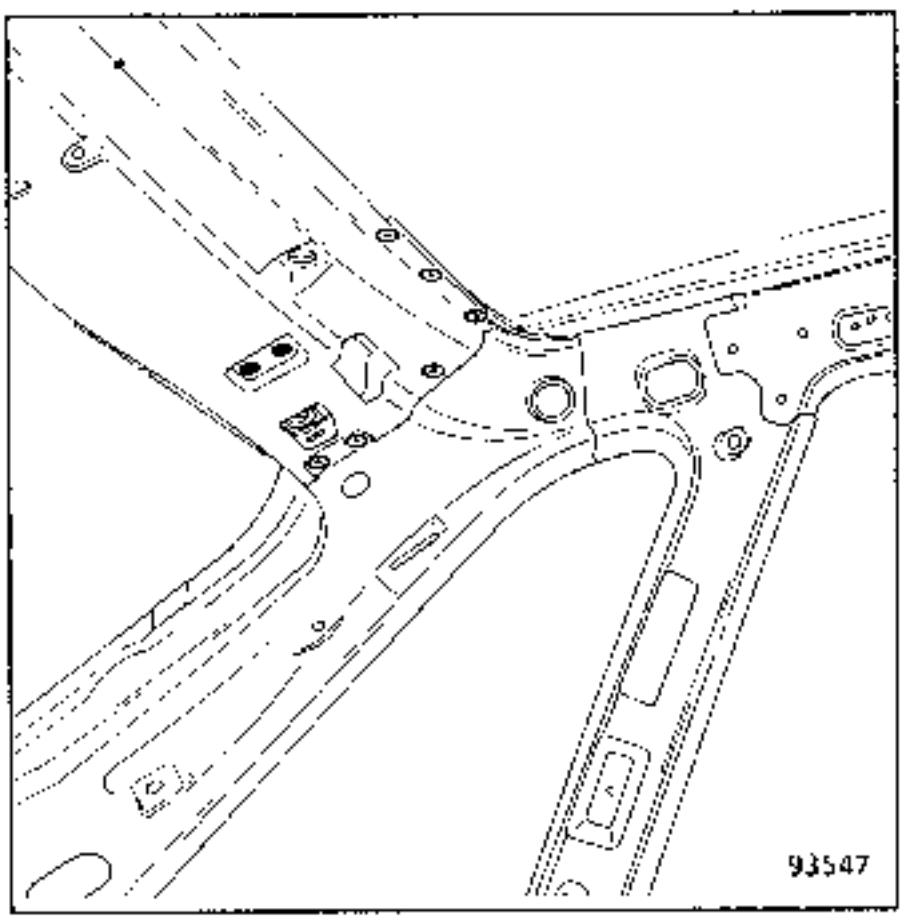
1 CONNECTION WITH QUARTER PANEL LINING

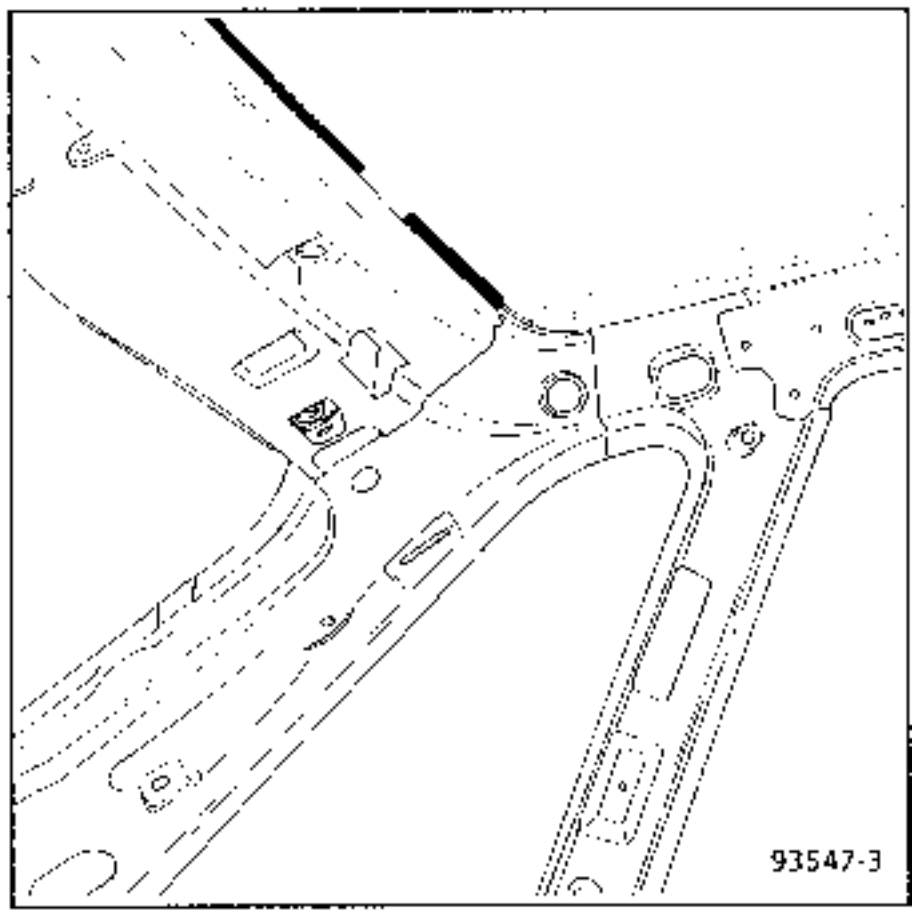
Cross reference: see 44-F-2

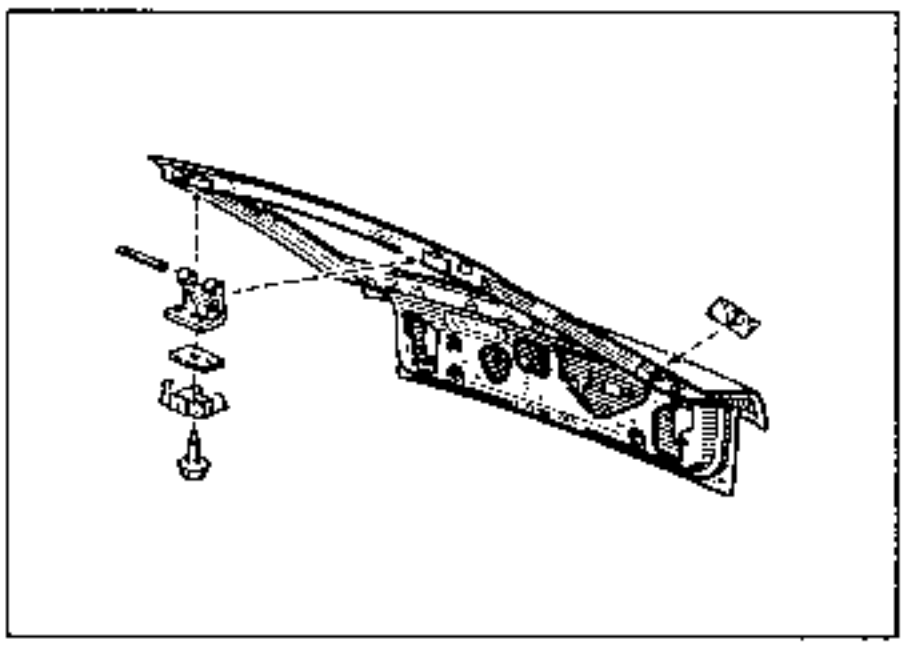
2 CONNECTION WITH ROOF

Cross reference: see 45-A-4



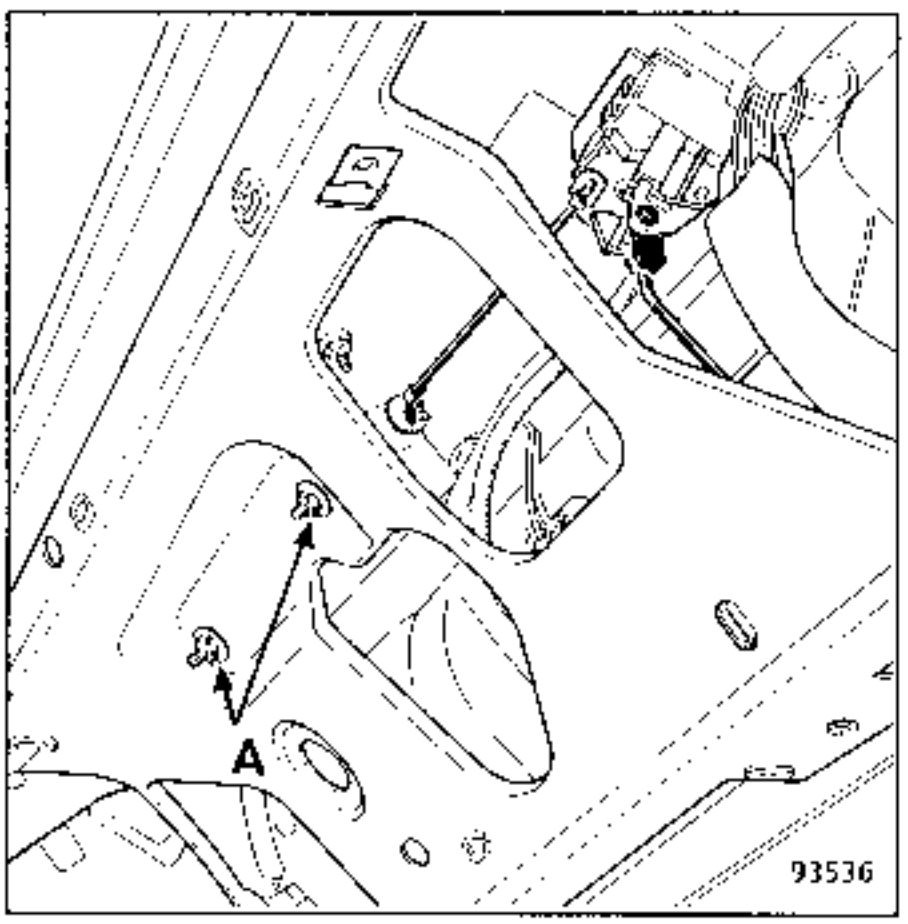






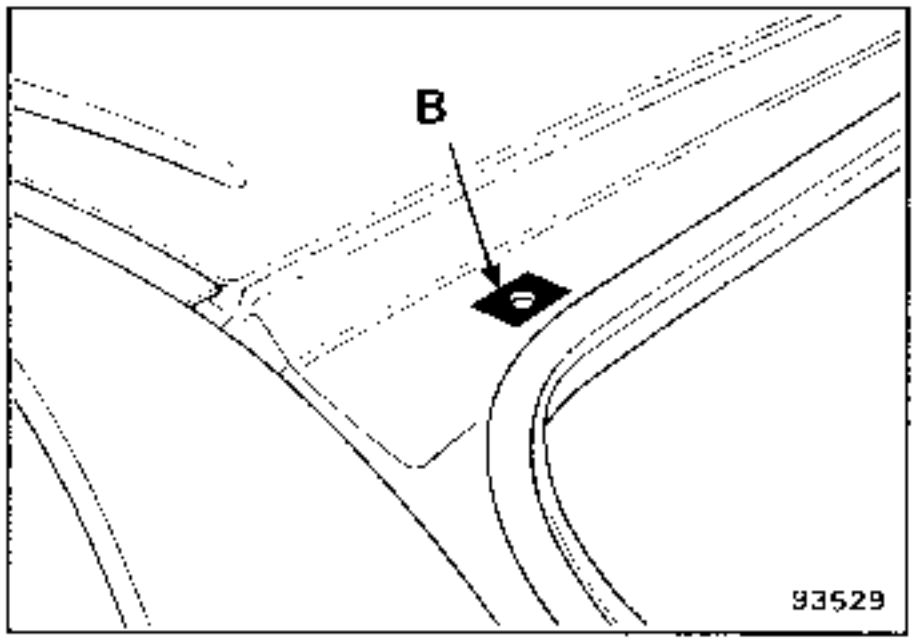
REMOVING

Strip the accessories from the tailgate in the following order.



- Remove the tailgate trim.
- Remove the rear screen wiper.
- Remove the tailgate lock motor (A) to be able to remove the wiring harness and the rear spoiler.
- Remove the wiring harness.

REFITTING

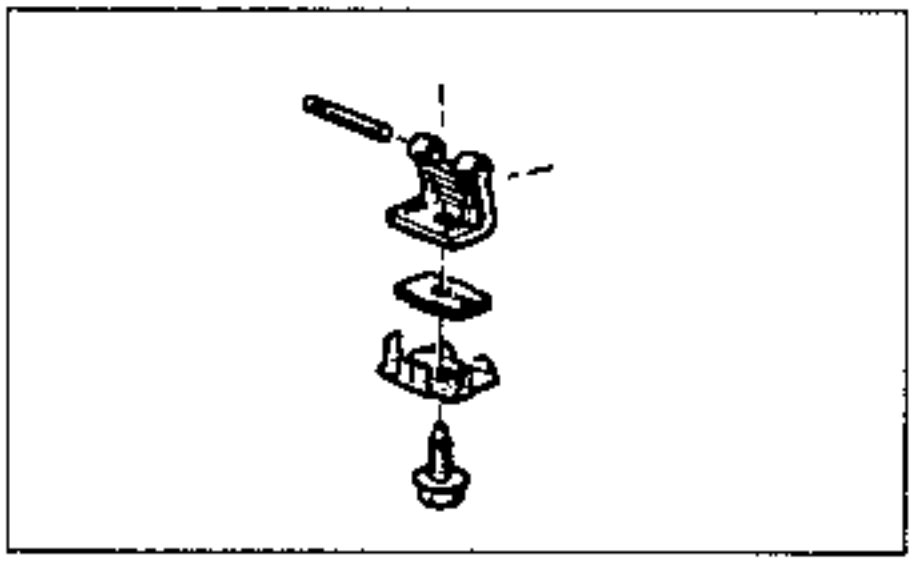


Before refitting the tailgate, apply sealing mastic to area (B) under the hinge.

After refitting, spray 2 pot anti-chipping mastic round the hinge.

When refitting the accessories it is preferable to refit the wiring harness first.

REPLACING

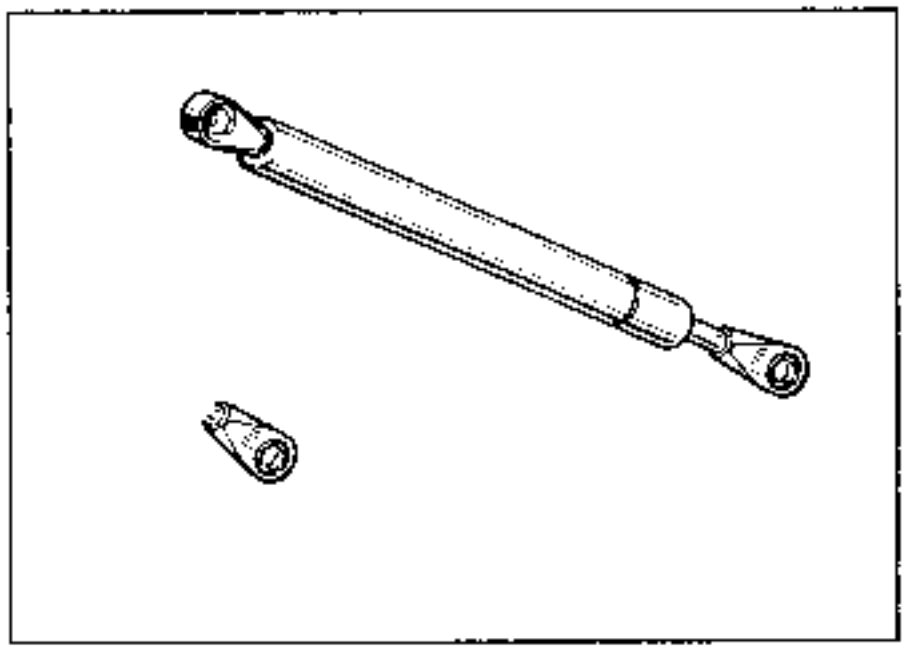


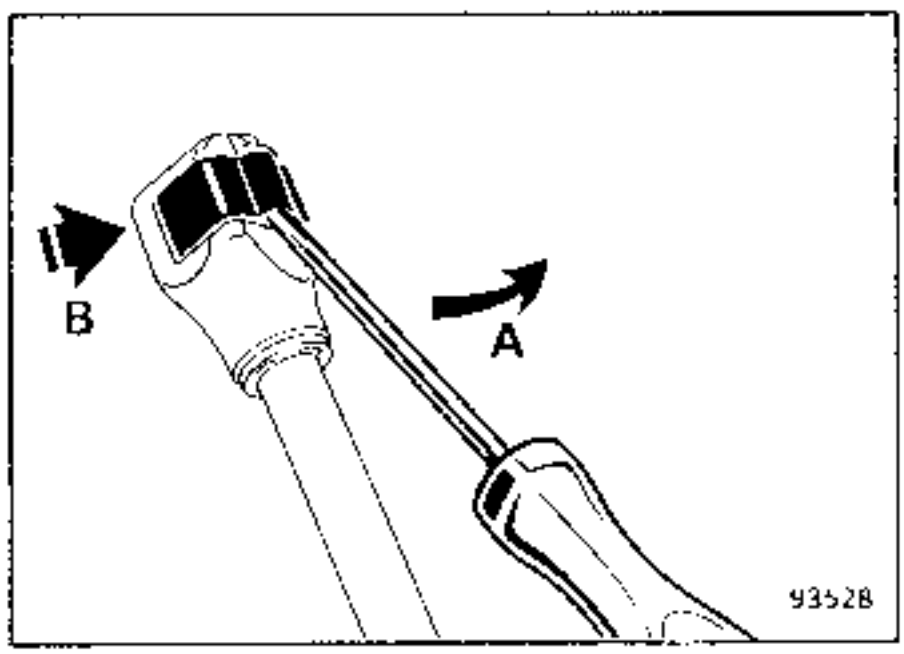
If the tailgate is to be replaced, the female hinge sections will either have to be retrieved from the old one or ordered separately as they are not supplied with the tailgate.

Note : To facilitate the adjustment of the tailgate, it is preferable to remove the hinge sections after removing the tailgate.

REMARK :

Before removing the hinge pins, mark which ends have the splines on them so that they can be removed in the correct direction.

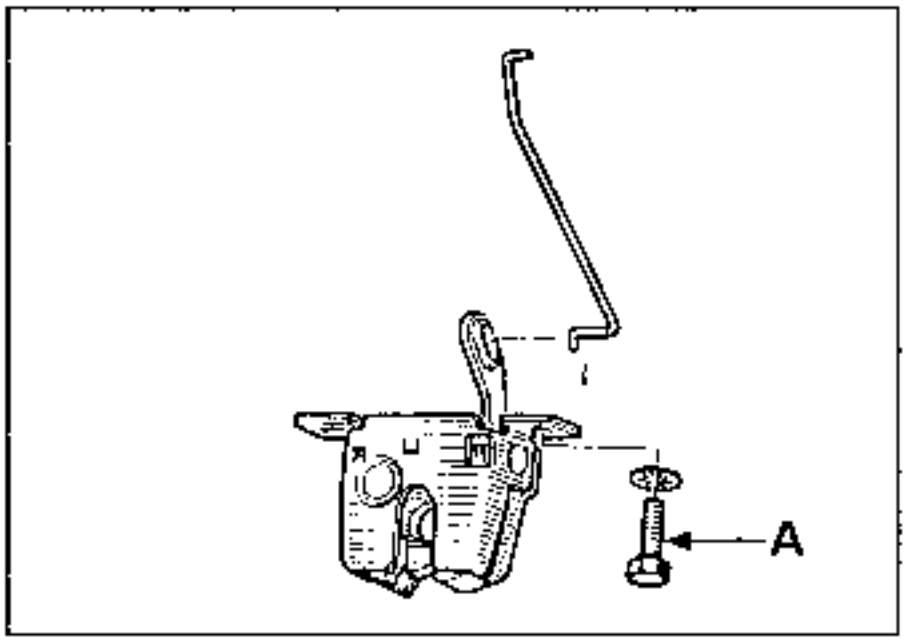




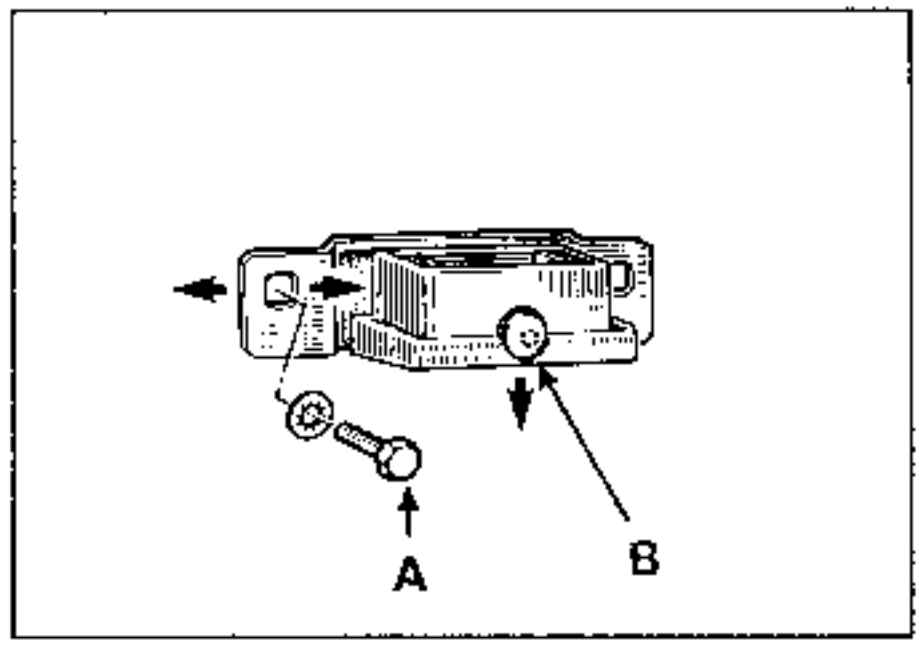
To remove the strut, lift up the metal clip (A), without removing it, using a screw-driver and lift the ball joint off its location.

If the clip breaks, the entire strut end fitting ref. 770 1024 613 will have to be replaced.

REMOVING

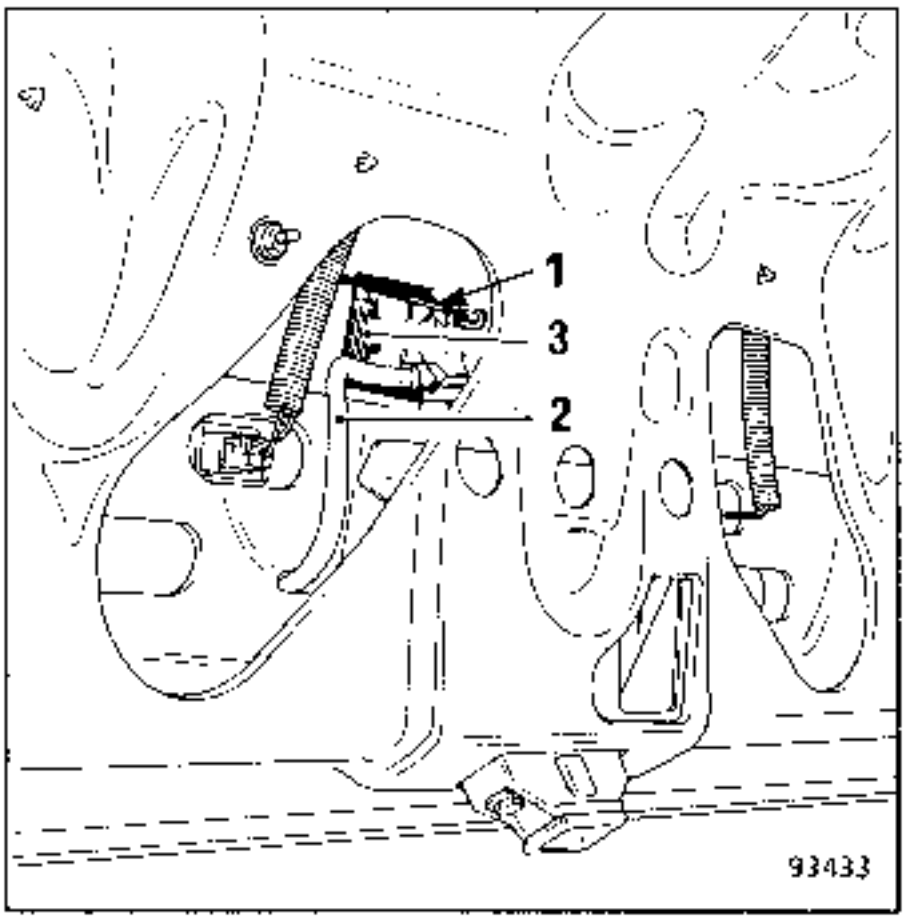


Remove the two bolts (A) and pull the lock, whilst swinging it, to release the control link.



Bolt A : sideways adjustment
Bolt B : height adjustment

Tailgate lock barrel



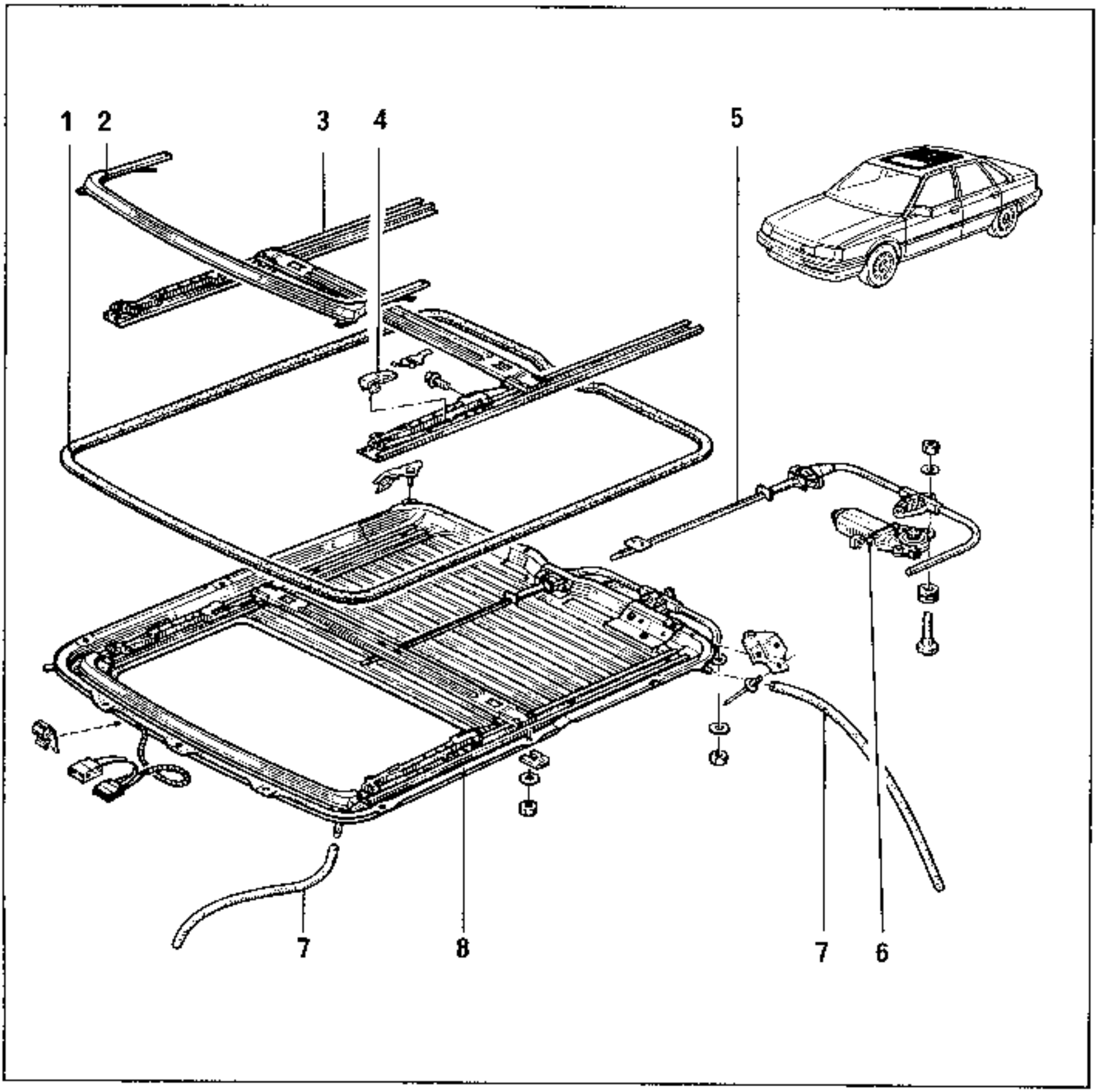
Unclip :

- The latch control link (1)
- The tailgate opening control link, which is connected to the lock..

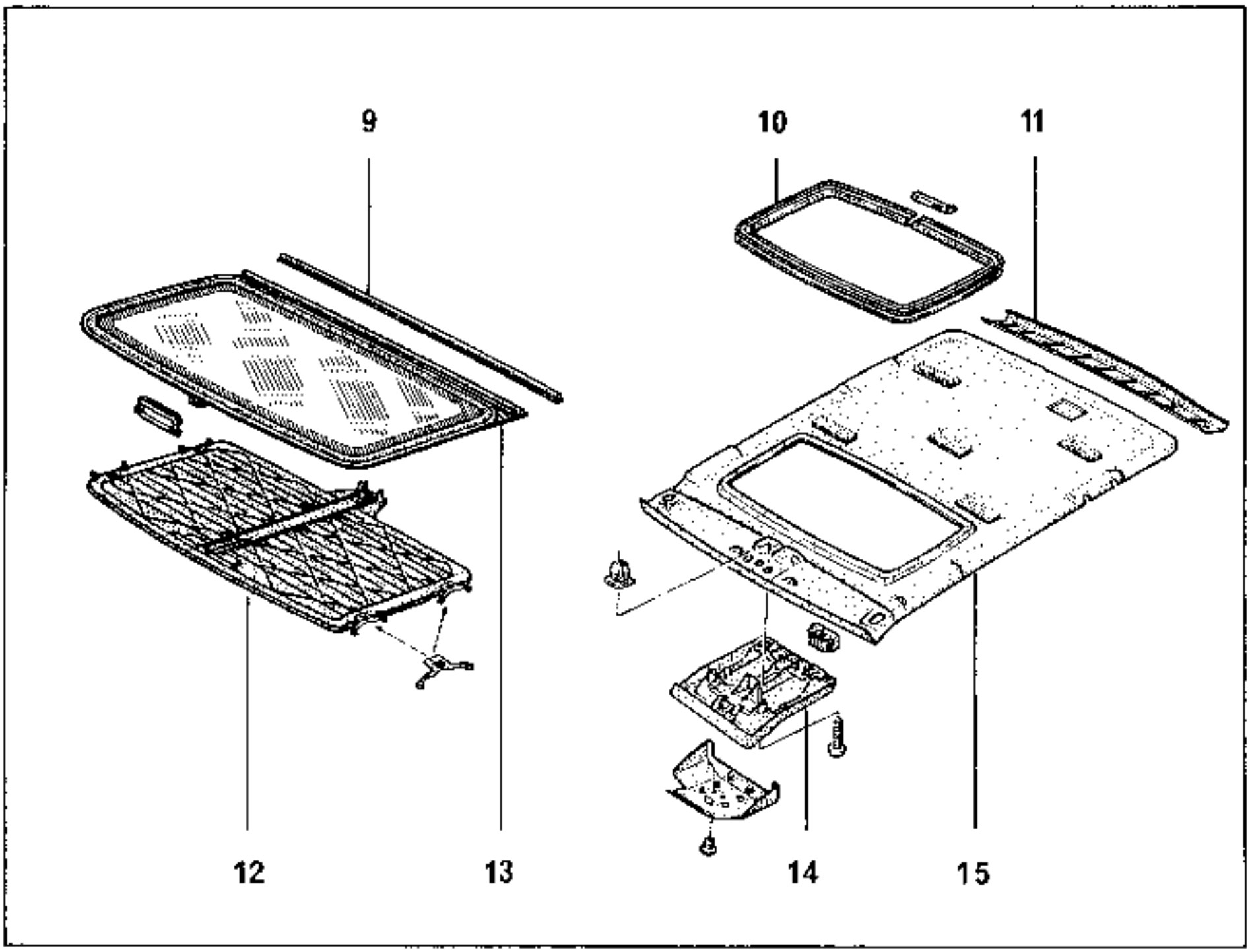
Disconnect the water drain pipe (2) and remove the clip (3) that secures the lock barrel in place.

Remove the lock barrel from outside the tailgate.

NAMES OF PARTS



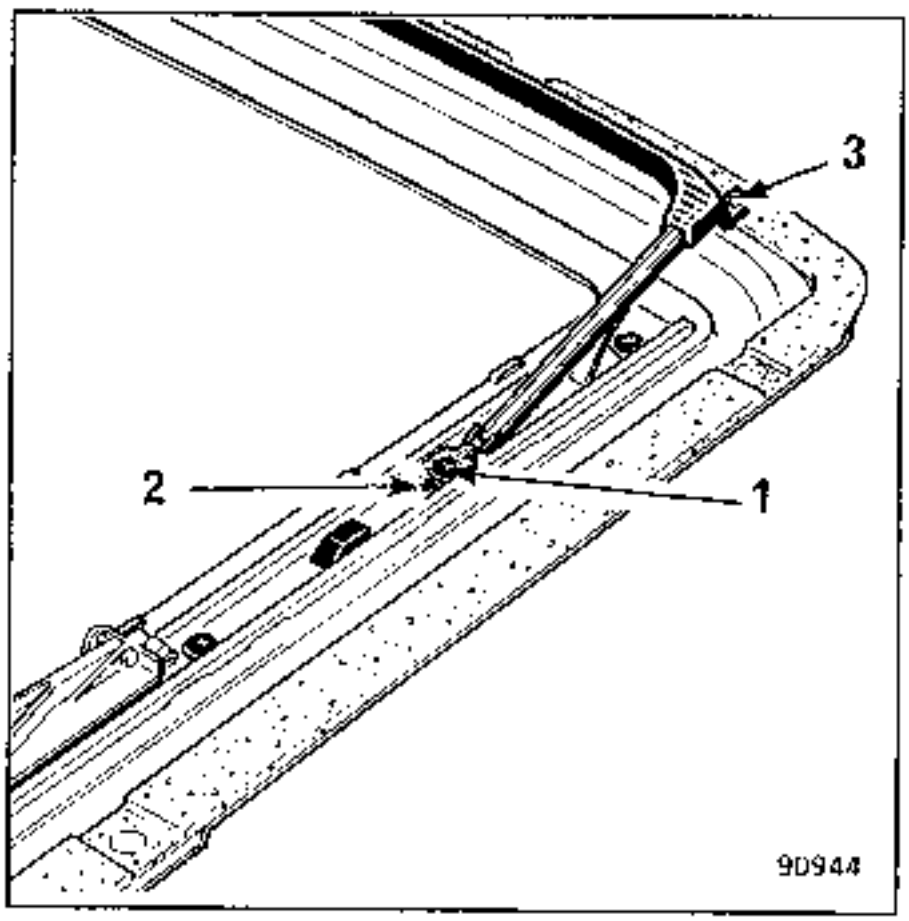
1 - Seal
2 - Deflector assembly
3 - Sun roof control
4 - Lifting ramp
5 - Control cable assembly
6 - Sun roof motor
7 - Water drain pipe
8 - Channel assembly



9 - Moving panel seal
10 - Finishing trim
11 - Roof rear crossmember trim
12 - Inner panel
13 - Moving panel glass assembly
14 - Roof console
15 - Headlining

AIR DEFLECTOR

REMOVING



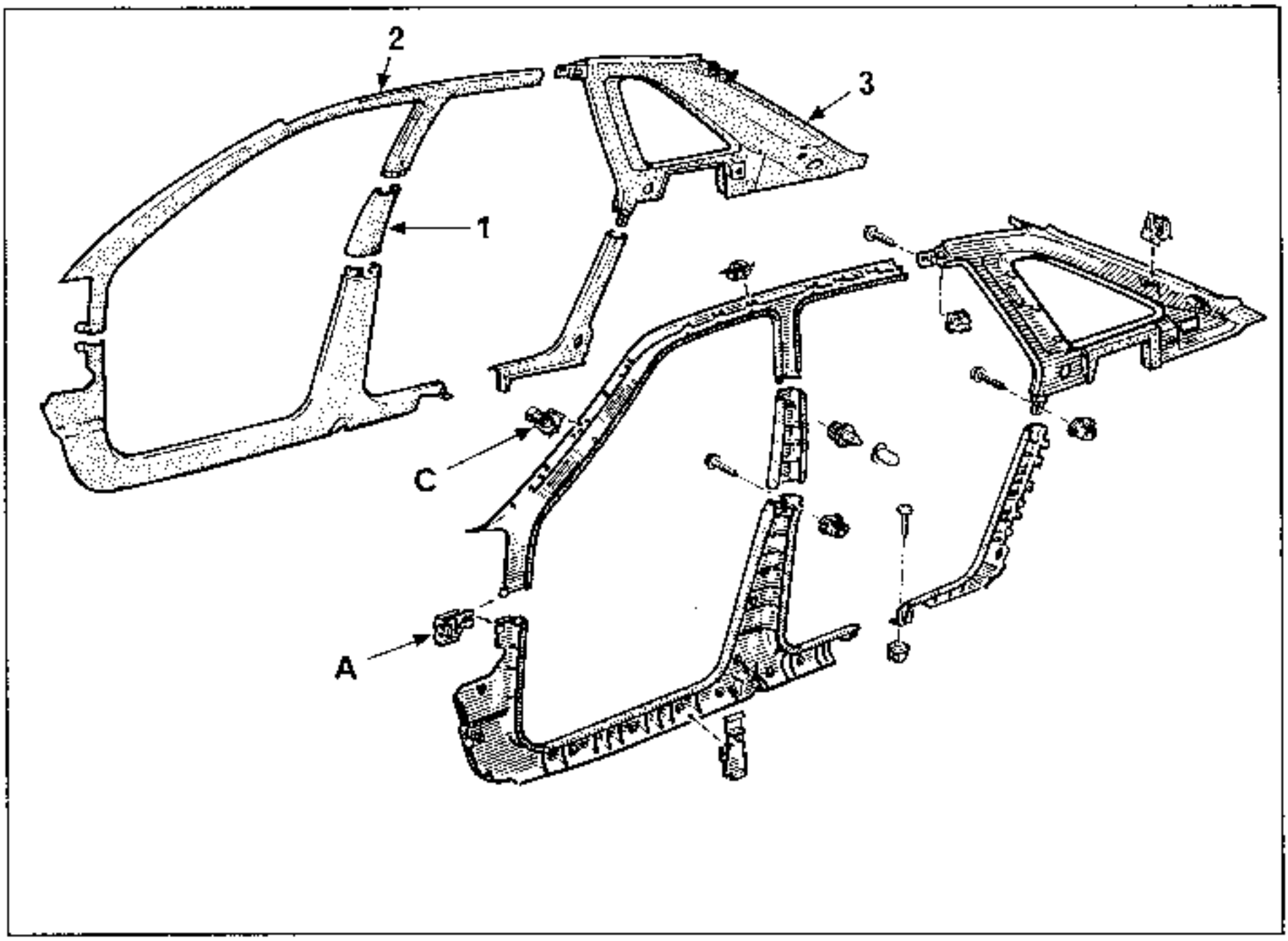
Place the moving panel in the "open" position.

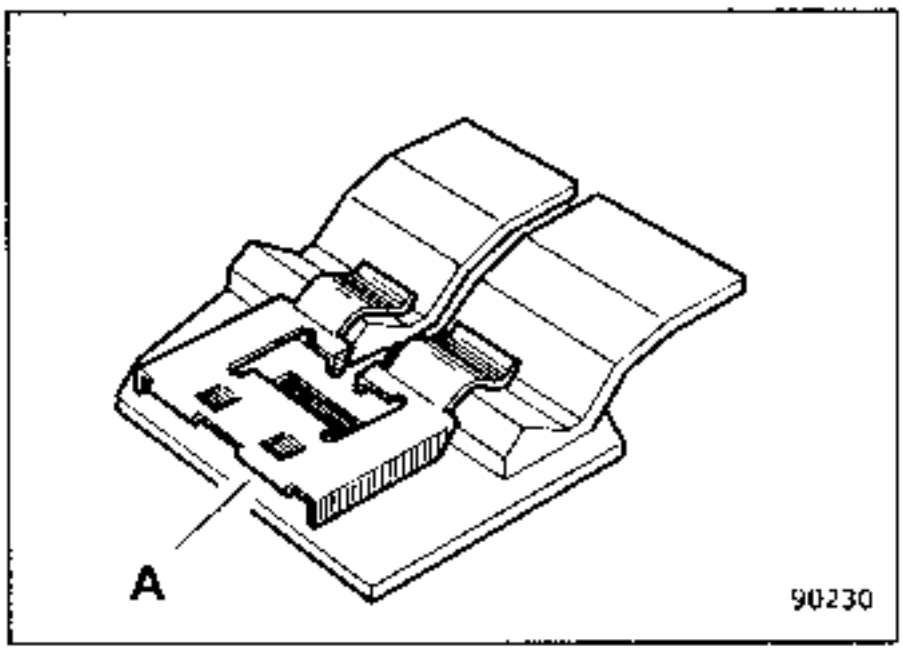
Remove the 2 screws (1) that secure the clips (2) in place.

Remove the deflector by freeing it from its stops (3).

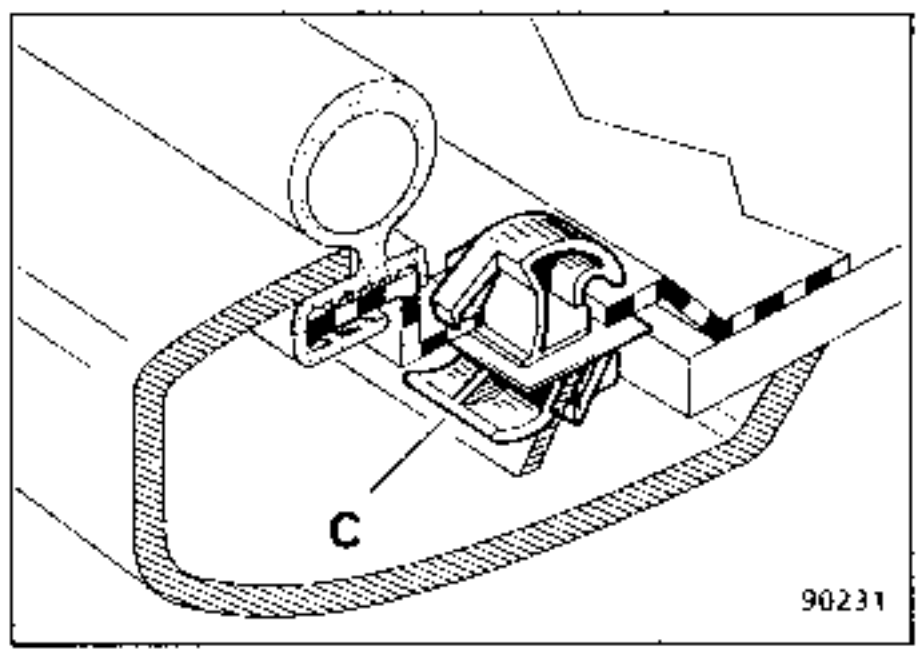
CHANNEL ASSEMBLY

REMOVING



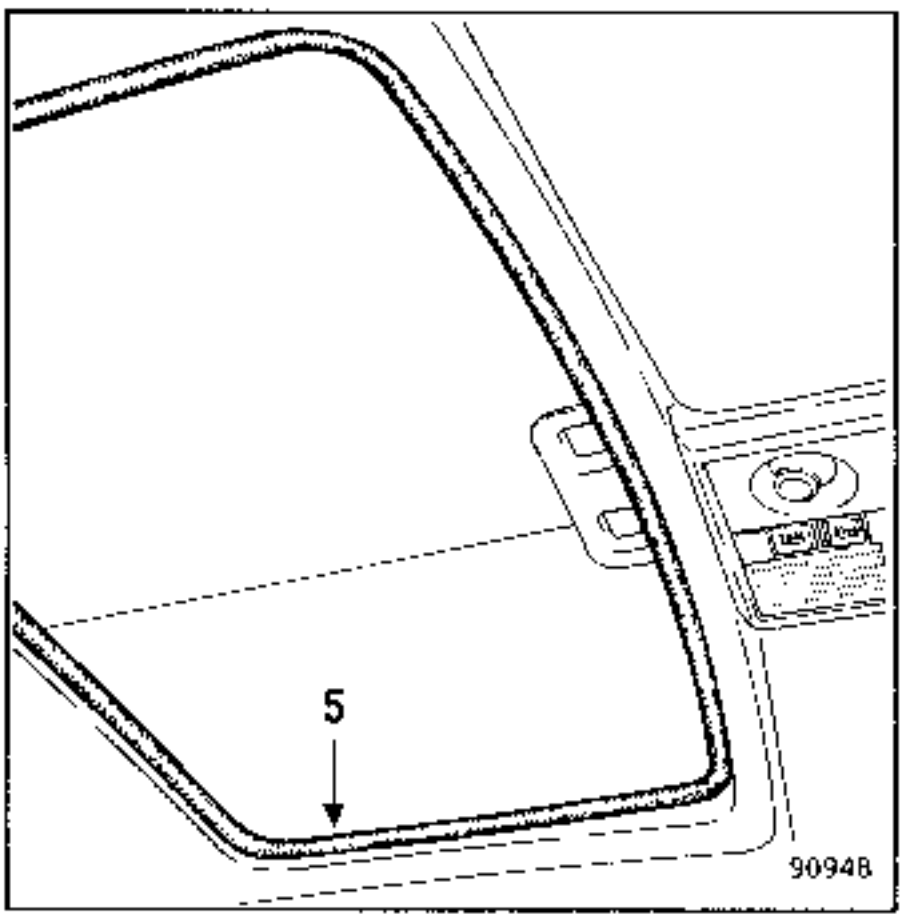


(A) Quick release fastening



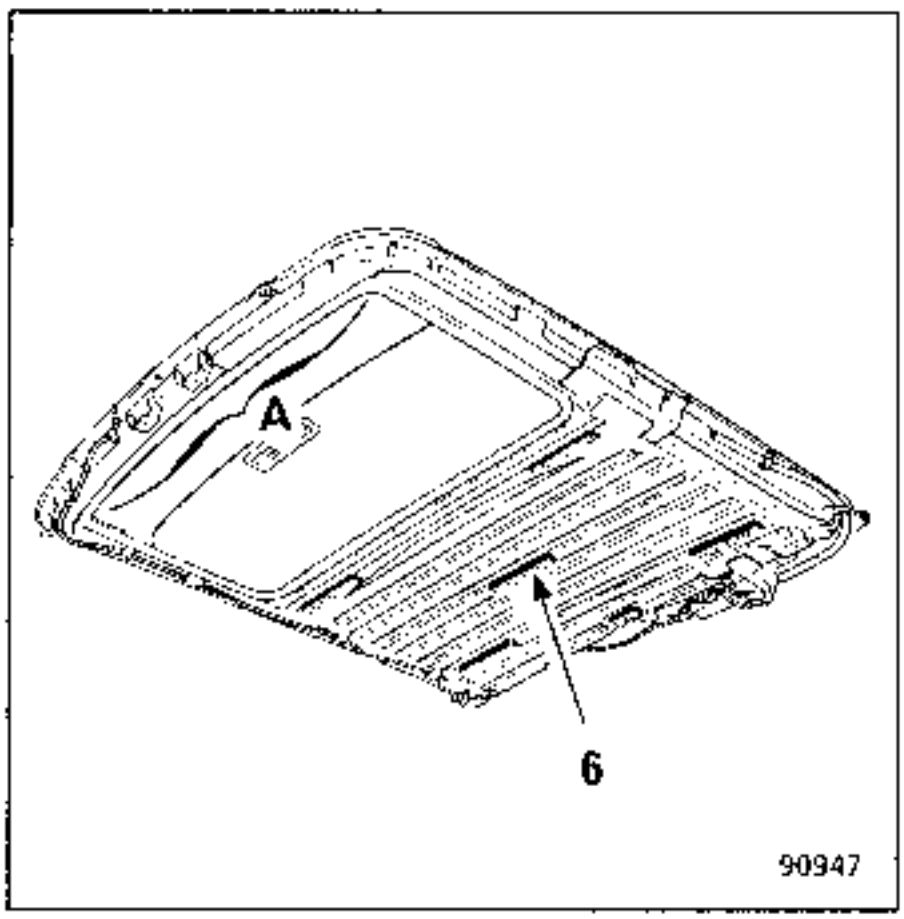
(C) Quick release fastening

Remove :
- The grab handles
- The body side interior trim pieces (1)(2)(3)
- The roof rear crossmember trim
- The roof console
- The sun vizors.



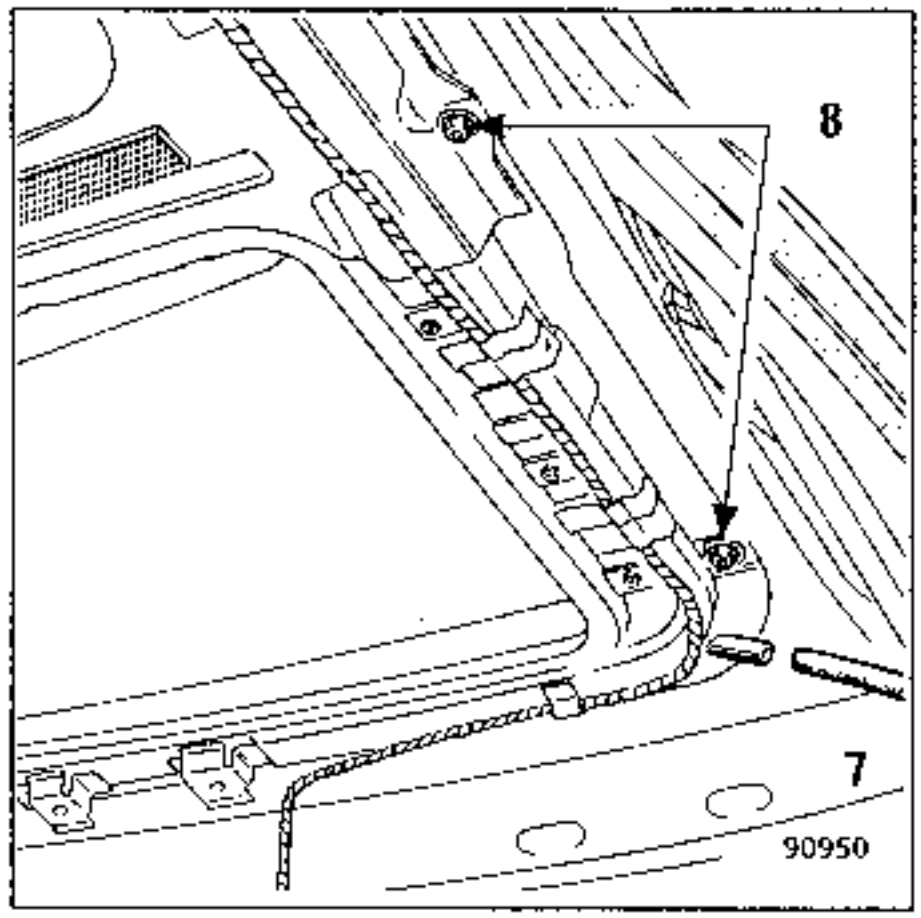
Open the inner panel and the glass.

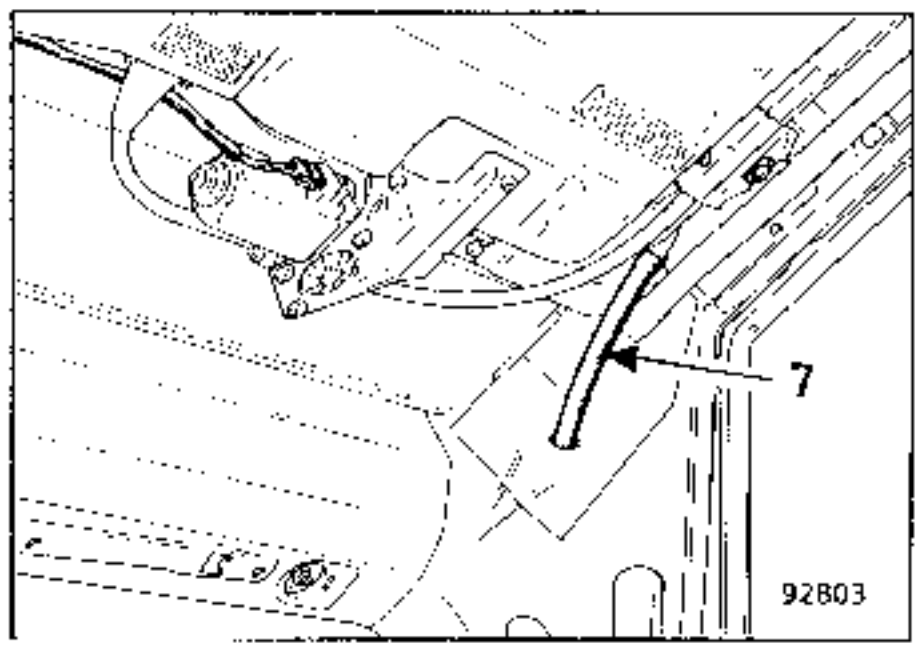
Remove the centre clip from the finishing trim (5).
Remove the trim with great care (it is a fragile component).



Remove the headlining. To do this, free the headlining with a cutter along section (A) and free the 6 "velcro" strips (6).

Take out the headlining through the tailgate frame.





Disconnect the motor supply connector.

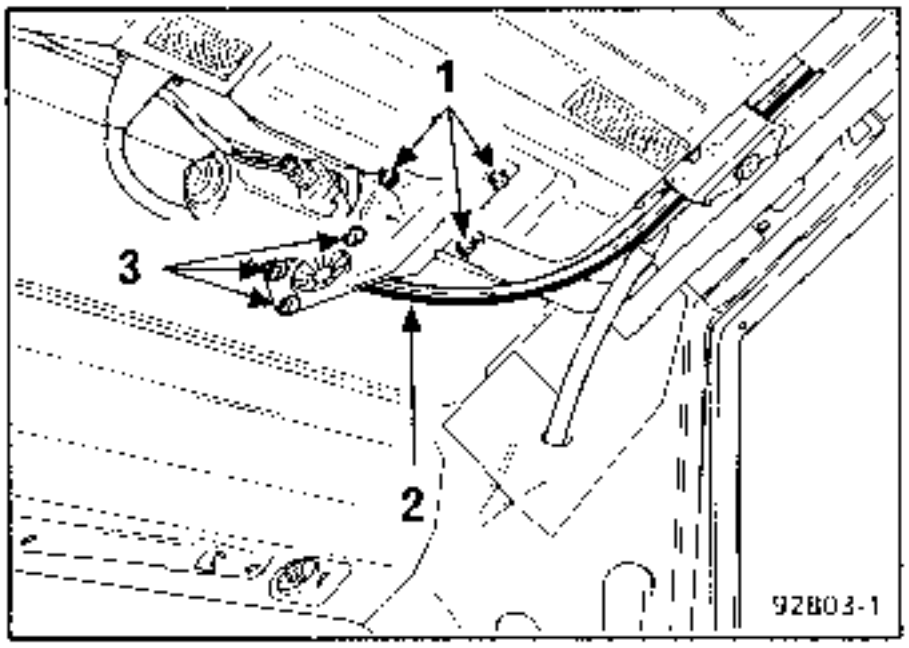
Disconnect the 4 water drain pipes (7).

Remove the 8 nuts (8) that secure the channel in place.

Take out the channel through the tailgate aperture.

MOTOR

REMOVING

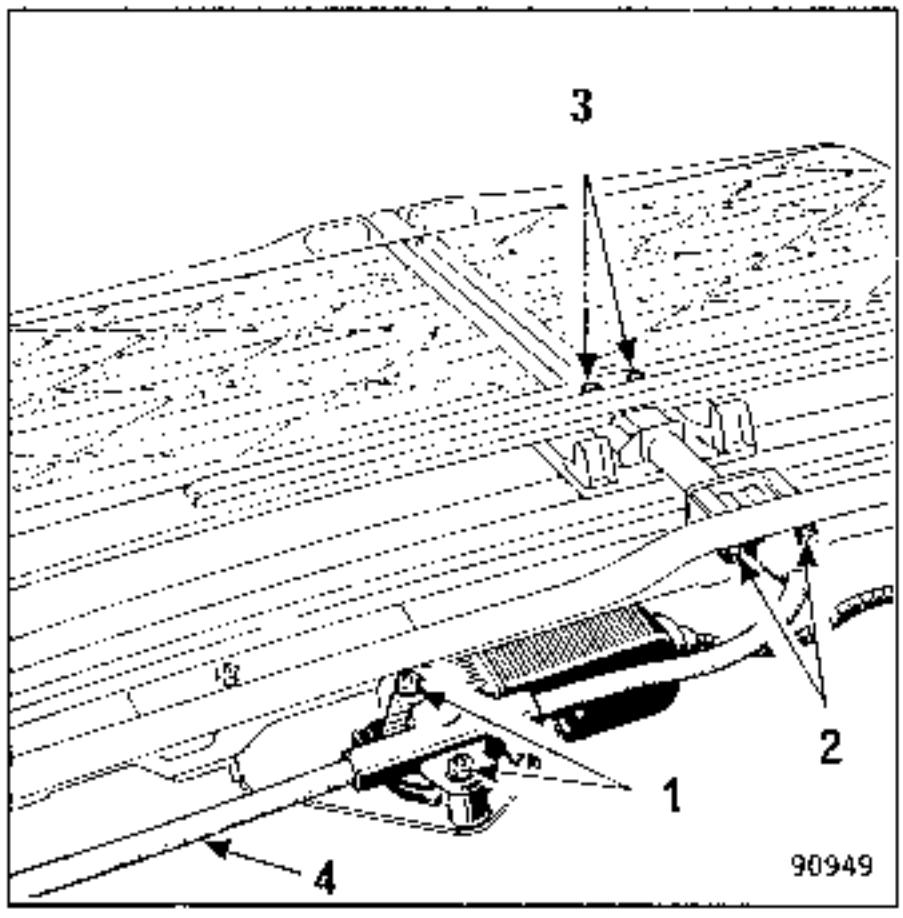


Disconnect the motor supply connector.
Remove the 3 screws (1) that secure the motor support plate.
Take out the drive cable (2) from its location.
Remove the 3 screws (3) that secure the motor to its plate.
Remove the motor by freeing it from the drive cable cover.

CONTROL CABLE ASSEMBLY

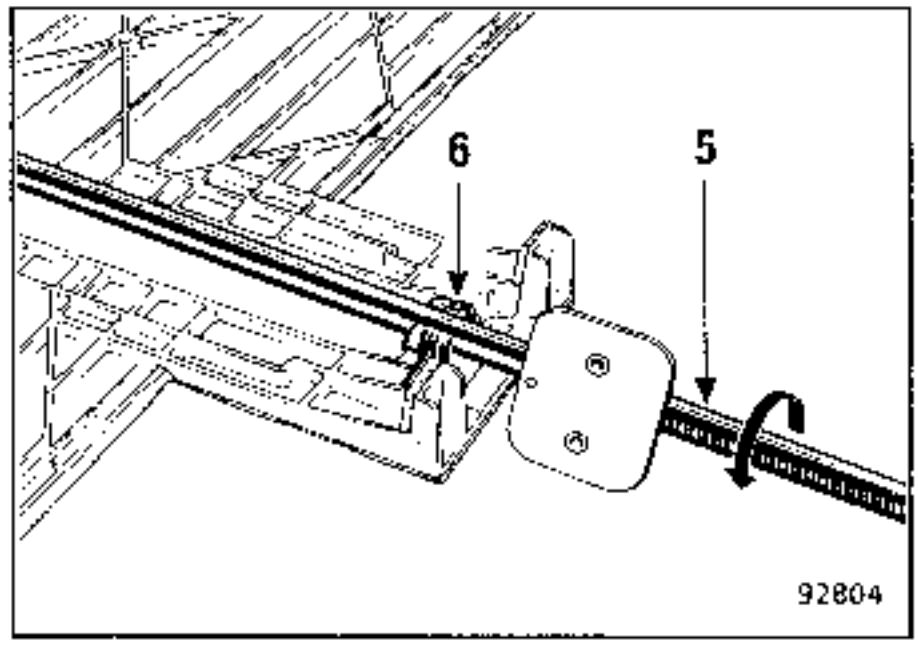
REMOVING

Note: To carry out this operation one must first remove the side channel.



Remove :

- the 2 nuts (1) that secure the cable to the motor.
- the 2 nuts (2) that secure its cover to the channel.
- the 2 screws (3) that secure the end of the cable to the centre crossmember.
- the cable cover (4) by freeing it from the control cable.

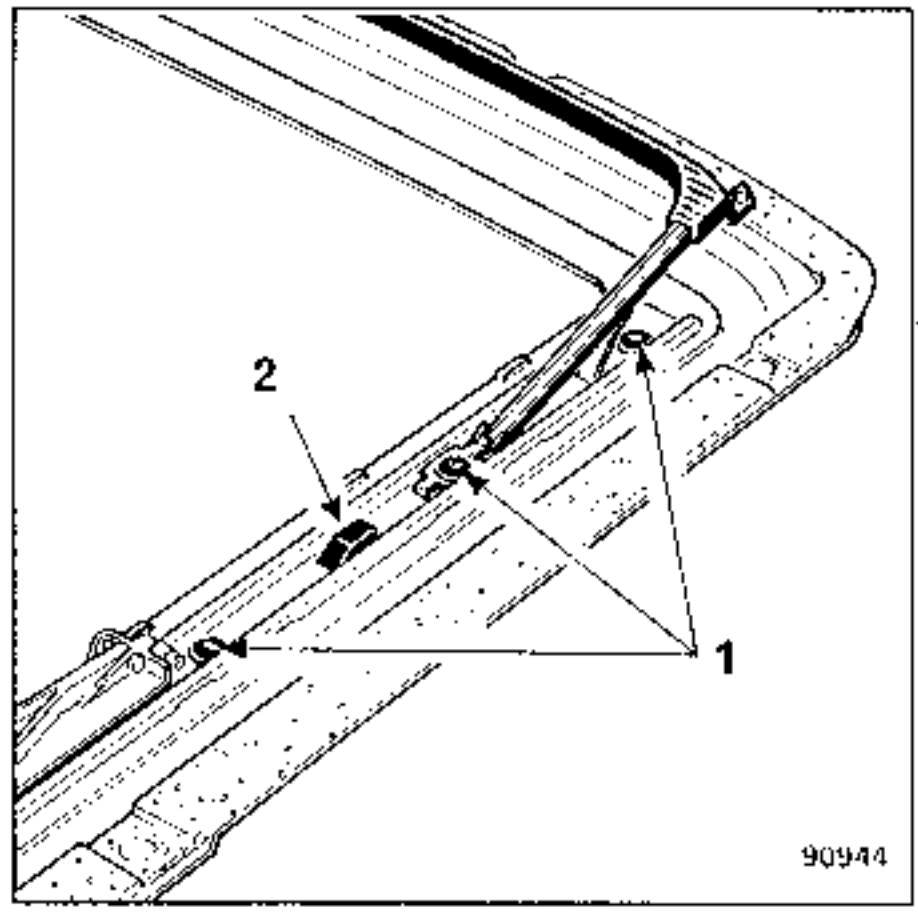


Swing the guide tube (5), on its centre line, round the hook (6) to separate it from the inside panel.

SUN ROOF CONTROL MECHANISM

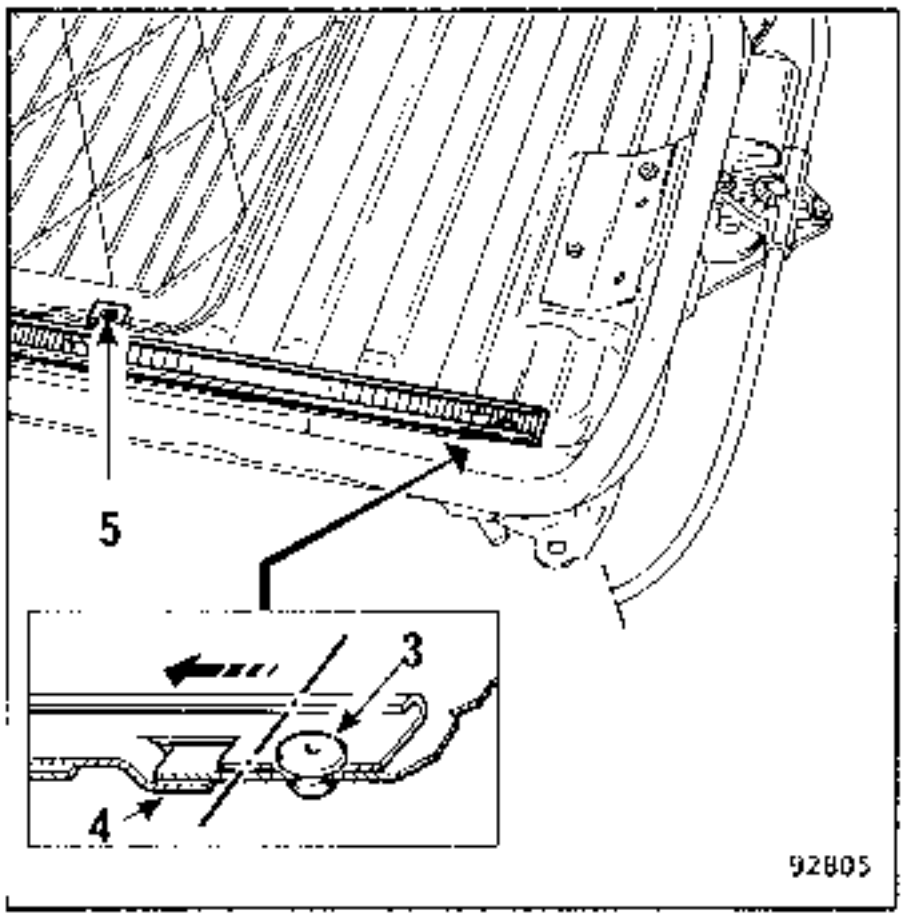
REMOVING

Note: To carry out this operation one must first remove the side channel



Bring the mechanism into the "open" position.
Remove the 6 screws (1) that secure the rails to the channel
Unclip the 2 lift ramps (2).

Remove the 2 screws that secure the control cable end to the mechanism centre crossmember.

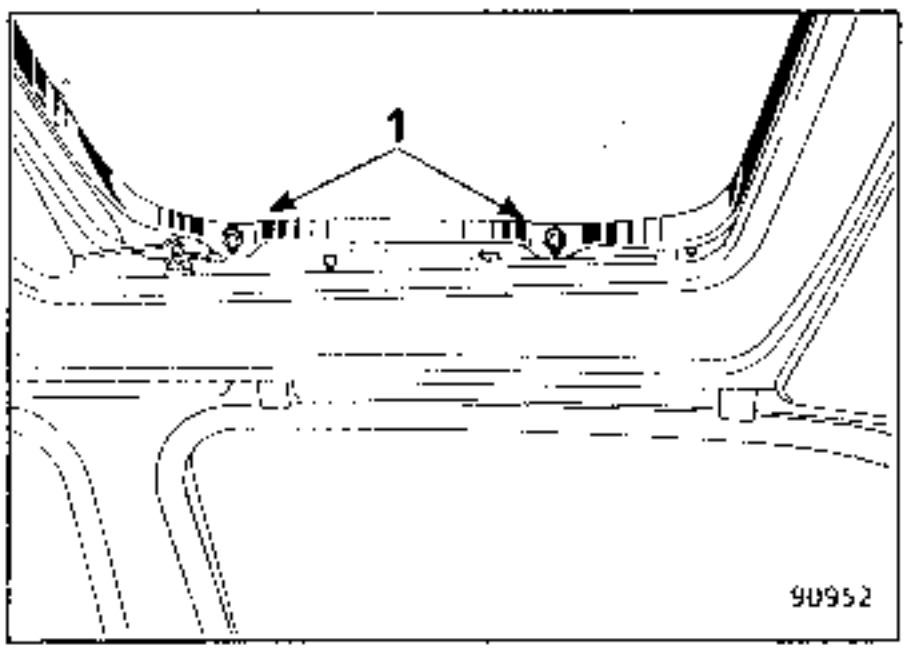


Drill out the 2 rivets (3) that secure the rear ends of the rails and remove the mechanism buy pulling the rails forwards to free the lugs (4).

Hold the inner panel as the mechanism is removed to release the guide springs (5).

MOVING PANEL GLASS ASSEMBLY

REMOVING



Close the glass.

Remove the 4 screws (1)(B.T.R. heads).
Move back the sun roof control system, electrically.
Tilt the glass slightly backwards and remove it from outside, in a forward direction.

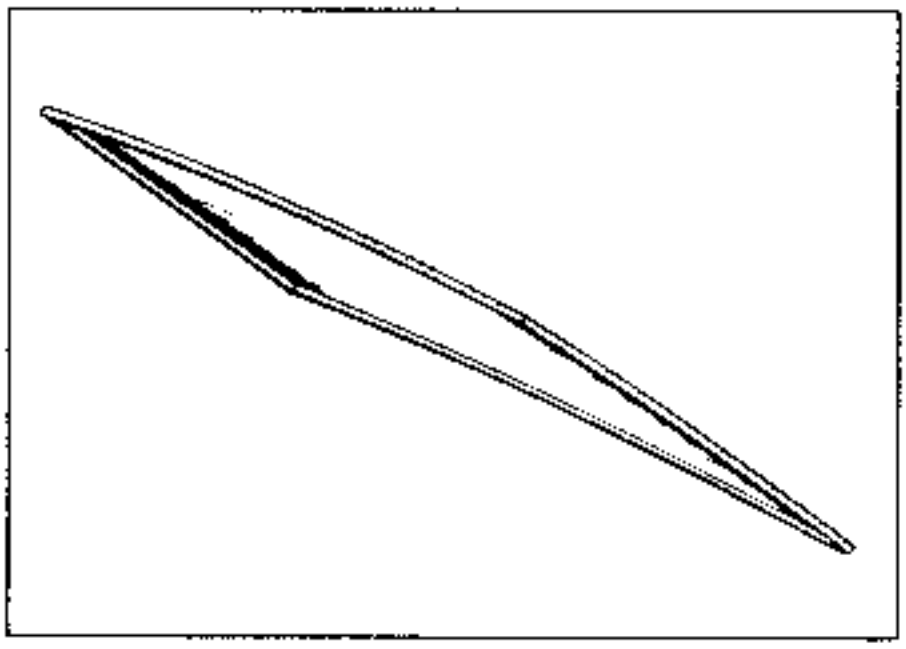
REFITTING and ADJUSTING

Place the glass assembly on the control mechanism and screw up the 4 screws (1) without tightening them.

Bring the control system into the closed position and adjust the moving panel to bring it flush with the roof.

Tighten the 4 screws.

Operate the sun roof a few times to check that it is still flush and readjust if necessary.



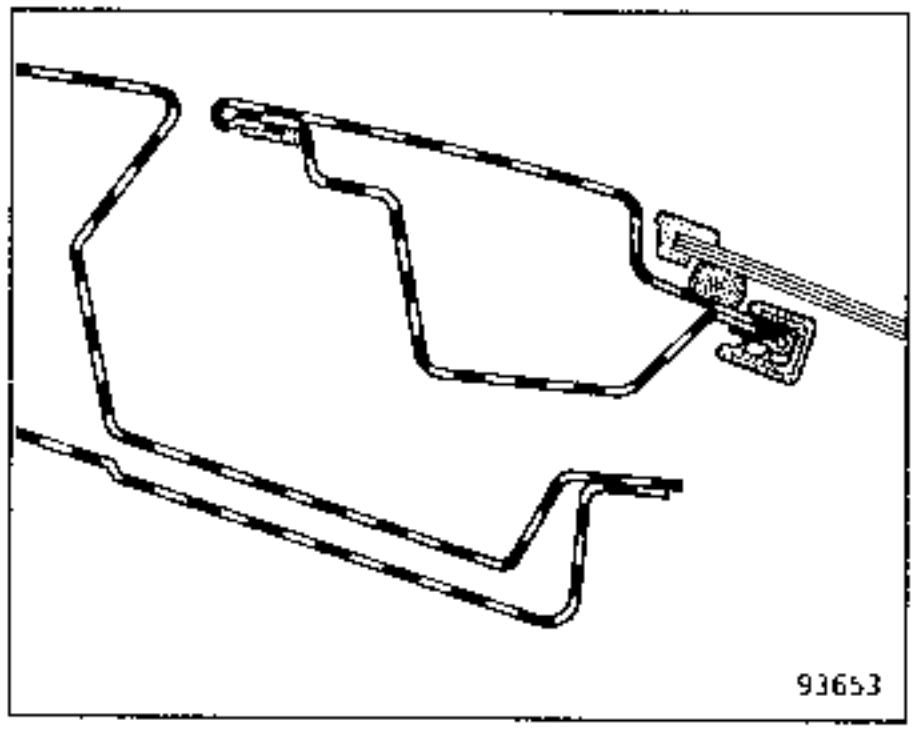
This screen is a moulded assembly, that is to say the trim is moulded into its periphery. It is impossible to separate the trim piece from the glass.

REMOVING

One of two methods can be used to cut the fillet of bonding mastic. In each case, carry out the operation very carefully to avoid damaging the moulding.

Method 1

Disconnect the wires that supply the heating element. Remove the overflow seal. The seal may have to be pulled very hard to remove it from the surround if it is embedded in th e bonding mastic. Apply adhesive tape to the edges (upper and lower) of the tailgate.

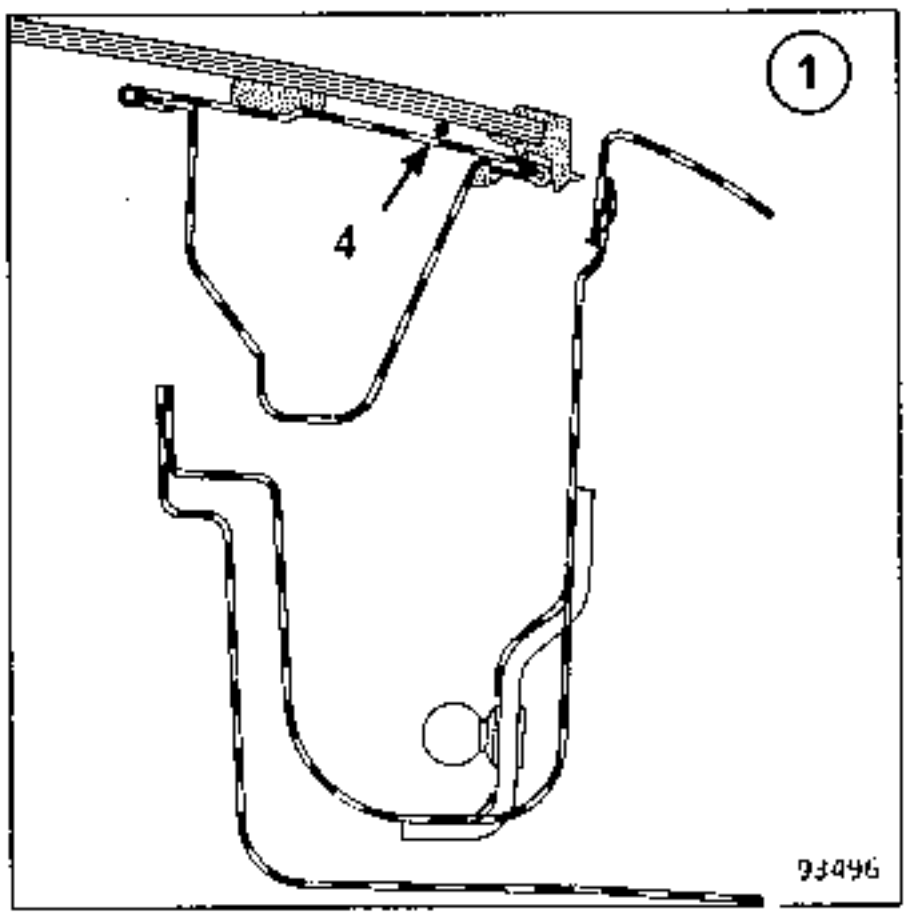


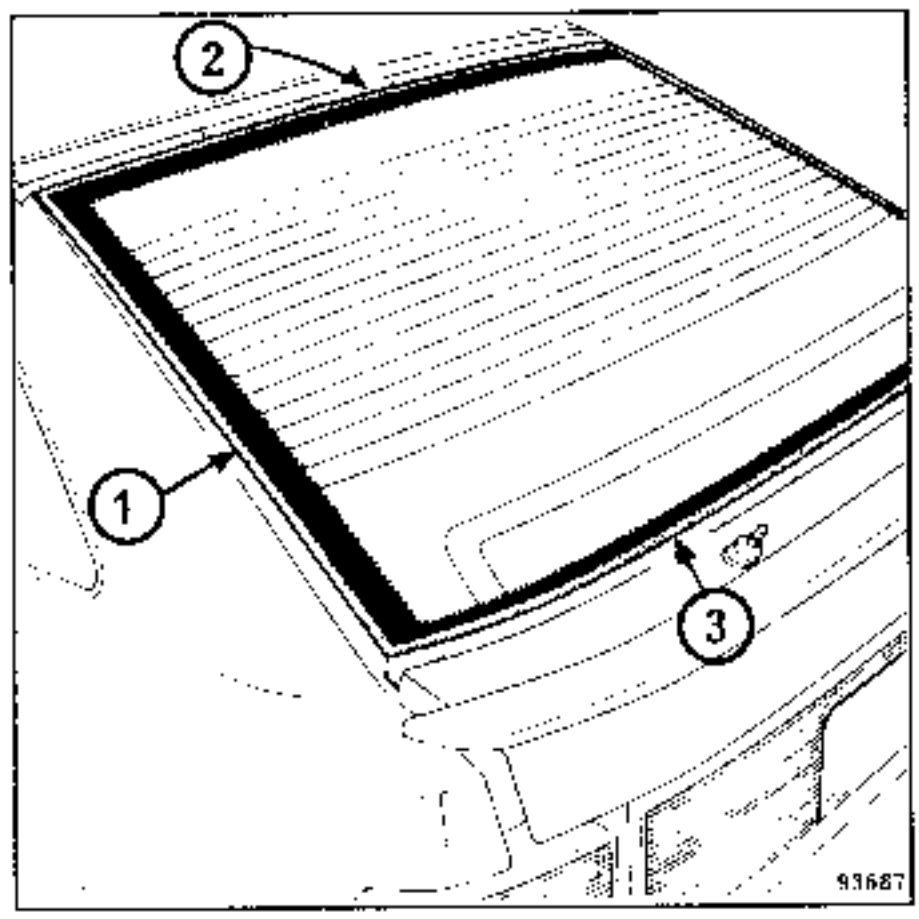
Check, along the edges (upper and lower) whether there is enough clearance between the moulding and the surround to pass a cutting wire between them. If there is not, use method 2.

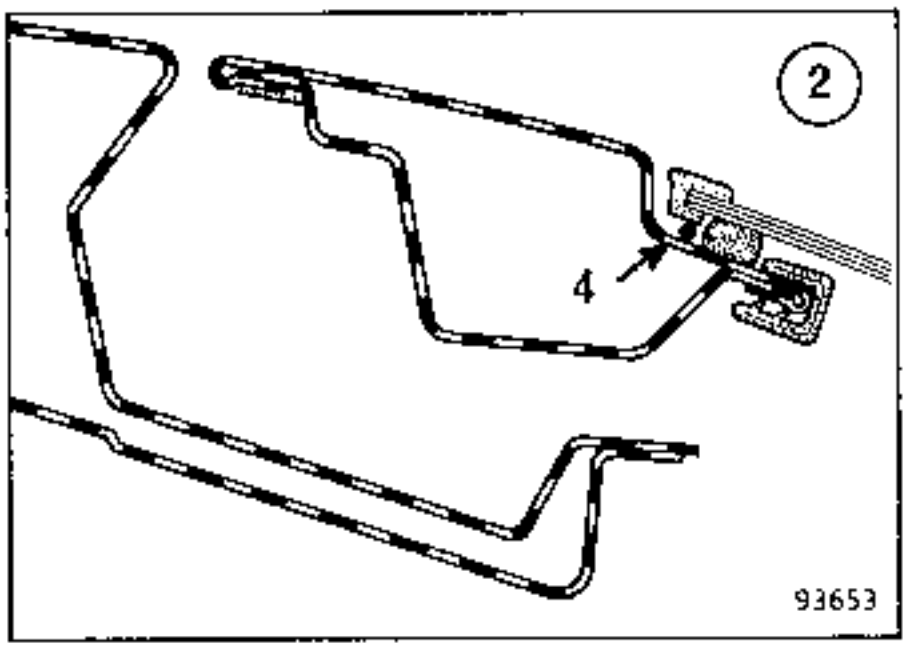
Pass a length of cutting wire through the mastic fillet, at one of the upper corners.

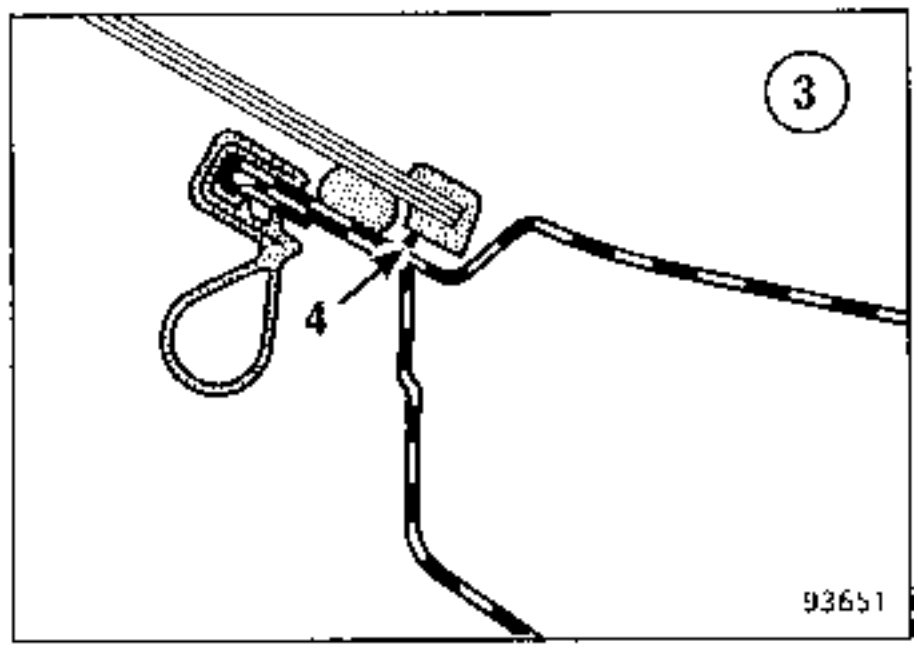
Cut the m astic fillet, finishing at the lower corner on the opposite side.

Method 2





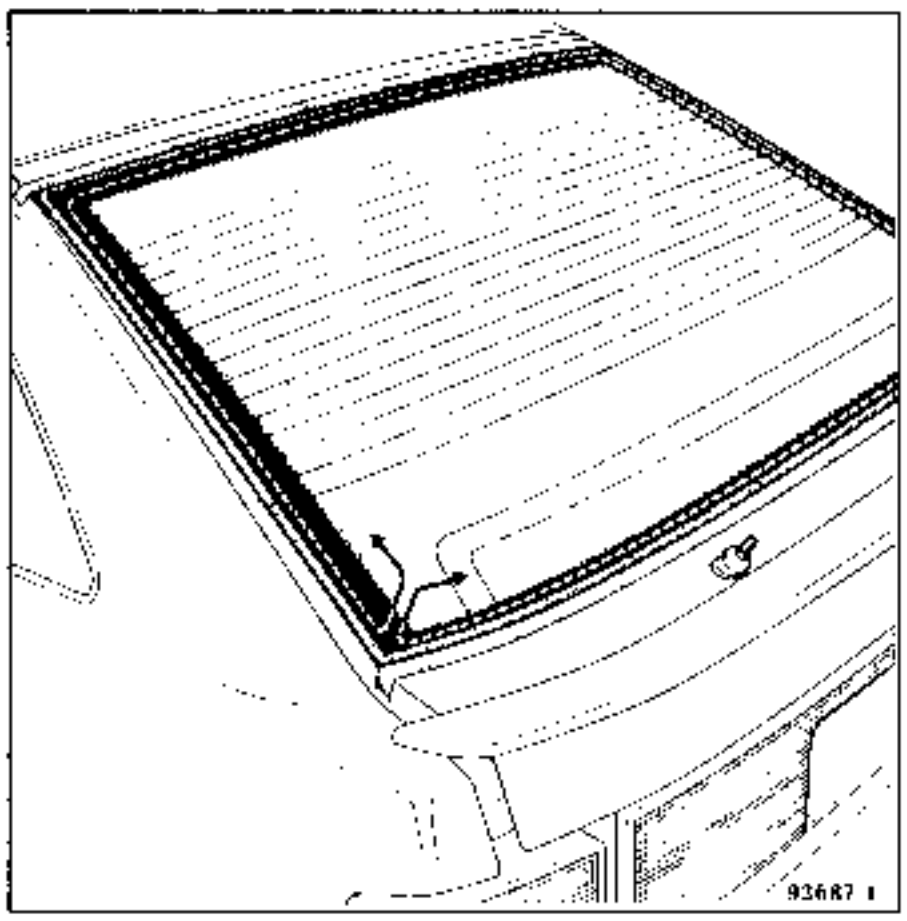




Take a length of cutting wire 5 m long.

At one of the lower corners, pass one end of the wire, approximately 15 to 20 cm long, through the mastic fillet, from the outside inwards.

From the outside, push the wire (4) under the moulded trim, around the entire periphery of the rear screen. Apply pieces of adhesive tape at regular intervals around the periphery to prevent it coming out.



After passing round the entire periphery of the screen, push the other end of the wire through the mastic fillet as shown in this illustration.

From inside the tailgate, fit the pulling handle and the wire retaining tool.

Cut through the mastic fillet without changing the position of the wire retaining tool.

Progressively, as the fillet is cut, reduce the length of the wire at the handle and ensure that the wire is passing correctly under the trim so as not to damage the moulding.

REFITTING

Cleaning the frame

Using a spatula approximately 20 to 25mm wide, sharpened to form a cutting edge, cut and smooth down the mastic to leave a thickness of between 0.5 and 1mm of mastic on the frame.

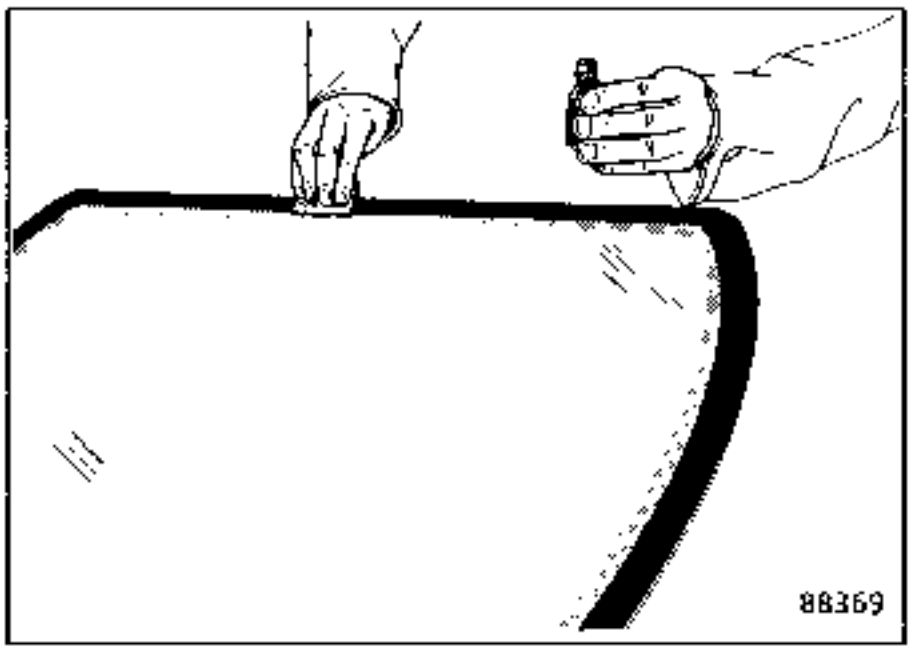
Note: It is essential to leave a film mastic on the frame to act as a support to the new fillet.

Remove all mastic residues and dust from the frame by blowing it off with compressed air.

Note: Use only dry air that is free from all traces of oil.

It is a general rule that no cleaning or degreasing product is to be applied to the mastic film.

Preparing the new glass



Carefully clean the enamelled surface around the entire periphery of the glass.

1-If possible, use demineralised water dry it with a clean dry cloth.

2-Then use the degreasing agent applied with the special cloth which forms part of the kit.

Apply the glass primer over the entire enamelled area along the upper and lower edges and over a 30mm strip in the centre of the enamelled area down the sides.

Preparing the frame

Apply the panelling primer to those areas where the film has been damaged back to the bare metal during the removing or cleaning operations.

Fit a new overflow seal to the frame, knocking it in place with a mallet.

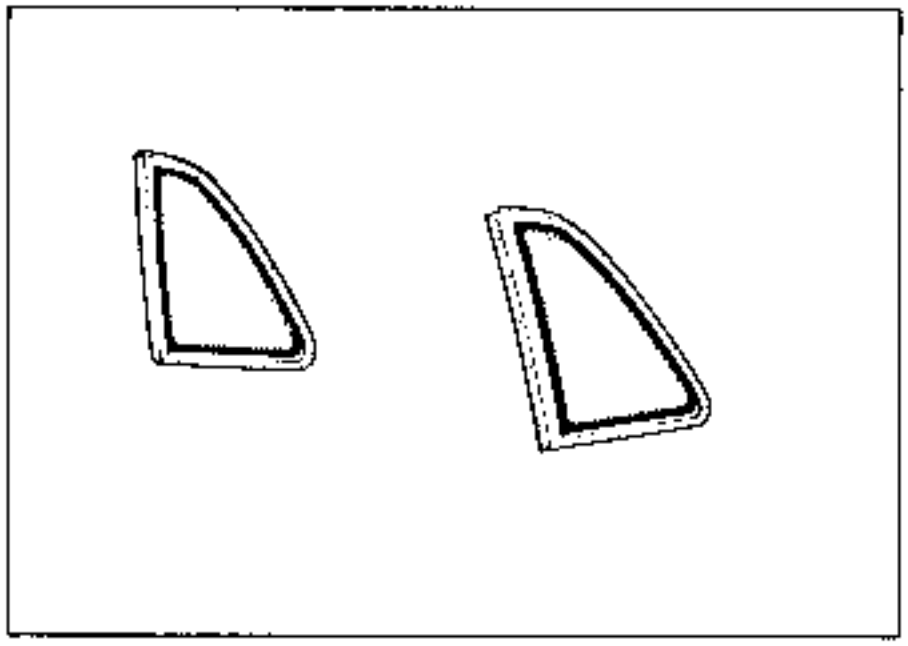
Fitting the glass

Apply a triangular section fillet of bonding mastic to the glass.

Apply the mastic along the centre of the primed strip. Smooth down the joint at the ends of the fillet with a spatula.

Holding it with suction pads, fit the rear screen, centralising it, laterally. Reconnect the heating element terminal tabs.

Note: The vehicle must not be moved for at least 3 hours. We strongly recommend you should use this time to run water over the periphery of the rear screen, on one hand to detect any leaks and on the other because water accelerates the polymerisation of the mastic.



These lights are moulded, that is to say the trim is moulded on to the periphery of the glass. It is impossible to separate the trim from the glass.

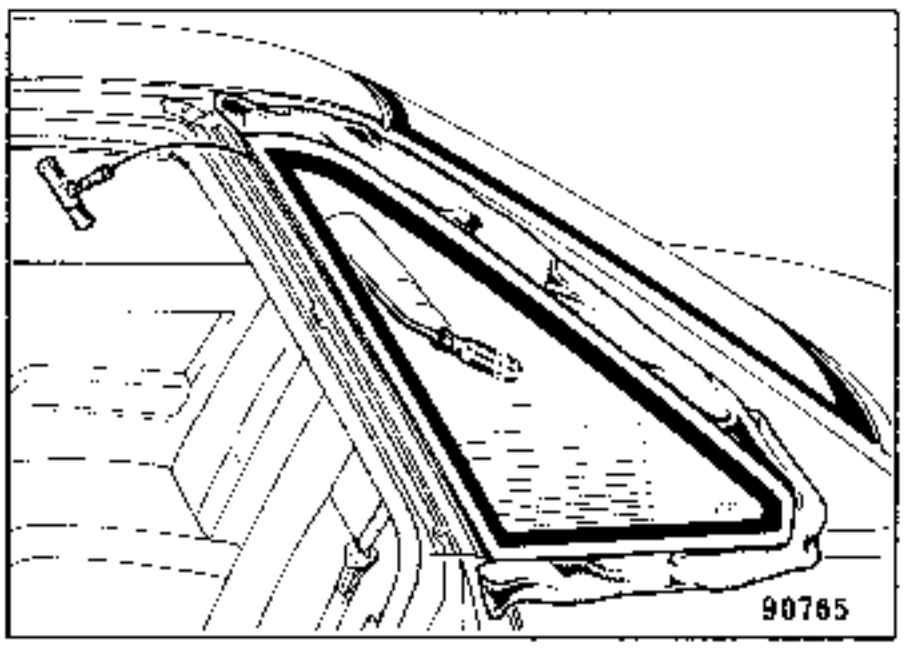
REMOVING

One of two methods can be used to cut the bonding mastic. In each case, take great care to avoid damaging the moulding.

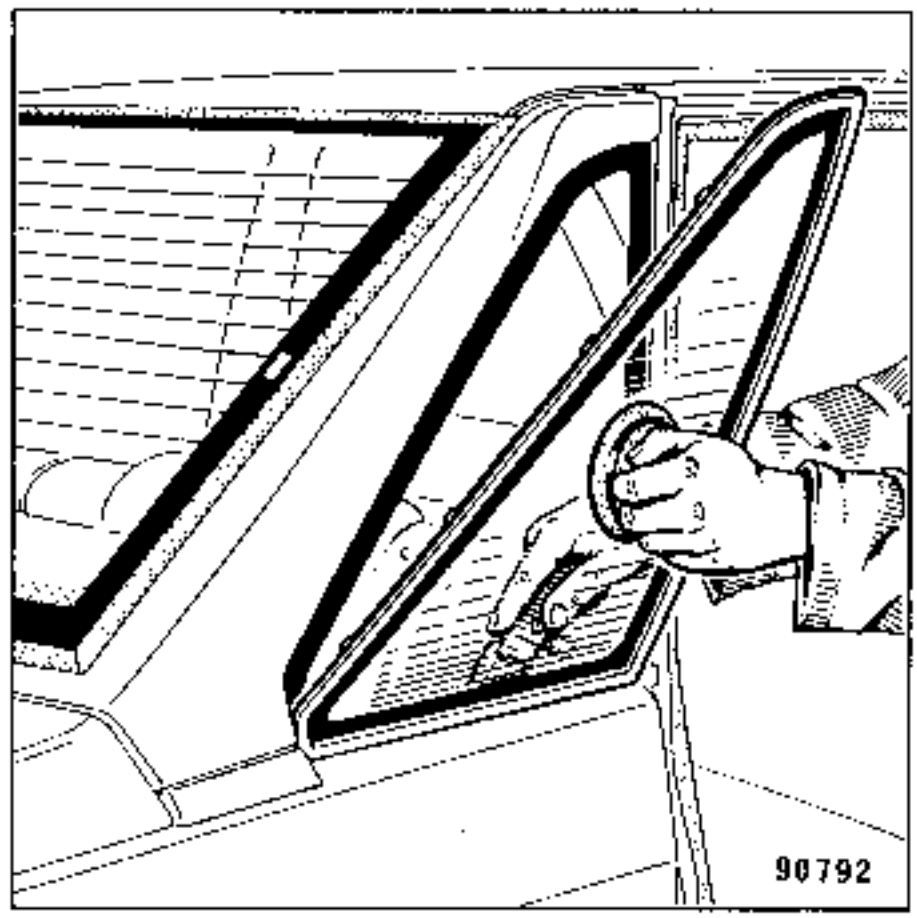
Method 1

Remove the quarter panel trim. Partially free the double seal.

Protect the bodywork round the entire periphery of the glass with wide adhesive tape.



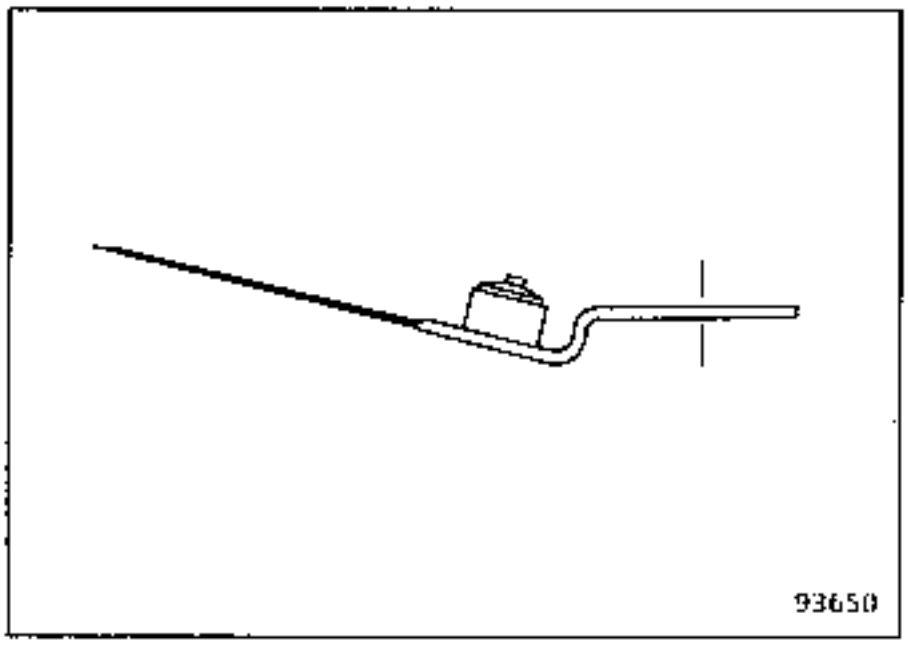
Pass a piece of steel wire approximately 30cm long through the mastic fillet in the upper corner. Fit the wire retaining tool and the pulling handle. Cut the mastic fillet in the direction shown on the illustration



After having cut down the 2 sides, swing out the glass and, with a sharp blade, cut through the remaining mastic.

Method 2

The quarter light can also be removed with the **FEIN** electric knife. In this case use blade
Suppliers reference : KM 4[illegible]05-09/ (see MR 500 for address)
Supplier : KENT MOORE UK LTD



Sharpen the blade whilst running the machine in position 2.

Remove the quarter panel lining. The light is cut out from inside the vehicle. Start the cut by inserting the blade through the mastic fillet (with the machine running in position 2).

Cut the mastic whilst varying the power of the machine to suit the load required to cut the mastic.

Note: It is very important for the blade to be sharp. Each blade must be sharpened before it is used.

REFITTING

Cleaning the frame

Using a spatula approximately 20 to 25mm wide, the edge of which has been sharpened, cut and smooth down the mastic fillet to leave a film of approximately 0.5 to 1mm thick round the frame.

Note :It is essential for a film of mastic to be left on the frame to act as a support for the new fillet.

Remove all residues of mastic and dust from the frame with a compressed air gun.

Note: Use only dry air free from all traces of oil.

The general rule is that no cleaning or degreasing product is to be applied to the mastic film.

Preparing the new glass

Carefully clean the enamelled area around the entire periphery of the glass.

1-If possible use demineralised water, wiping it with a clean dry cloth.

2-Then use the degreasing agent applied with the special cloth which forms part of the kit.

Apply glass primer to the enamelled surface with the special pad.

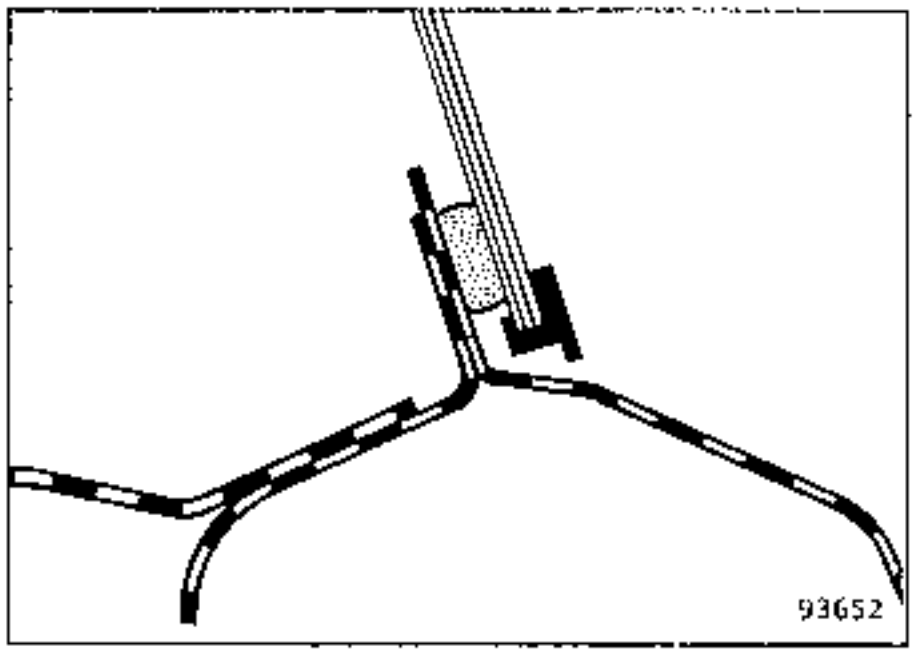
Preparimg the frame

Apply panelling primer to those points where the film has been damaged back to the bare metal during removing or cleaning.

Fitting the glass

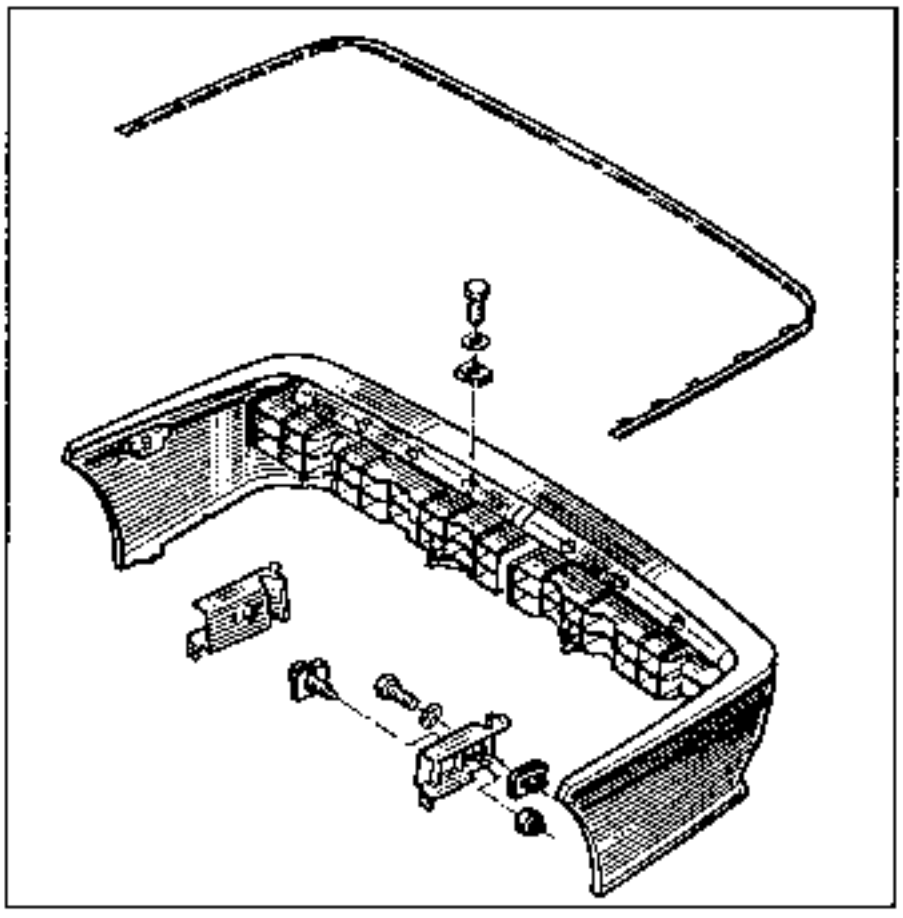
Apply a triangular section fillet of bonding mastic around the glass.

Use the edge of the moulding to guide the cartridge nozzle.
Smooth down the joint at the ends of the fillet.
Using a suction pad, fit the glass into its frame.

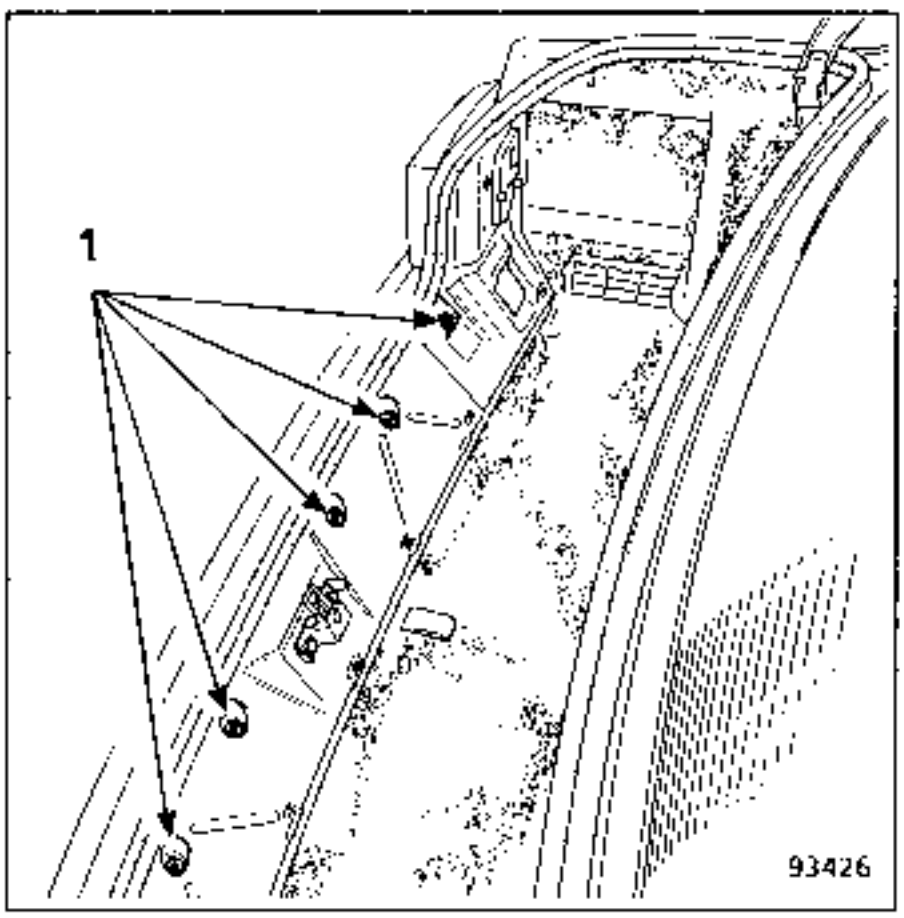


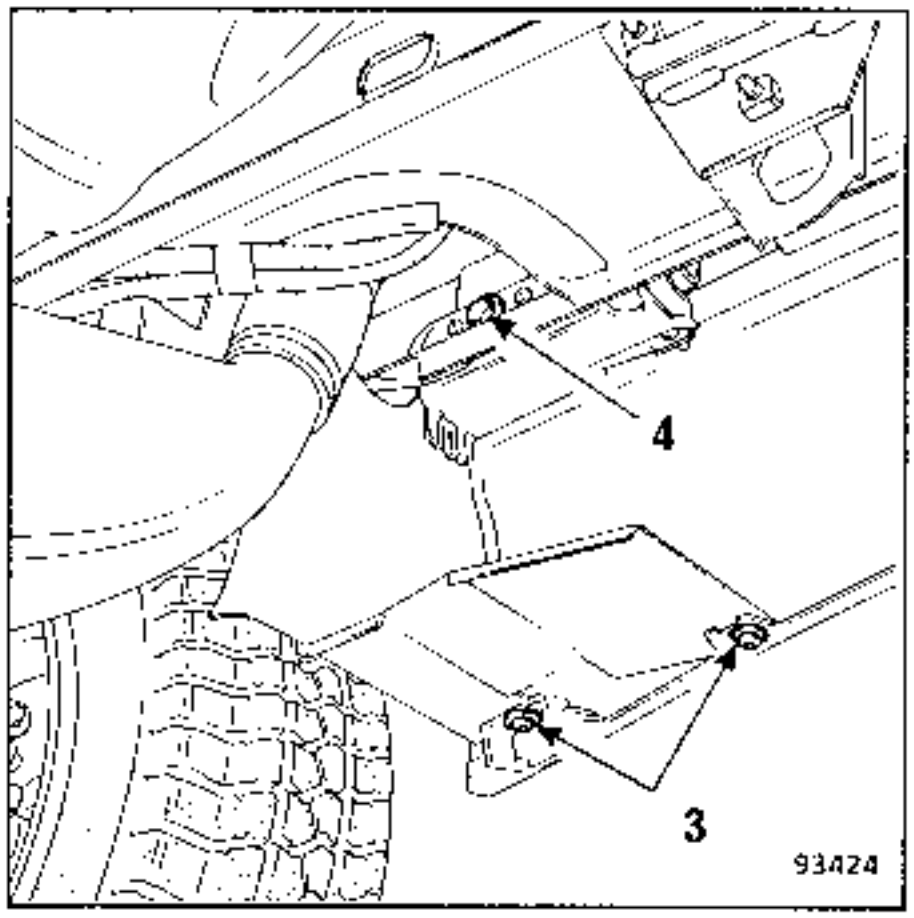
Centre-up the glass to obtain a clearance of 2mm between the edge of the moulding and the side panel.

Note: The vehicle is not to be moved for at least 3 hours. We strongly advise you to use this time to run water over the periphery of the quarter light on one hand to detect any leaks and on the other hand because water accelerates the polymerisation of the mastic.



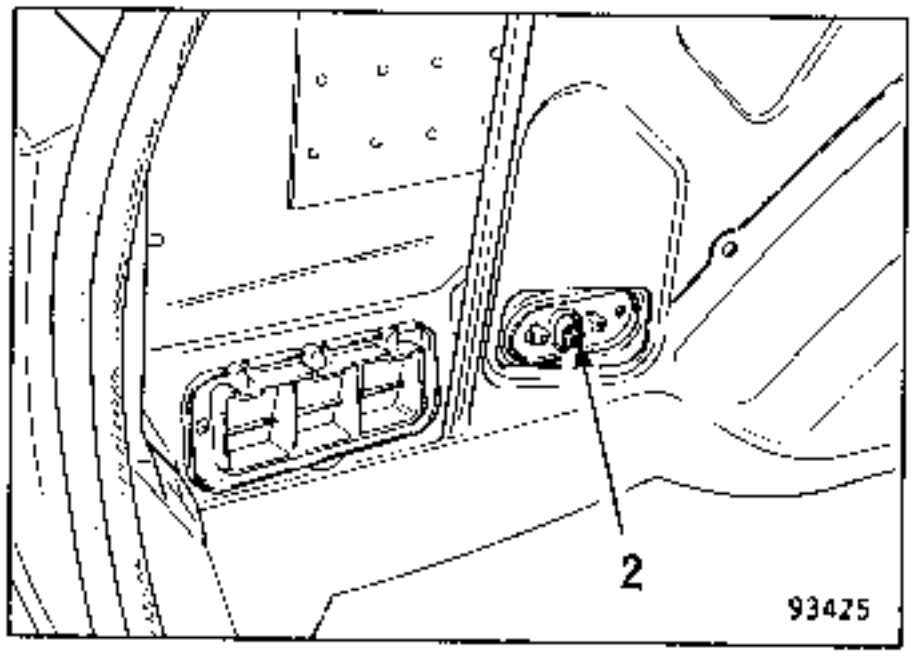
REMOVING



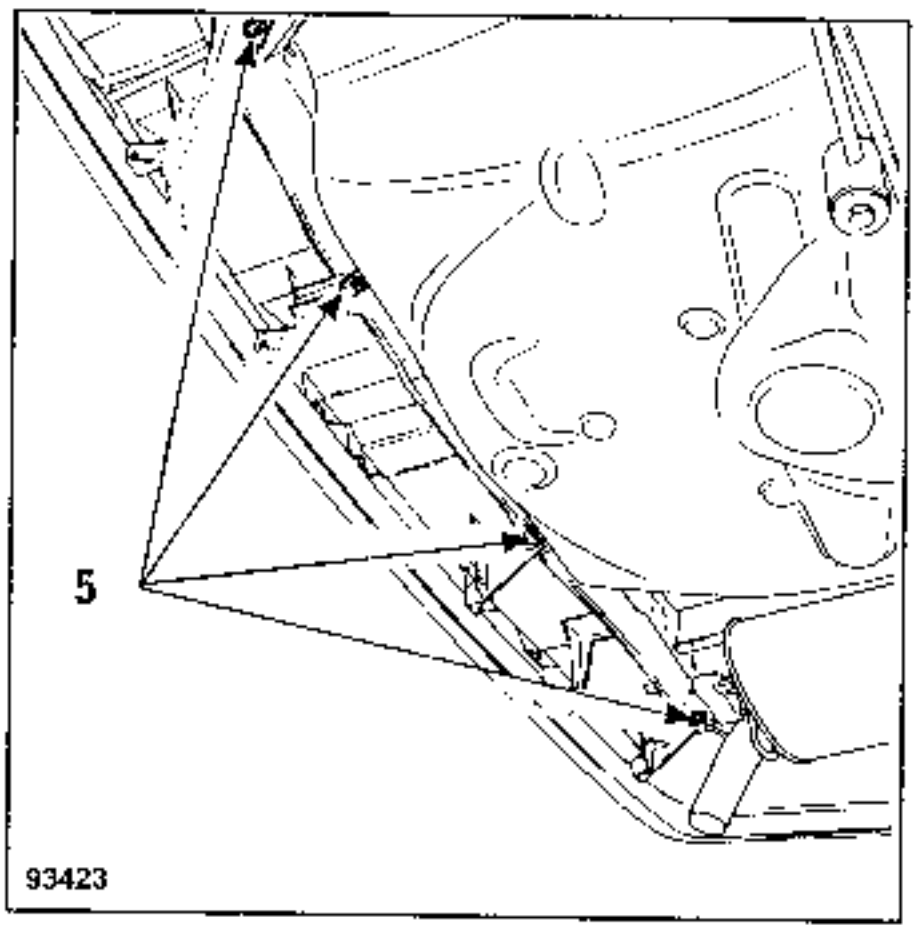


Remove :

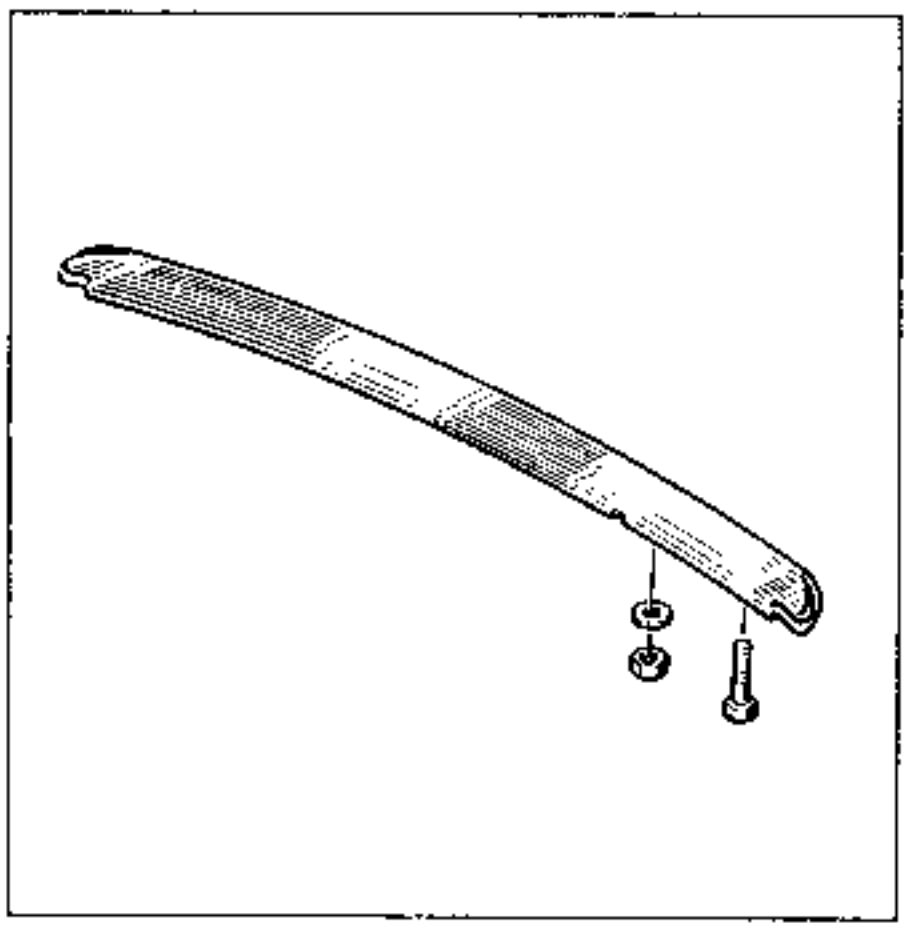
- the rear end panel interior trim which is secured nine Torx head screws.
- the six screws (1) that secure the upper edge of the bumper shield.
- the four screws (3) that secure the wheel arch protectors
- on the right-hand side, the side securing screw (4).



- the left-hand side securing screw (2) after pulling the wheel arch trim to one side.



- the four screws (5) that secure the bumper to the rear cross member.
- the bumper shield.

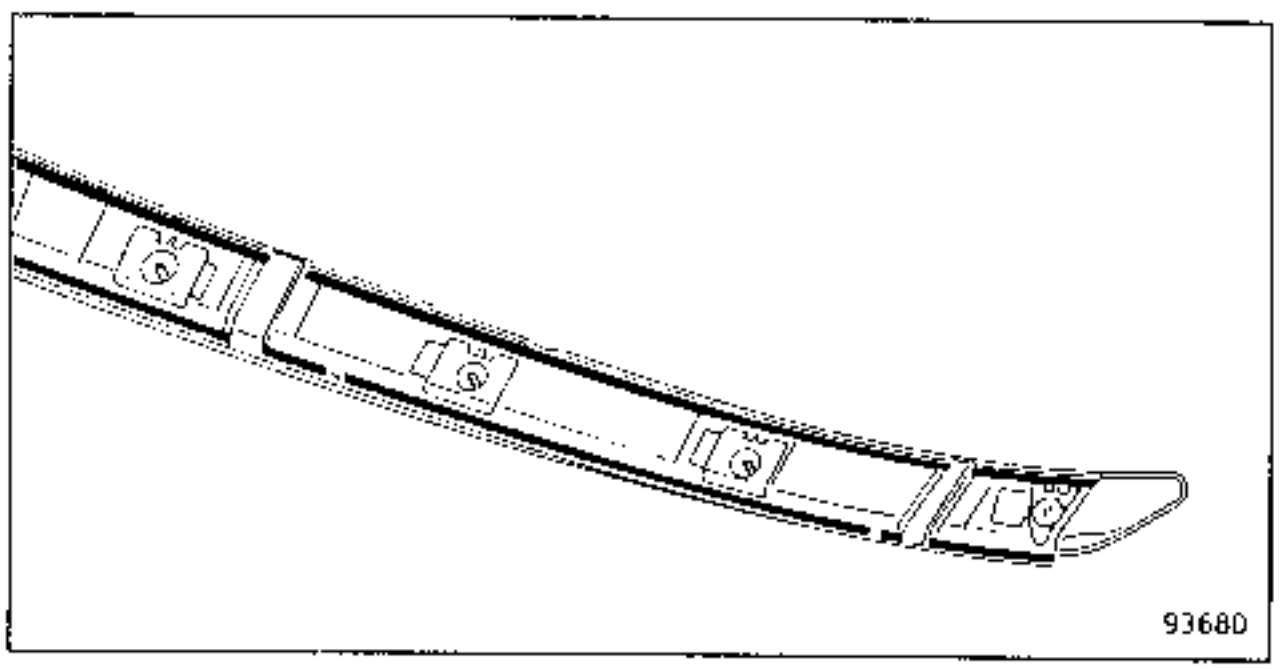


To remove the tailgate spoiler, one must first remove the rear screen wiper (motor) and the tailgate lock motor support.

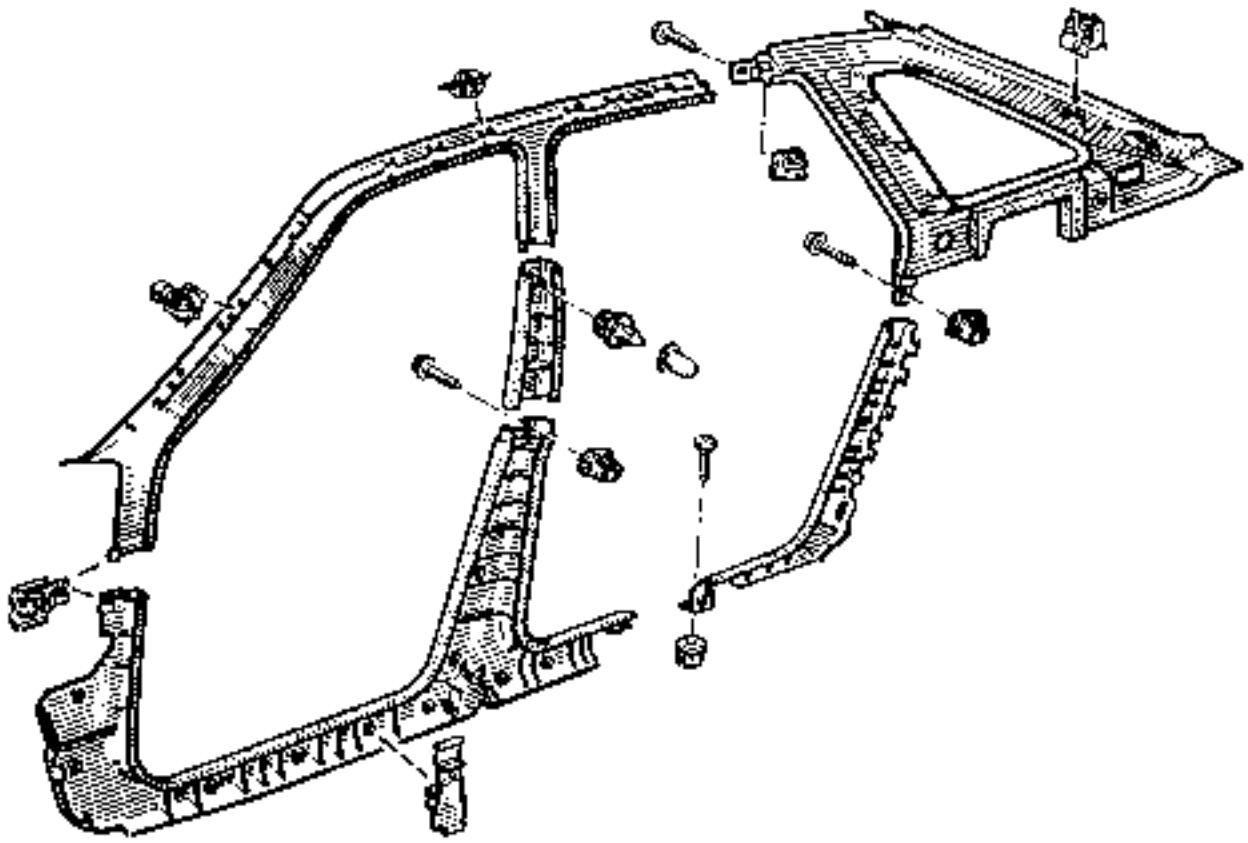
REMARK :

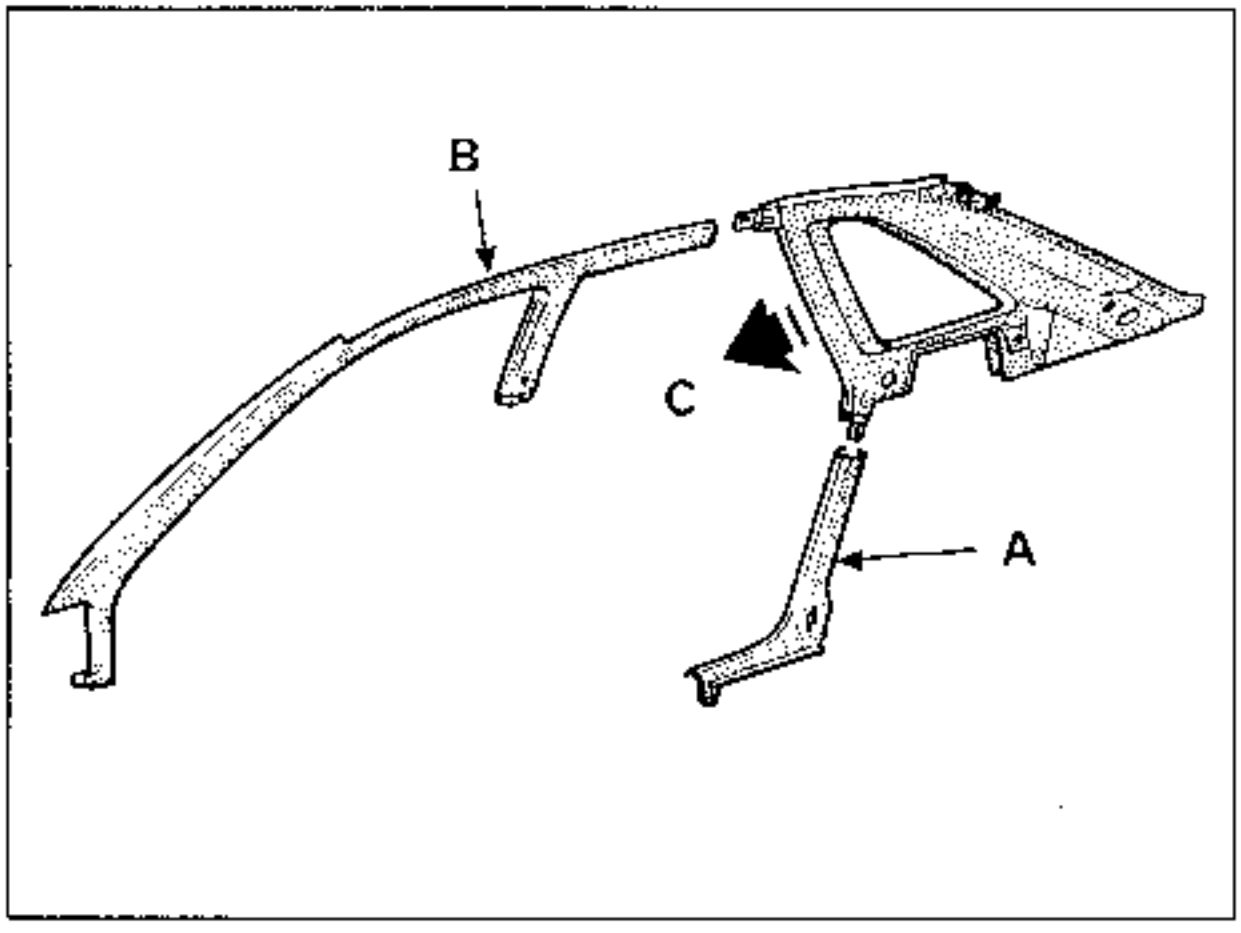
If the spoiler is to be removed and refitted, and not replaced by a new one, the entire adhesive strip on both spoiler and tailgate must be removed.

Carefully degrease the spoiler with a solvent of the acetone type.

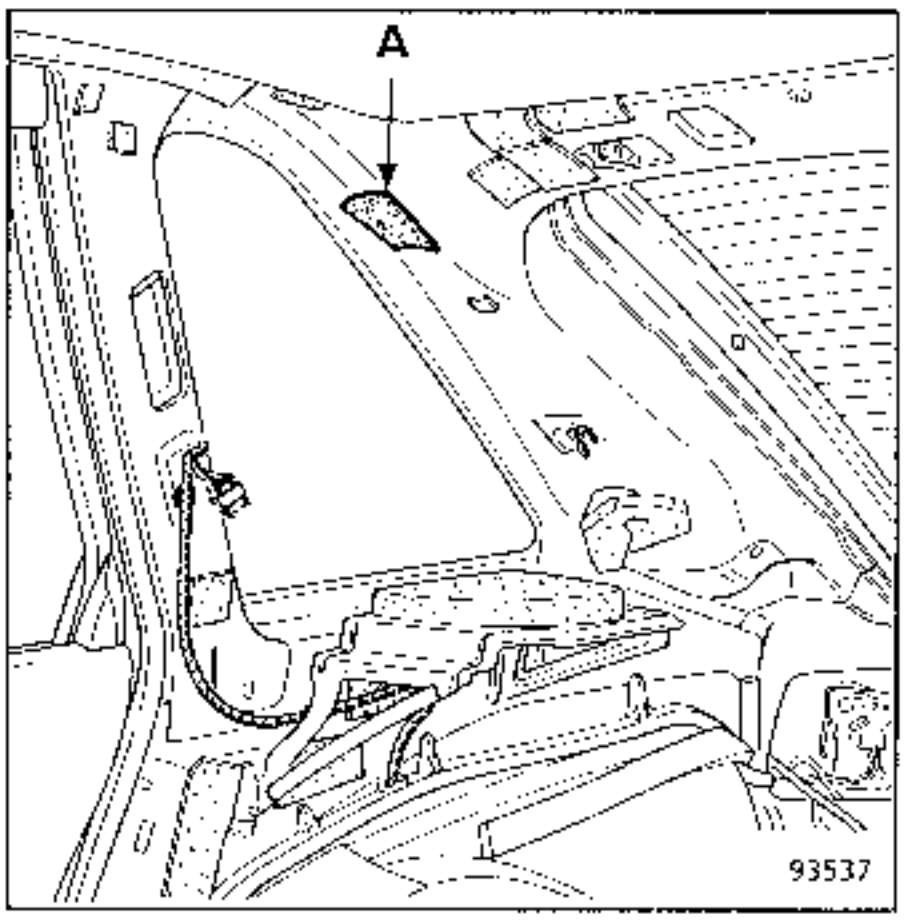


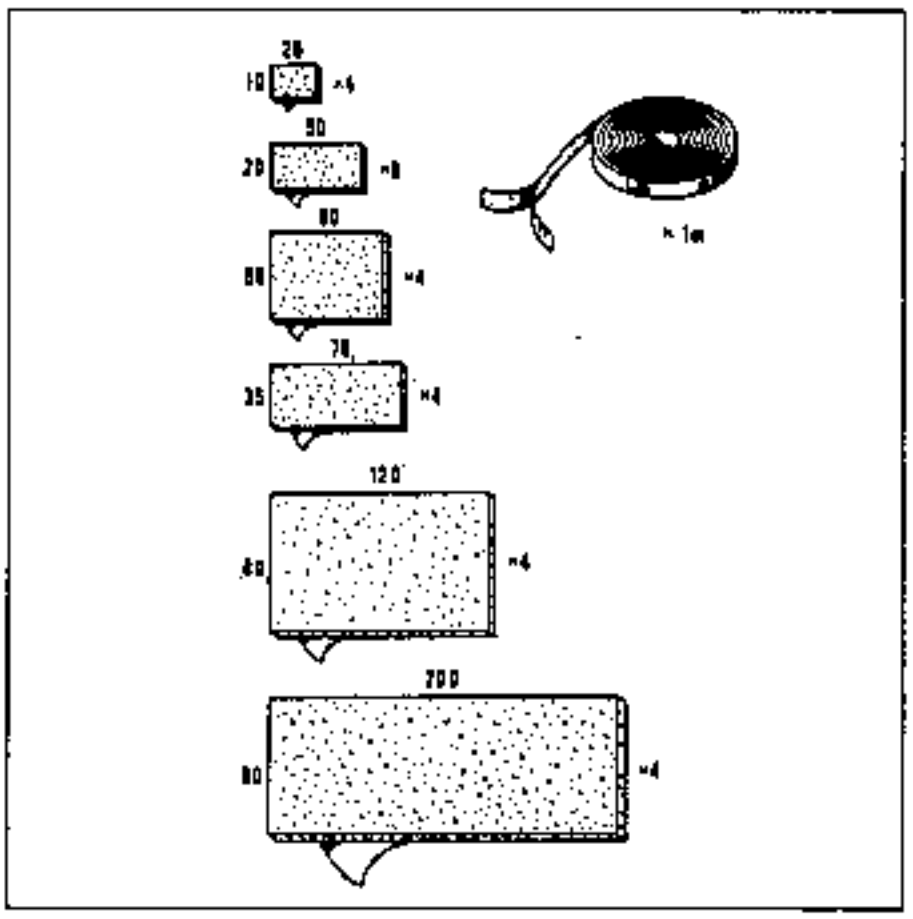
Apply, to the spoiler, two faced adhesive tape, carefully ensuring that the water drains are left uncovered.





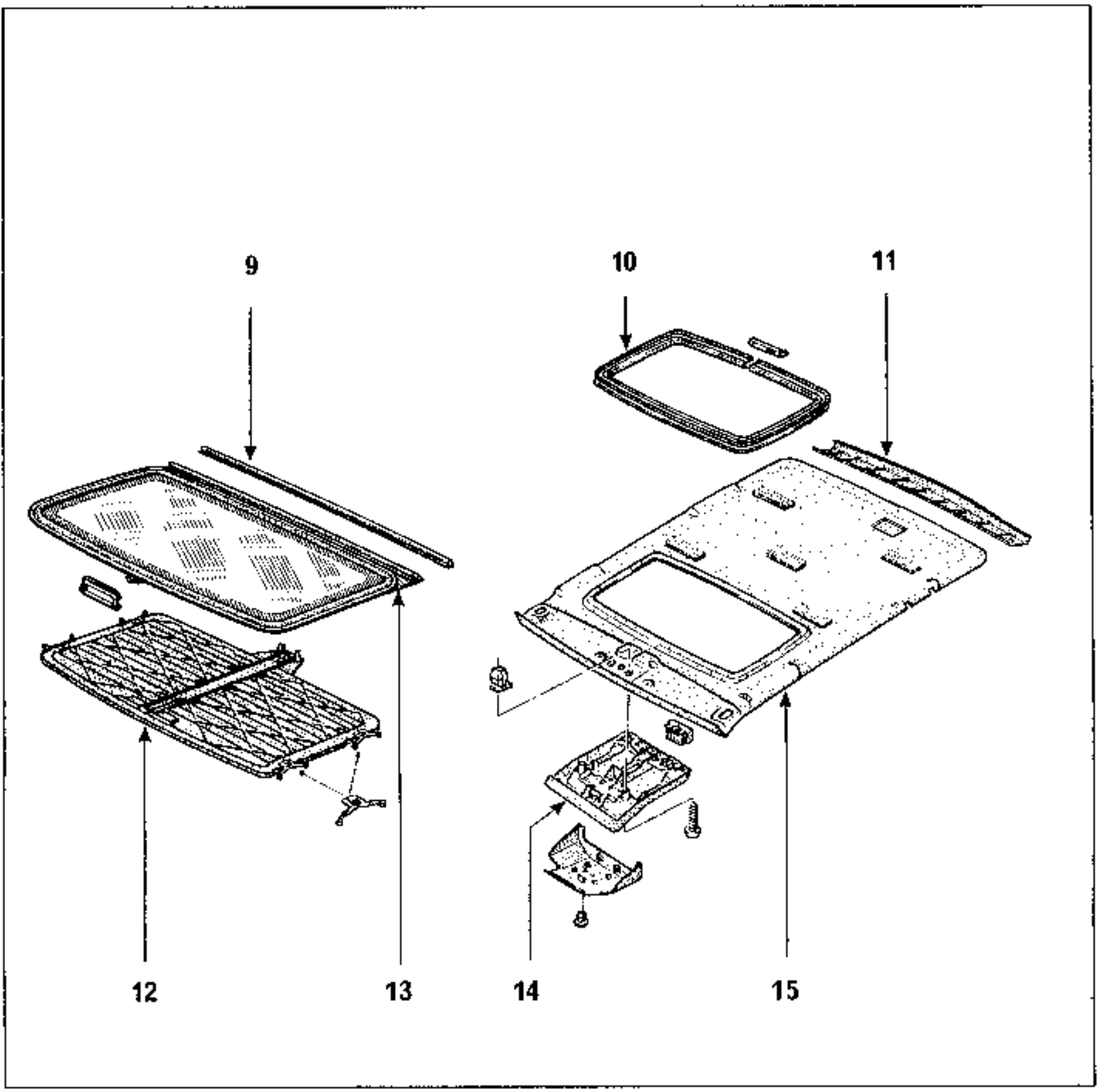
To remove the quarter panel trim, one must first remove the rear door pillar trim (A) and part of the upper body side trim (B).
After removing the securing screws, free the trim by pulling it towards the front of the vehicle (C).





A) kit of self-adhesive foam pads for all vehicles ref.: 7701 465 051

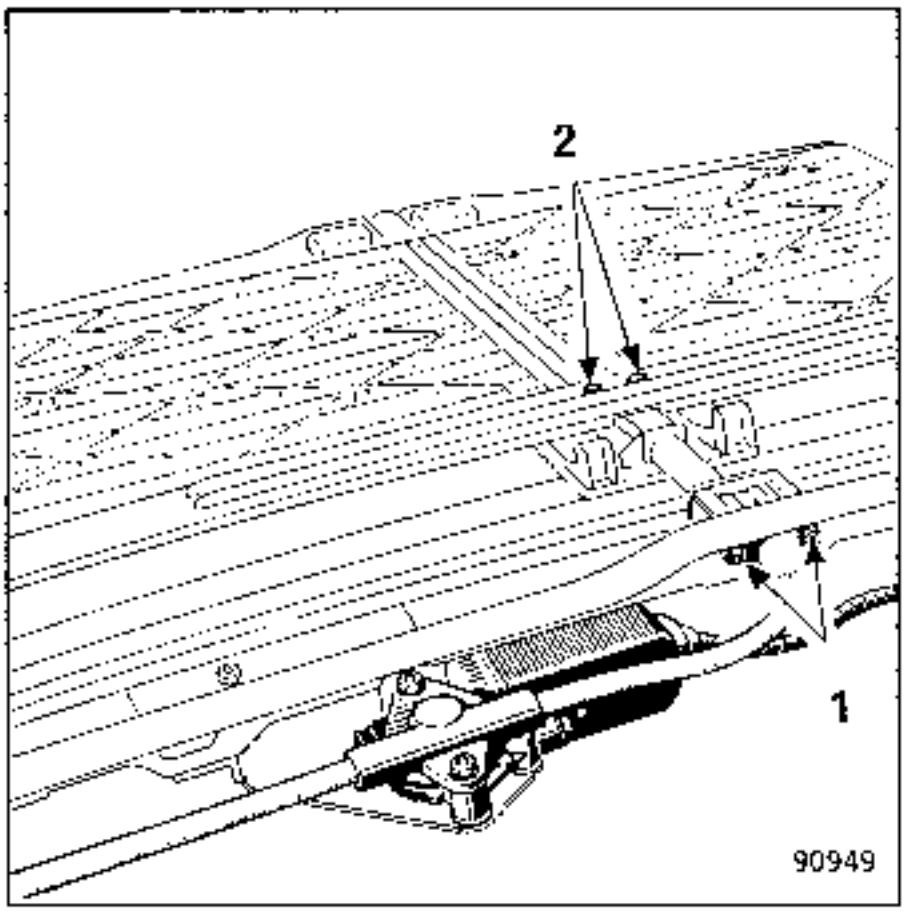
DESCRIPTION OF PARTS



9 - Moving panel seal
10 - Finishing trim
11 - Roof rear cross member trim
12 - Inner panel
13 - Moving panel glass assembly
14 - Roof console
15 - Head lining

REMOVING THE INNER PANEL

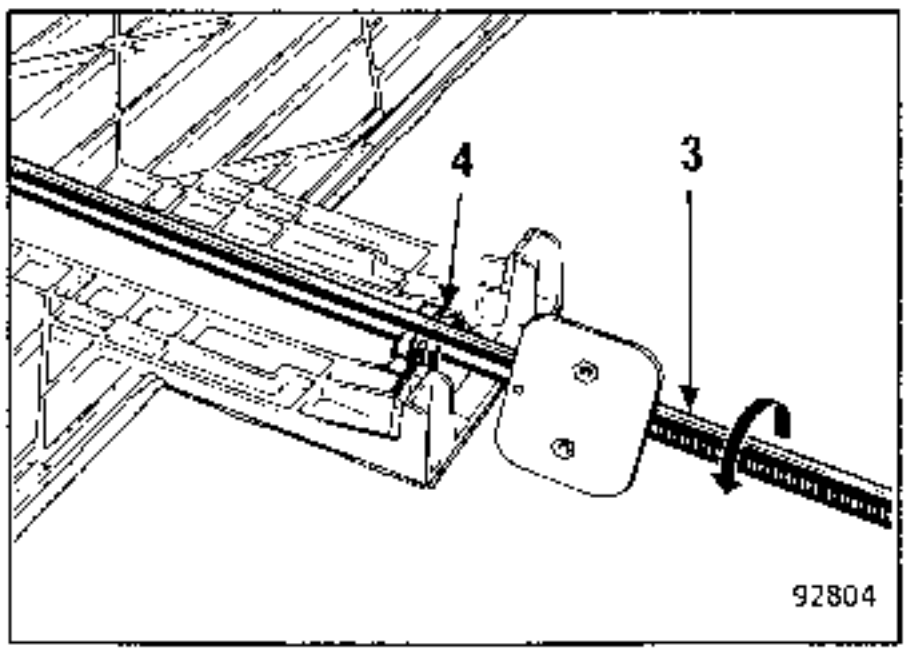
Note: To remove the panel one must first remove the side channel.



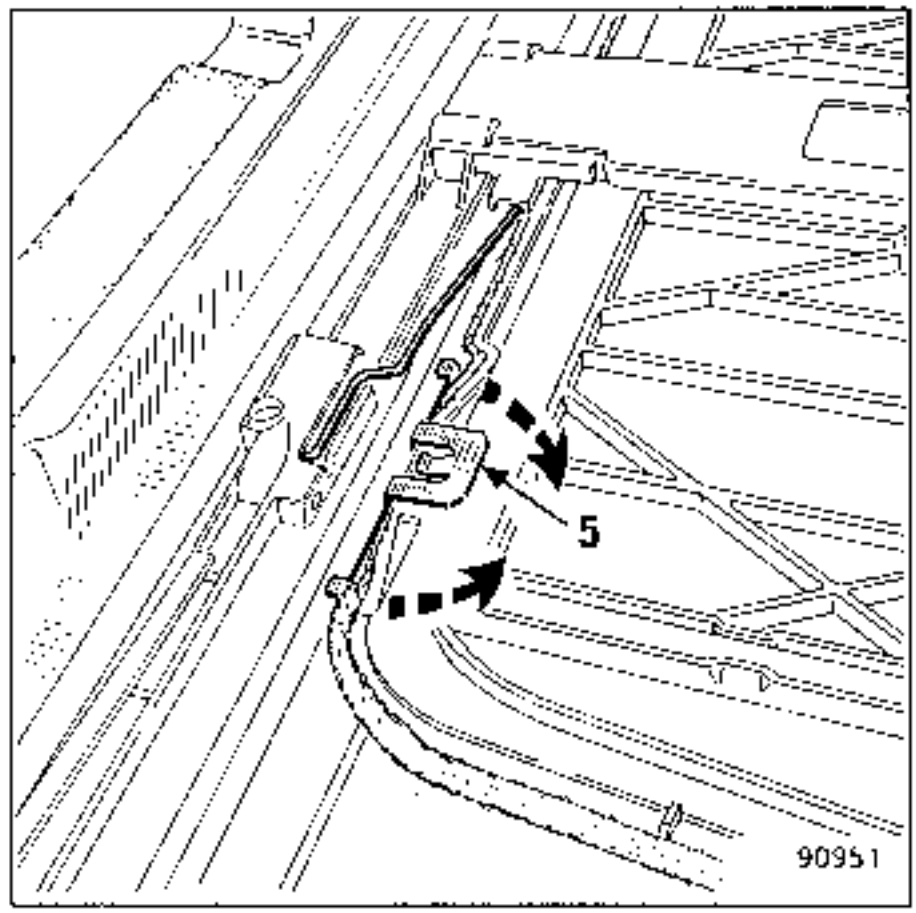
Remove the 2 nuts (1) that secure the control cable to the side channel.

Remove the 2 screws (2) that secure the control cable end fitting to the mechanism centre cross member.

Move the mechanism into the open position.

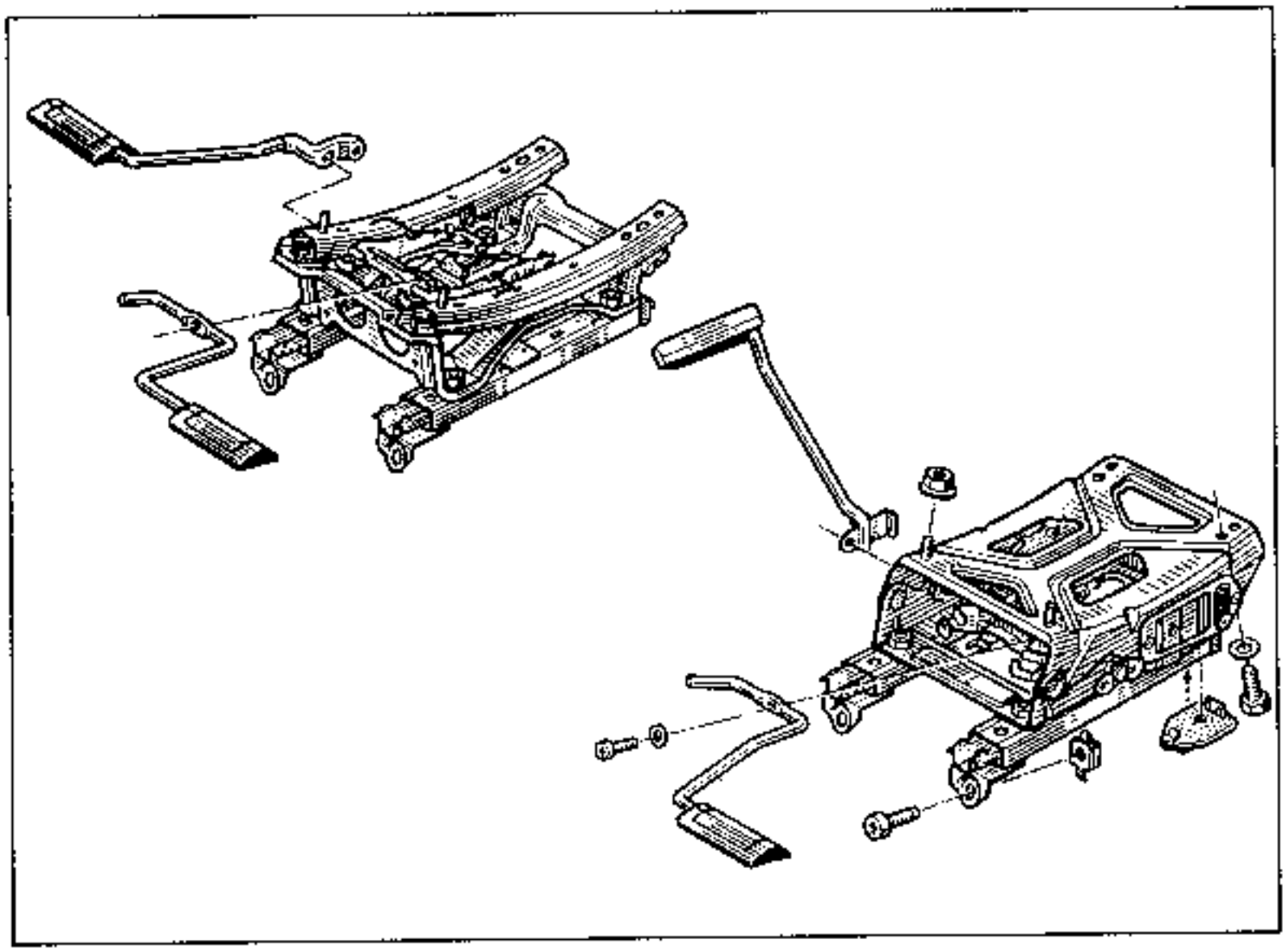


Swing the guide tube (3), on its centre line, around the hook (4) to free the inner panel.

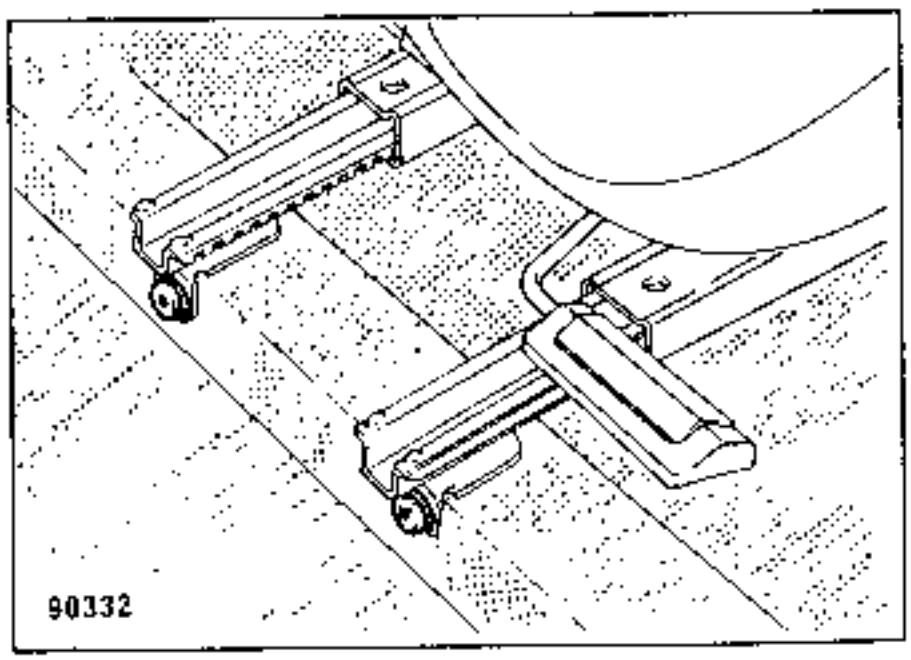


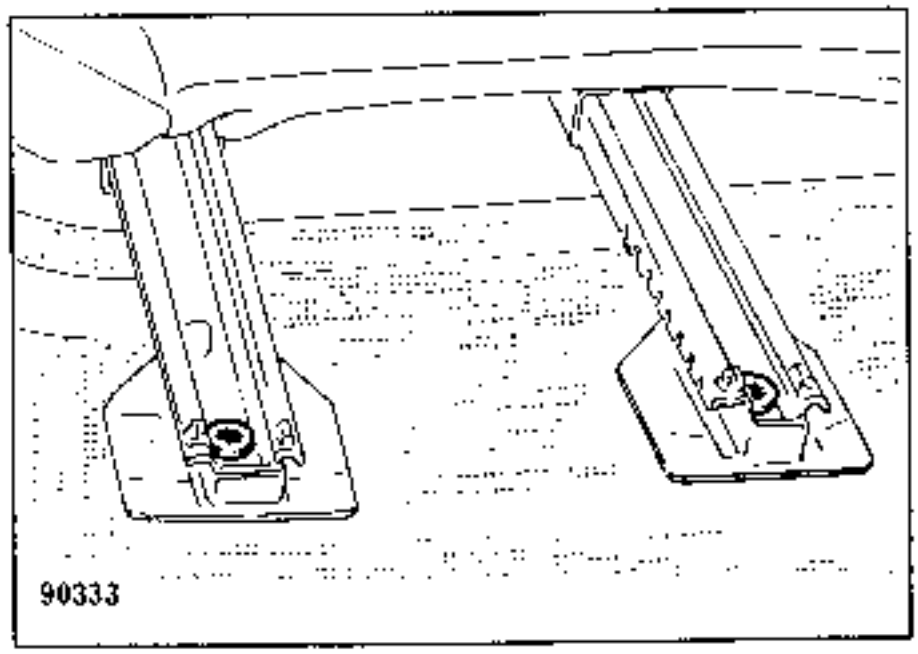
Using a screwdriver, free the guide springs (5) from the rails and remove the inner panel.

REMOVING - REFITTING

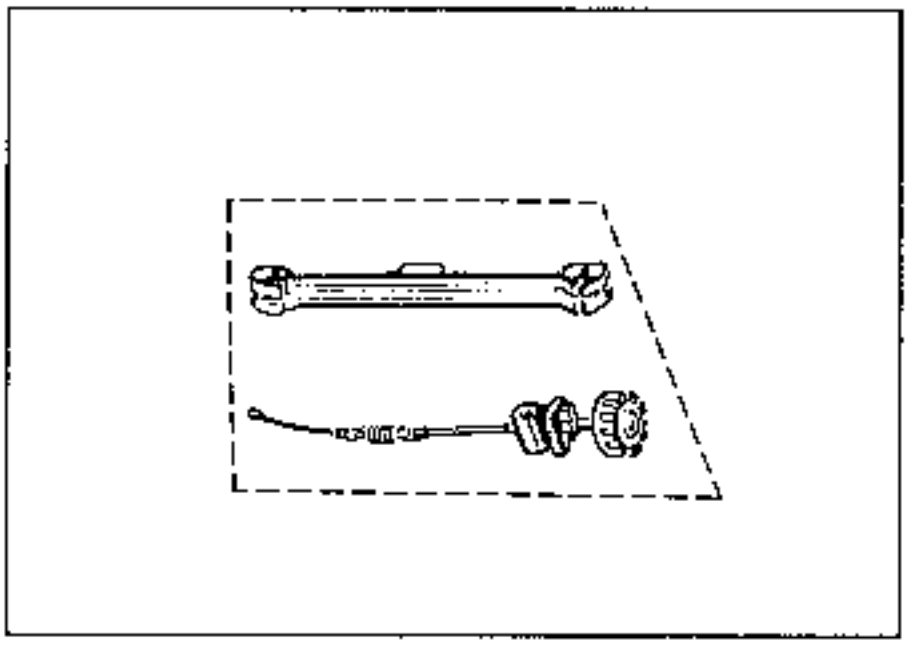


The slides are secured to the floor by 4 screws.



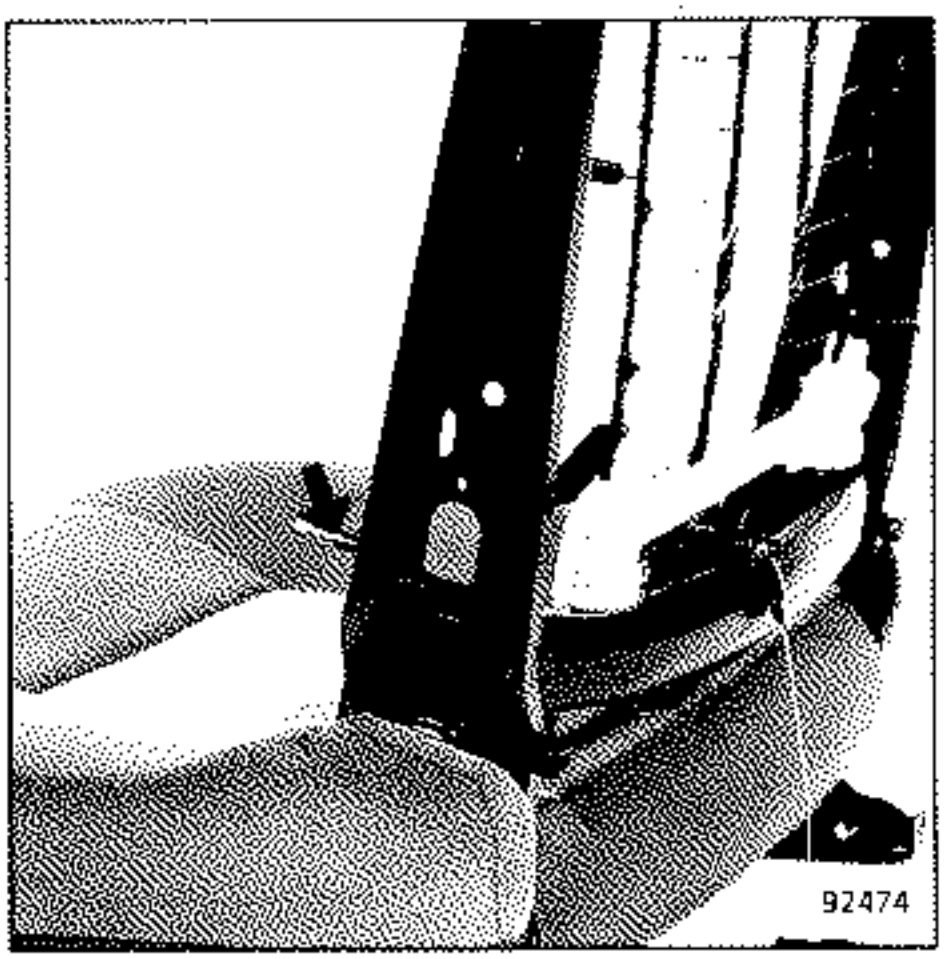


LOWER BACK ADJUSTMENT

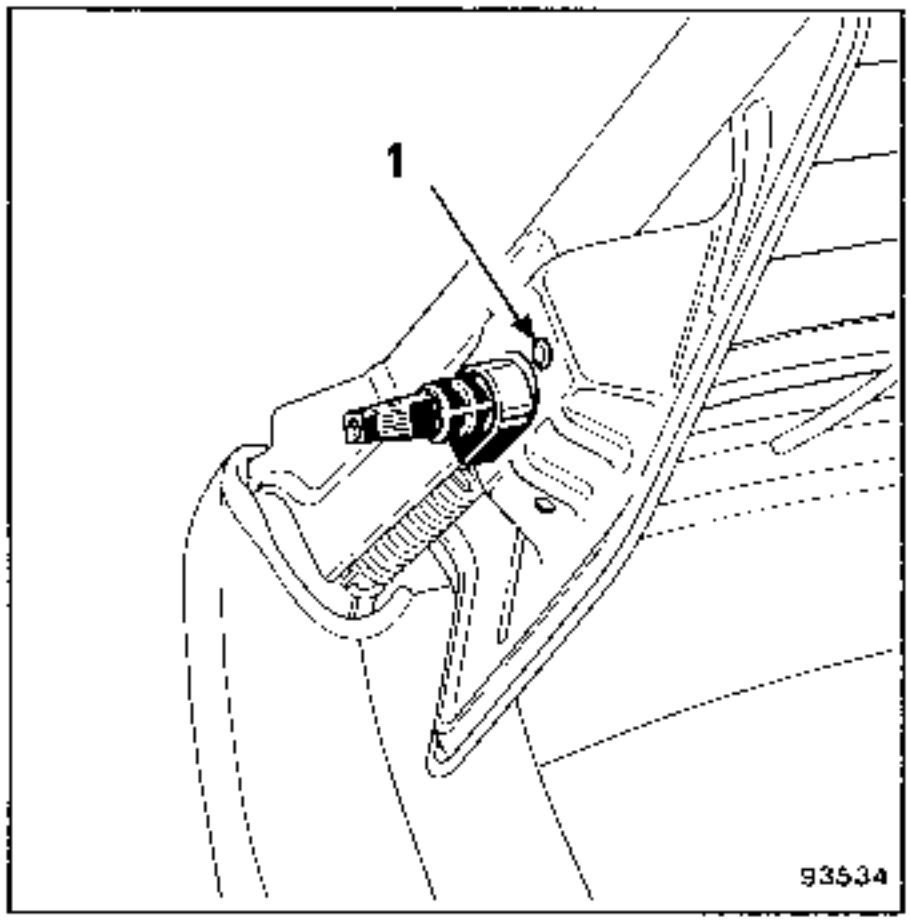


REMOVING

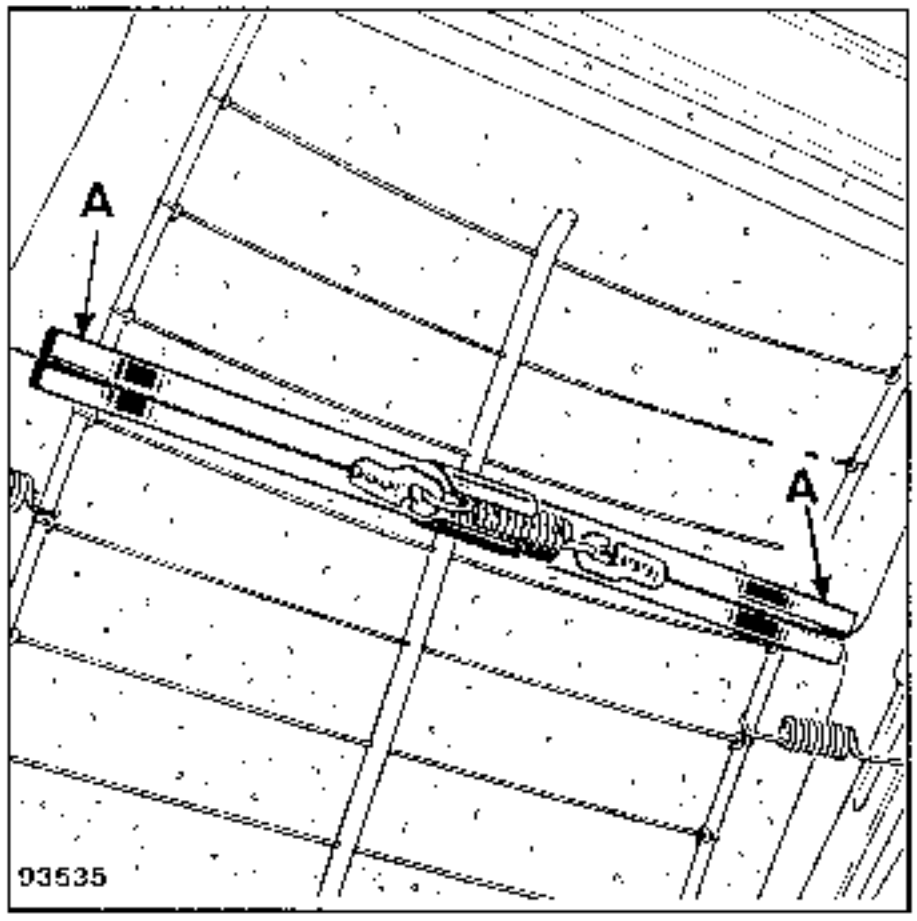
After removing the upholstery from the seat back, adjust the mechanism in the released position.



Using a pair of pliers, remove the cable retainer then pass the cable through the frame.

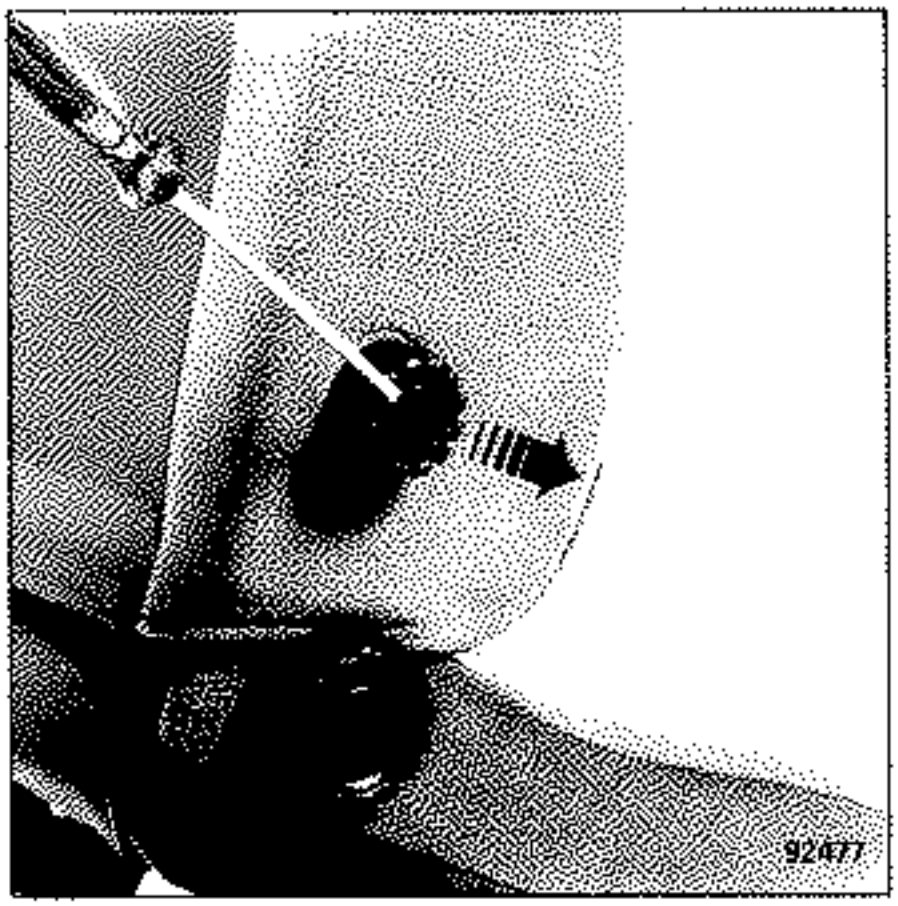


Remove the rivet that secures the control in place.



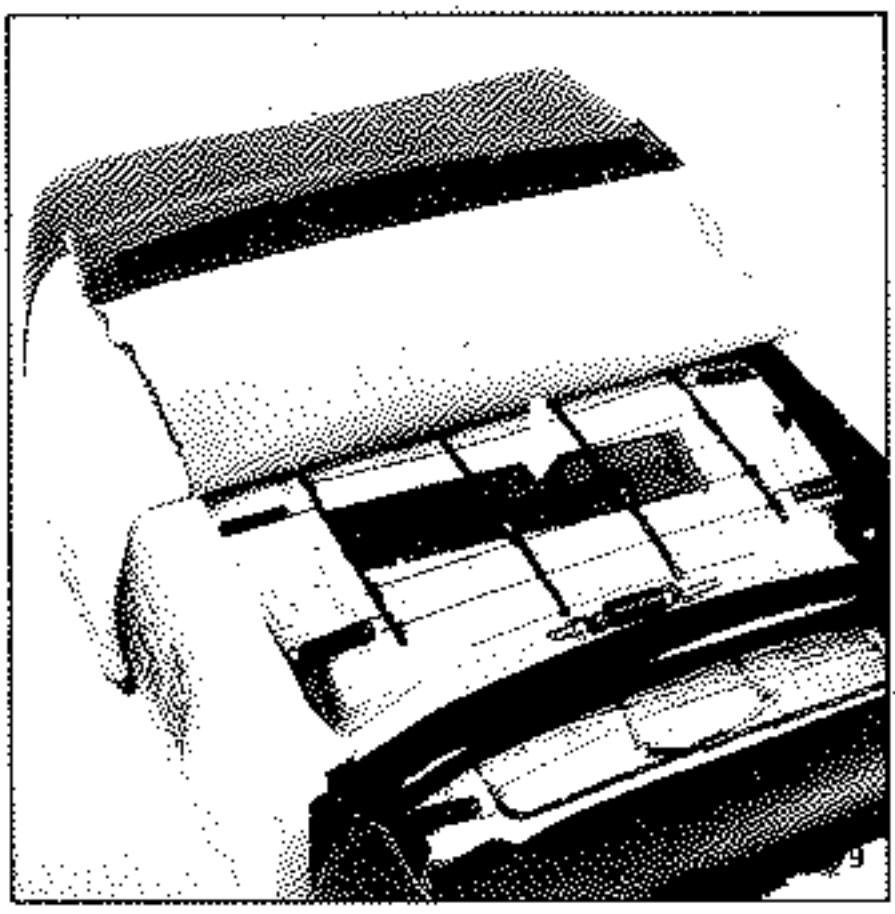
Unclip the plastic guide A.

When refitting, fit the 2 cables to the centre spring last.

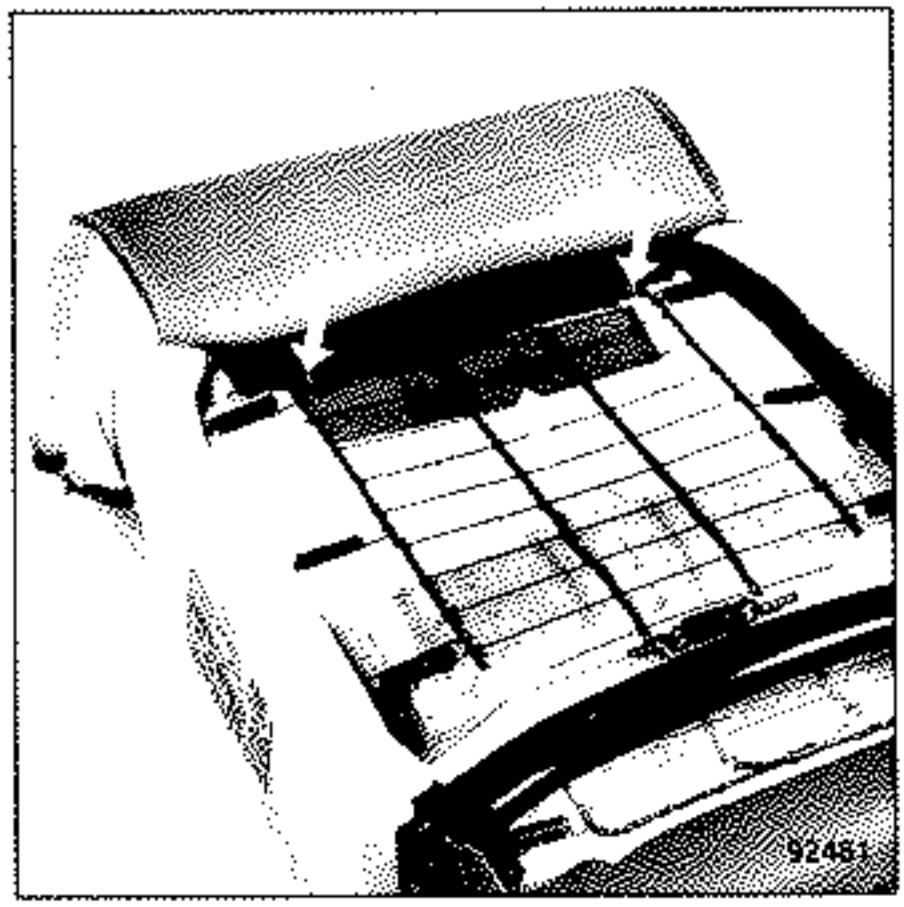


If the seat is equipped with this control, free the centre clip on the seat back adjusting knob with a screwdriver and pull off the knob.

At the back of the seat, remove the 2 hooks and unclip the 2 clips which retain the trim.

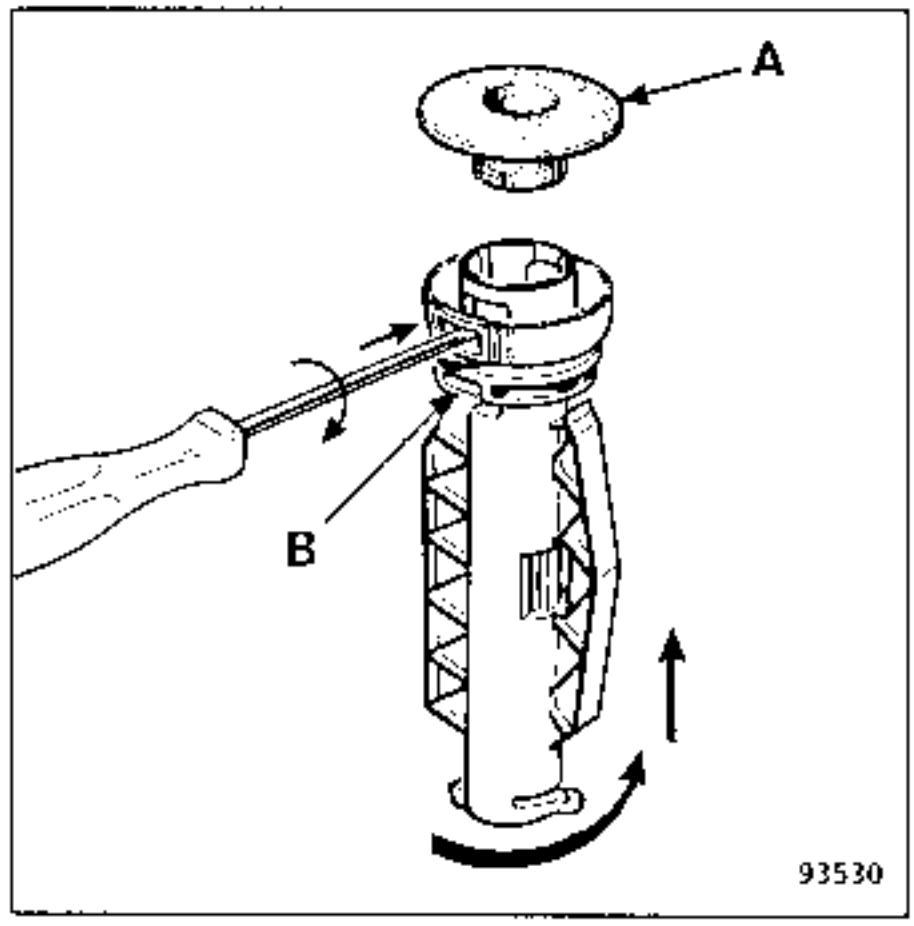


Lift the trim, pass the card that tensions the cloth through the foam.



Further lift the trim.

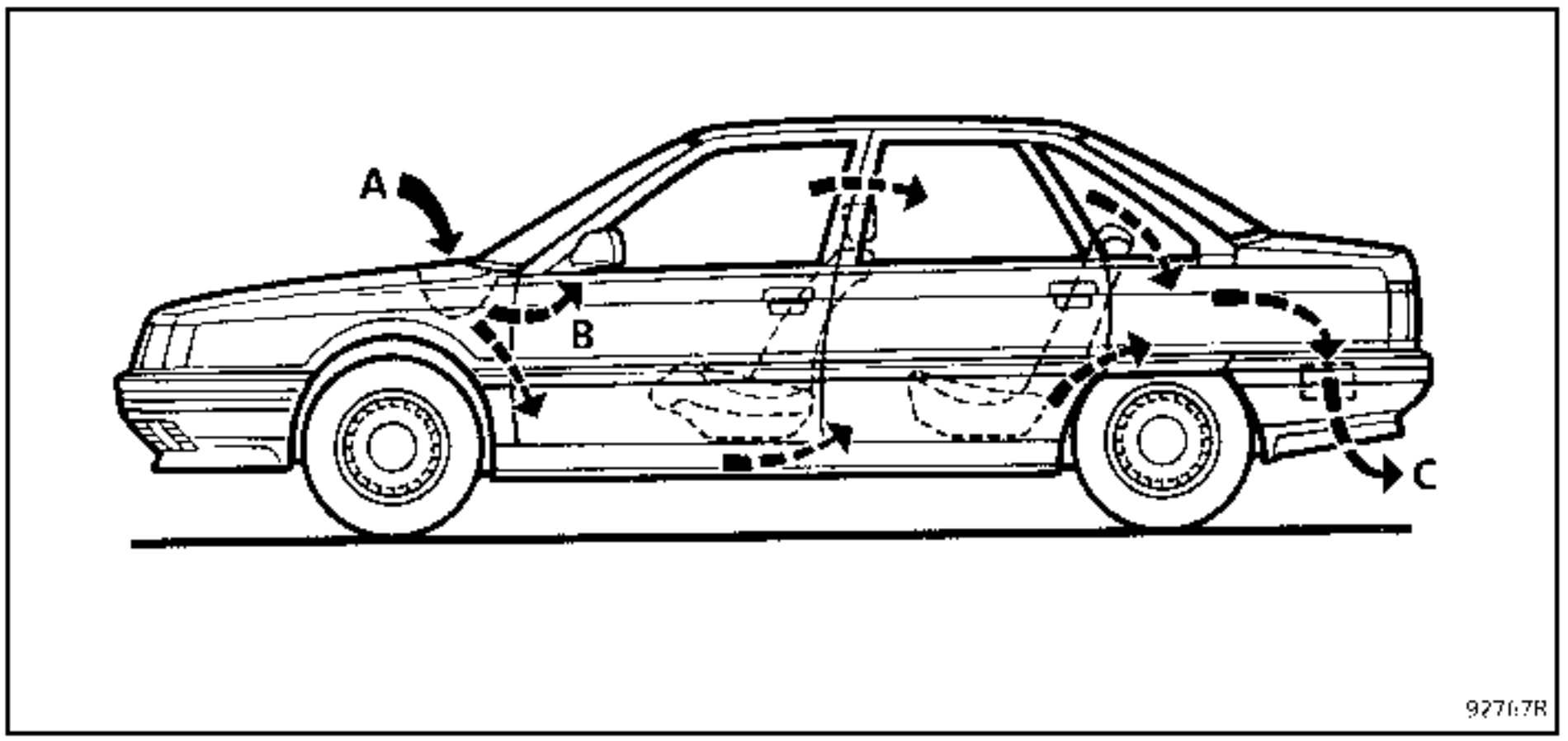
Cut the 2 clips that secure the upper link in place and pass the second card through the foam to separate it from the trim.

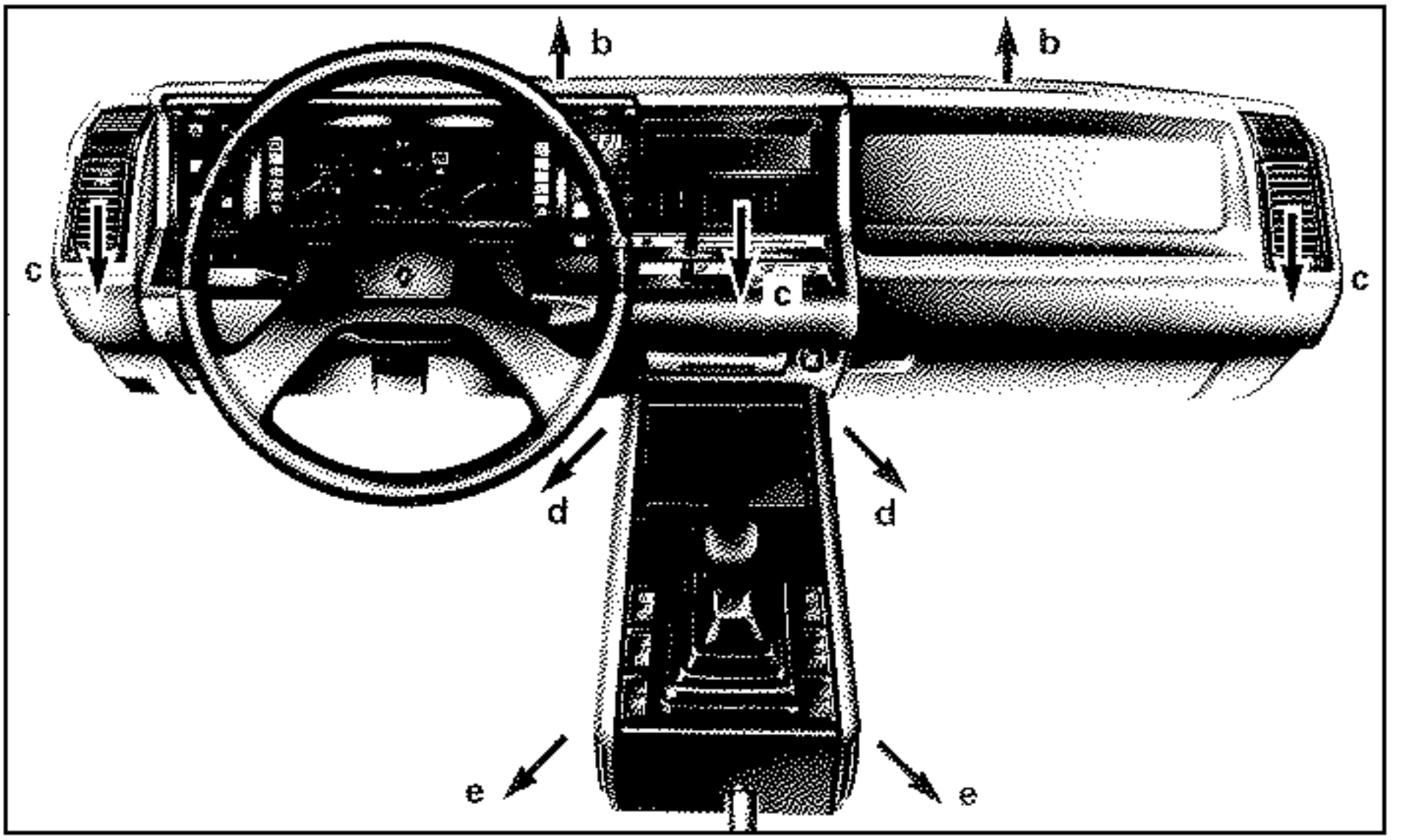


To remove the trim entirely, unclip the 2 covers (A) from under the trim.
To remove the head restraint guides, lift the tab (B) and swing them in the direction shown by the arrow.

UP TO THE END OF MODEL YEAR 1989

AIR DISTRIBUTION

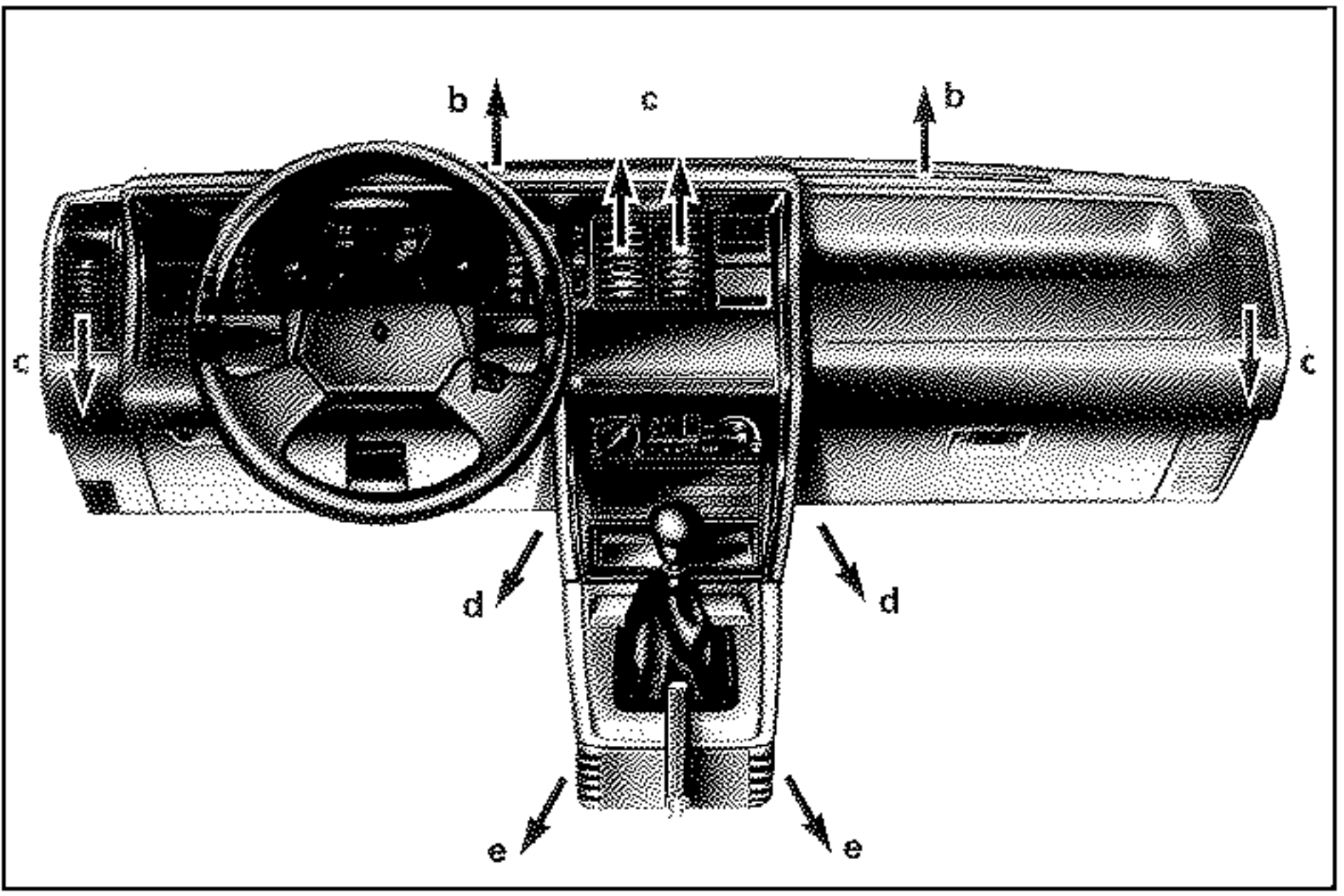




A External air intake
B Air distribution
C Air extraction through rear lefthand and righthand wings

b windscreen demisting outlets
c dashboard ventilator outlets
d lower ventilator outlets
e rear seat ventilator outlets (depending on equipment level)

FROM MODEL YEAR 1990 ONWARDS



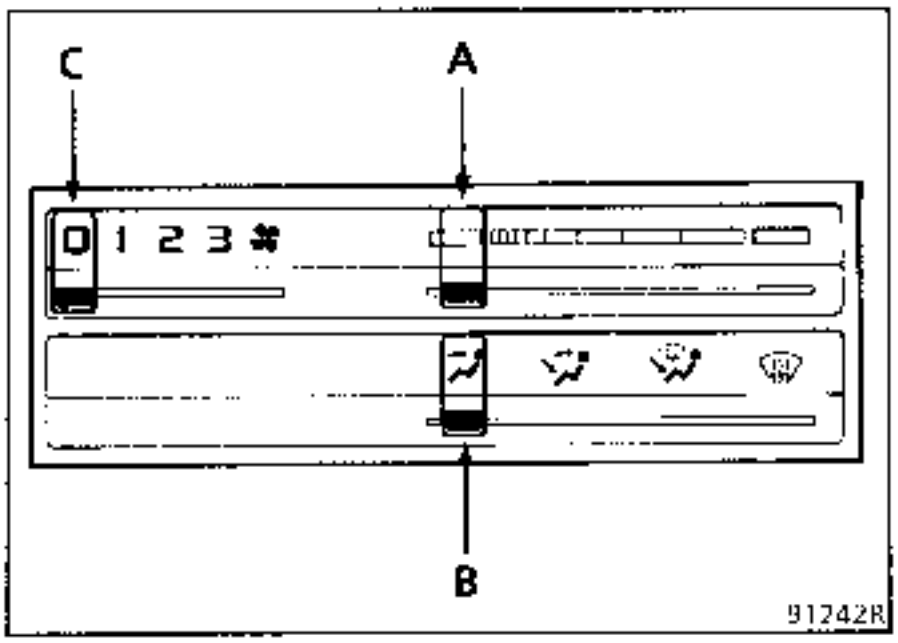
b Windscreen demisting outlets
c Dashboard ventilator outlets
d Lower ventilator outlets
e Ventilator outlets for the rear seats (depending on equipment level)

UP TO MODEL YEAR 1989

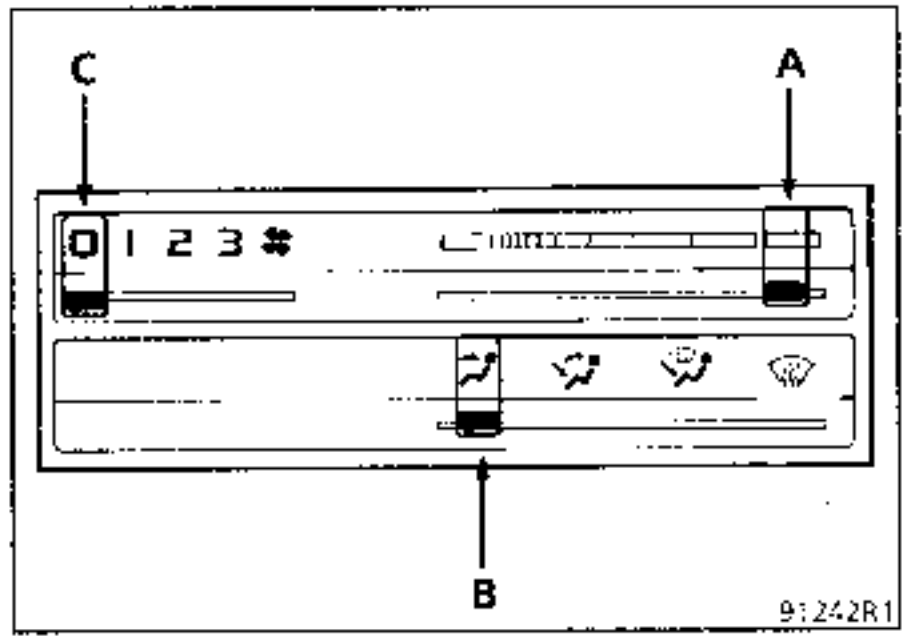
Temperature control slide (A)

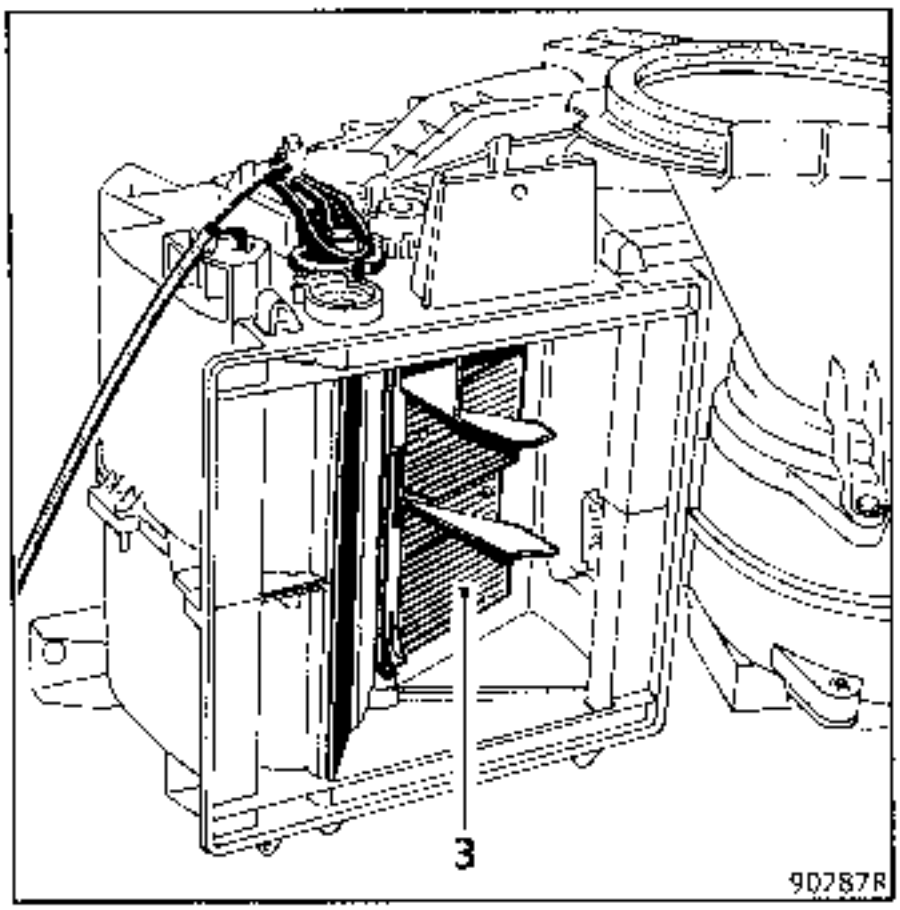
Controls hot air / cold air flap (3).

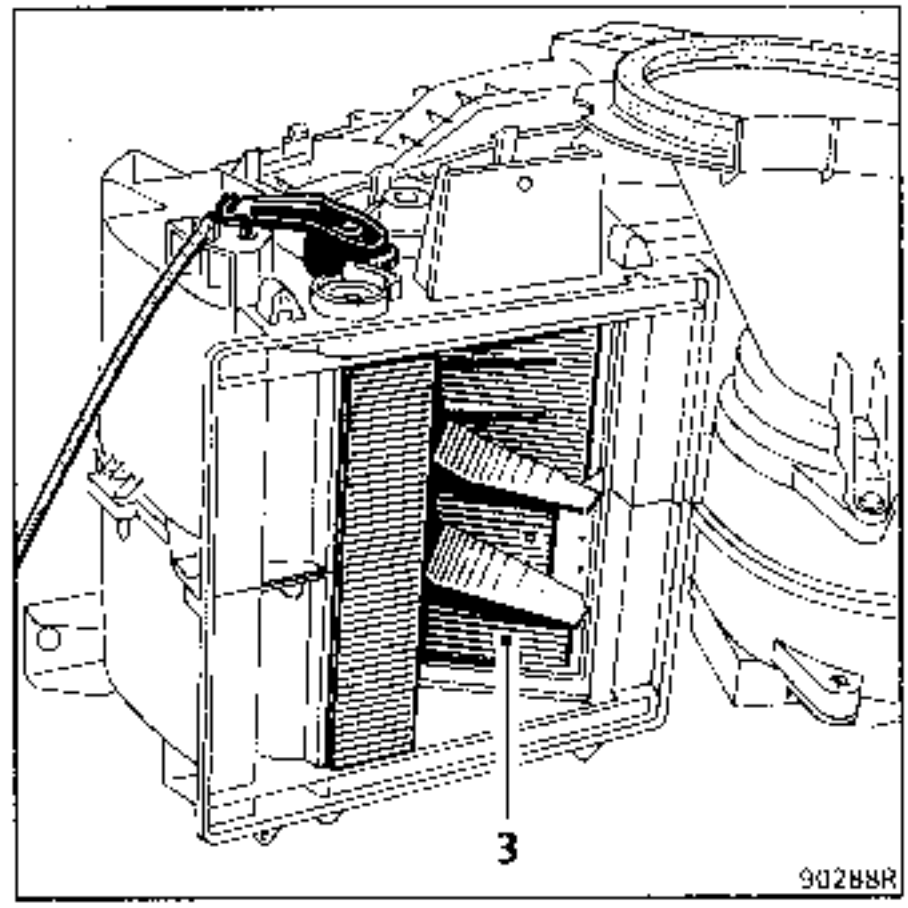
COLD AIR



HOT AIR





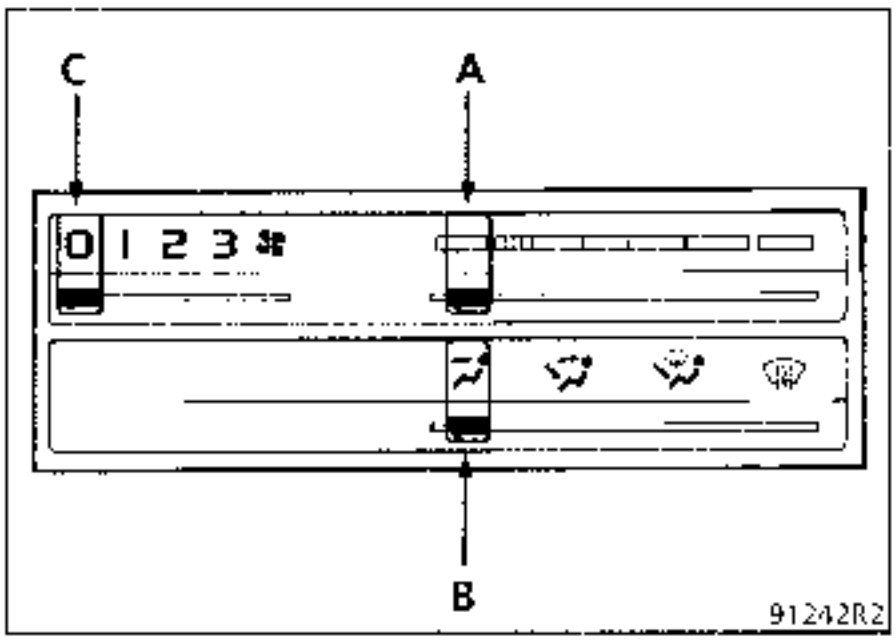


The blower does not have a heater valve and has a permanent current supply. Flap (3) controls the operation of the fresh air reheating system.

Air distribution slide (B)

Controls the air distribution flaps

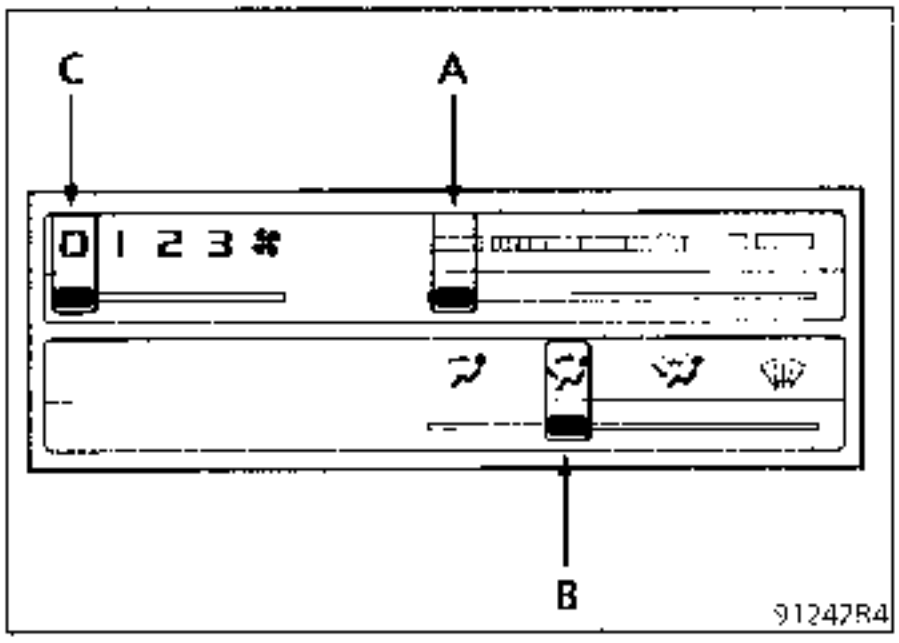
VENTILATION



The air flow is only directed towards ventilators (**c**) in the dashboard.

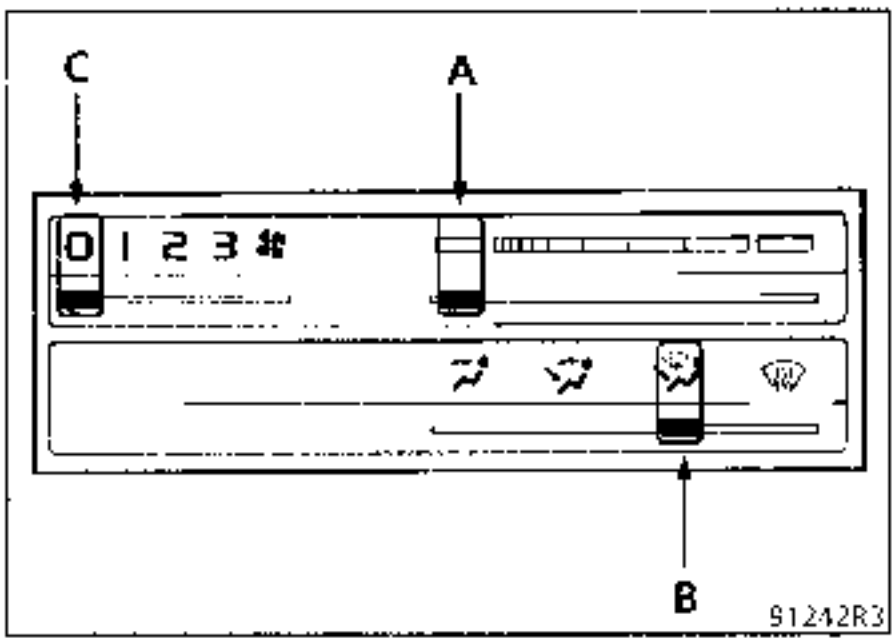
There are 3 settings for each ventilator :
- open or closed,
- up or down,
- left or right.

HEATING - VENTILATION



The air flow is distributed between the dashboard ventilators (**c**) and lower ventilators (**d**) and (**e**). When the air is heated by altering the setting of control slide (**A**), the air temperature at the dash board ventilators (**c**) is lower than that at ventilators (**d**) and (**e**).

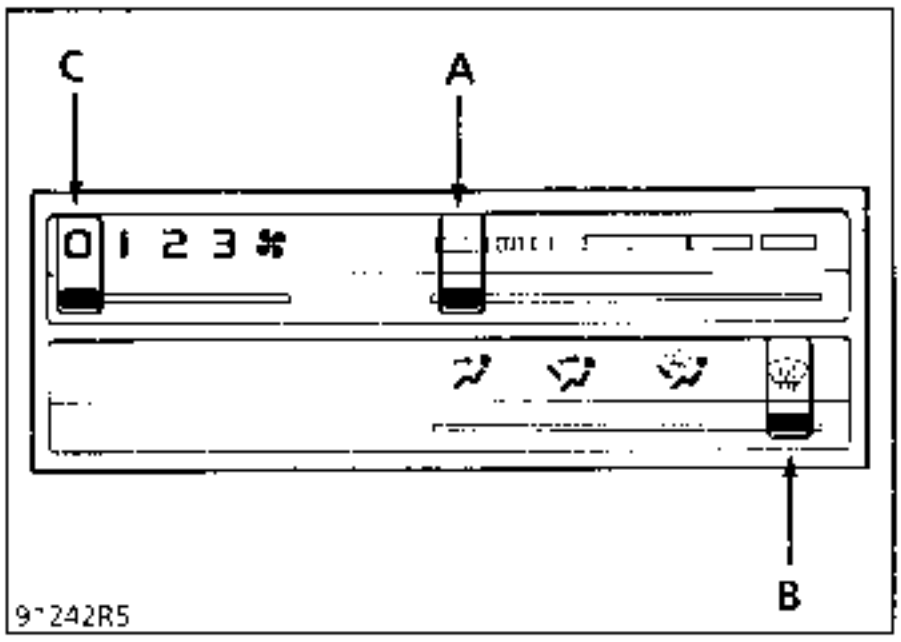
HEATING - DEMISTING



The air flow is distributed between ventilators (**b**), (**d**), and (**e**)

in this position, the dashboard ventilators (**c**) are supplied with air. They can be shut off using their own air flow control.

DEMISTING - DEFROSTING



The air flow is directed towards windscreen ventilator (**b**) and dashboard ventilators (**c**).

For improved efficiency, each of the dashboard ventilators may be activated as desired, in particular for demisting the side windows.

Ventilator control slide (C)

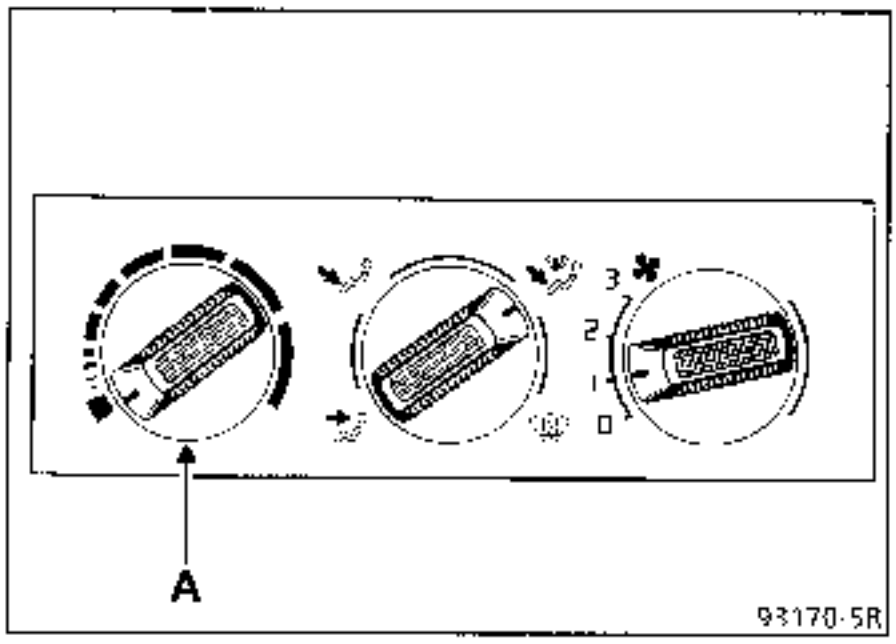
Ventilation is by means of "blown air". The flow of air inside the passenger compartment is determined by the settings of control slide (**C**).

FROM MODEL YEAR 1990 ONWARDS

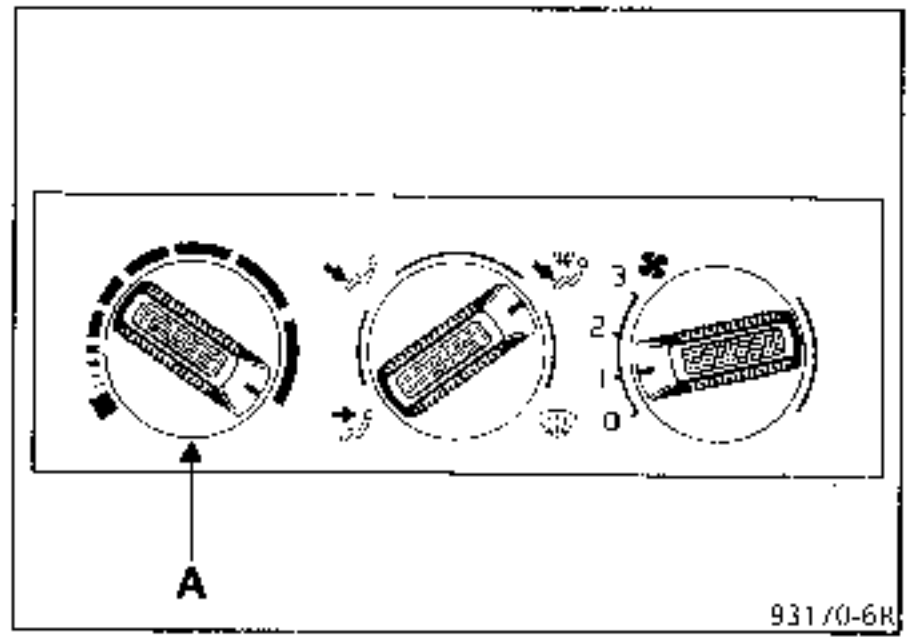
Temperature control dial (A)

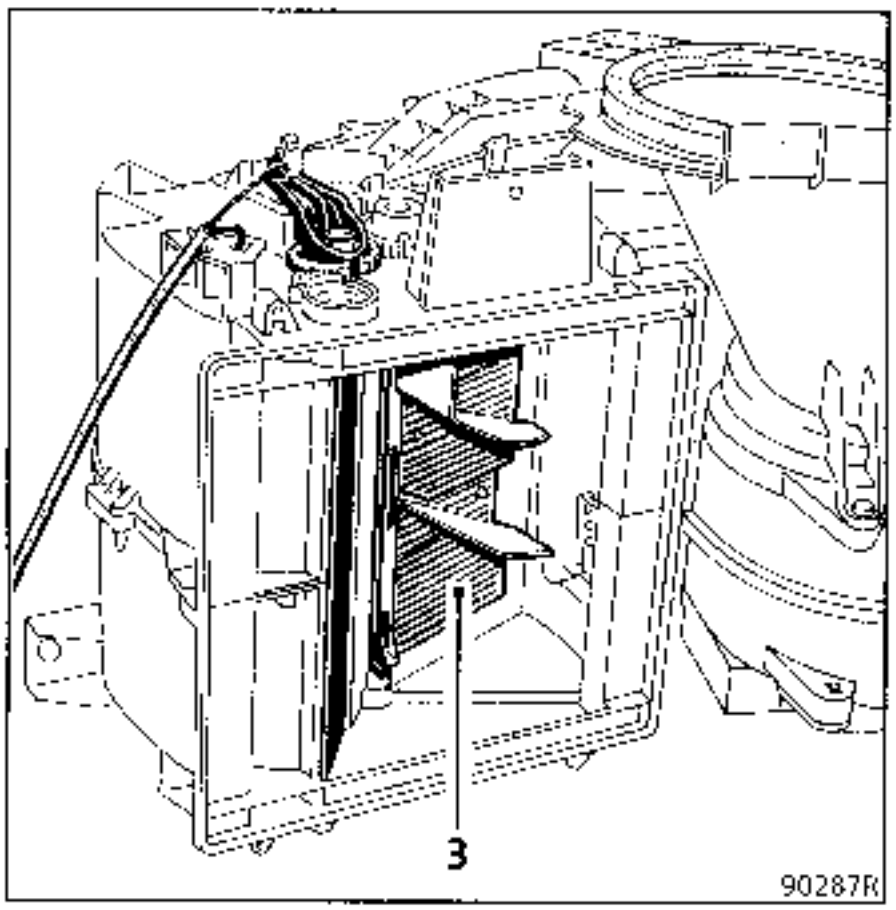
Controls hot air / cold air flap (3).

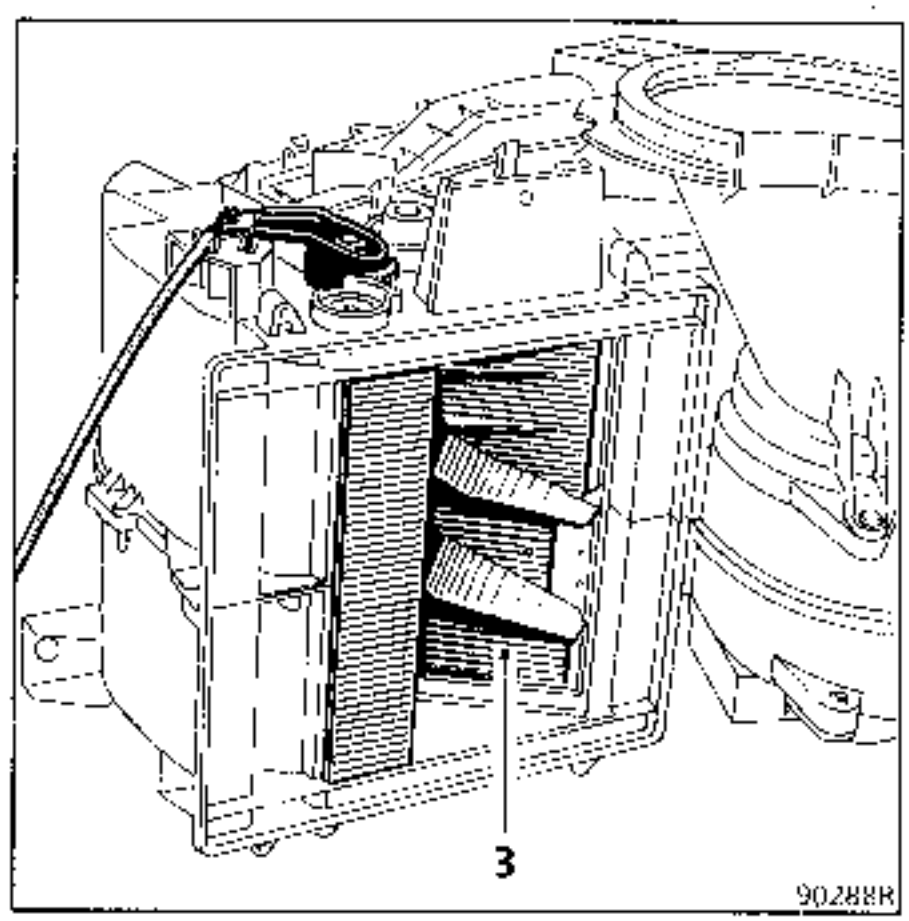
COLD AIR



HOT AIR





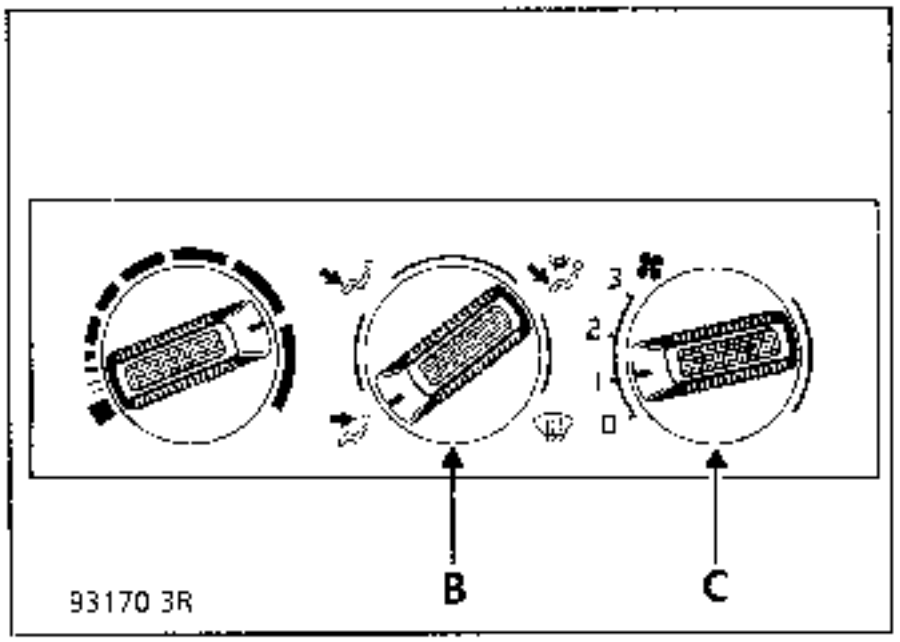


The blower does not have a heater valve and has a permanent current supply. Flap (3) controls the operation of the fresh air reheating system.

Air distribution dial (B)

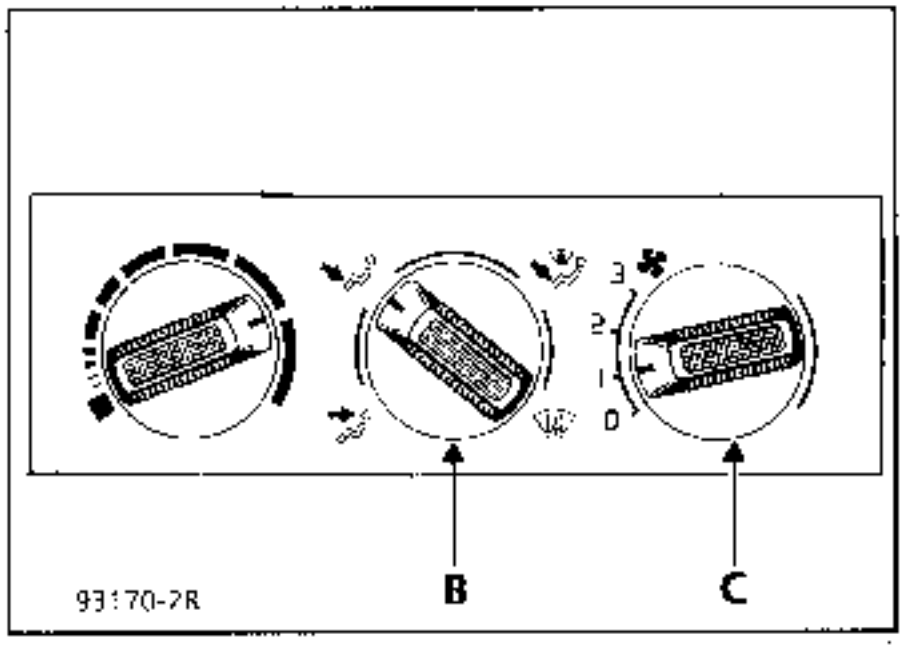
Controls the air distribution flaps

VENTILATION



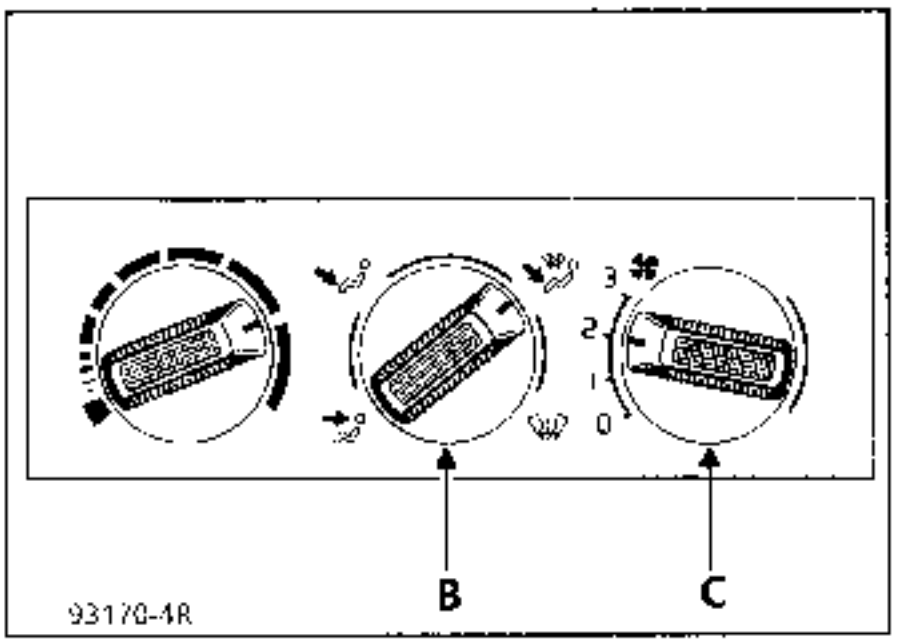
The air flow is directed only to the dashboard ventilators.

HEATING



The air flow is directed towards lower ventilators (d) and dashboard ventilators (c).

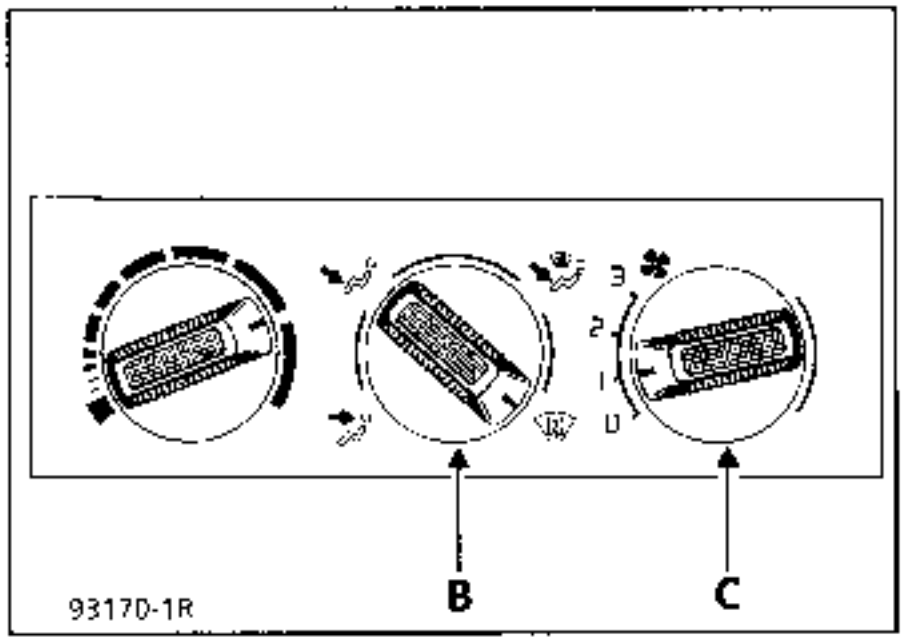
HEATING - DEMISTING



The air flow is distributed between all of the ventilators (b), (c), (d), (e).

To improve efficiency, each of the three dashboard ventilators (c) may be closed.

DEMISTING - DEFROSTING



The entire air flow is directed towards the windscreen demisting outlets and dashboard ventilators (c).

For improved efficiency, centre ventilators (c) in the dashboard may be closed.

Fan motor control knob (C)

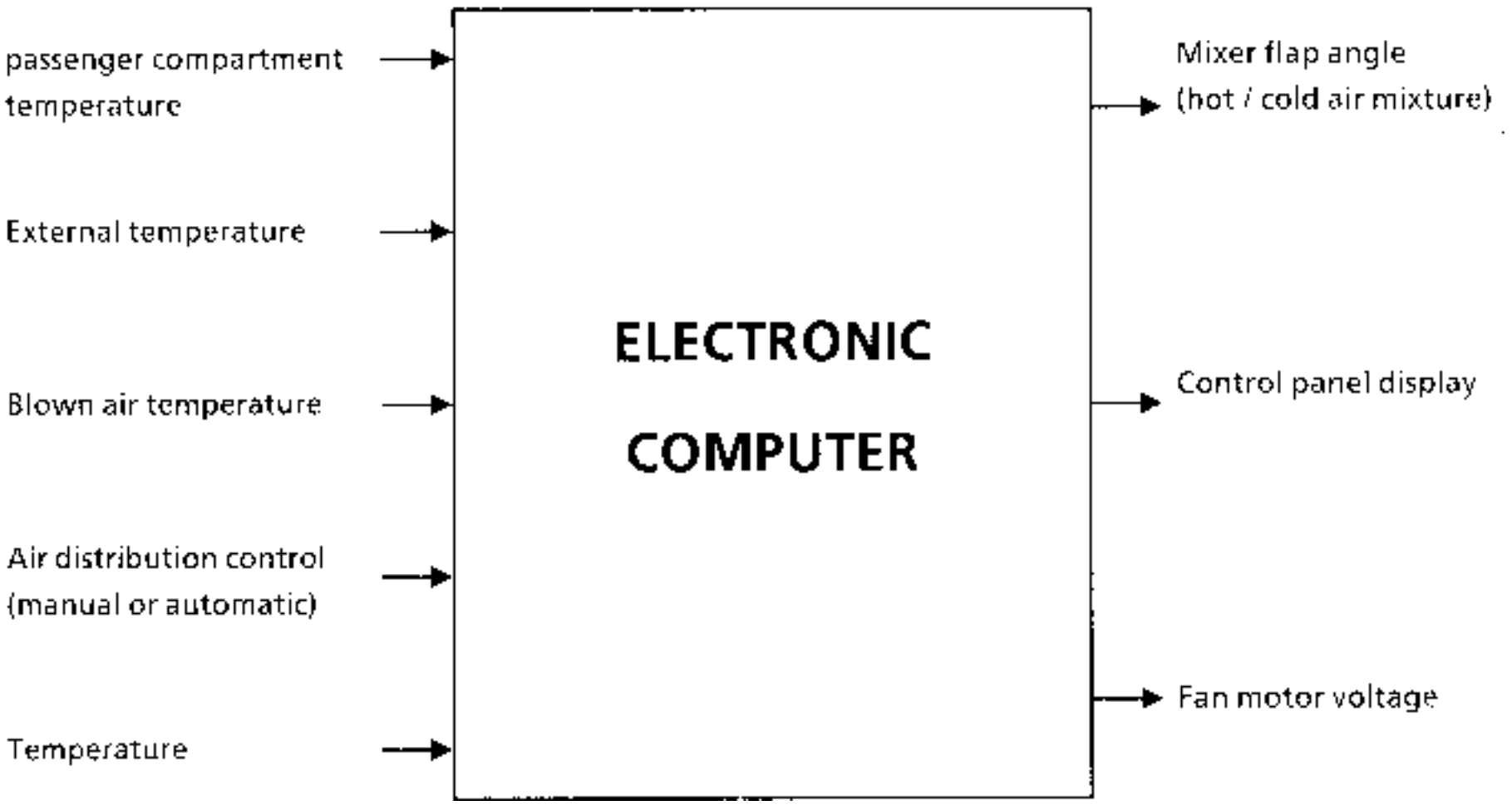
The passenger compartment is cooled by means of "blown air". The flow of air in the passenger compartment is determined by the positions of knob (C).

FROM MODEL YEAR 1990 ONWARDS - VERSION WITH REGULATED HEATING/VENTILATION

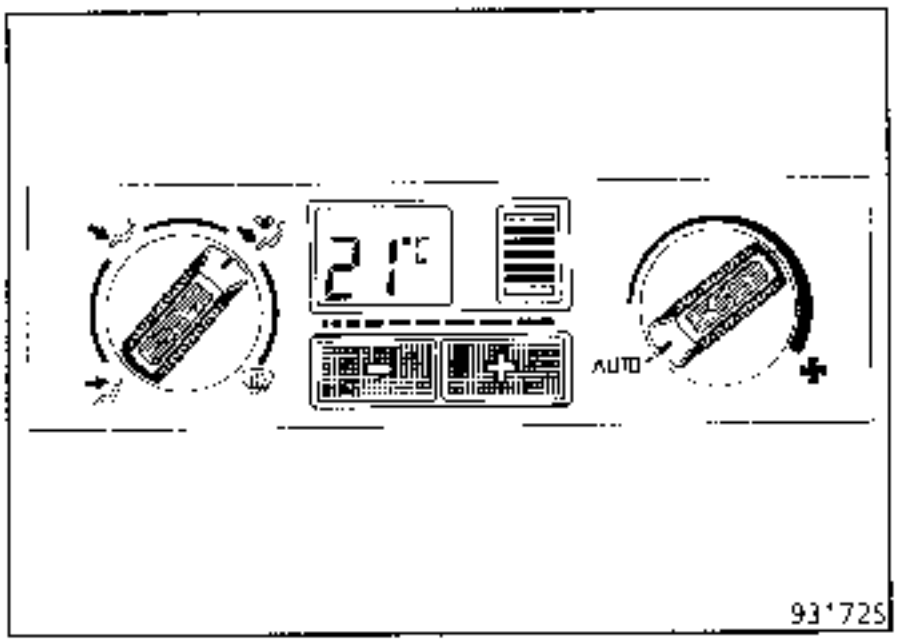
As from model year 1990, **Renault 21 "Phase 2"** vehicles may be equipped with a heating system with temperature regulation.

The aim of the temperature regulation is to make the temperature inside the vehicle as comfortable as possible for the occupants, taking account of the different conditions which can occur inside the passenger compartment.

The temperature regulation system is electronically controlled by means of a computer integrated in the control unit.



ADJUSTING THE TEMPERATURE

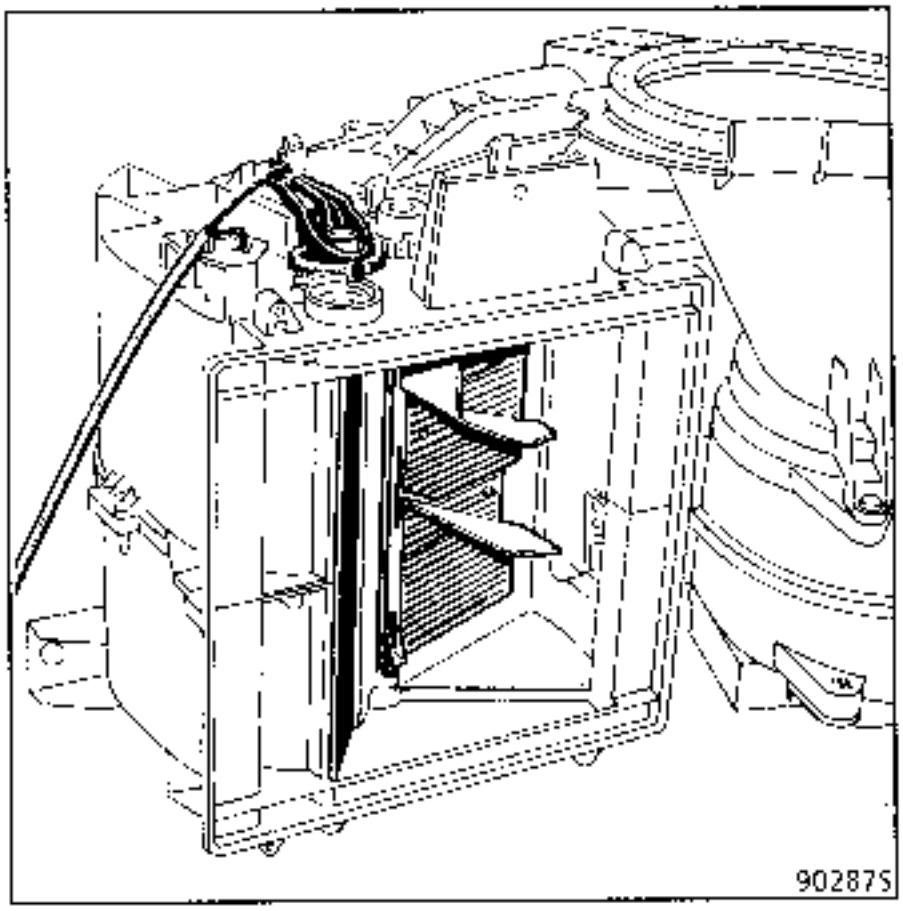


The two "-/+" keys enable the temperature to be adjusted (average temperature measured at head height of the front seat passengers) between **18 °C** and **28 °C**.

Depressing one or other of these keys enables the temperature to be increased or decreased by **2 °C** per second; brief pressure on the same keys will alter the level displayed by **1 °C**.

When the temperature has been adjusted, the regulating device ensures that the temperature in the passenger compartment remains stable, irrespective of the weather conditions and the speed of the vehicle.

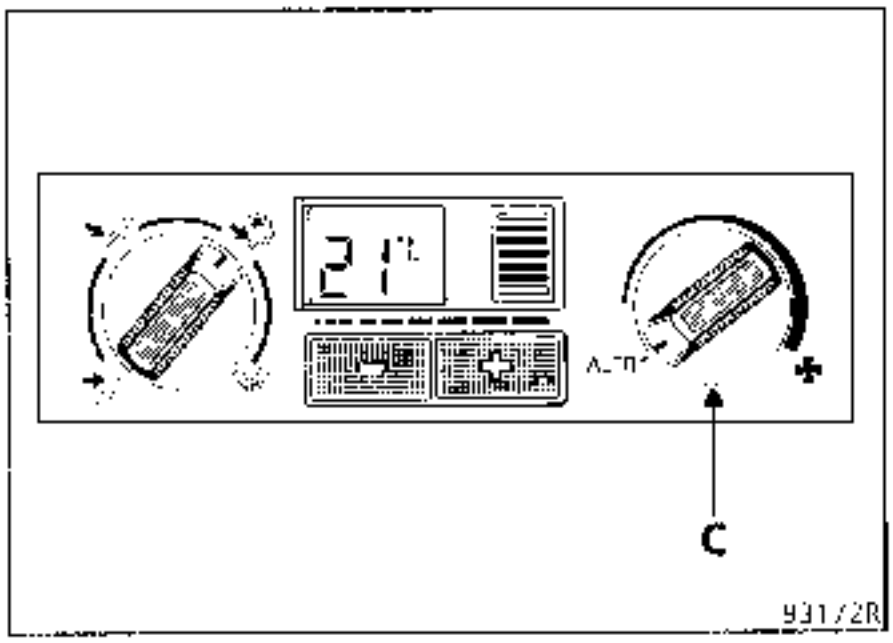
The temperature regulation device controls the adjustment of the mixer flap (hot/cold air mixture).



When the temperature level selected is **28 °C**, the temperature cannot be regulated : the temperature is the one obtained as a result of the system giving maximum performance.

NOTE : When starting the vehicle in cold weather, increasing the temperature displayed (in particular above **21 °C**) will not increase the temperature more quickly. The system increases the temperature in an optimum manner irrespective of the information displayed.

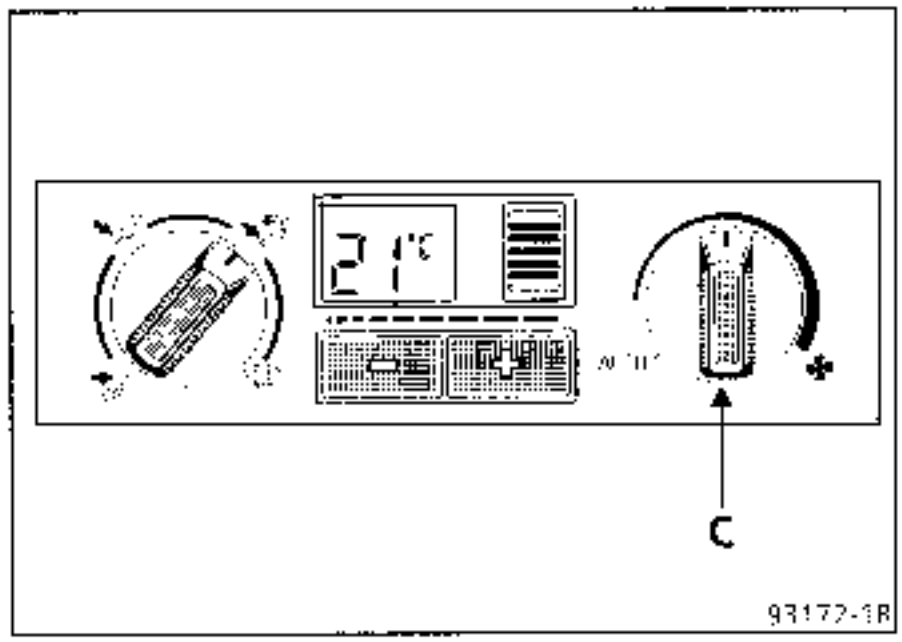
AIR FLOW DIAL (C)



AUTOMATIC SETTING

In the automatic setting, the air flow is regulated automatically by the regulating system which controls the voltage (and thus the speed) of the fan.

When starting the vehicle in cold weather, the regulating device produces a very weak flow of air in the **"AUTO"** setting so as not to blow cold air into the passenger compartment.



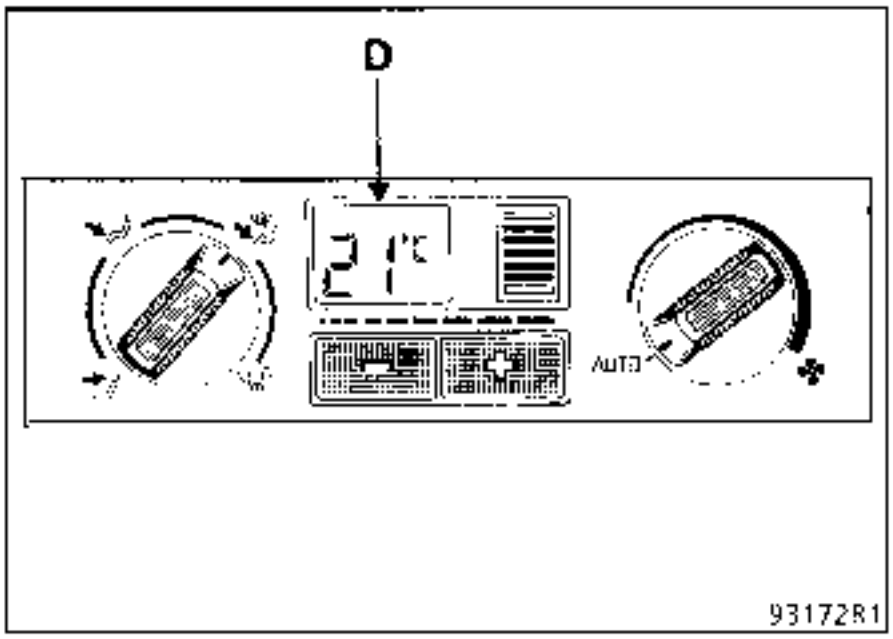
MANUAL SETTING

The air flow obtained when the system is in the **"AUTO"** setting ensures that the temperature is at a comfortable level.

For reasons of acoustics or air speed, this air flow level may be considered excessive (in particular in severe weather conditions). In this case, you can exit the automatic mode and switch to manual regulation.

Changing to manual regulation may reduce the performance of the system somewhat.

DISPLAY (D)

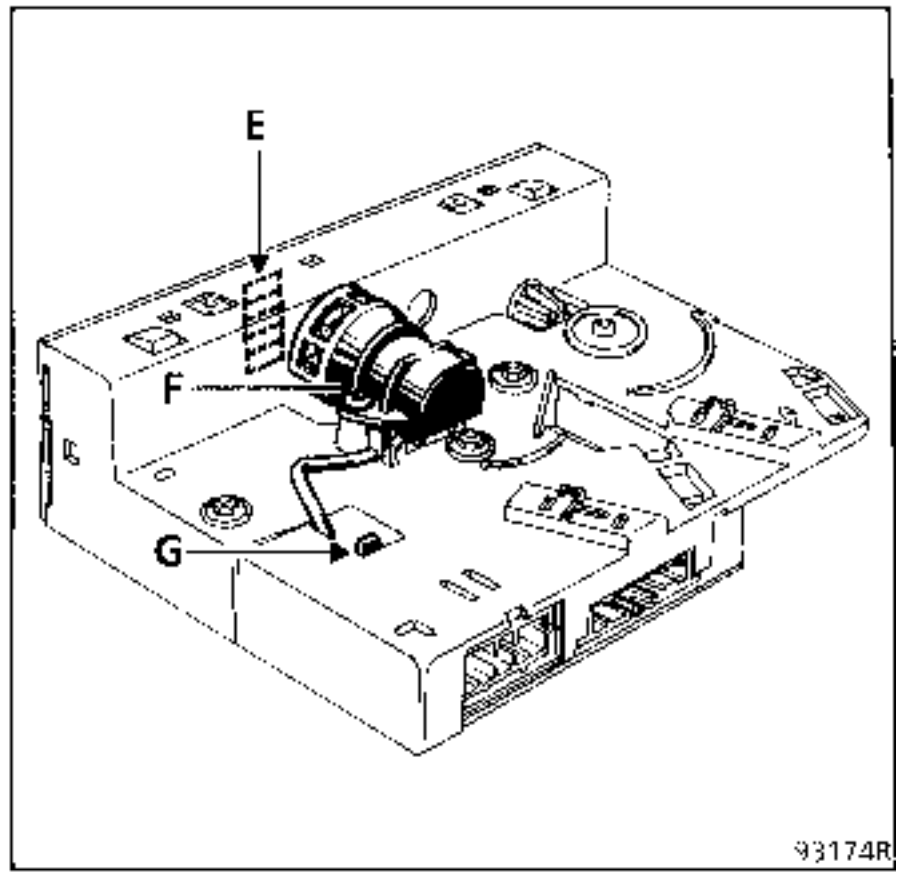


The temperature selected is displayed together with its unit of measurement (°C or °F).

The last temperature selected before the ignition was switched off is stored in the system's memory and is displayed after a two second delay when the vehicle is restarted.

When an incident is detected on the system, the message "**SERVICE**" appears on the display. **The system must then be examined to determine the fault.**

Internal temperature sensor (E)

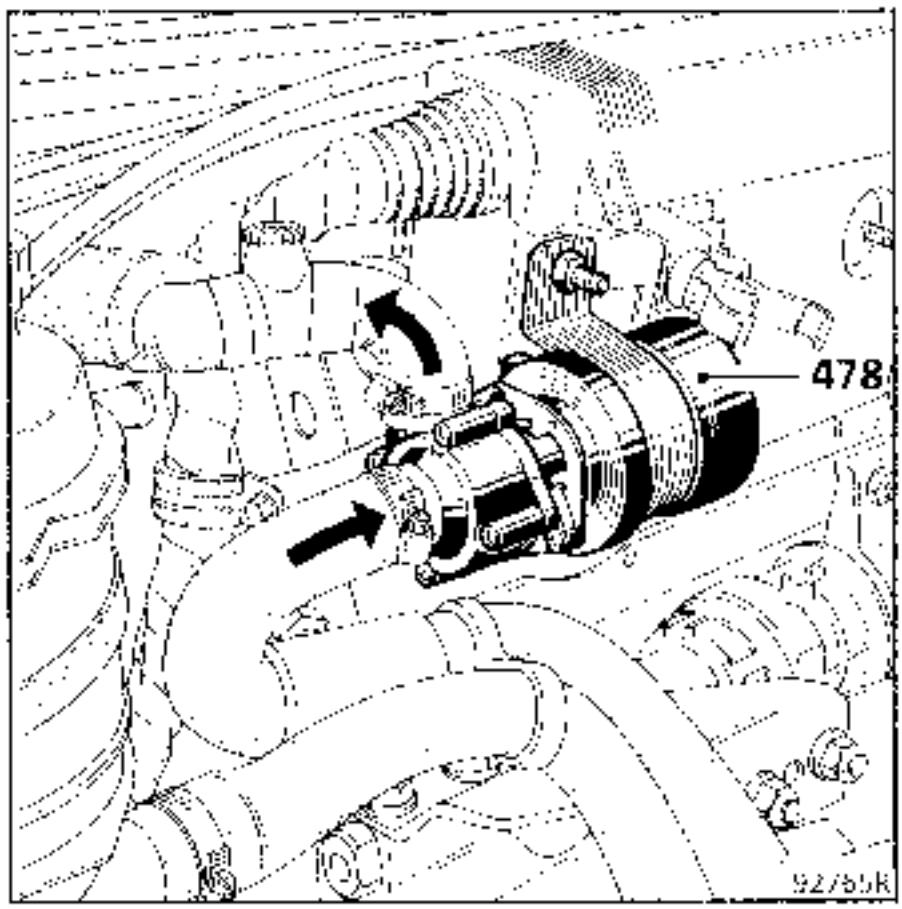


A thermistor with a negative temperature coefficient is integrated in the control panel with the sensor ventilation system (**F**). If there is a sensor failure, the control panel will have to be replaced.

As from model year 1989, **Renault 21 Diesel X486, X488 and X48V** are equipped with an electric pump (**478**) circulating the coolant in the heating system.

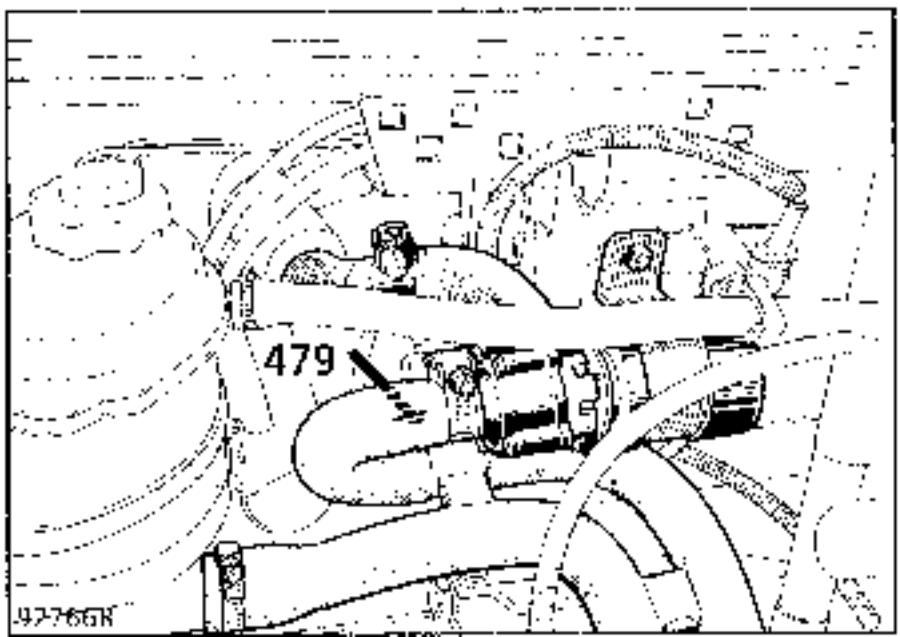
This pump is controlled up to a temperature of **77 °C** at the heater radiator inlet. Above this temperature, the circuit is established in the normal way.

The pump is only activated again when the temperature drops to below **67 °C**.

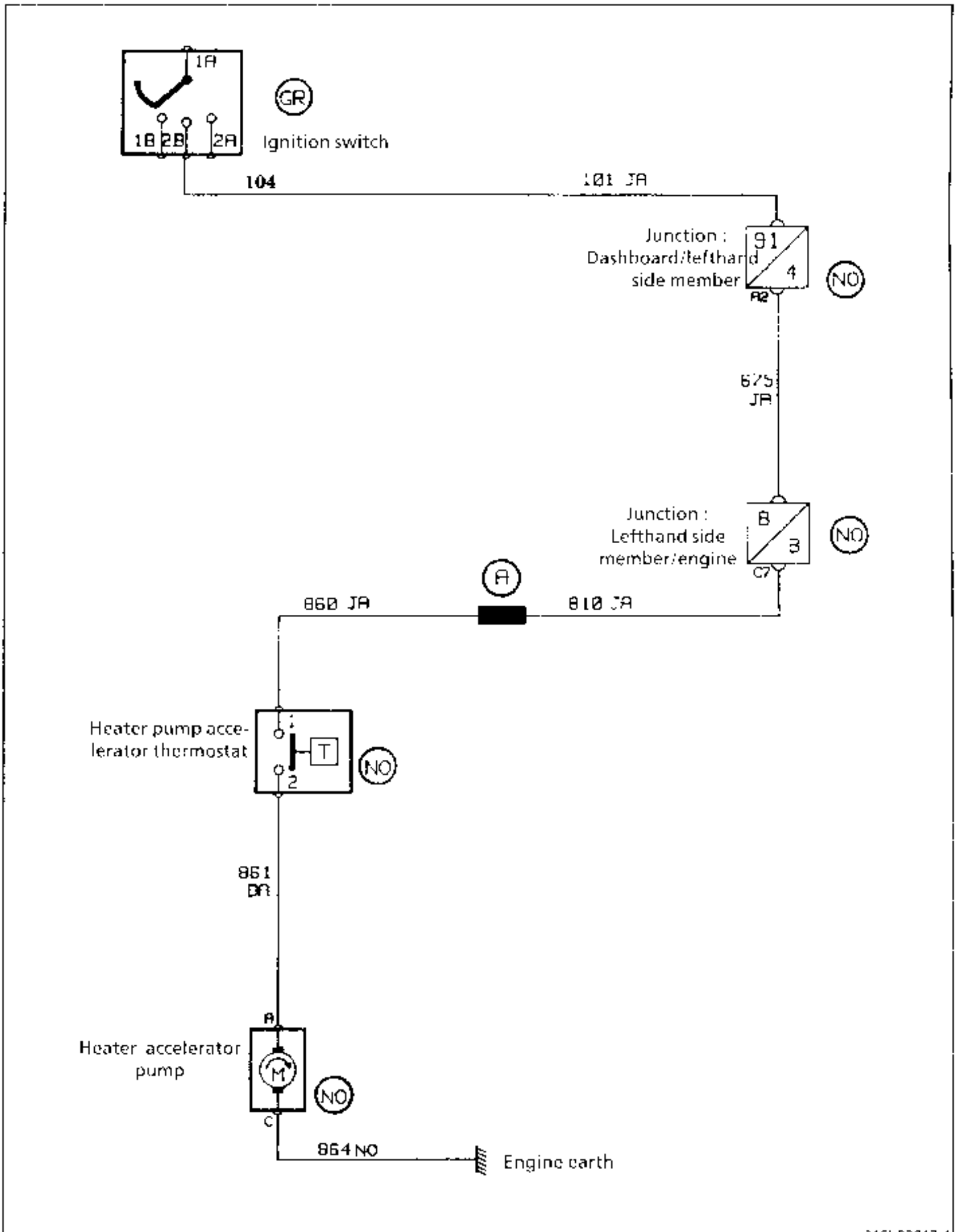


This pump is located on the engine compartment bulkhead and is connected in production in the coolant system.

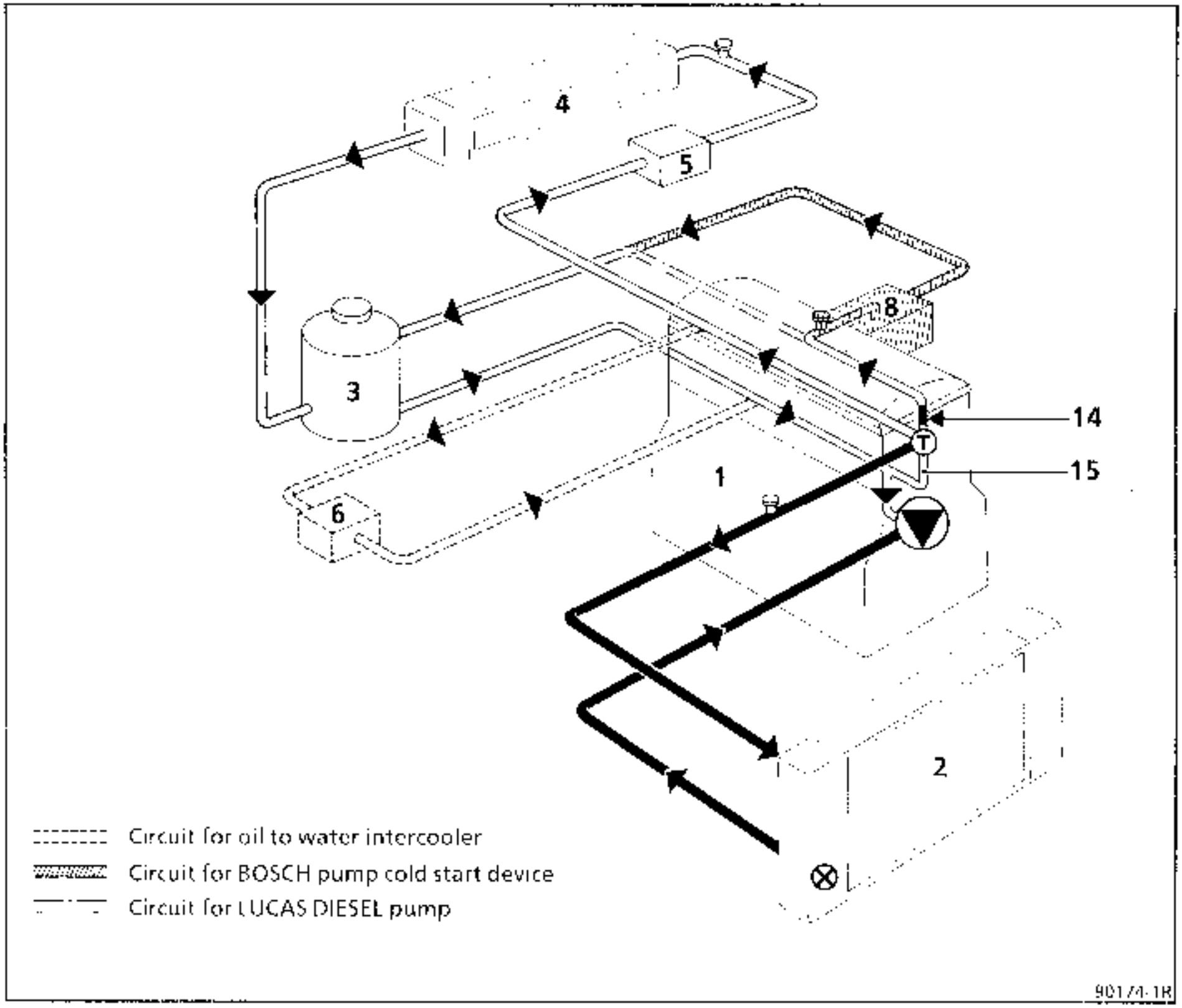
Thermostatic sensor (**479**) is screwed onto the electric pump inlet tube.



Wiring diagram for the X48 heating system coolant pump



Special feature of the X48 with auxiliary heating system coolant pump.



1 Engine
2 Radiator
3 "Hot type" expansion chamber with permanent defuming
4 Heater matrix
5 Electric coolant pump
6 "Modine" oil to water intercooler for Turbo diesel engine
8 BOSCH pump cold start device
14 ⌀ 3.5 mm restrictor
15 P circuit (see thermostat operation)

Coolant pump

Dual action thermostat

Bleed screws :
- 2 for : LUCAS DIESEL pump
- 3 for : BOSCH pump

Thermal switch

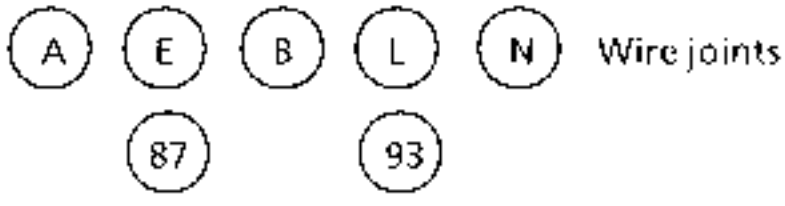
6	Electronic module for fan motor assembly
18	Blown air temperature sensor
104	Ignition switch
124	Heater control
209	Combined lighting/direction indicators switch stalk
234	Fan motor assembly relay
245	External temperature sensor
260	Fuse box
298	Blower device
320	Fan motor assembly
418	Passenger compartment temperature sensor ventilator
420	Mixer flap

LIST OF JUNCTIONS

R5	Dashboard/heater bulkhead harness
R11	Dashboard/lefthand side member harness
R99	Dashboard/heater harness

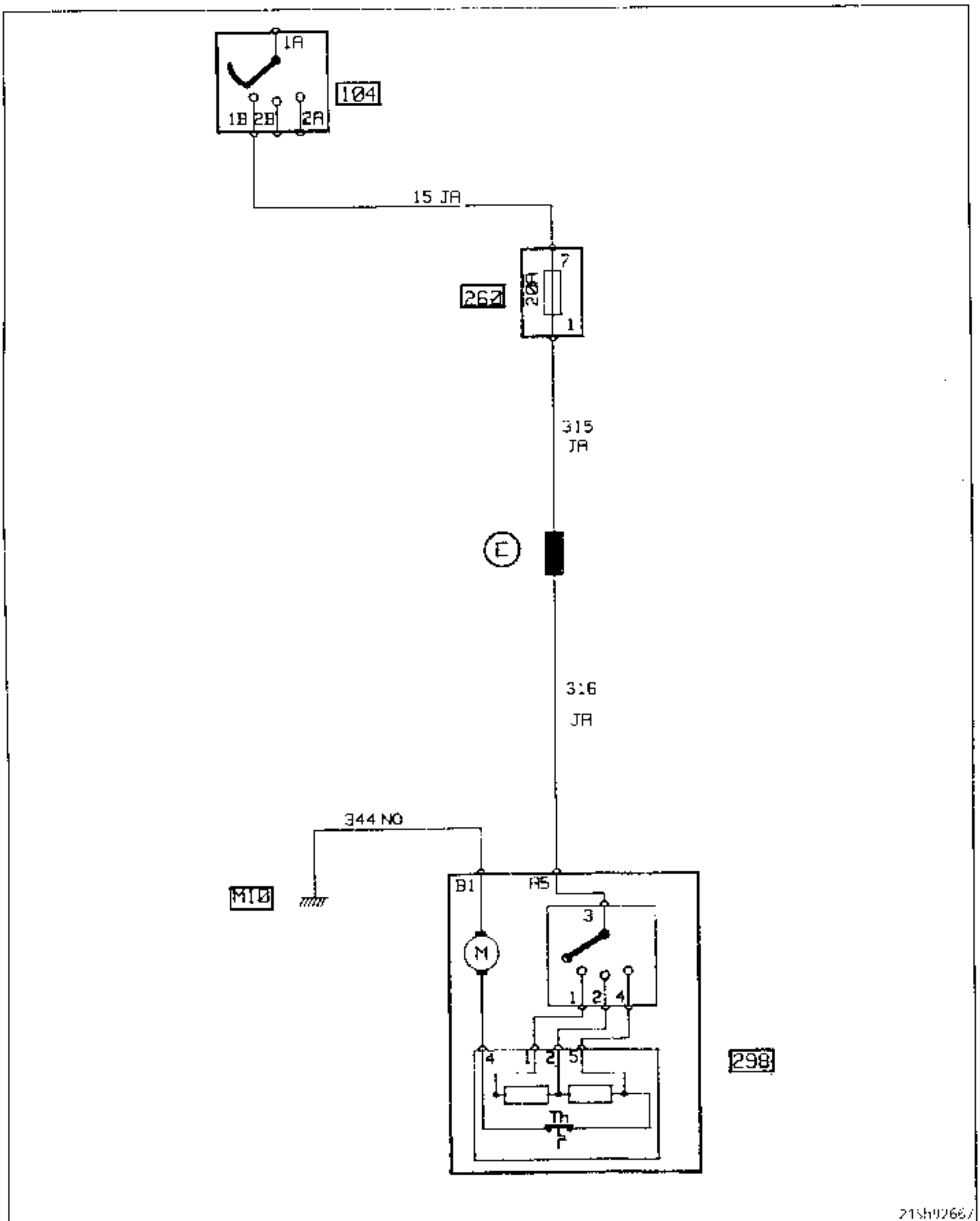
LIST OF EARTHS

M9	Front righthand pillar earth
M10	Front lefthand pillar earth

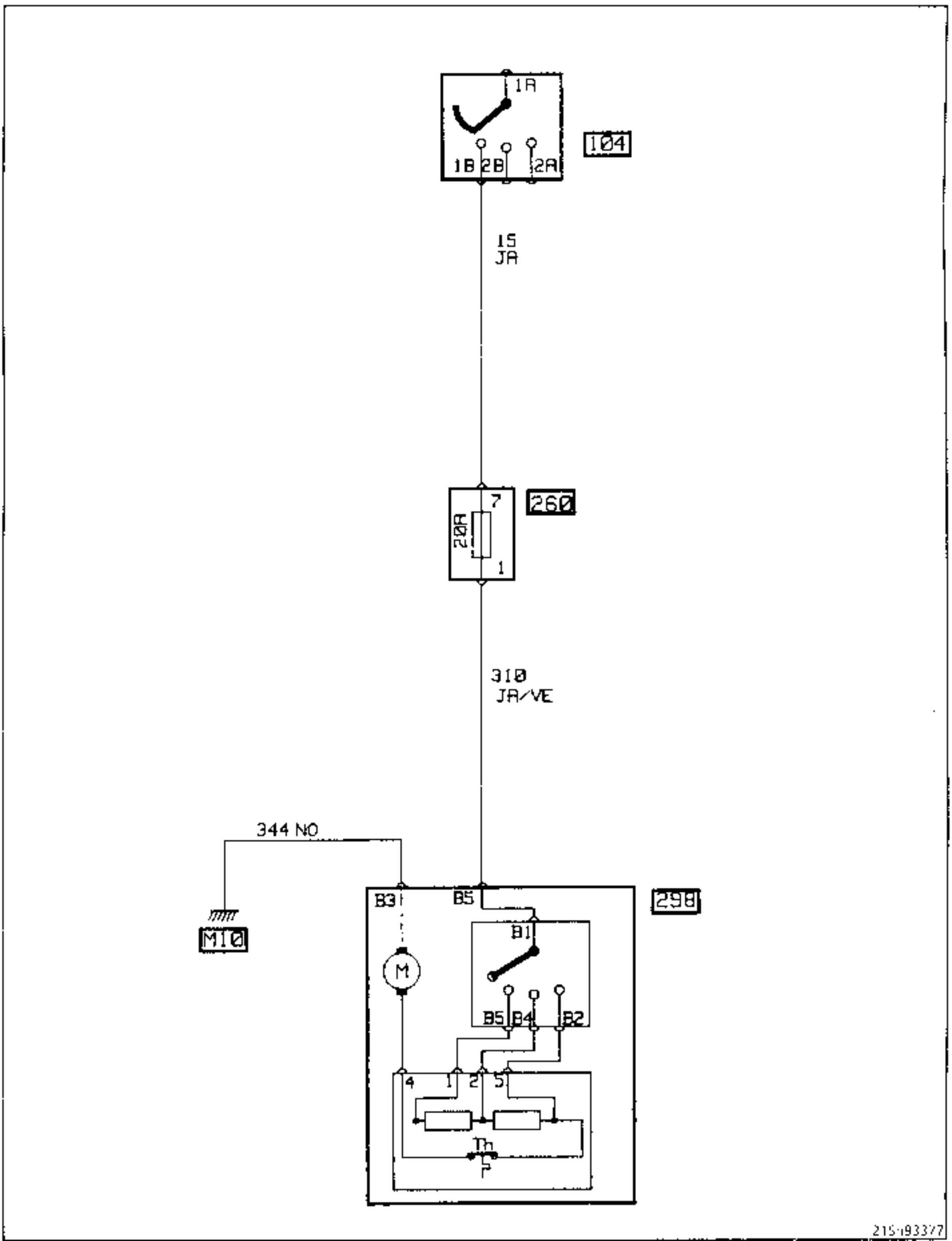


ALL TYPES UP TO MODEL YEAR 1989

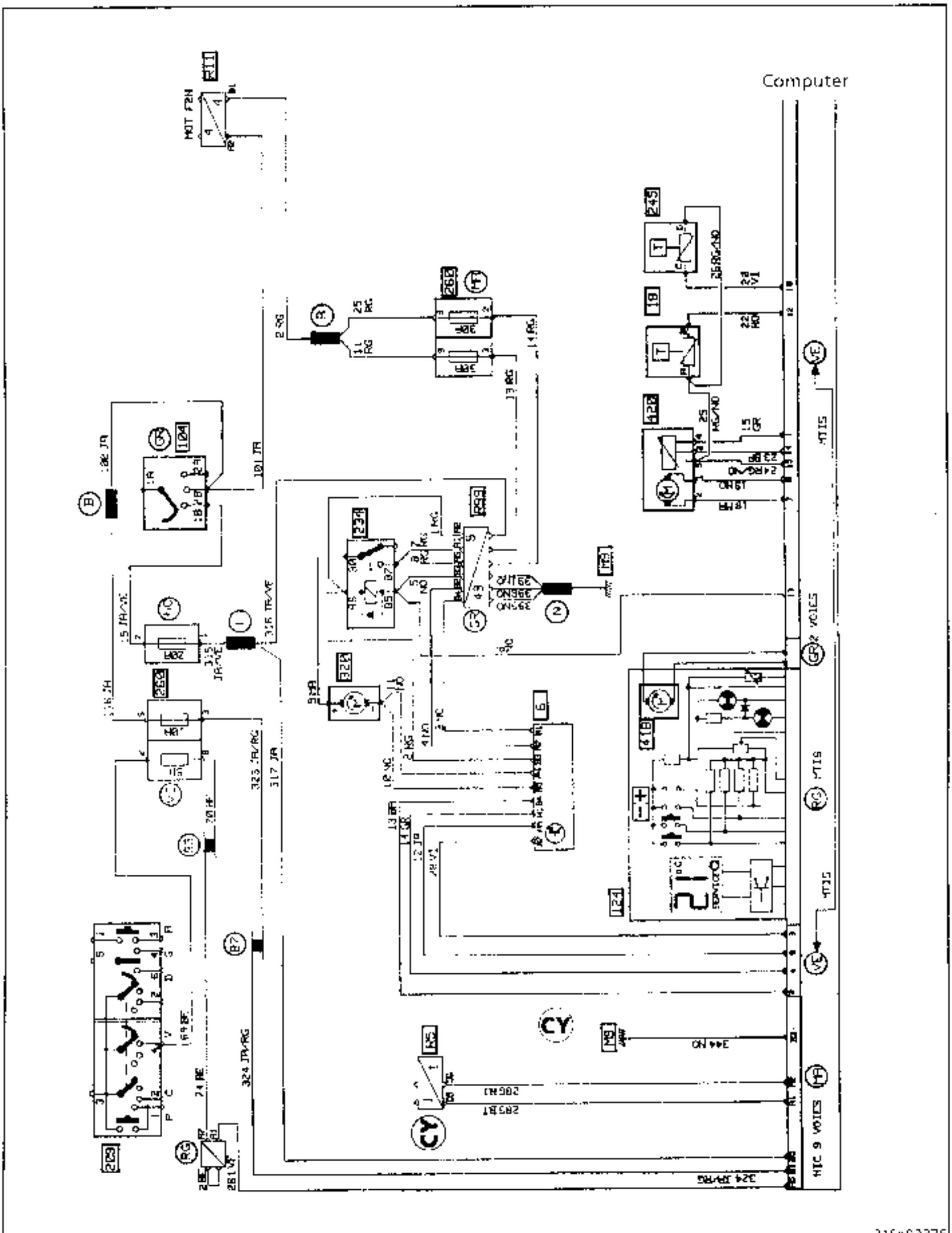
WIRING DIAGRAM



AS FROM MODEL YEAR 1990

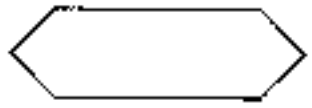


AS FROM MODEL YEAR 1990 - VERSION WITH REGULATED TEMPERATURE

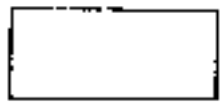


ALL TYPES UP TO MODEL YEAR 1989

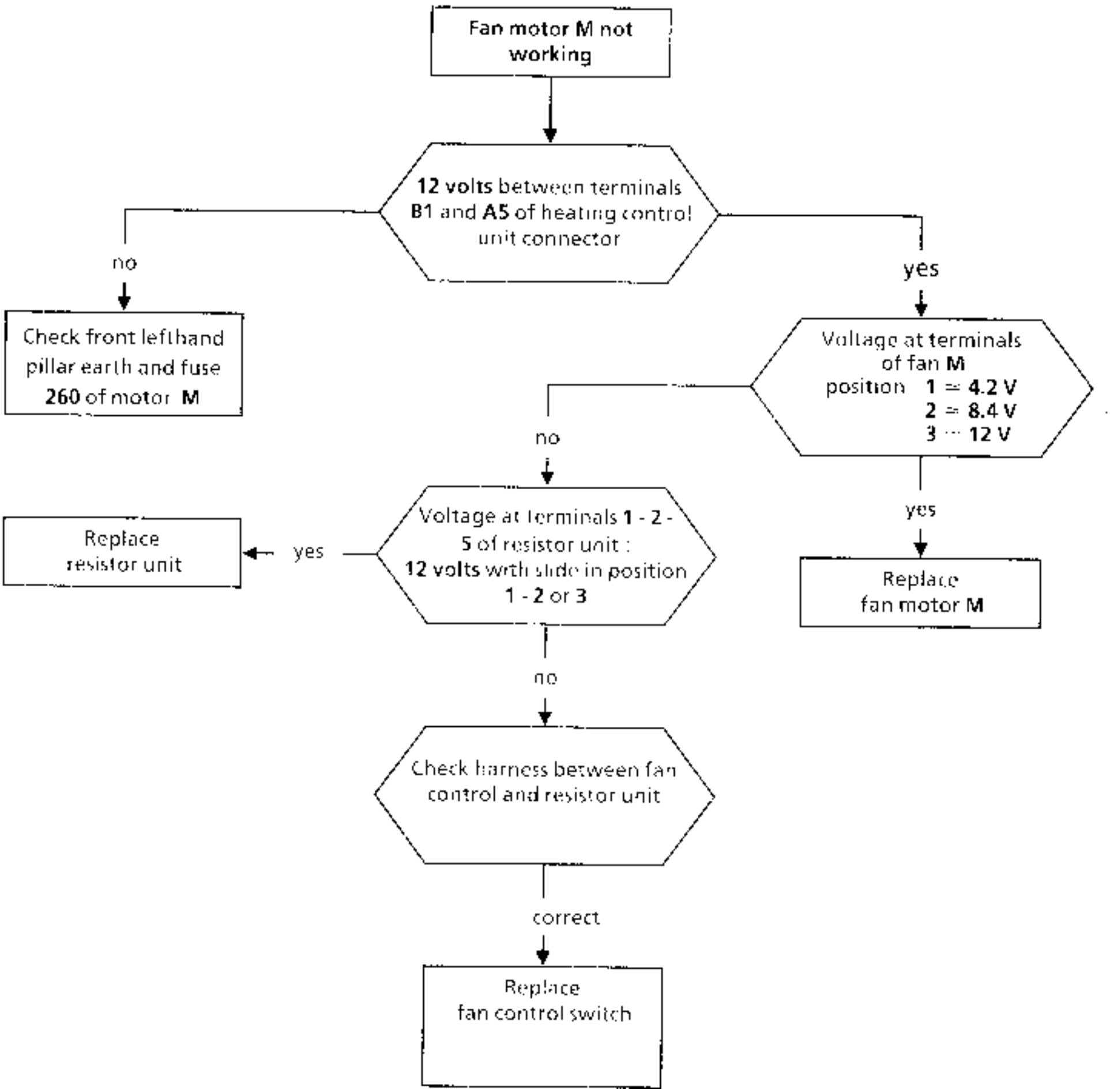
Key :



Operations to be performed



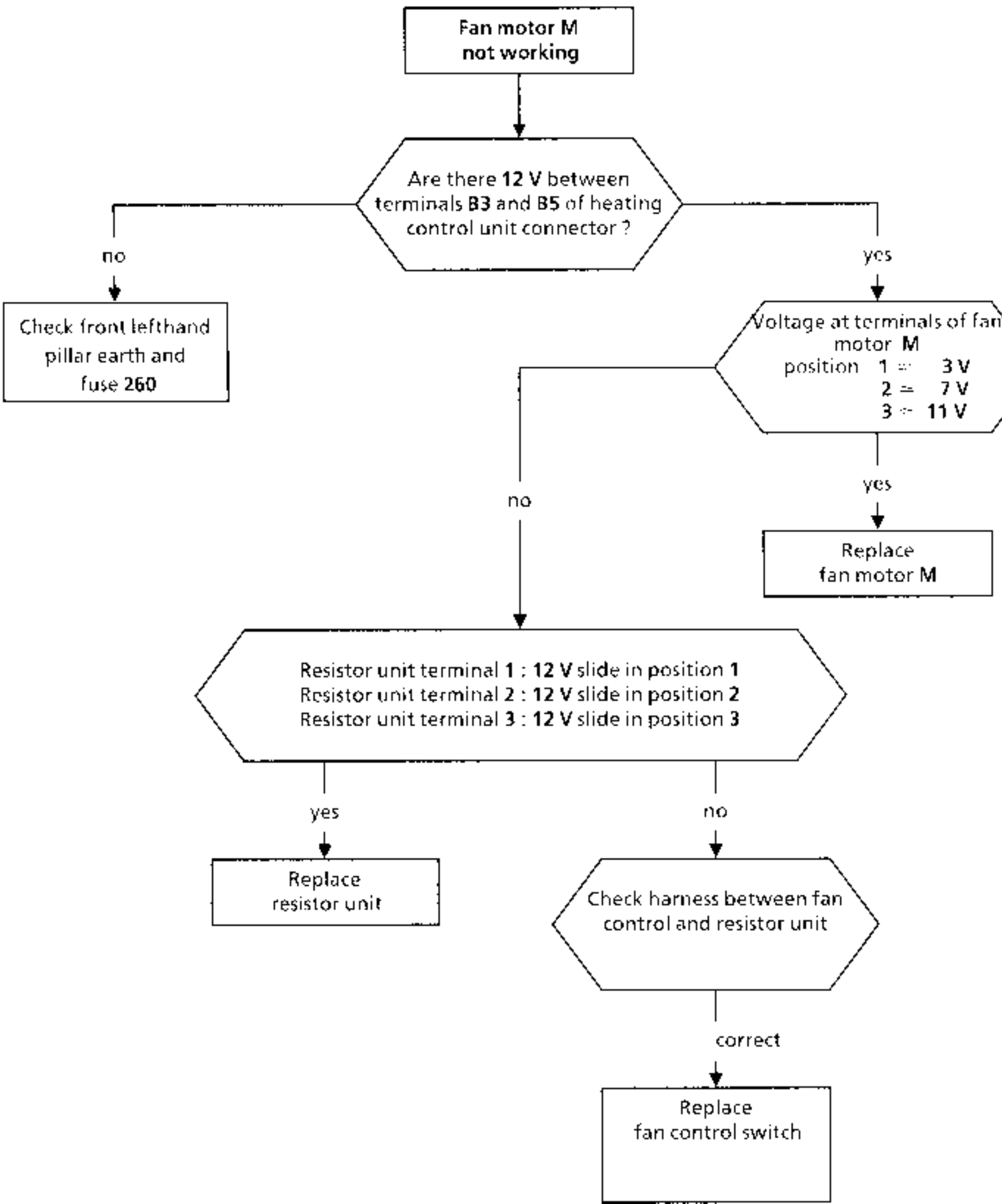
Checks



AS FROM MODEL YEAR 1990 (except version with regulated temperature)

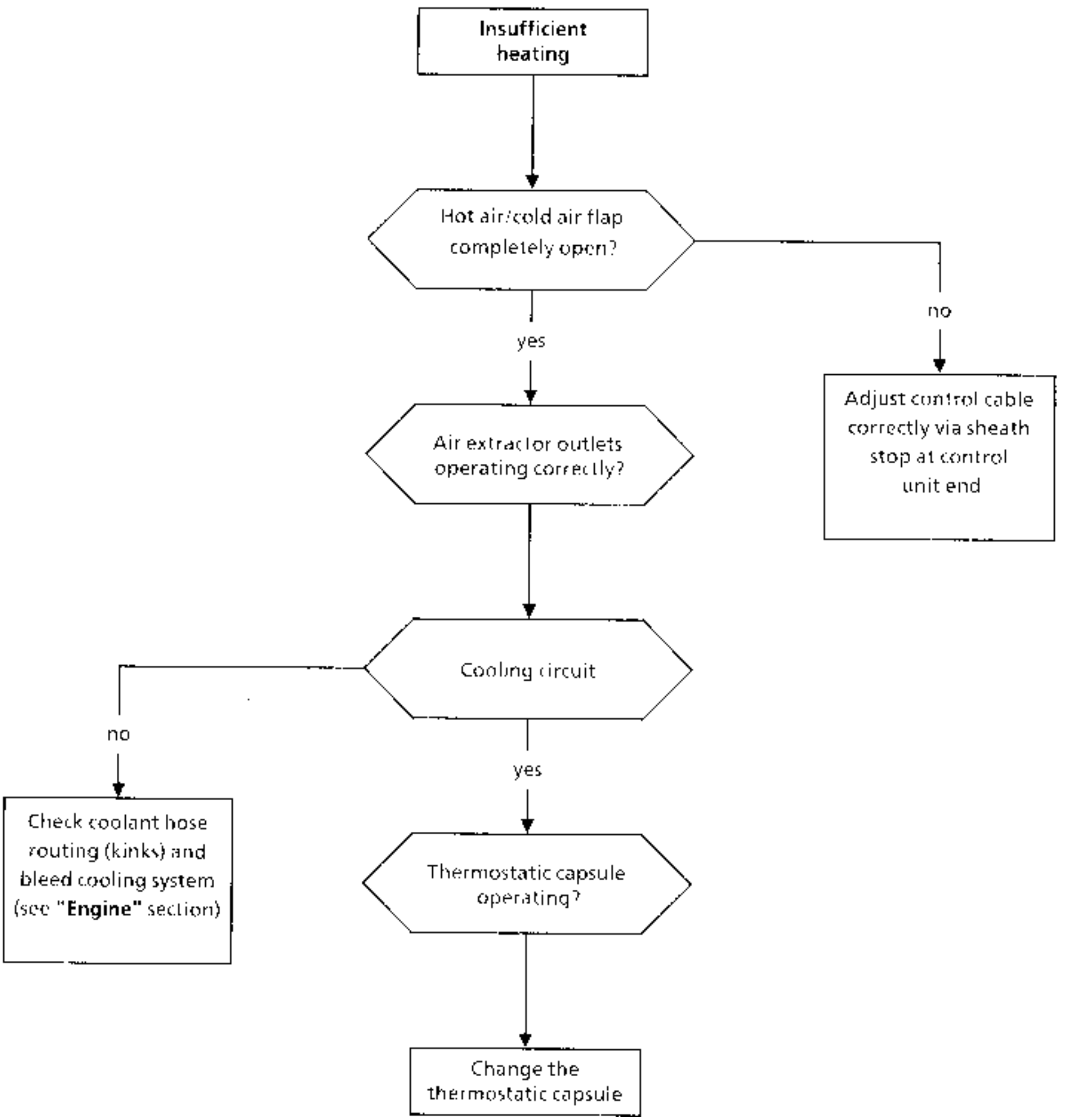
Key: Operations to be performed

Checks



Key:


Operations to be performed
Checks


Insufficient heating
Hot air/cold air flap completely open?
no
Adjust control cable correctly via sheath stop at control unit end
yes
Air extractor outlets operating correctly?
Cooling circuit
no
Check coolant hose routing (kinks) and bleed cooling system (see "Engine" section)
yes
Thermostatic capsule operating?
Change the thermostatic capsule

GENERAL

The computer integrated in the control unit has a self-diagnostic system for the peripheral units of the heating/ventilation system with regulated temperature.

If one of the units fails, a warning light is triggered and the **"SERVICE" warning light** on the instrument panel illuminates.

At the same time, operation of the system in **"defect mode"** is triggered and this enables the driver to reach the nearest workshop without major damage being caused to the system.

The incident causing the warning light to illuminate can be displayed by using the diagnostic plug, **XR 25** test box and the appropriate cassette.

When an incident has occurred it is stored in the computer's **"non-volatile memory"** when the ignition has been switched off. This memory can be consulted at any time using the **XR 25** test box and the appropriate cassette.

If one of the peripheral units of the temperature regulating system fails, the computer will instruct the **"SERVICE"** warning light to illuminate and the system to operate in defect mode, which may differ according to the components at fault.

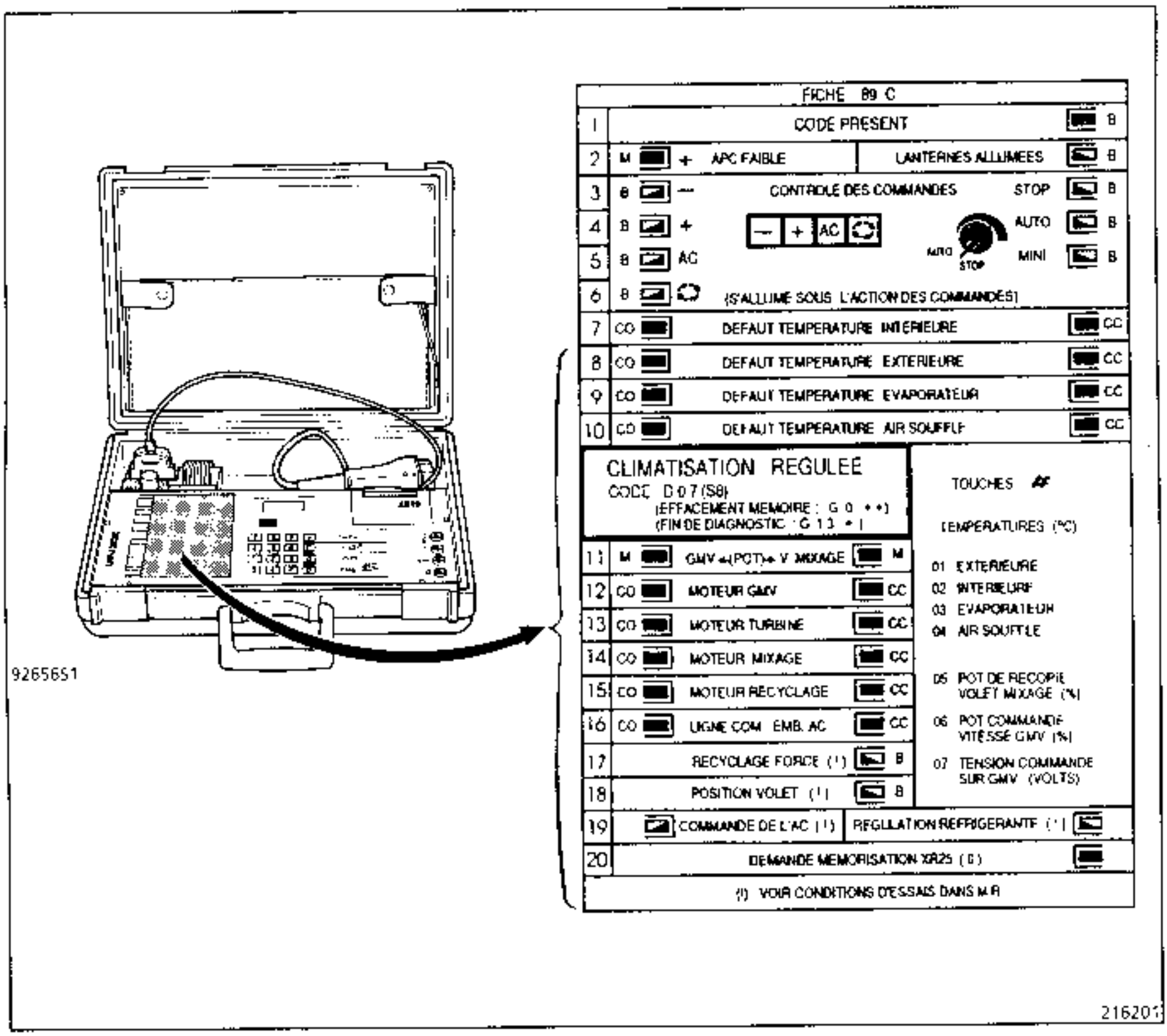
DEFECT MODES FOR DIFFERENT INCIDENTS

Incident detected	Warning light illuminated	Corresponding defect mode
Internal temperature sensor	"SERVICE"	- Value imposed : 21 °C - imposed fan voltage : minimum
External temperature sensor	"SERVICE"	Value imposed : external temperature stored at the time the incident occurred.
Blown air temperature sensor	"SERVICE"	Value imposed : blown air temperature stored at the time the incident occurred.
Fan control potentiometer	"SERVICE"	- AUTO instruction for the air flow operating mode.
Mixer flap copying potentiometer	"SERVICE"	- Extreme hot or extreme cold depending on external temperature
Mixer motor	"SERVICE"	- Motor stops: fan voltage : minimum
Fan motor	"SERVICE"	- Motor stops

The XR 25 test box is essential for all fault finding on the heating system irrespective of the origin of the incidents.

It has a microprocessor and provides access to all the data supplied by the various sensors and enables the diagnostic message sent by the computer to be read.

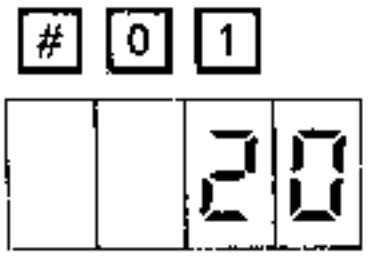
It enables the **"non-volatile memory"** contained in the computer to be erased after each operation on the heating system.



USING CASSETTE N° 8

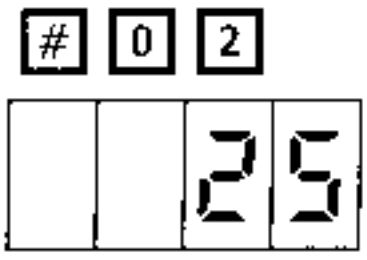
- Connect the test box to the diagnostic socket.
- Position the selector knob on **S8**
- Switch on the ignition.
- Enter the special code for regulating the temperature [D] [0] [7] then enter [#] followed by two figures to access the various data sent by the computer.

IMPORTANT : fault-finding the temperature regulating system using the XR 25 slows the system down to approximately one third is normal operating speed.



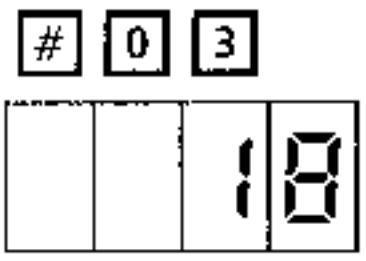
EXTERNAL TEMPERATURE : Value given in degrees Celsius

All versions with regulated temperature



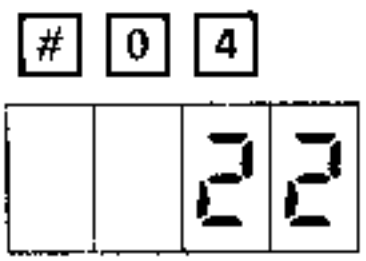
INTERNAL TEMPERATURE : Value given in degrees Celsius

All versions with regulated temperature



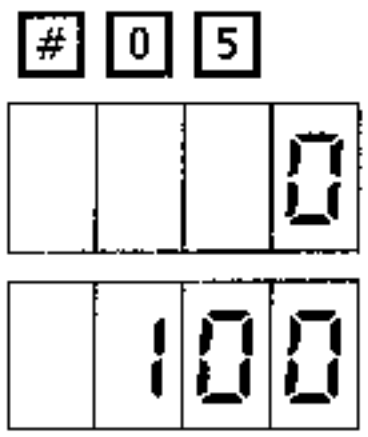
EVAPORATOR TEMPERATURE : Value given in degrees Celsius

Only on versions with air conditioning and regulated temperature



BLOWN AIR TEMPERATURE : Value given in degrees Celsius

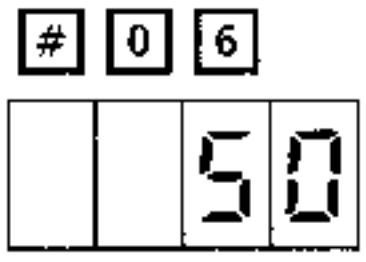
All versions with regulated temperature



MIXER FLAP COPYING POTENTIOMETER

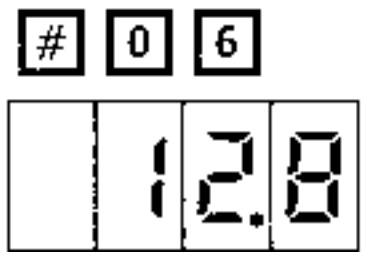
Value given as a %
All versions with regulated temperature
0 % is the extreme cold setting

100 % is the extreme hot setting



FAN MOTOR SPEED CONTROL POTENTIOMETER

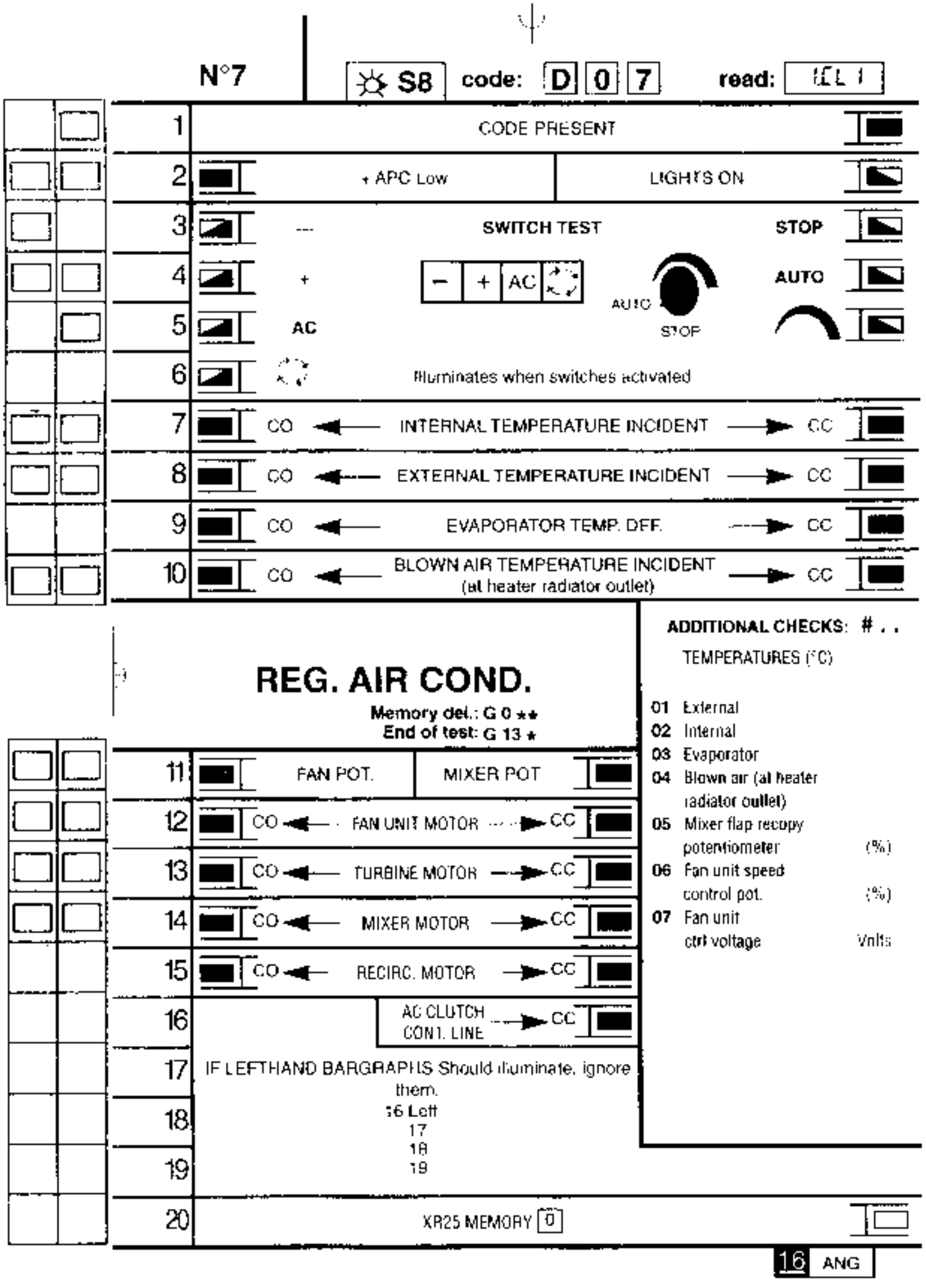
Value given as a %
All versions with regulated temperature

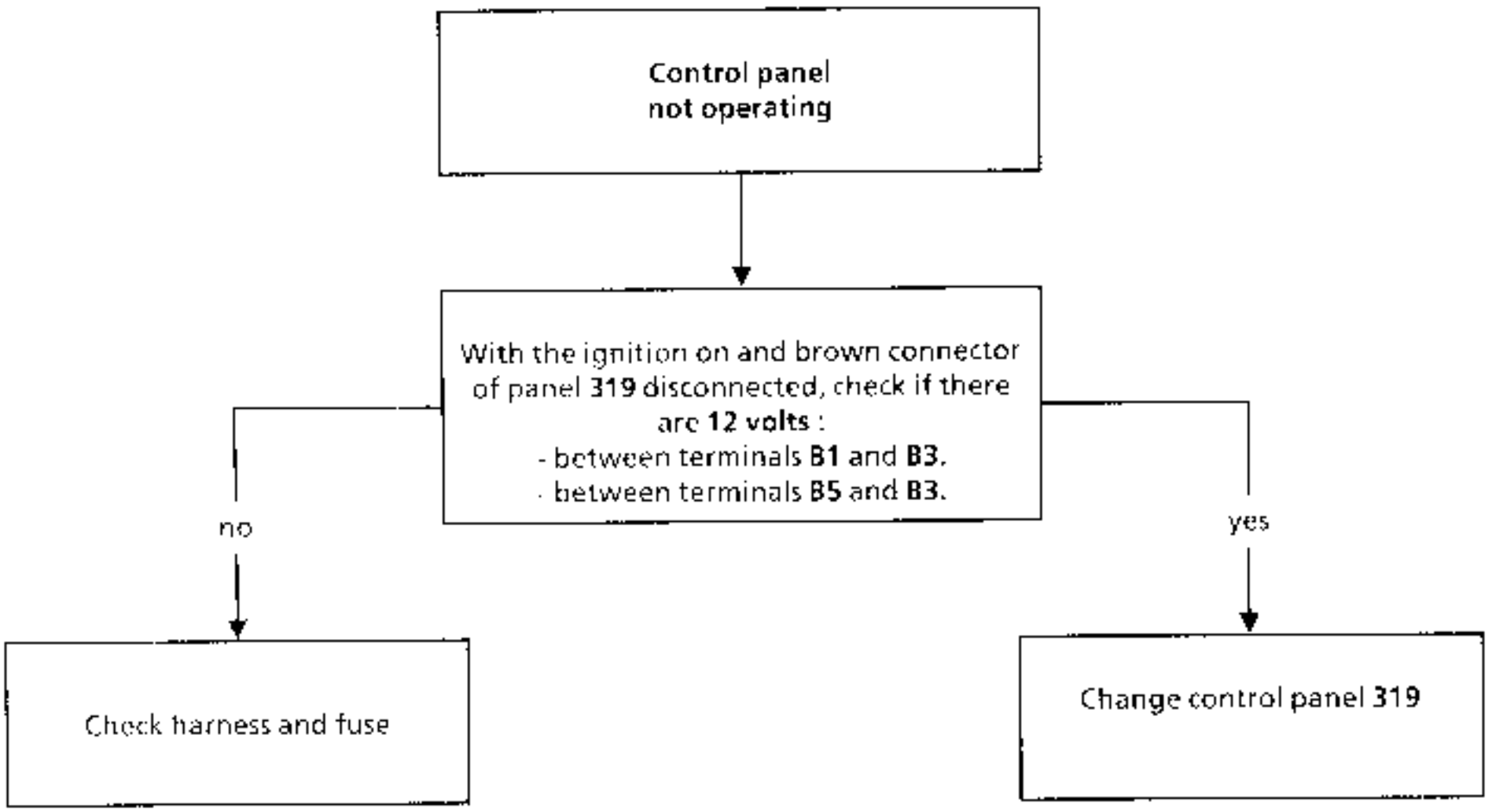


CONTROL VOLTAGE APPLIED TO FAN MOTOR

Value given as a %
All versions with regulated temperature

Shows where the bargraph can illuminate




Control panel not operating
With the ignition on and brown connector of panel 319 disconnected, check if there are 12 volts :
- between terminals B1 and B3.
- between terminals B5 and B3.
no
yes
Check harness and fuse
Change control panel 319

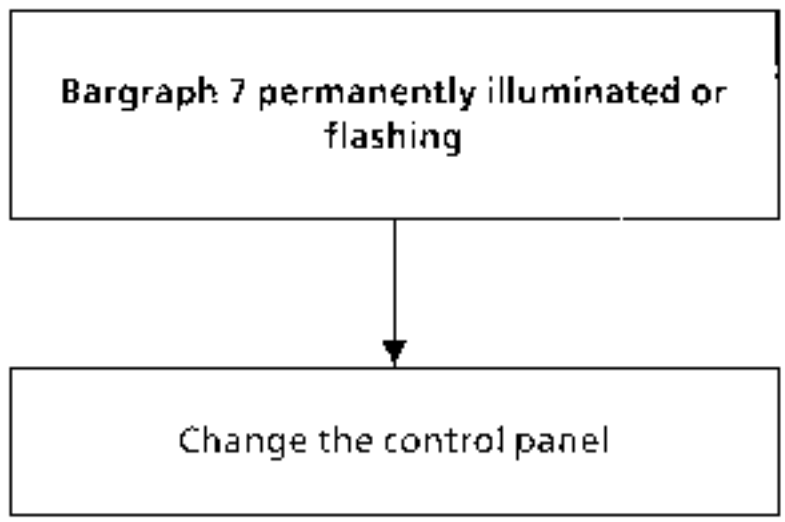
Control panel operating normally

Illumination of the bargraph tested by pressing on control panel keys :	
KEY DEPRESSED	RIGHTHAND SIDE OF BARGRAPH ILLUMINATES
	3 illuminated
I	4 illuminated
KEY DEPRESSED	LEFTHAND SIDE OF BARGRAPH ILLUMINATES
AUTO	4 illuminated
MANUAL	5 illuminated

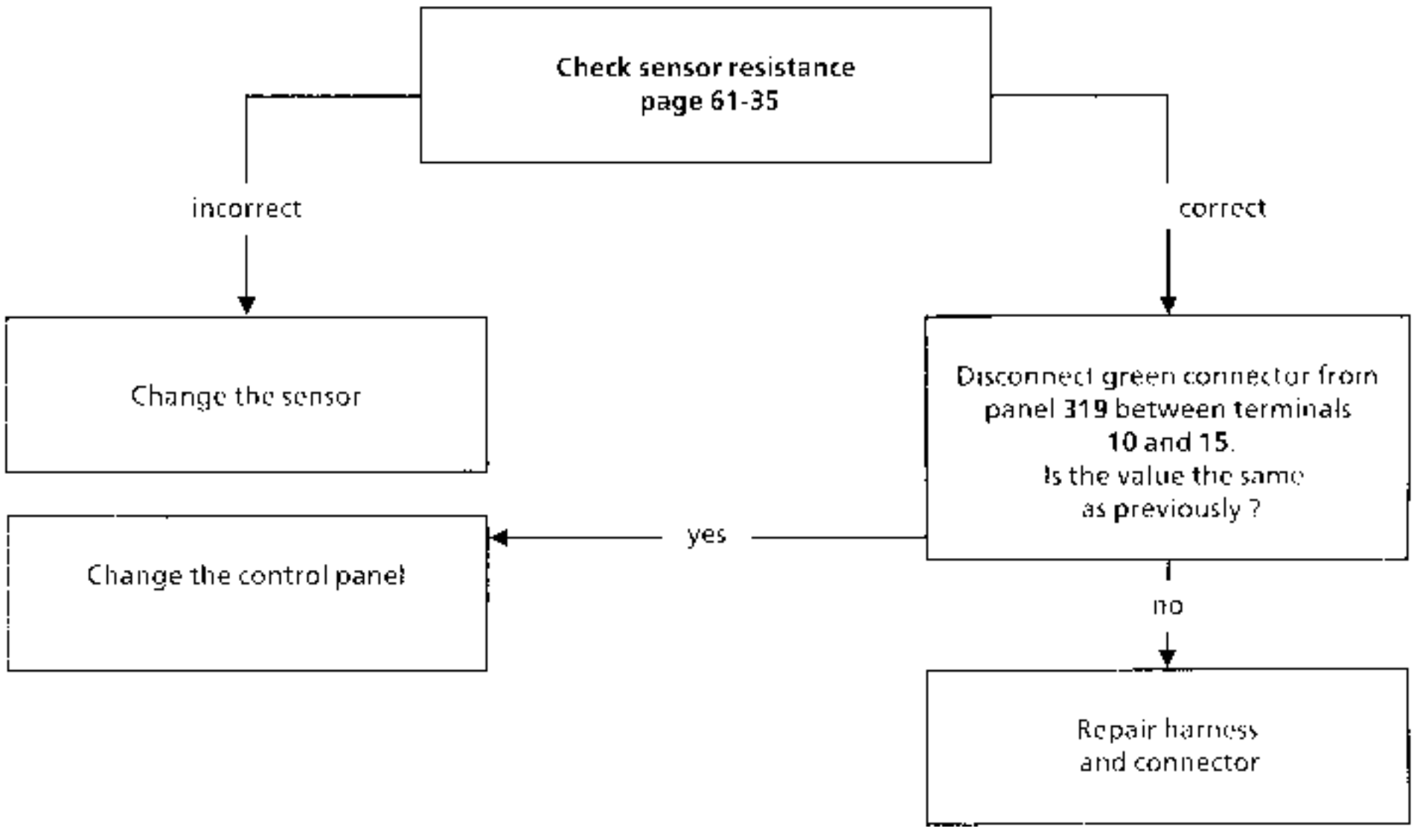
One or more bargraphs not illuminating or extinguishing

Change the control panel

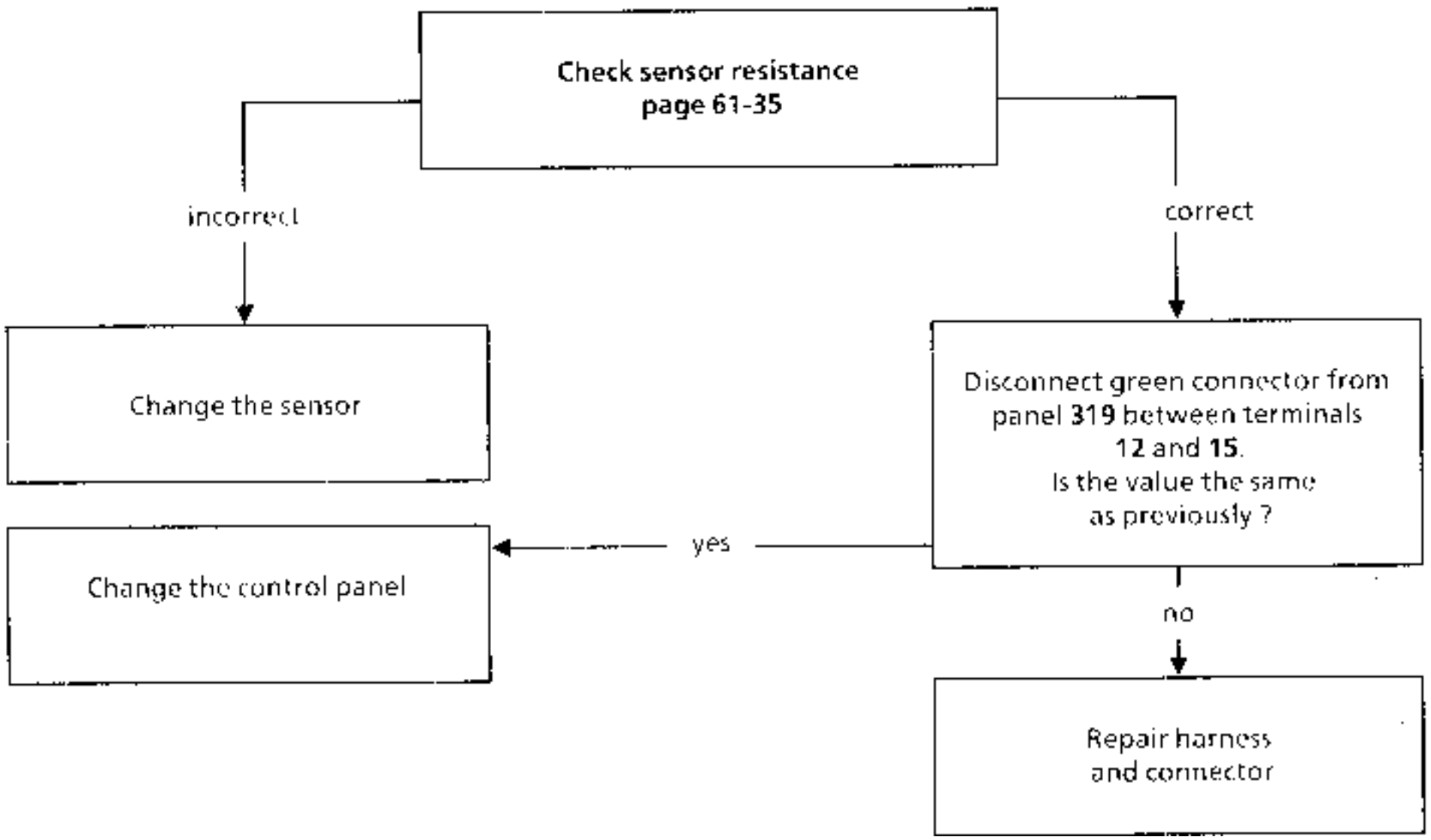
Incident : **BARGRAPH 7 ILLUMINATED** : (Internal temperature)



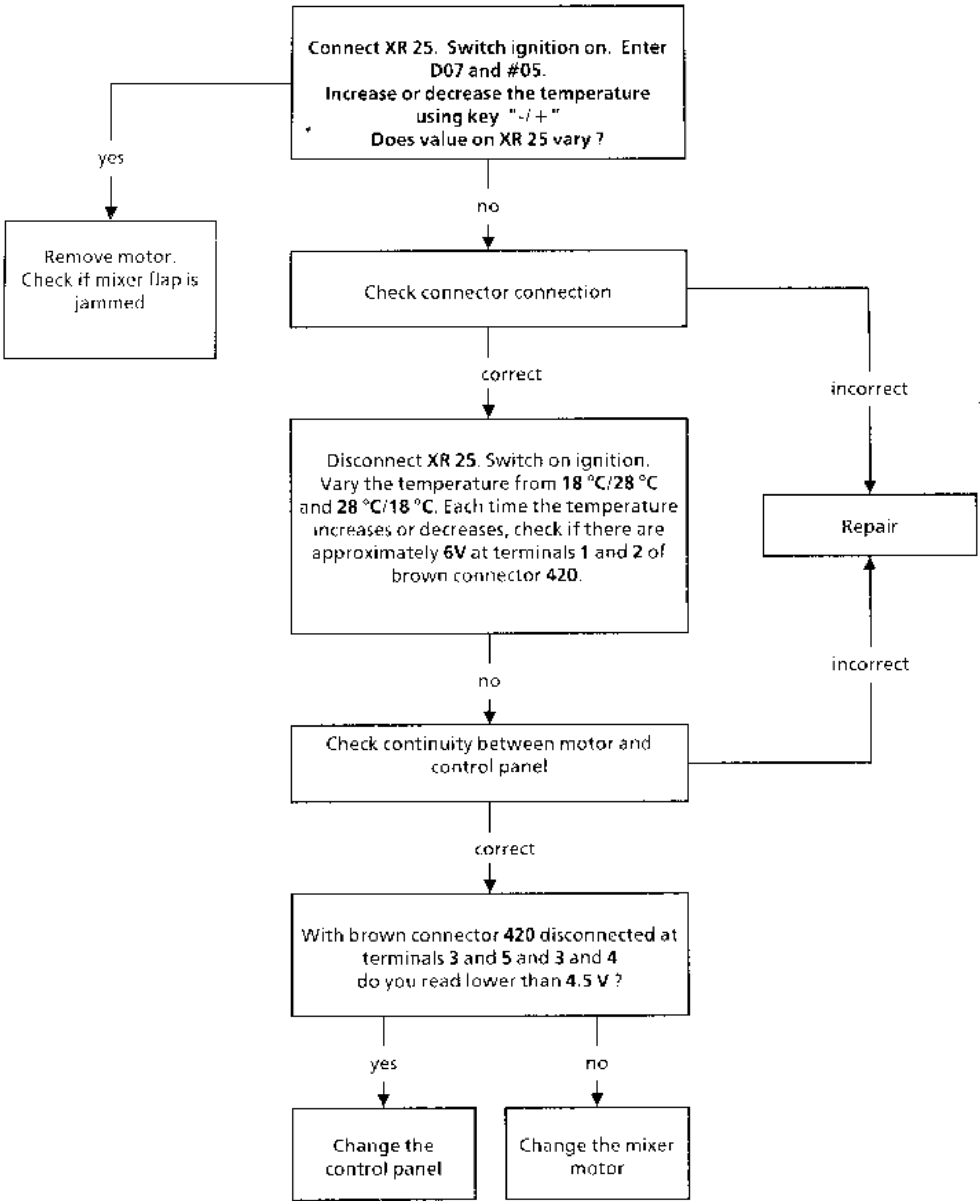
Incident : **BARGRAPH 8 ILLUMINATED** : (External temperature)



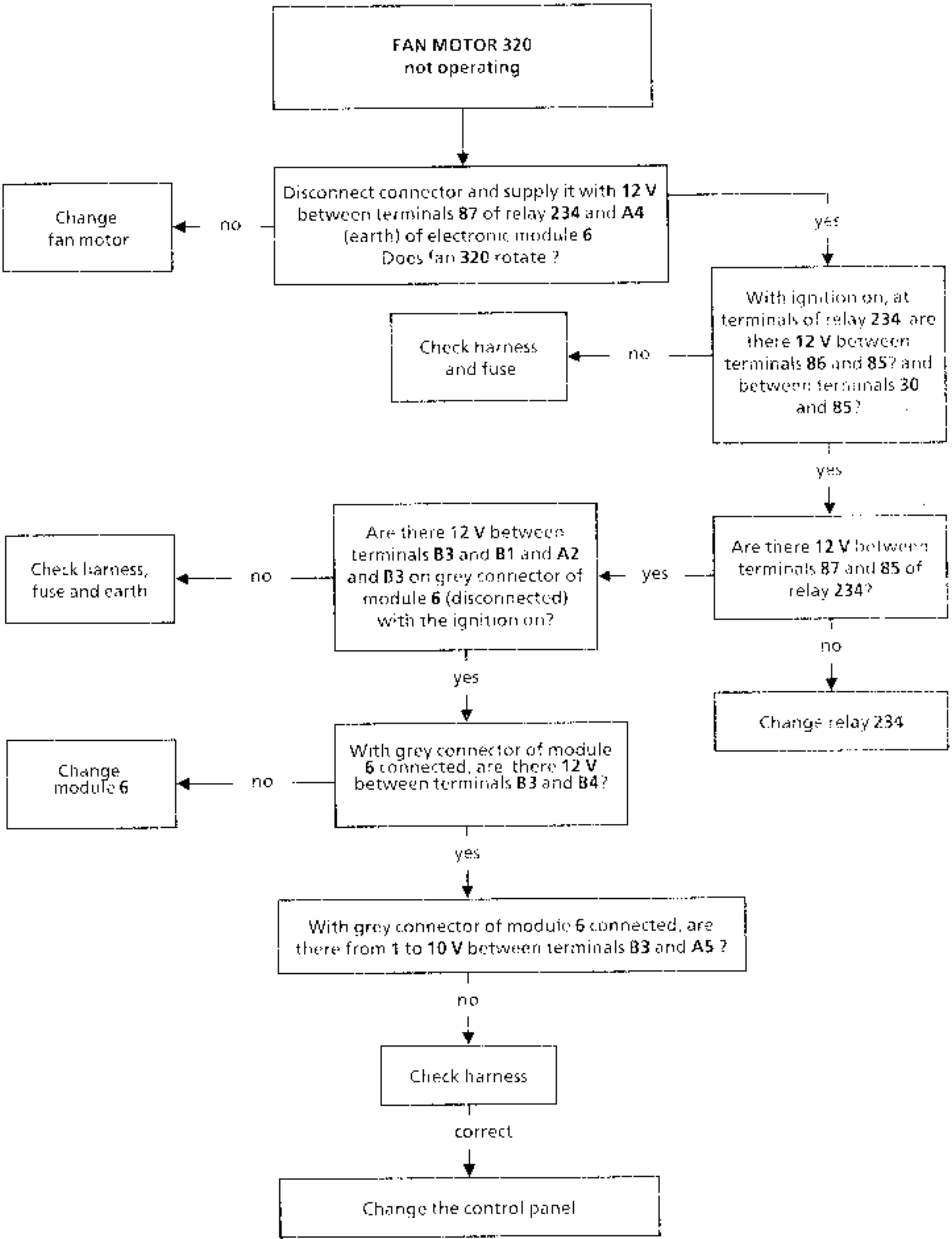
Incident : BARGRAPH 10 ILLUMINATED : (Blown air temperature)



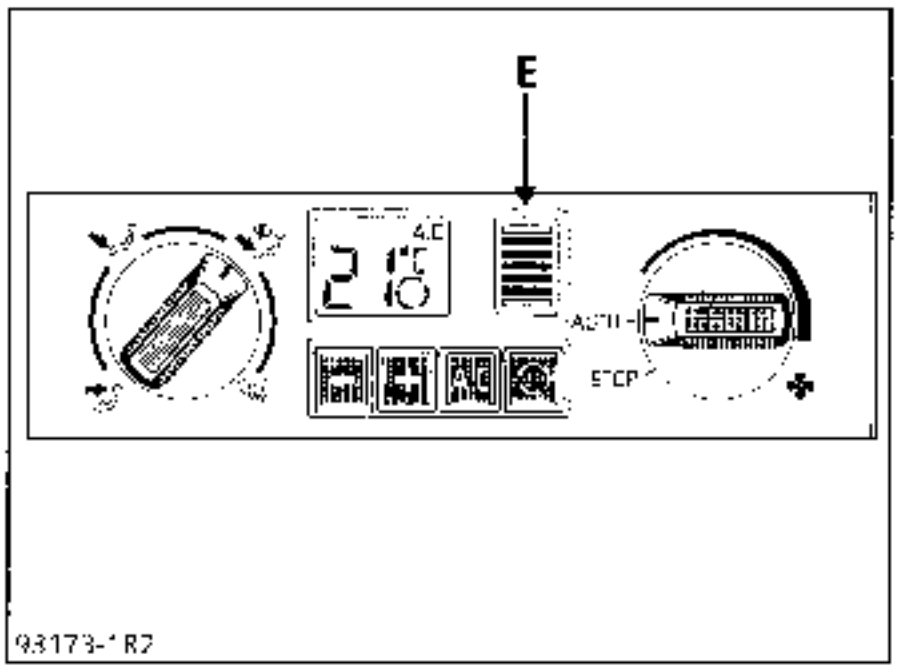
Incident : **BARGRAPH 11 RIGHTHAND SIDE ILLUMINATED** : (Mixer flap potentiometer)



Incident : **BARGRAPH 12 ILLUMINATED** : (Fan motor)

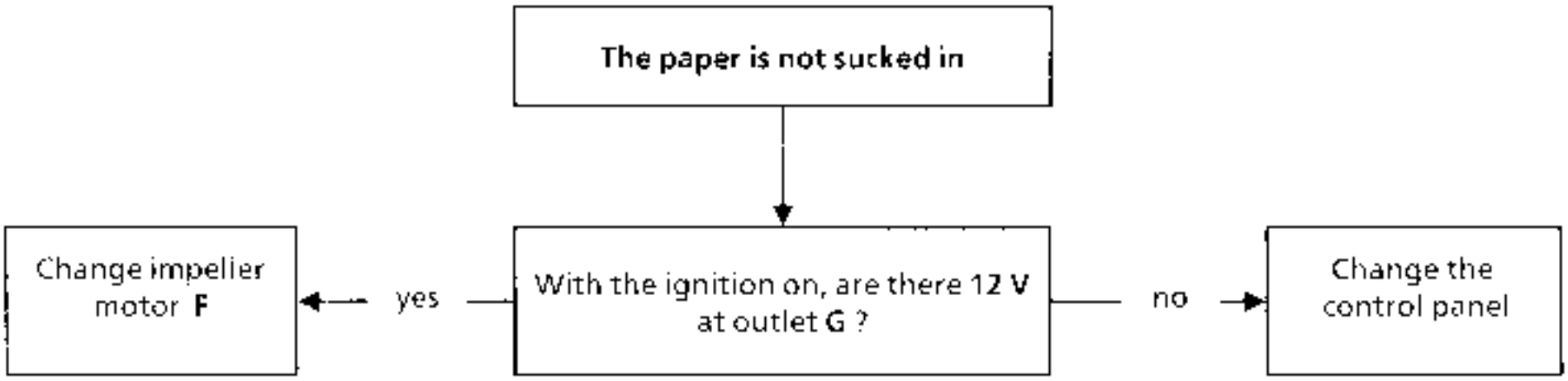


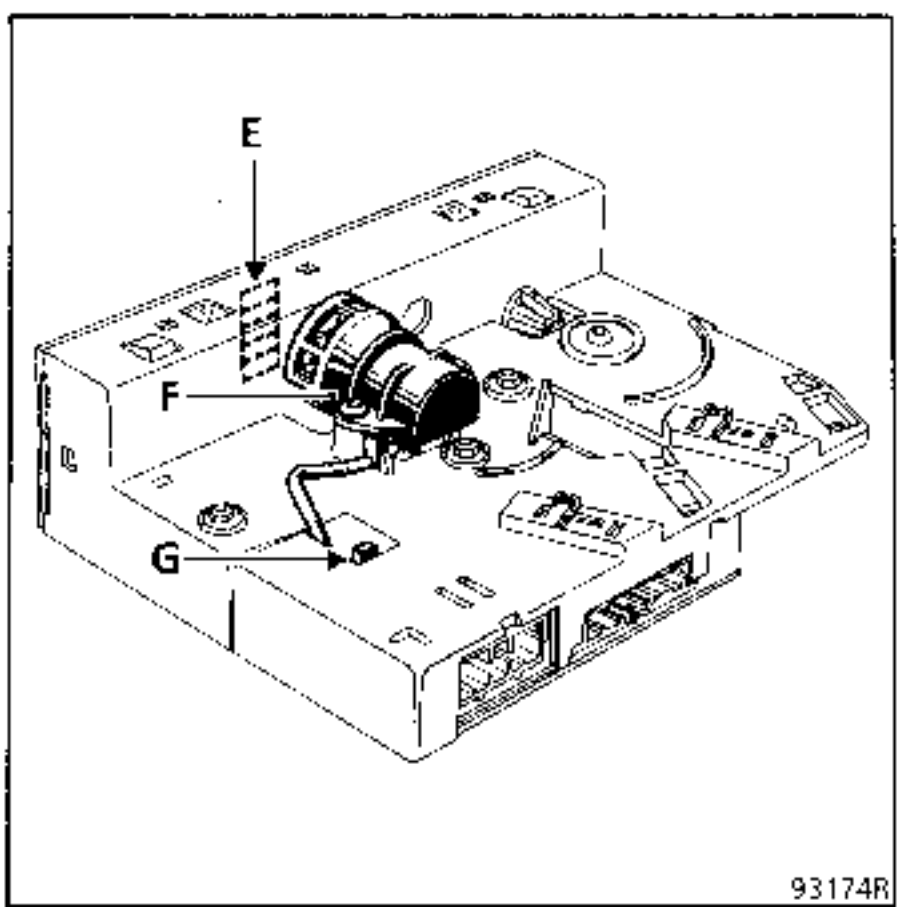
Incident : BARGRAPH 13 LEFT OR RIGHT ILLUMINATED : (Impeller motor)



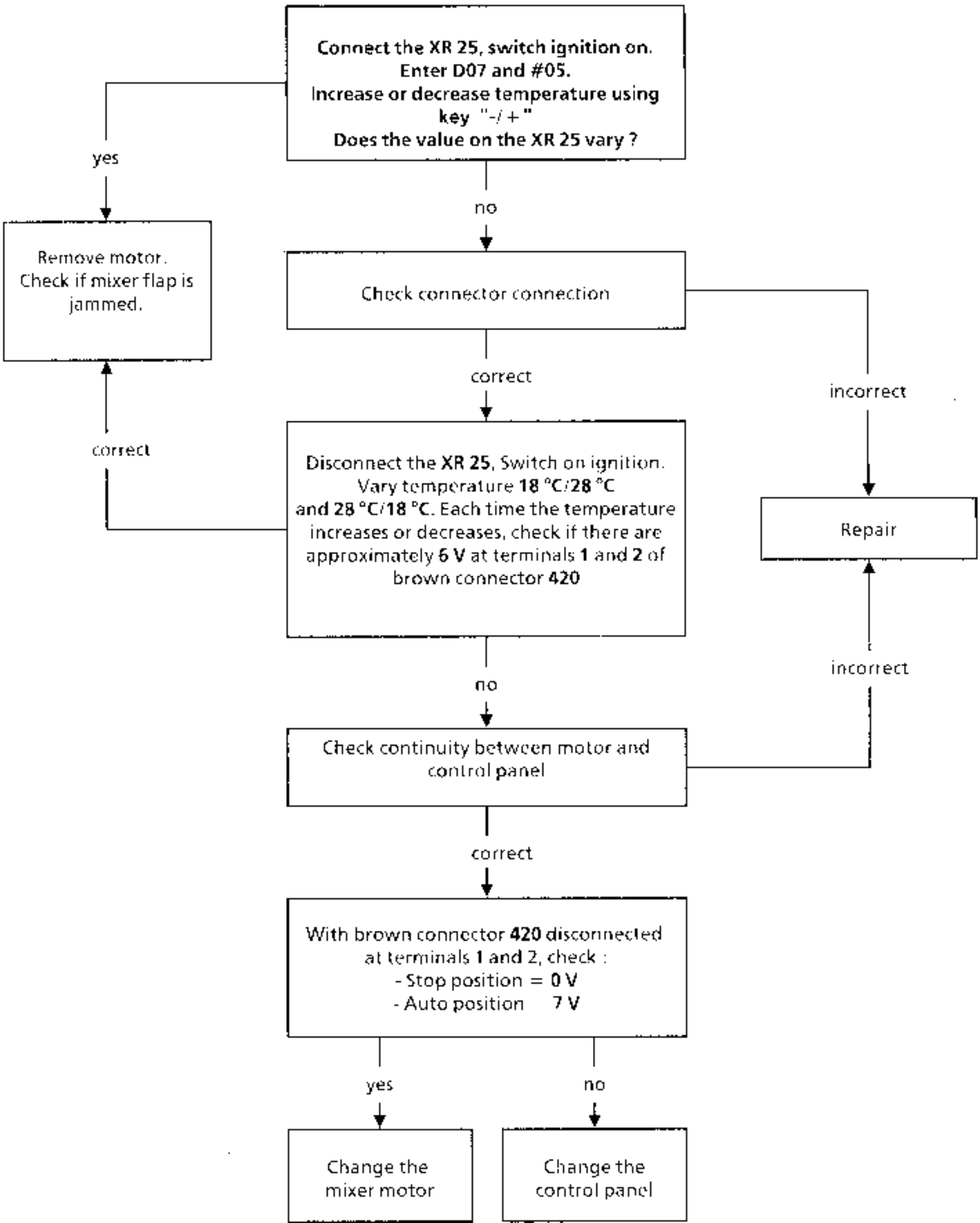
Checking ventilation of the passenger compartment temperature sensor

With the ignition on and using a small piece of paper (such as a paper handkerchief) placed in front of the internal temperature sensor (E) check that the paper is sucked in.



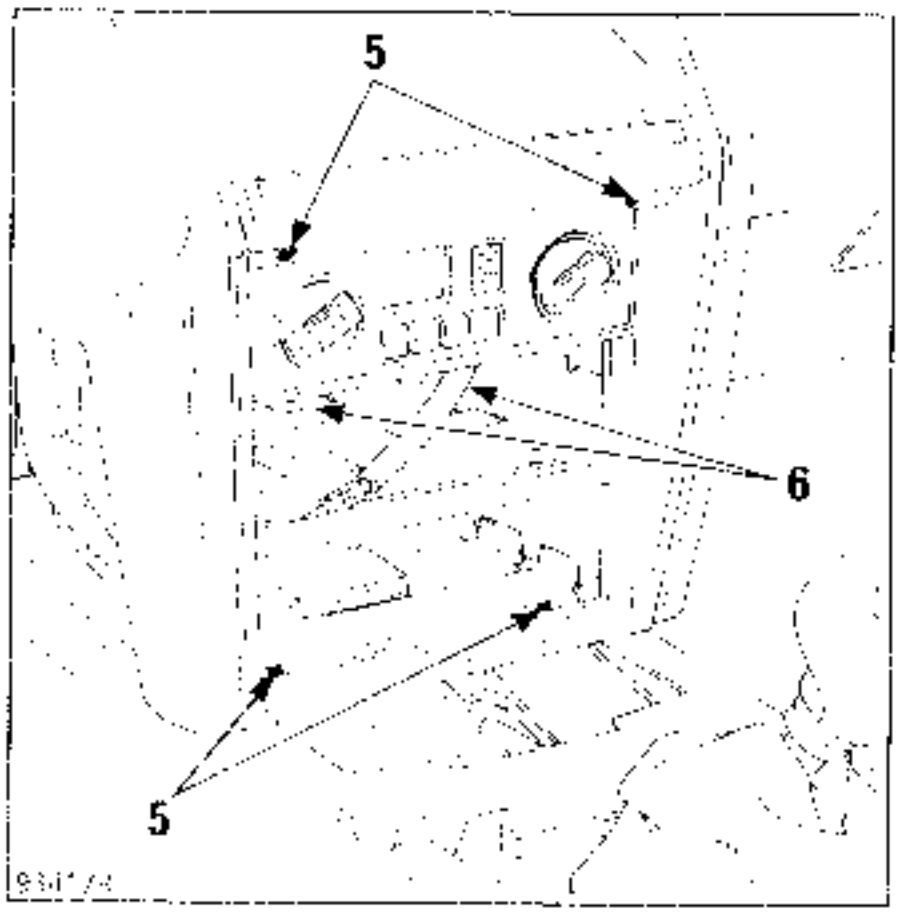


Incident : **BARGRAPH 14 LEFT OR RIGHT ILLUMINATED** : (Mixer motor)



REMOVAL

Remove:
- the radio set or the radio compartment trim,
- the unit from the bottom compartment,
- the four front panel securing screws (5),
- the two securing nuts (6) from the back of the bracket.

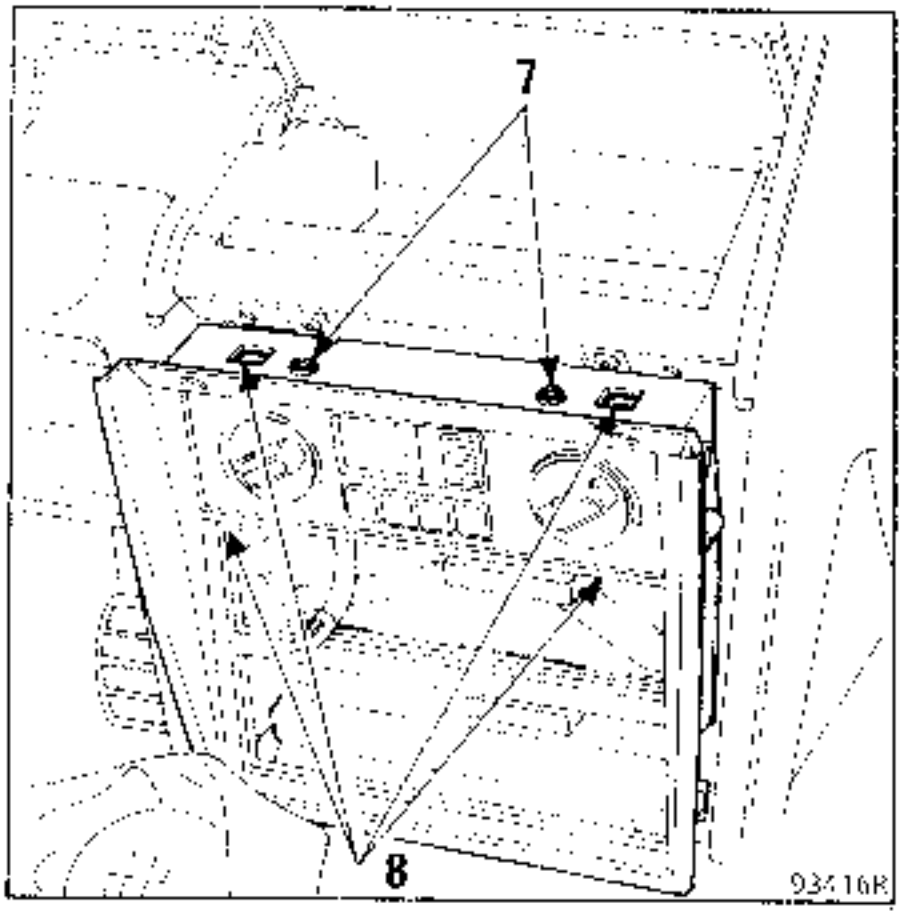


Gently take the bracket out from the dashboard.

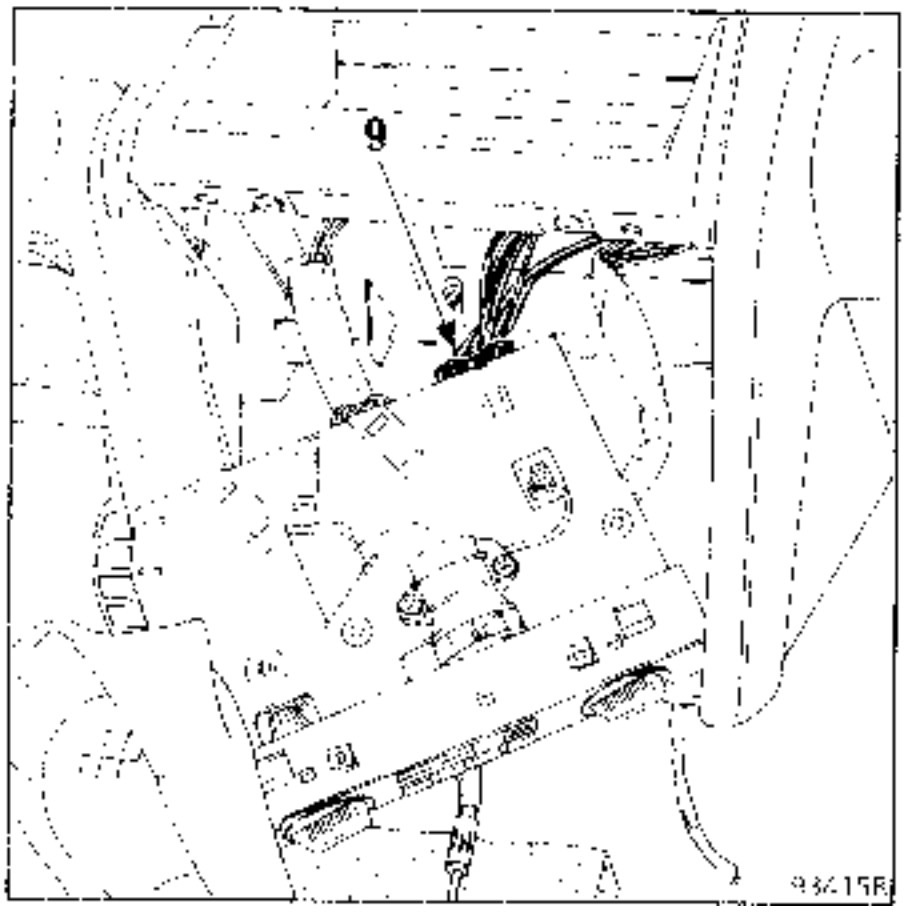
Remove the two screws (7) securing the control panel to the bracket.

Unclip the four support lugs (8) from the control panel and push the panel back in

Remove the bracket by tilting it downwards



Disconnect electrical feed connector (9) (brown) and 15-track connector (green) from the control panel.



REFITTING

Refit the control panel.

Re secure the bracket in reverse order to removal.

Reconnect the battery.

Reset all those functions interrupted when the battery was disconnected (clock...).

NOTE : So as to easily mark those vehicles which have been adjusted, a white mark should be placed inside the diagnostic socket cover (for example : Using a "white Stylo marker pen")

PERFORM A VEHICLE ROAD TEST.

CHECKING USING THE XR 25

If one of the following bargraphs appears (permanently illuminated or flashing) :

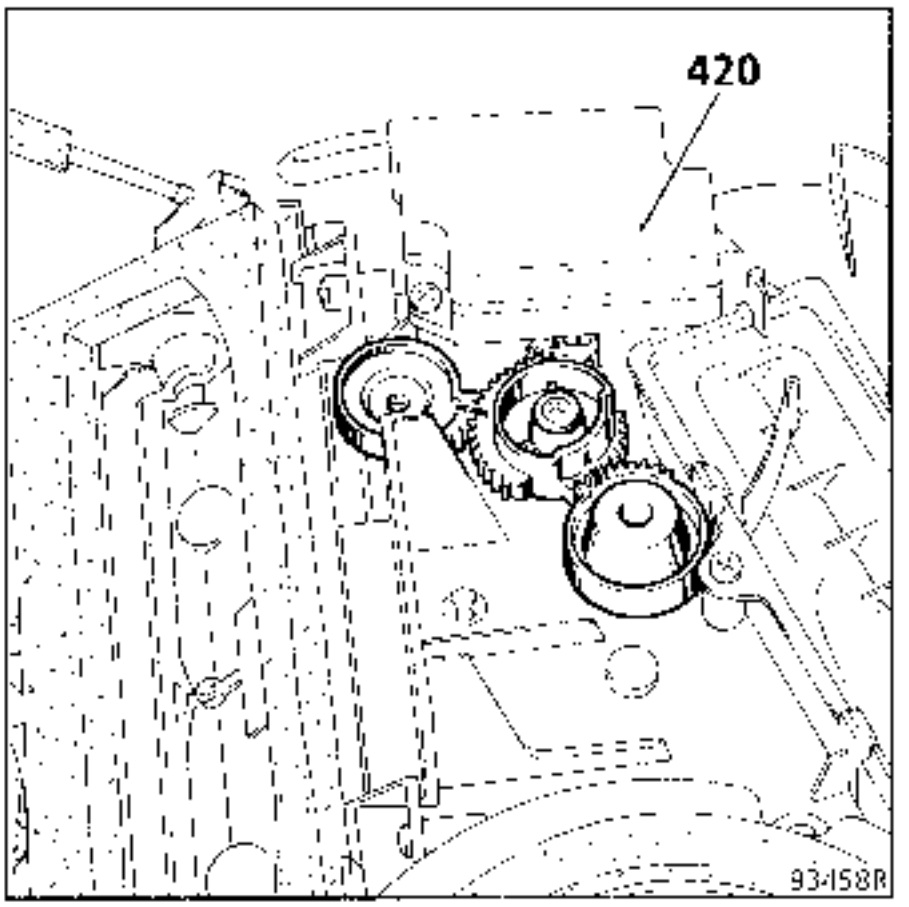
Bargraph	N° 14 RH N° 14 LH N° 15 RH N° 15 LH N° 11 RH	Permanent or flashing

The following operations need to be carried out.

Changing the mixer micro-motor

Disconnect the battery.

Remove :
- the dashboard (**MR 291 Section 8**).
- the air conditioner (**MR 291 Section 6**),
- the mixer micro-motor (**420**).



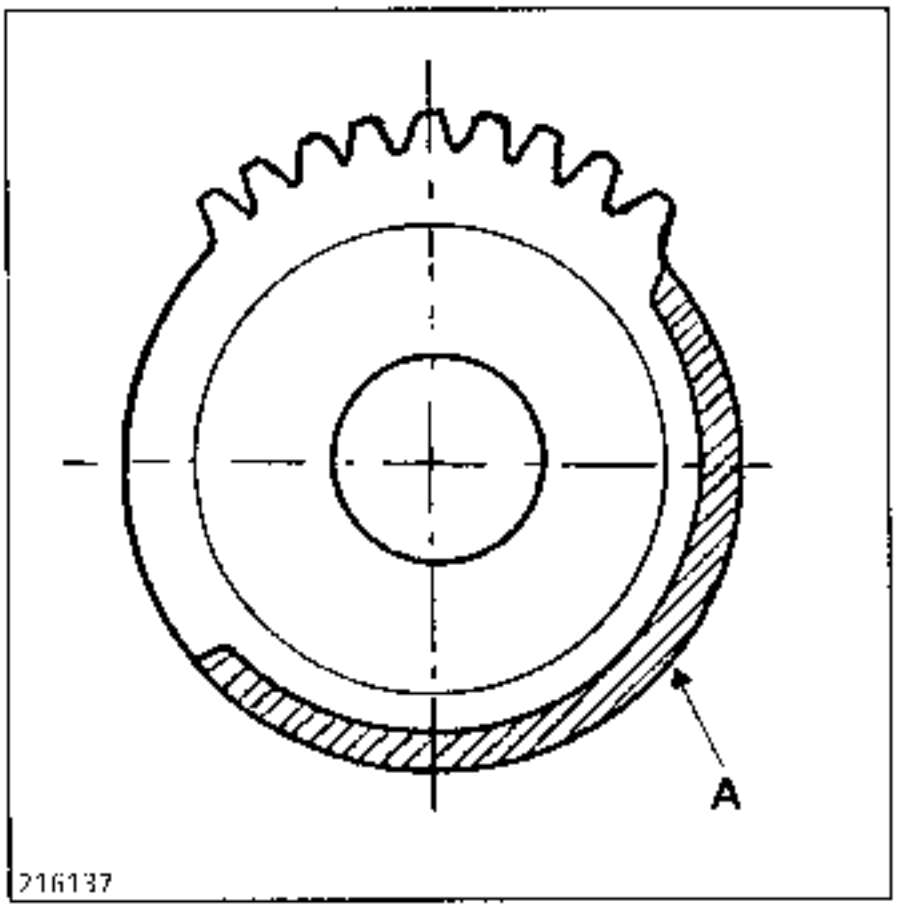
Fit a mixer micro-motor,
Part No : 77 01 034 351.

Mixer drive gear thickness reduction

This is to prevent any possible contact between the outer casing of the heater radiator and the drive gear (**P**).

Remove drive gear (**P**) (which is clipped onto its shaft).

Reduce the thickness of the edge of the drive gear.

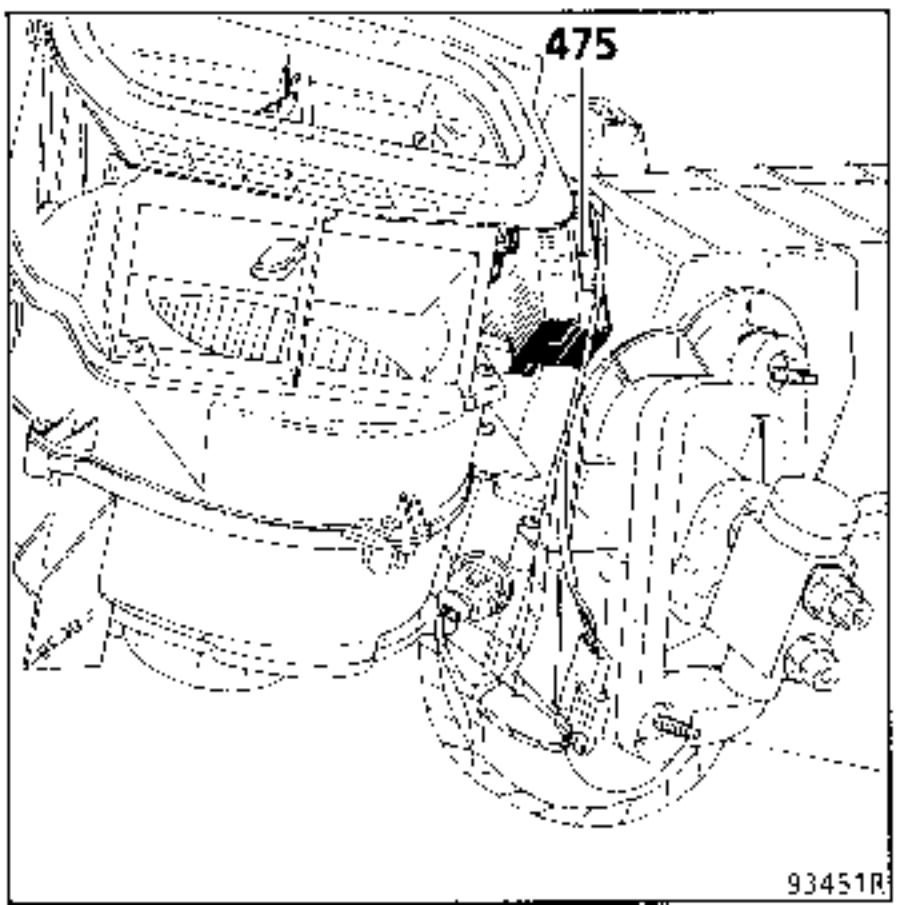


Modified drive gear

Refit the modified drive gear, making sure that the marks are correctly aligned.

Replacing the recycling micro-motor

The motor is supplied with a connector and lever.



Remove the recycling micro-motor **(475)**.

Fit the new recycling micro-motor.

Refit :
- the air conditioner,
- the dashboard.

Reconnect the battery.

Reset all those functions interrupted when the battery was disconnected (clock, etc.).

REMOVAL - REFITTING

Only the **air distributor unit control cable can be removed** without the dashboard having to be removed.

Removing the air distributor unit cable (J) :

For vehicles up to the end of model year 1989

Disconnect the battery.

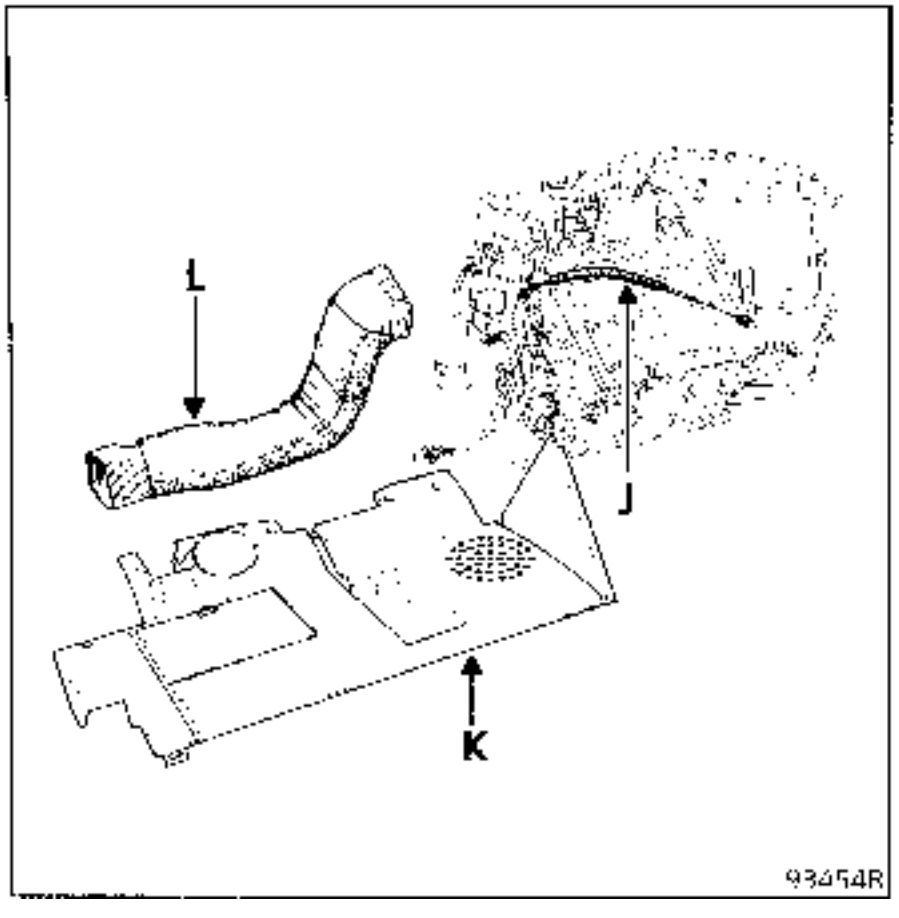
Remove :
- the lower trim from the dashboard **(K)** (see "**Electrical**" section),
- breather pipe **(L)**.

Unclip the temperature scale markers from the control slides.

Remove the screw holding the control assembly (see the section on removing the blower device).

Free the control assembly by moving the side retaining clips apart.

Remove cable (J).



For vehicles as from model year 1990

Disconnect the battery.

Remove :
- the lower trim from the dashboard(K),
- breather pipe (L),
- cable (J).

REMOVING THE HOT AIR / COLD AIR AIR FLAP CABLE

Disconnect the battery.

Proceed as for the removal of the air blower device and remove the dashboard.

On refitting, proceed in the reverse order to removal.

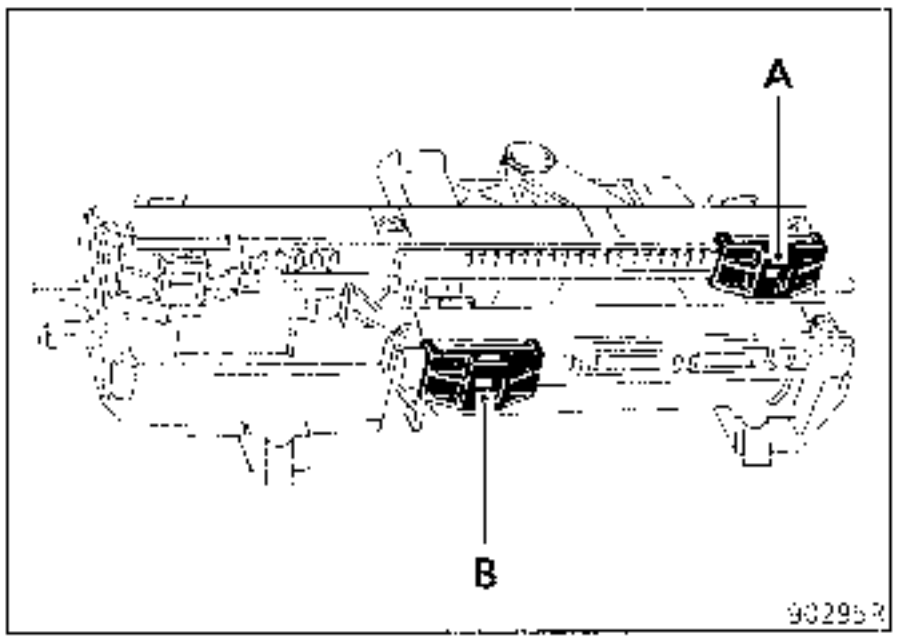
The cables can be adjusted simply by removing the control slides.

Air mixer slide (**A**) on the hot setting.

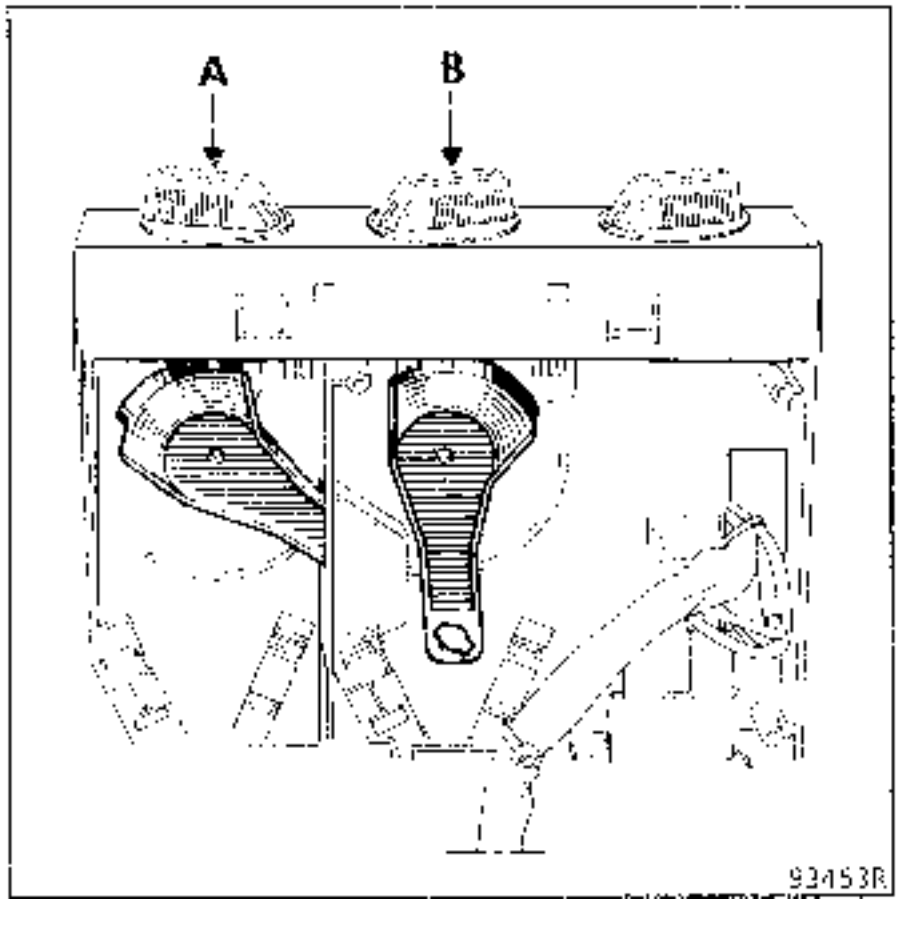
Air distribution slide(**B**) on the ventilation setting.



Up to the end of model year 1989



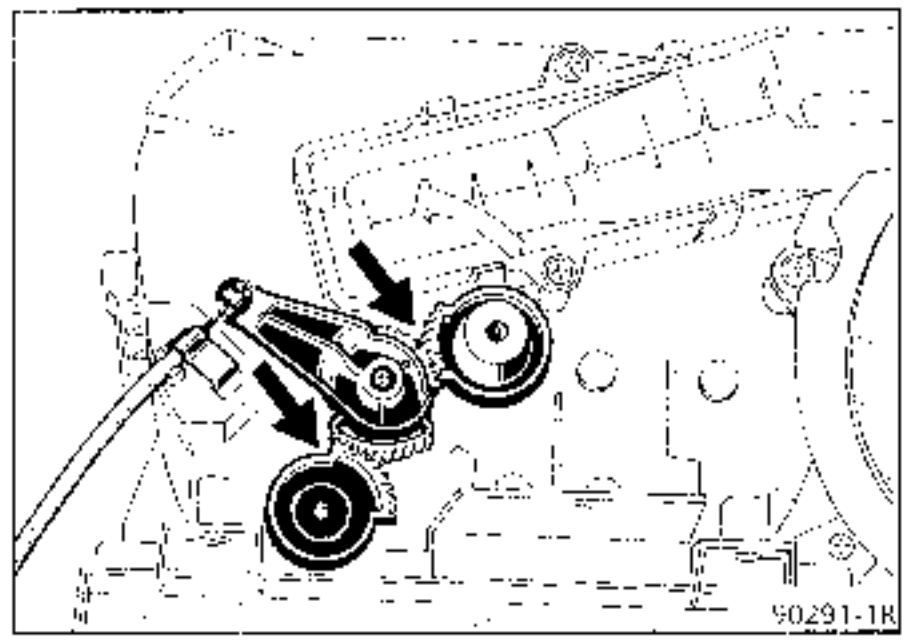
As from model year 1990

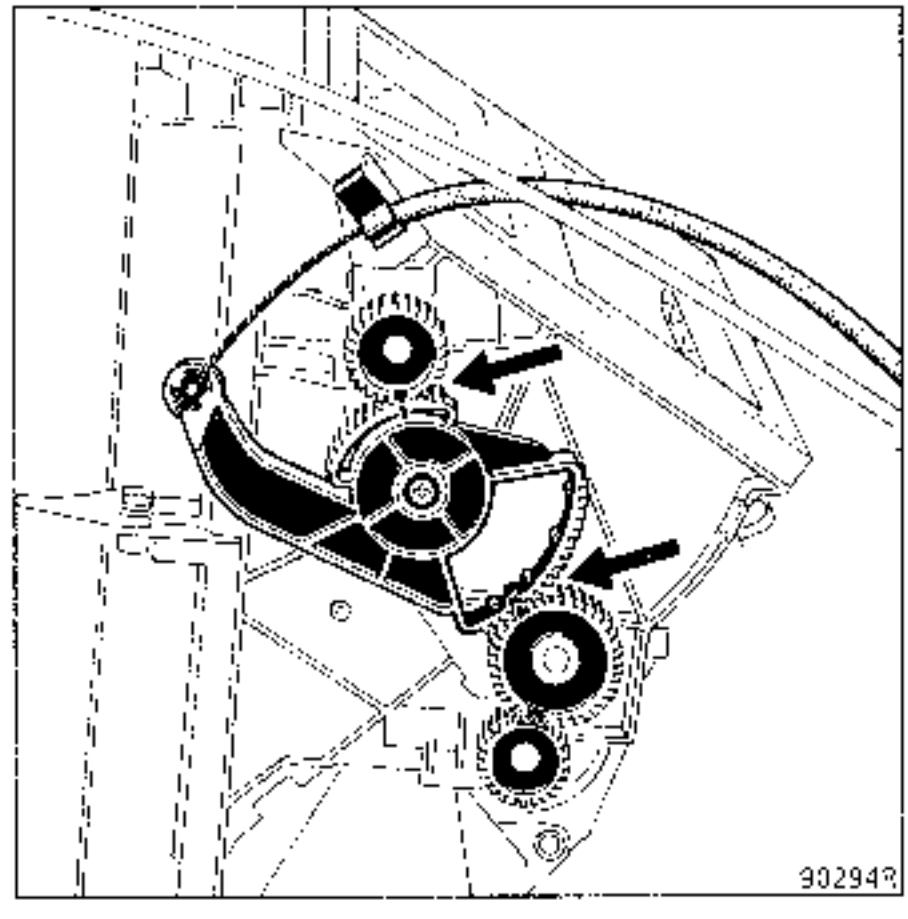


Air mixer flap marks aligned.

Air distribution flap marks aligned.

Clip the sleeve stops in place.





If the cables cannot be adjusted by moving the slide control assembly, proceed in the same way by adjusting them at the blower unit end.

In this case, the mixer flap cable can only be adjus ted after the dashboard has been removed.

ESSENTIAL SPECIAL TOOLING		
Mot.	453-01	Hose clamps
M.S.	583	Hose clamps

REMOVAL

Disconnect the battery.

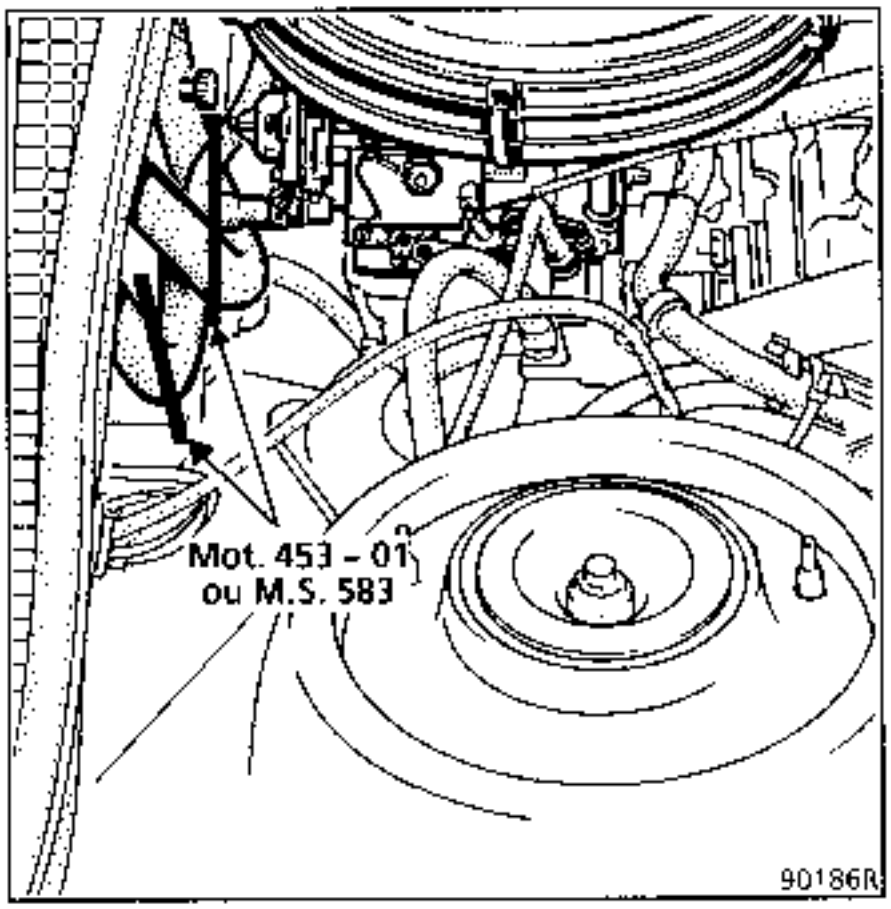
Remove the dashboard (see "**Electrical**" section).

Leave the cable-controlled assembly coupled to the blower device.

Disconnect the block connectors.

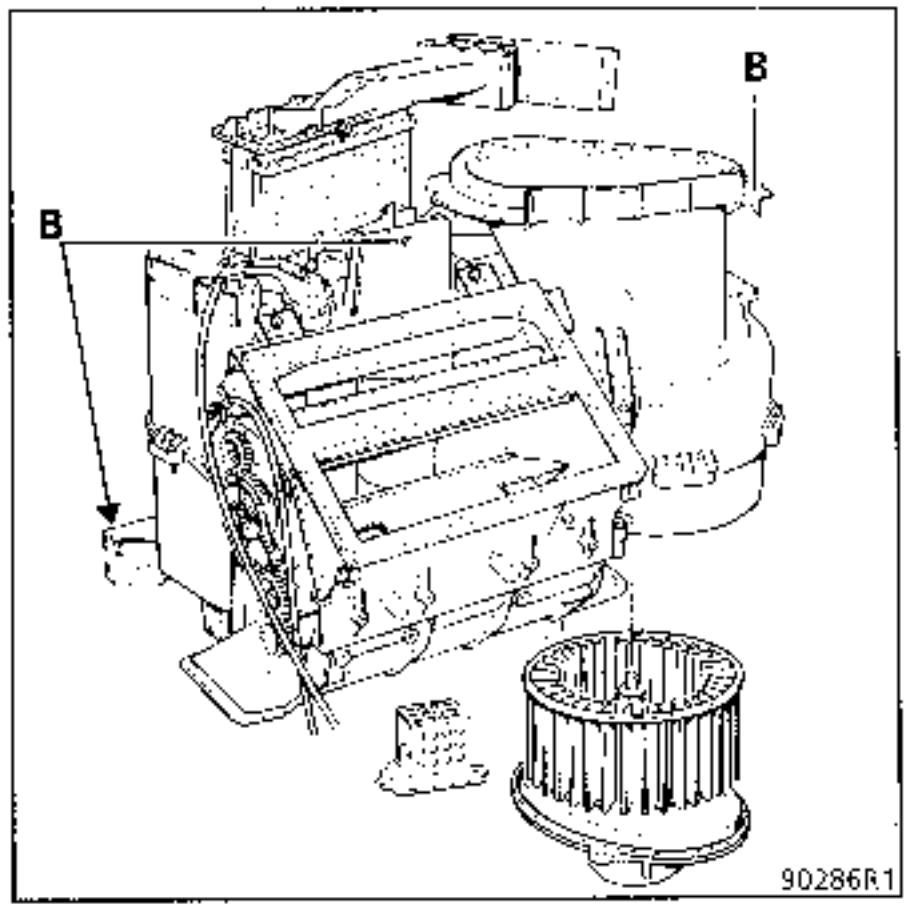
Clamp the heater coolant hoses using tools **Mot. 543-01** or **M.S. 583.**

Disconnect the hoses.



Remove the three mounting screws (B) from the bulkhead blower.

Disengage the blower assembly at the rear to remove it.



REFITTING

Offer up the air blower to the bulkhead, tilting it so that the sealing lips can be put back in the correct place.

Secure the blower device by means of screws (B).

Ensure that the sealing lips are in place.

Refit the dashboard.

Adjust the flap control cables.

Secure the cable-controlled device under the dashboard.

Connect the coolant hoses.

Fill and bleed the engine cooling system (see "**Engine**" section).

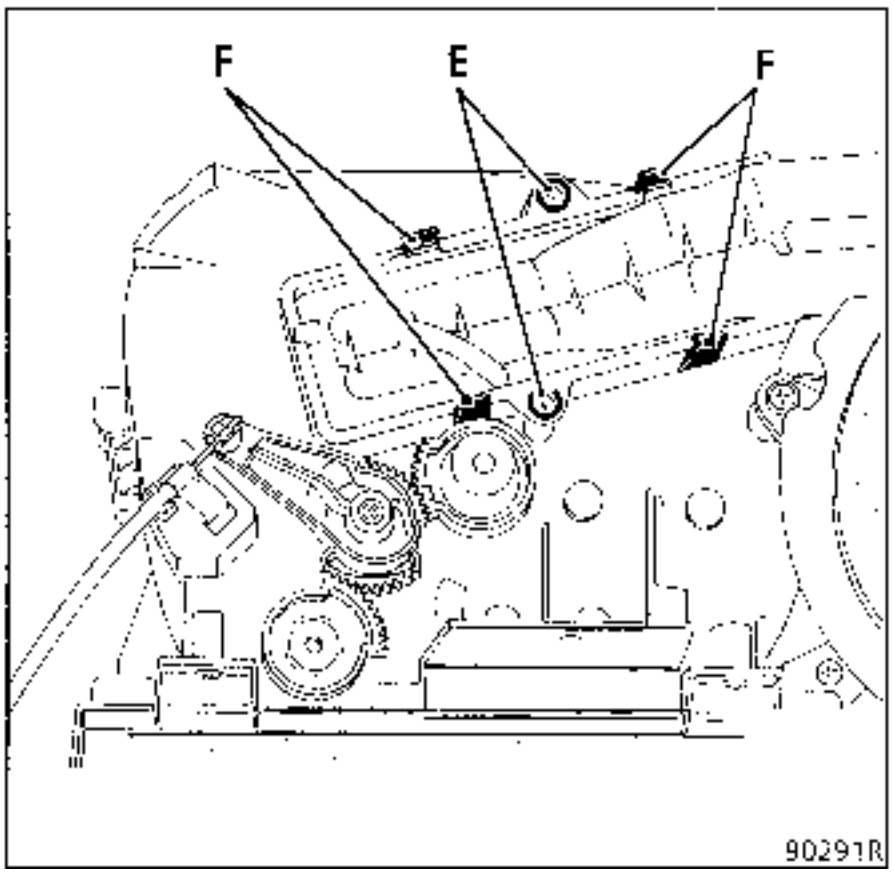
REMOVAL

Remove :
- the blower assembly,
- the screws securing the radiator on to the blo wer device (E).

Pull the four support clips apart (F).

Take out the radiator by disengaging it in an upwards direction.

NOTE : Be very careful not to damage the radiator fins.

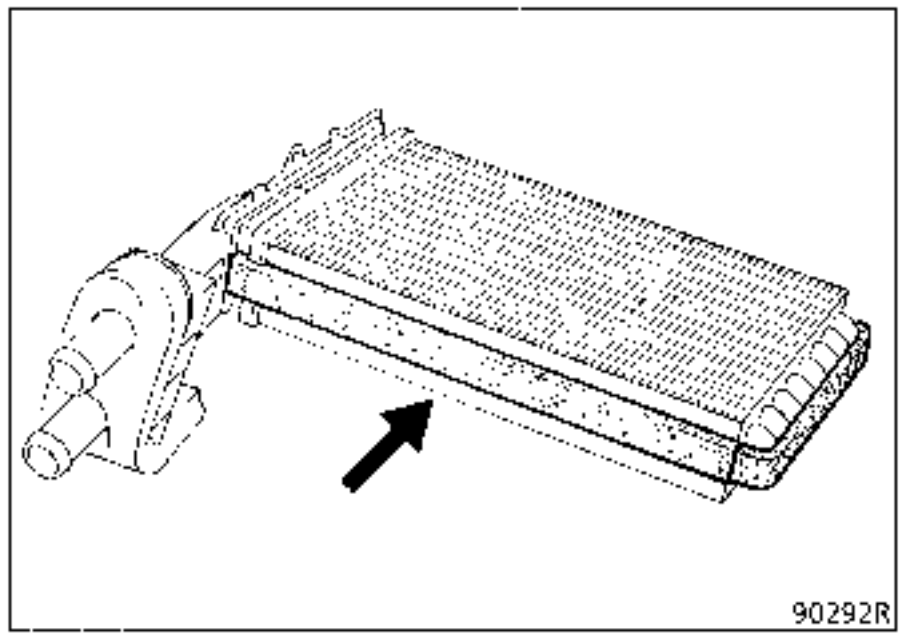


REFITTING

Fit the radiator complete with its foam spacer bands into the body of the blower device.

Make sure that the 4 tabs are clipped.

Fit the mounting screws onto the body of the blower device.

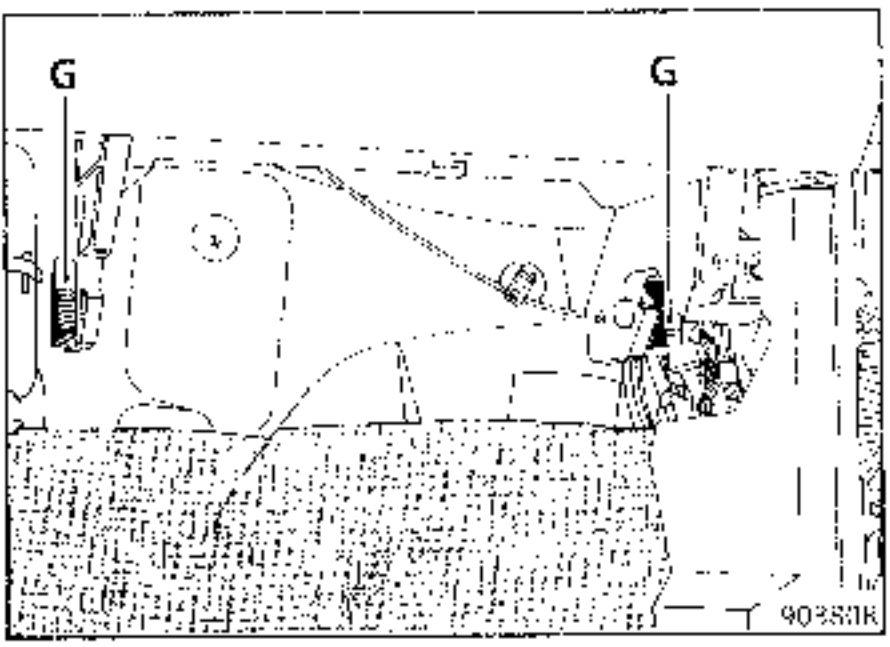


REMOVAL - REFITTING

The fan motor is reached through the passenger compartment.

Disconnect the battery.

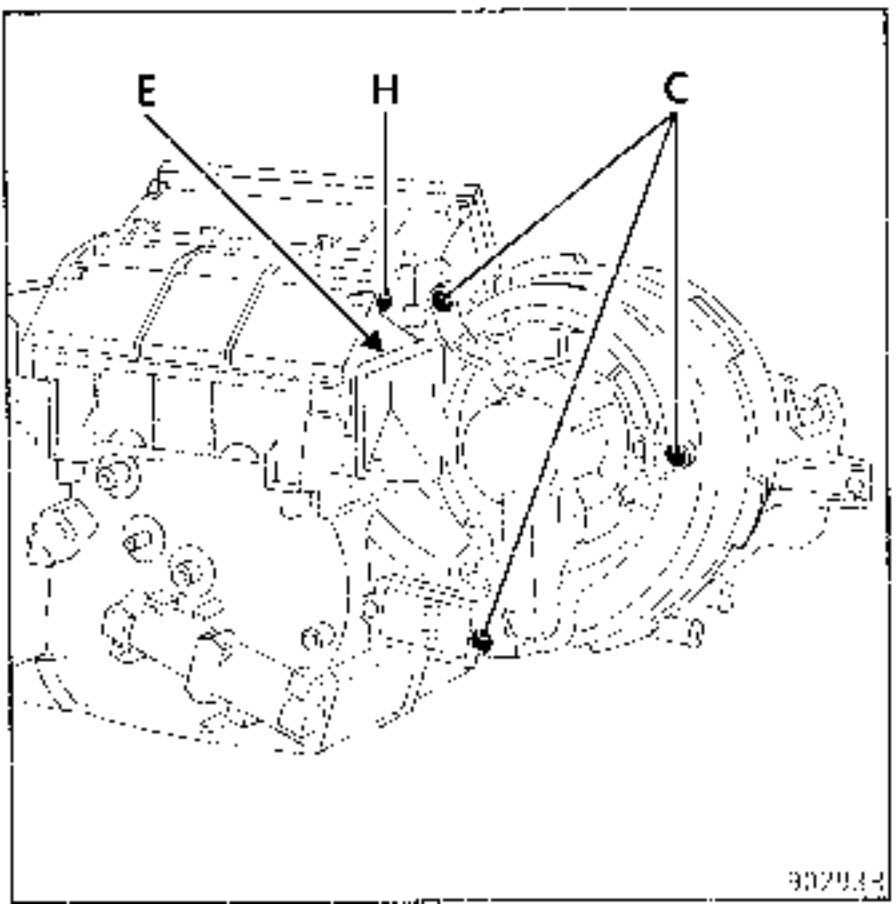
Remove the righthand glovebox (move the righthand and lefthand locking clips away from the hinge pins (**G**)).



Unclip fan outlet (**E**) on the righthand side of the blower device.

Remove the three mounting screws (**C**) from the fan motor.

Take out the impeller/fan assembly from the blower device.



NOTE : Pull the fan motor to free it from its mounting.

When reassembling the motor on its mounting, follow the identification marks to ensure that the connector is positioned correctly.

If the ventilator clips break, fit a mounting screw at (**H**).

REMOVAL - REFITTING

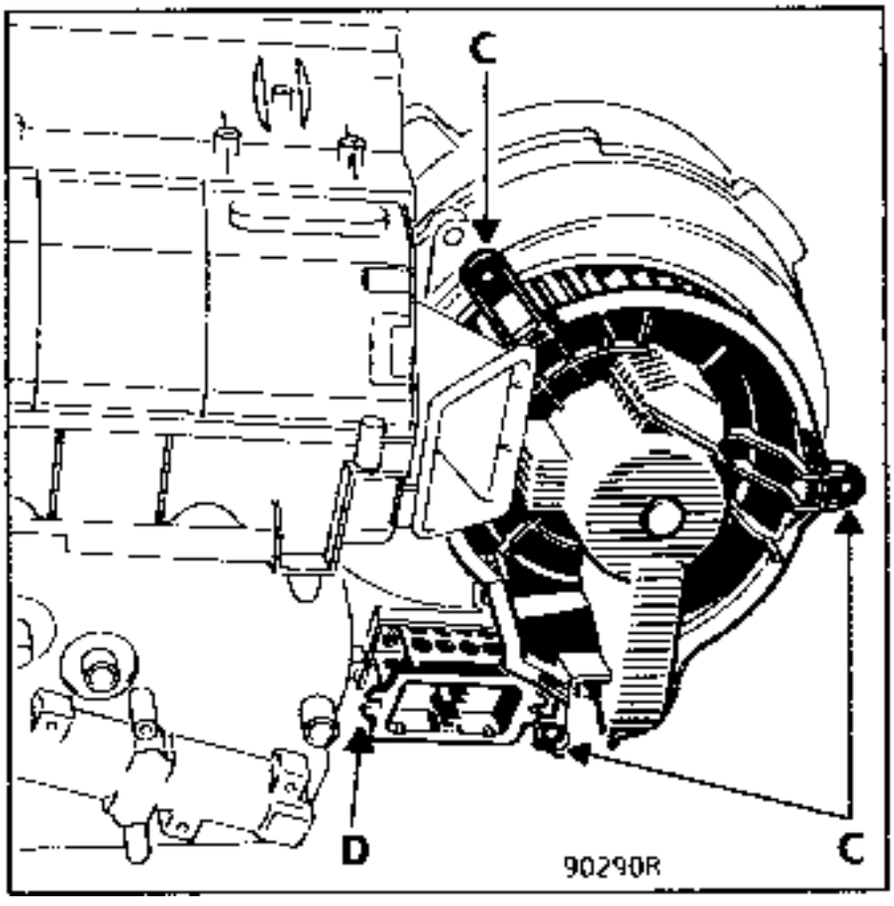
The electrical resistors for the fan motor can be reached through the passenger compartment.

Remove :
- the righthand glovebox,
- the fan mounting screws (C).

Leave the fan motor hanging.

Remove the screw (**D**) securing the resistor mounting.

Take out the resistors from the bottom.



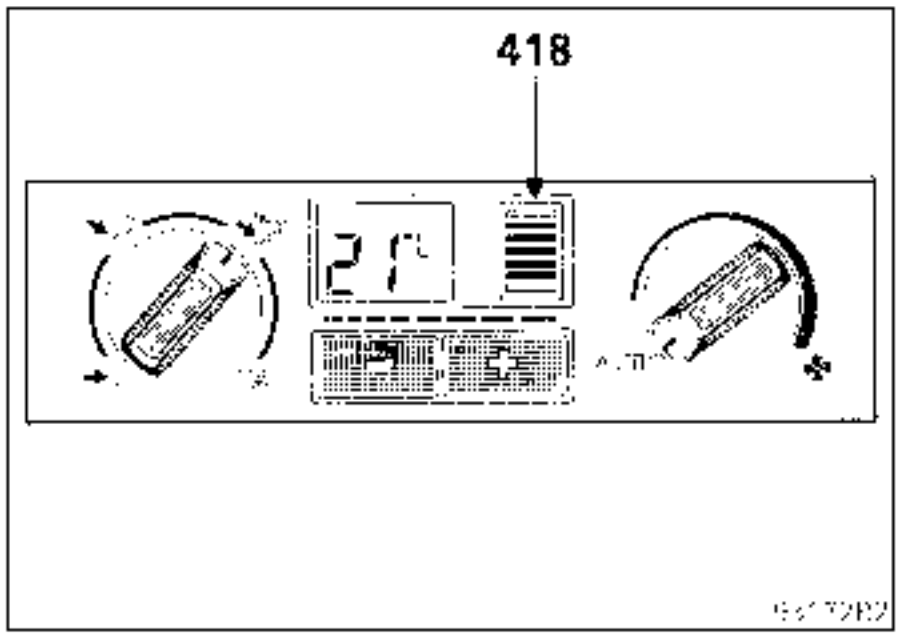
Checking the blown air, external and internal temperature sensors

DEGREES CELSIUS	THERMAL RESISTANCE (Ω)
-10	49000 to 60000
5	37300 to 45700
0	29000 to 35500
5	22500 to 27500
10	18000 to 21600
15	14000 to 17000
20	11300 to 13800
25	9000 to 11000
30	7300 to 8500
35	5800 to 7000
40	4700 to 5600
45	4000 to 4500

These values are given as guide, but have no significance for fault finding as they present too great a thermal spread.

Internal temperature sensor (418)

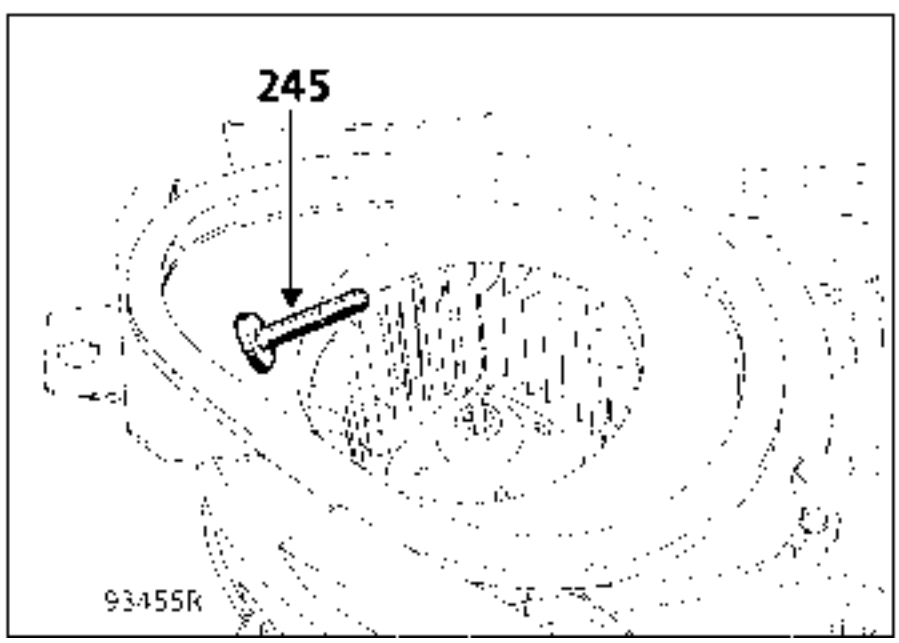
This is a thermistor with a negative temperature coefficient, integrated in the control panel printed circuit. If the sensor is faulty, the control panel will have to be replaced.



External temperature sensor (245)

This is a thermistor with a negative coefficient located in the air conditioner air intake.

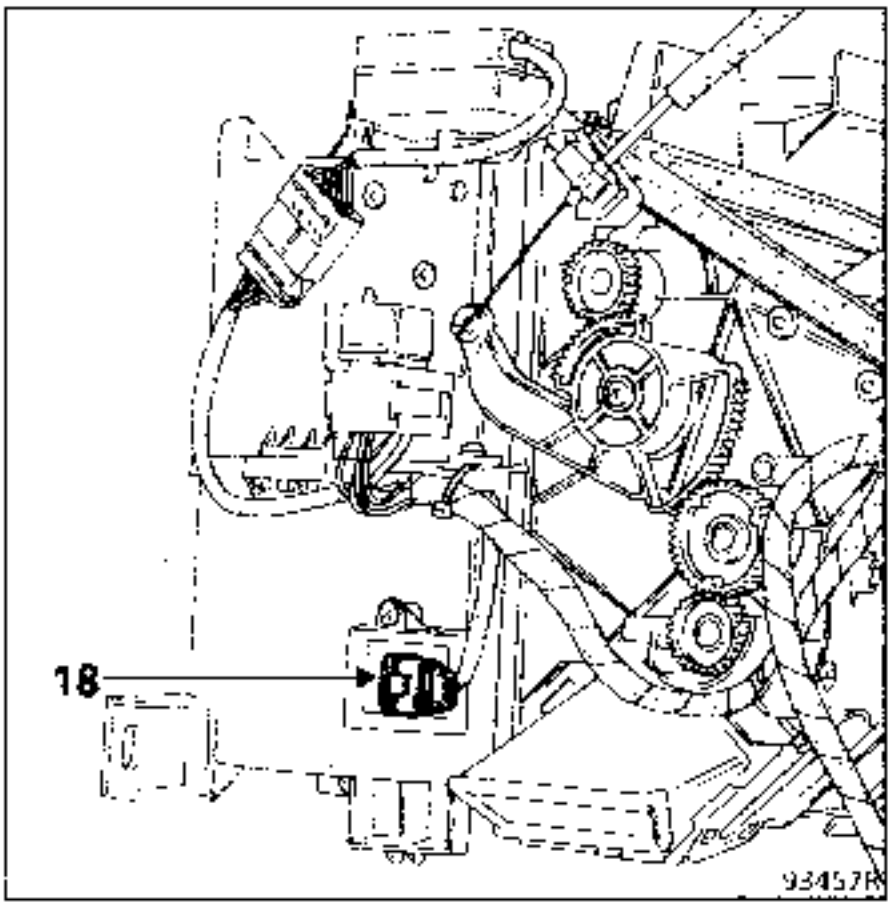
It is interchangeable and can be reached through the air intake duct at the water box end



Blown air temperature sensor (18)

This is a thermistor with a negative temperature coefficient located downstream of the radiator.

It can be reached directly from inside the vehicle, at the pedal assembly end and is located on the heater device.



MIXER MOTOR (420)

The mixer flap is assisted by an electric motor with a potentiometre for checking the position of the flap.

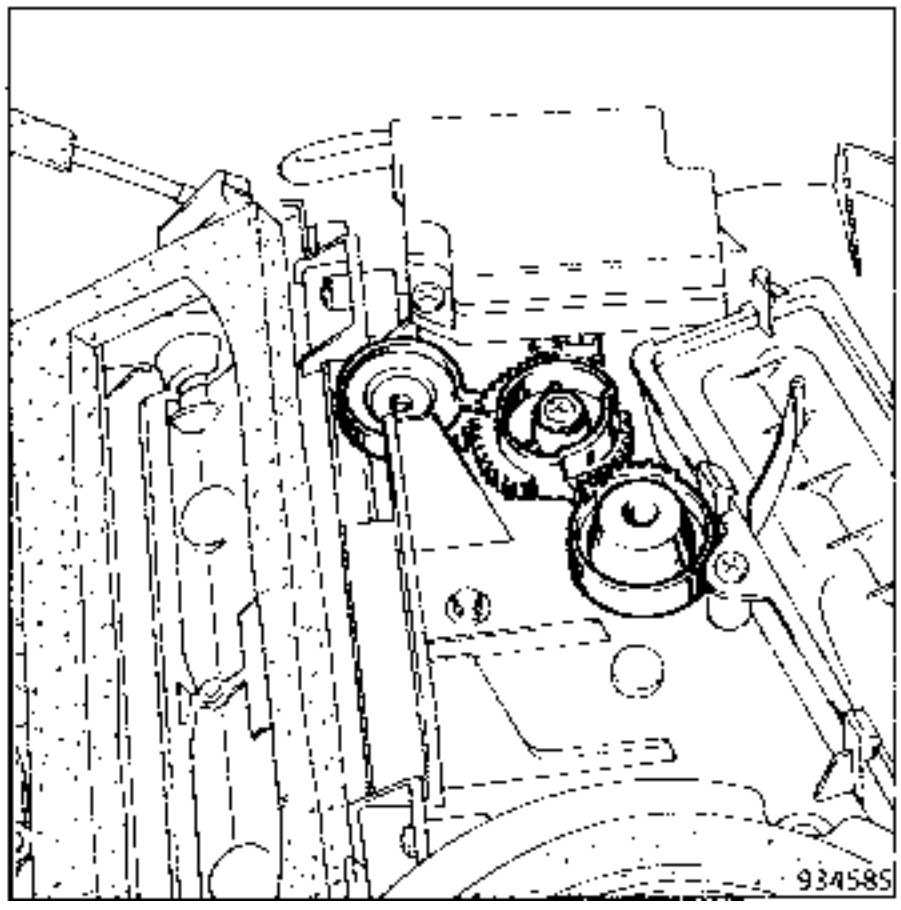
The motor is permanently supplied with approximately **7 volts** power in the extreme **HOT** or **COLD** settings.

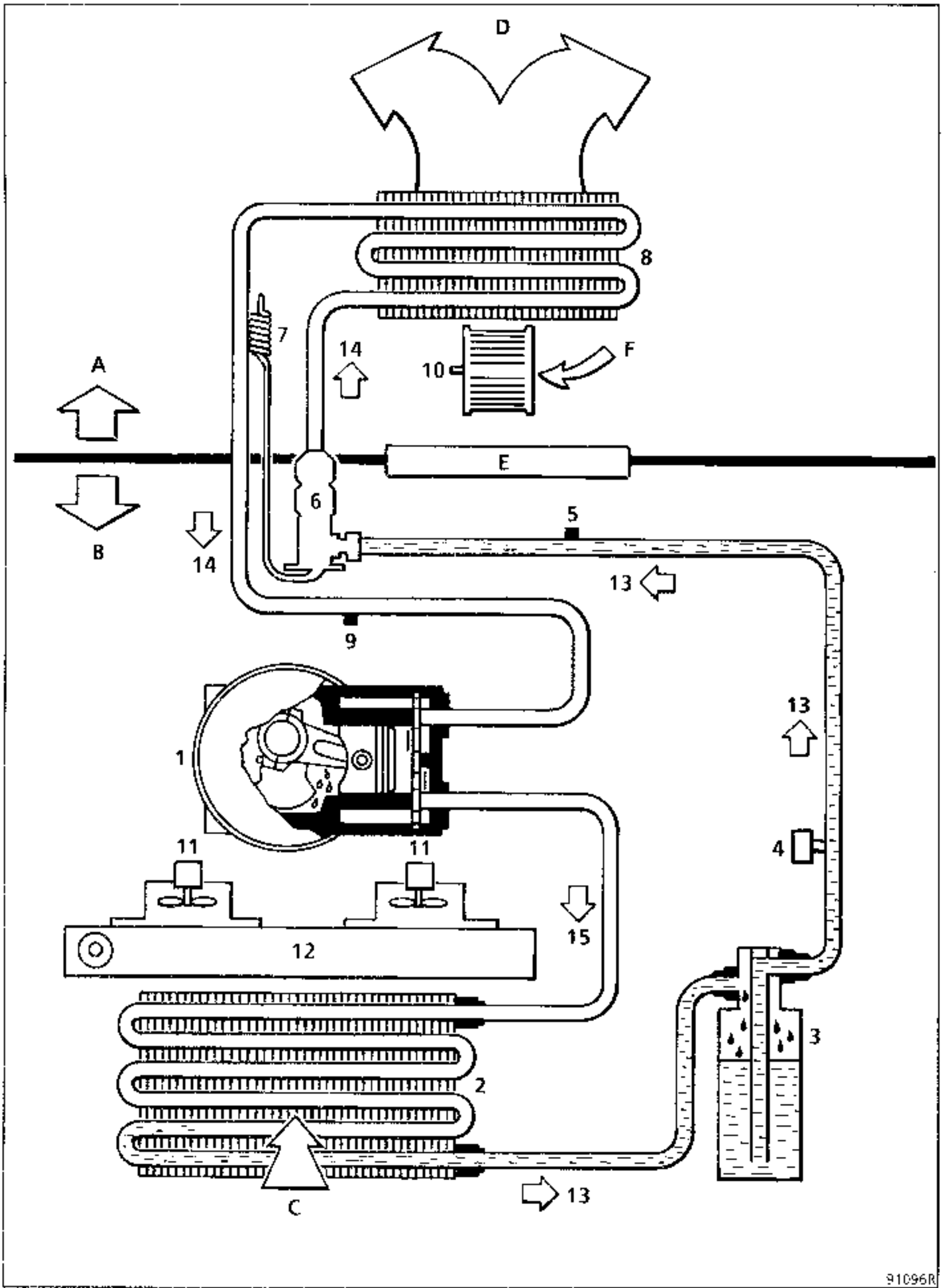
In the intermediate setting, the voltage is **0 volts**.

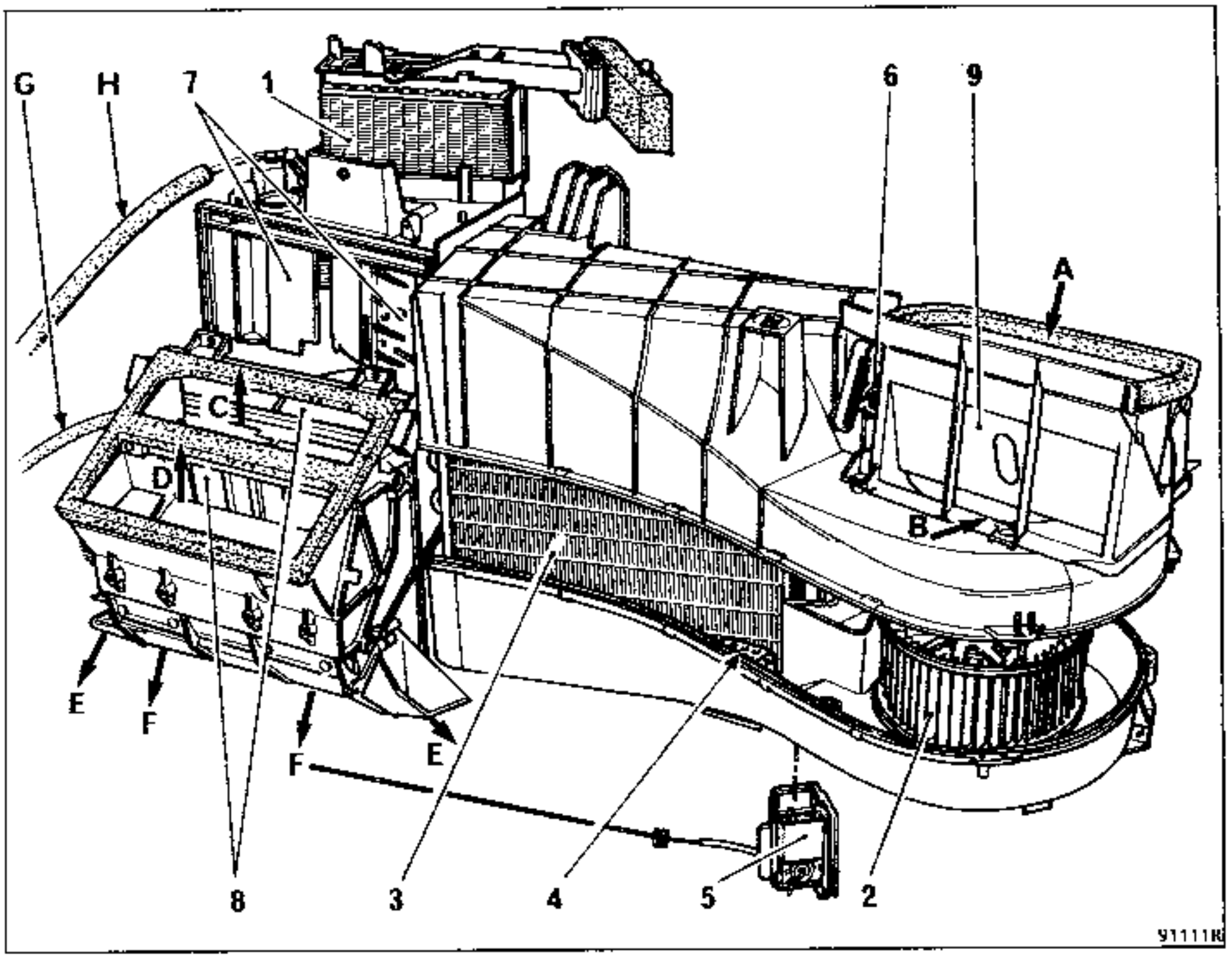
The motor can be reached after the dashboard and air conditioner have been dismantled (see section 83).

If the motor has to be replaced, the new one is supplied with its connector and output drive gear. It is pre-set for fitting to the air conditioner.

On refitting, the marks on the drive gears for the flap and motor **must be aligned**.




D
8
7
14
10
F
A
E
6
5
B
14
13
9
13
1
11
11
4
15
12
3
2
C
13
91096R



1 Heater radiator
2 Blower fan
3 Evaporator
4 Fan resistors
5 Fixed thermostat
6 Motor or recirculation flap diaphragm
7 Hot air/cold air flaps
8 Top/bottom air flaps
9 Recirculation flap
A External air inlet
B Recirculated air inlet
C Windscreen demisting outlet
D Dashboard ventilator outlet
E Lower ventilator outlets
F Ventilator outlets to rear seats
G Air distribution cable
H Air mixer cable

A Passenger compartment
B Engine compartment
C External air
D To air mixer unit
E Scuttle panel
F External or recirculated air

CONSUMABLES

Compressor oil :

- **ELF RIMA 100** . **135 cm³ ± 15.**

Refrigerant fluid :

- Freon **R12** : **950 g ± 50.**
  R134a : **750 g + 35.**

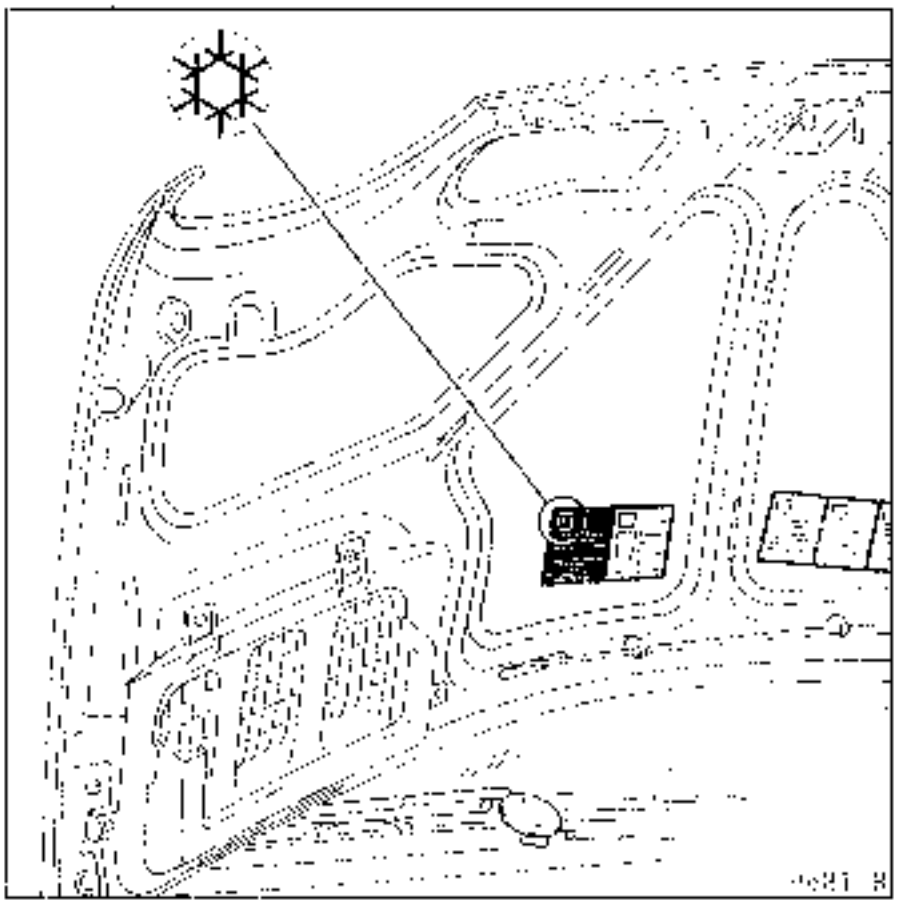
1 Compressor
2 Condenser
3 Refrigerant fluid reservoir
4 Three-purpose pressostat
5 High pressure bleed screw
6 Relief valve
7 Relief valve thermostatic regulation
8 Evaporator
9 Low pressure bleed screw
10 Air conditioning fan
11 Cooling fan
12 Engine radiator
13 High pressure fluid
14 Low pressure vapour
15 High pressure vapour

To contribute towards protecting the environment, **Renault** vehicles now use refrigerant fluid type **R134a** in their air conditioning systems. Refrigerant type R134a for use with **SANDEN SP20 (PAG)** is not compatible with refrigerant type R12 for use with **ELF RIMA 100** type oil. It is therefore forbidden to use one type in place of the other. For servicing and maintenance you must use the refrigerant type and oil recommended for the system it was designed for (**R12** for **R12** and **R134a** for **R134a**).

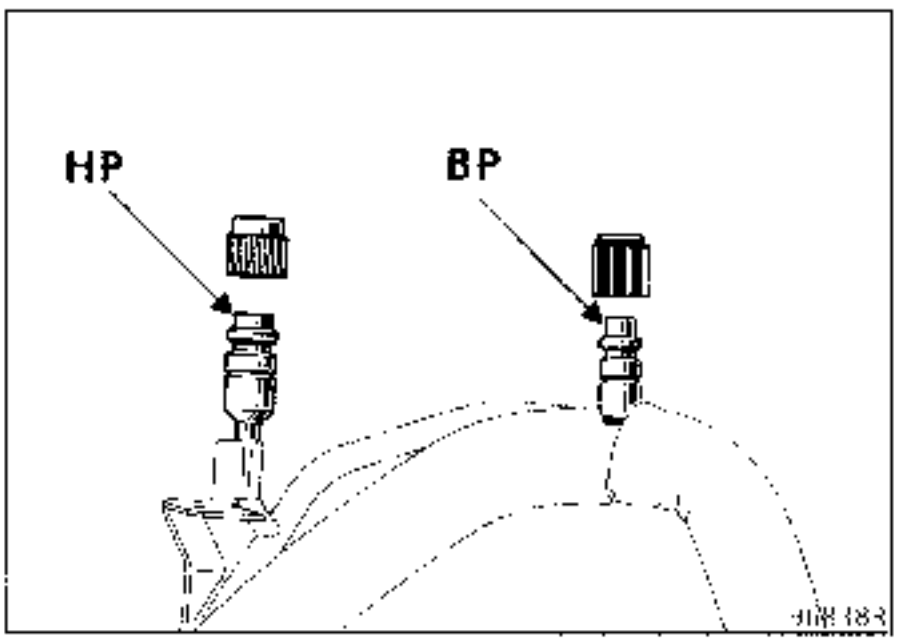
There are two ways of recognising those vehicles equipped with refrigerant type **R134a** :

- a label carrying the symbol and the inscription **R134a** marked either on the bonnet, on the grille panel or on the front cross member.

Example



- The refill valves are of the "**snap**" type with a difference in diameter between the **high pressure** and the **low pressure** valves



For details on refilling and oil levels, refer to the manual entitled **"Air Conditioning - New Refrigerant type R134a"**.

CONTENTS

Type	Engine	Quantity (g) R134a
X 48	All types	750 ± 35

OIL LEVEL

The quantity of oil for **air conditioning** circuits **R12** and **R134a** is identical. It is only the type of oil that changes.

When carrying out repair work concerning leakages or if a component has been replaced, oil (special R134a) should added.

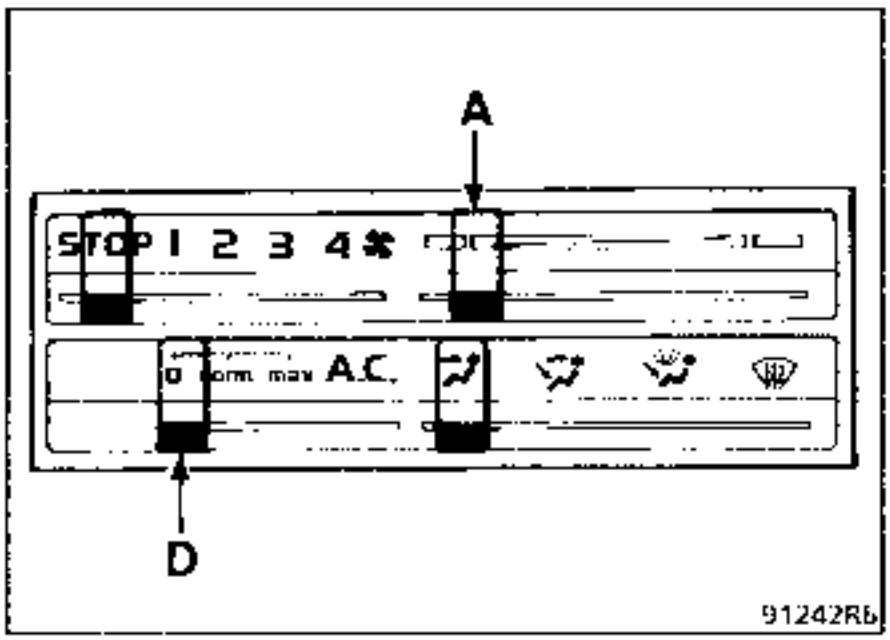
OPERATION ON AC CIRCUIT	QUANTITY OF OIL TO BE ADDED
Draining AC circuit	Measure the amount of oil drained out and add a similar quantity of new oil
Hose split or other rapid leakage	100 ml
Replacing a condenser	30 ml
Replacing an evaporator	30 ml
Replacing the dehydrating bottle	15 ml
Replacing a hose	10 ml

When removing-refitting the compressor without replacing it (for example, when repairing a clutch) after draining the oil from the compressor, refill it with **120 ml**.

UP TO THE END OF MODEL YEAR 1989

TEMPERATURE CONTROL KNOB (A)

This control has the same function as described in the "**Heating-Ventilation**" section when air conditioning control (D) is in position **0**.



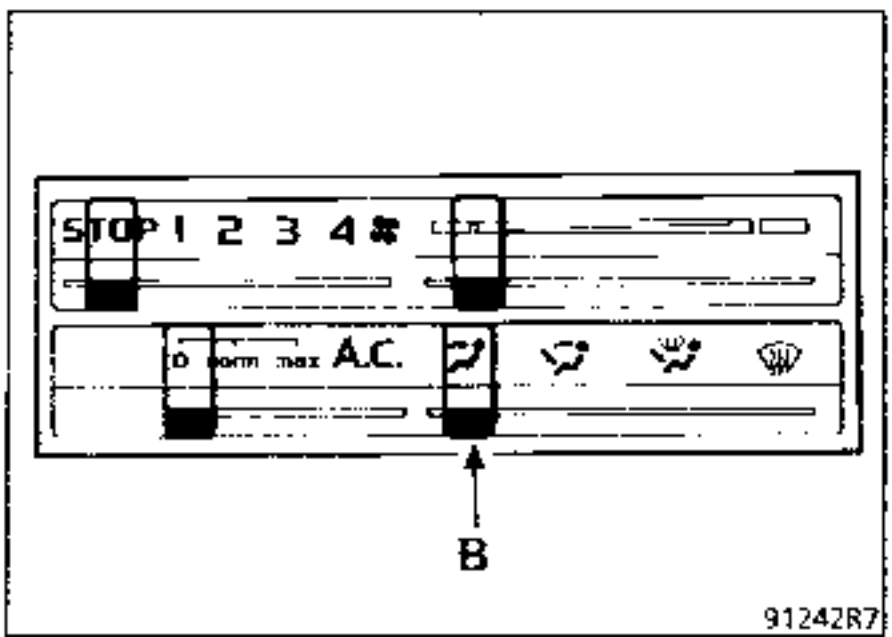
When air conditioning control (D) is in the "**AC Norm**" or "**AC Max**" position the air is first cooled and then dried by passing through the evaporator, then a relatively large part of it is reheated by passing through the radiator.

When the slide is on the extreme lefthand setting, the air is not reheated and is therefore at the lowest temperature possible.

Moving the slide to the right enables the air temperature to be adjusted.

AIR DISTRIBUTION KNOB (B)

This control has the same function as described in the "**Heating-Ventilation**" section.



AIR FLOW CONTROL SLIDE (C)

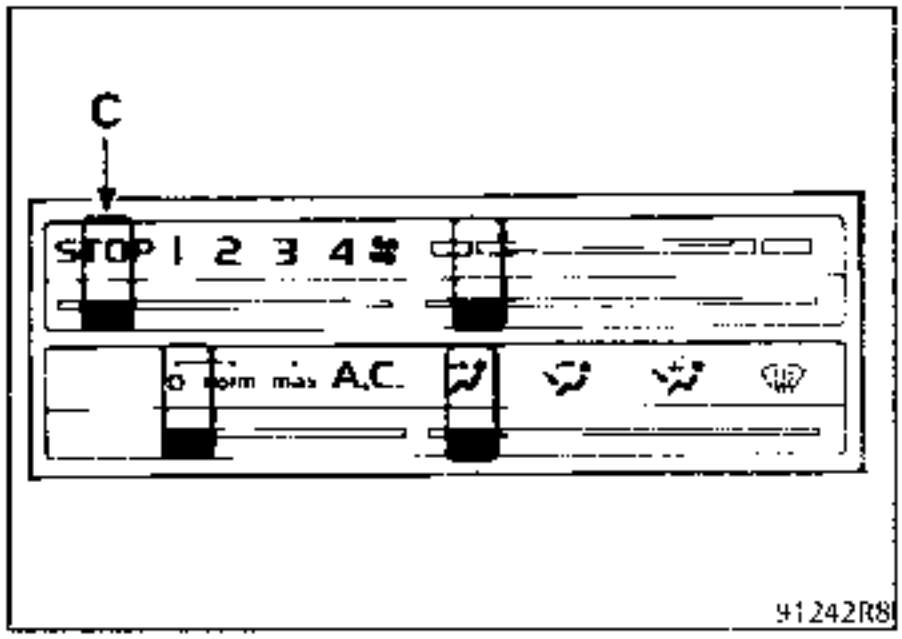
This control has the same function as described in the "**Heating-Ventilation**" section without air conditioning, except :

- that the **0** setting is replaced by **STOP**,
- there is an additional setting, **4**.

STOP POSITION : The ventilation is not operating and the air entry is shut off by the recircula ting flap.

The air conditioning system cannot be activated.

This setting is equivalent to the total stoppage of the installation, irrespective of the position of the other controls.



POSITION 4 : on this setting the system gives maximum performance.

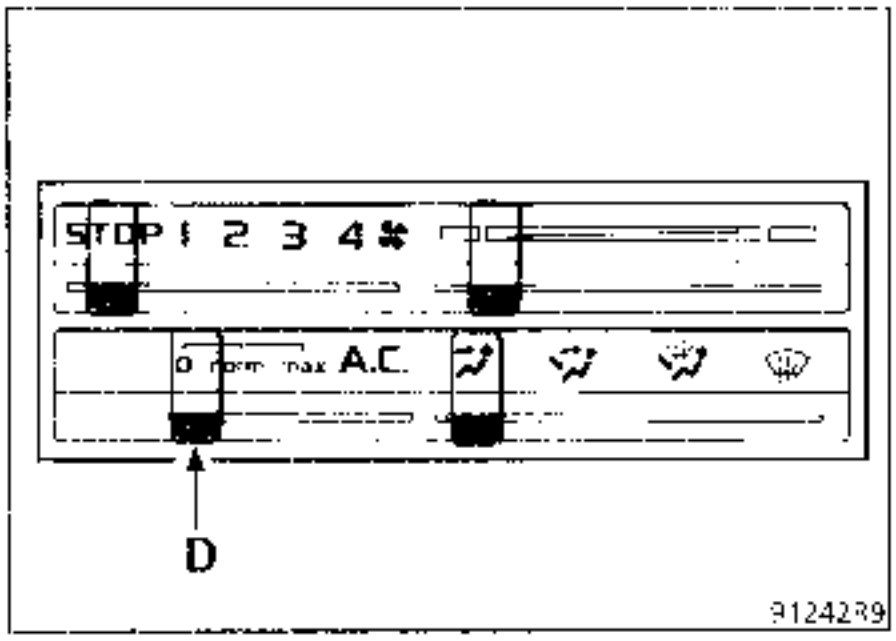
AIR CONDITIONING CONTROL SLIDE (D)

This control switches the air conditioning system on and off

Using it enables :

the temperature of the air inside the passenger compartment to be lowered,

the amount of humidity of the air blown into he passenger compartment to be reduced (aids demisting).



POSITION 0 : the air conditioning system is not operating, heating and ventilation have the same functions as on a vehicle which does not have air conditioning.

POSITION "AC Norm" : the air conditioning is operating. This is its normal setting for use. The cold air is taken from outside the vehicle and is constantly renewed.

POSITION "AC Max" : the air conditioning is operating. The air is taken from inside the passenger compartment and is recirculated without taking in any air from outside. This position enables the temperature inside the passenger compartment to be lowered quickly and to insulate it from the external atmosphere (when travelling in polluted areas, for example).

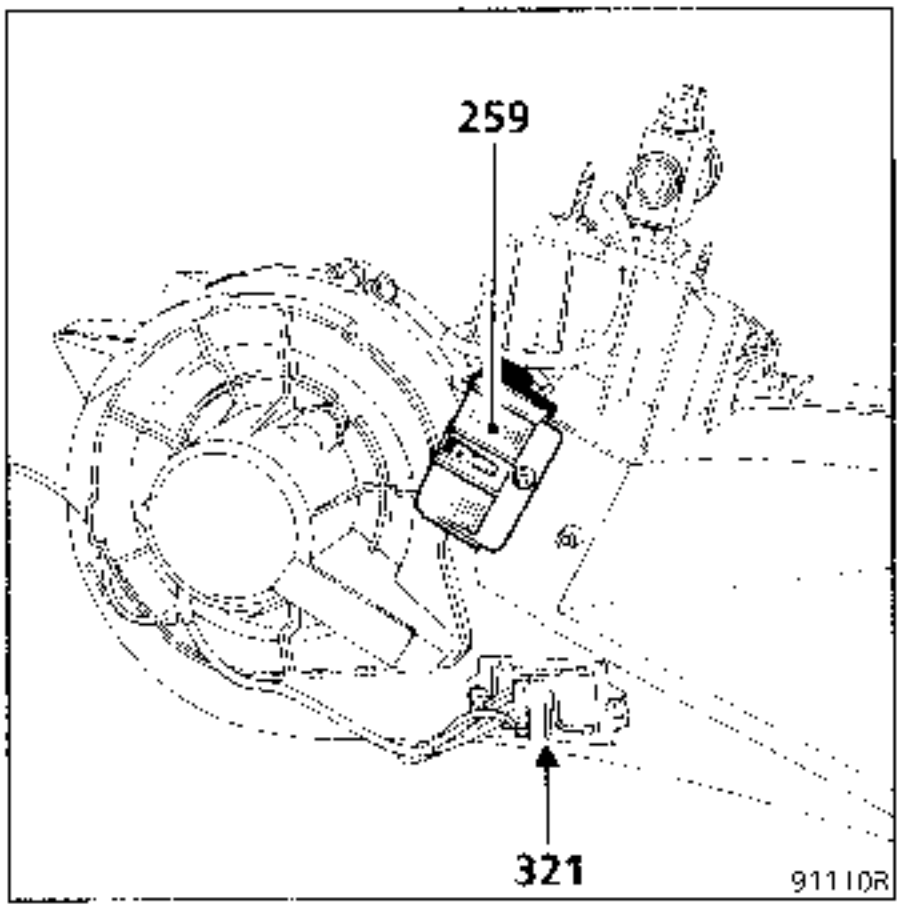
However, if the system is used for a long time on this setting, the vehicle interior will mist up slightly owing to the polluted air inside the passenger compartment (if passengers are smoking, for example).

It is therefore advisable to return to the "**AC Norm**" position as soon as the vehicle moves out of the polluted area or as soon as the desired temperature is reached.

NOTE : The air conditioning control does not activate the system if air flow control (**C**) is on **STOP**.

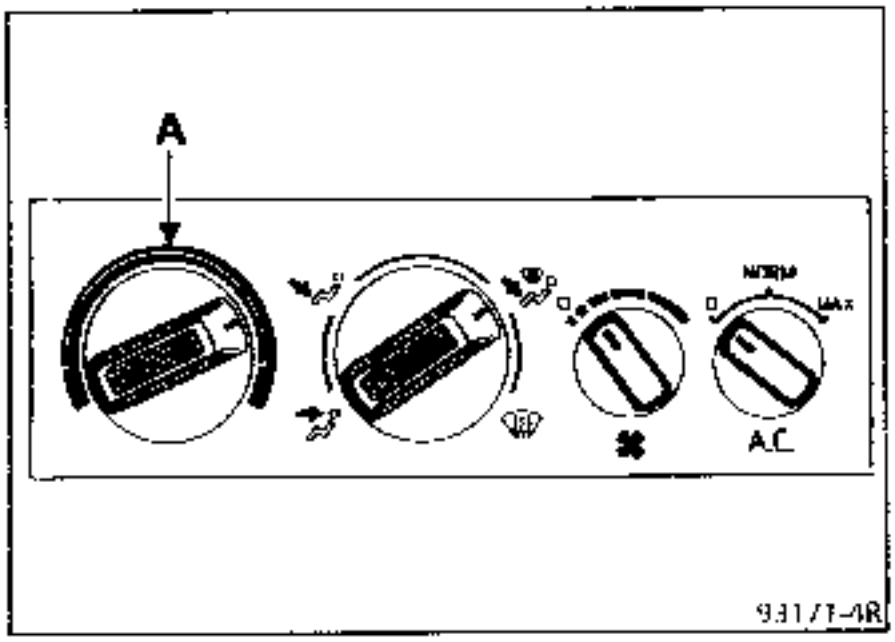
SPECIAL FEATURE OF THE SYSTEM

The temperature of the air leaving the evaporator cannot be adjusted. It is adjusted automatically by a fixed thermostat (**259**)



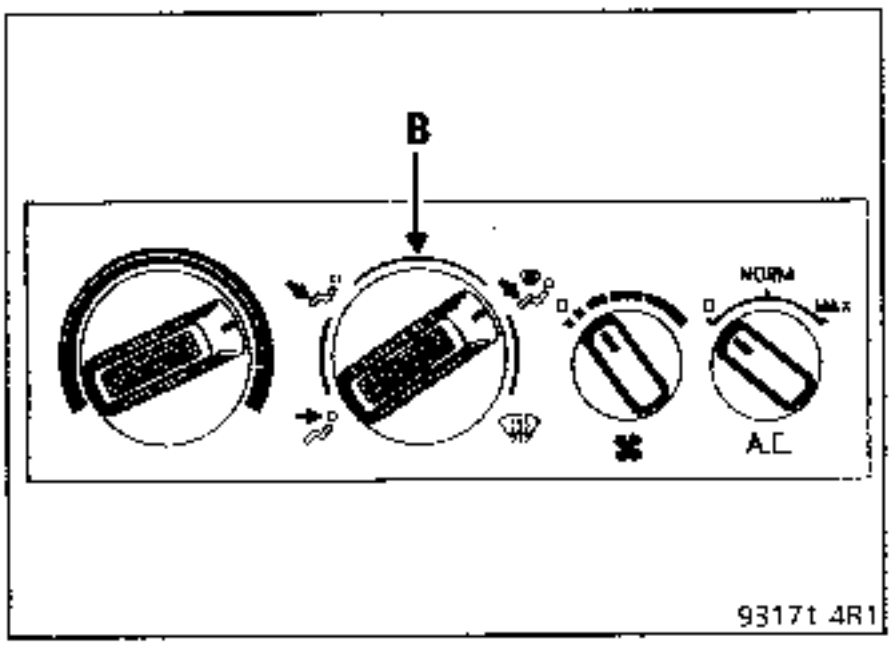
AS FROM MODEL YEAR 1990

TEMPERATURE CONTROL KNOB (A)



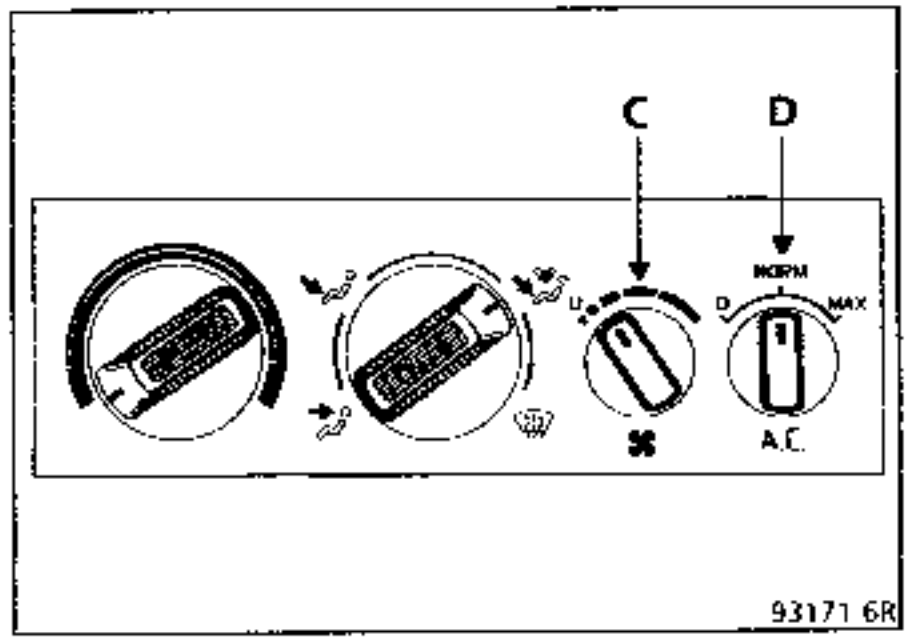
This control has the same function as described in the "**Heating-Ventilation**" section.

AIR DISTRIBUTION KNOB (B)



This control has the same function as described in the "**Heating-Ventilation**" section.

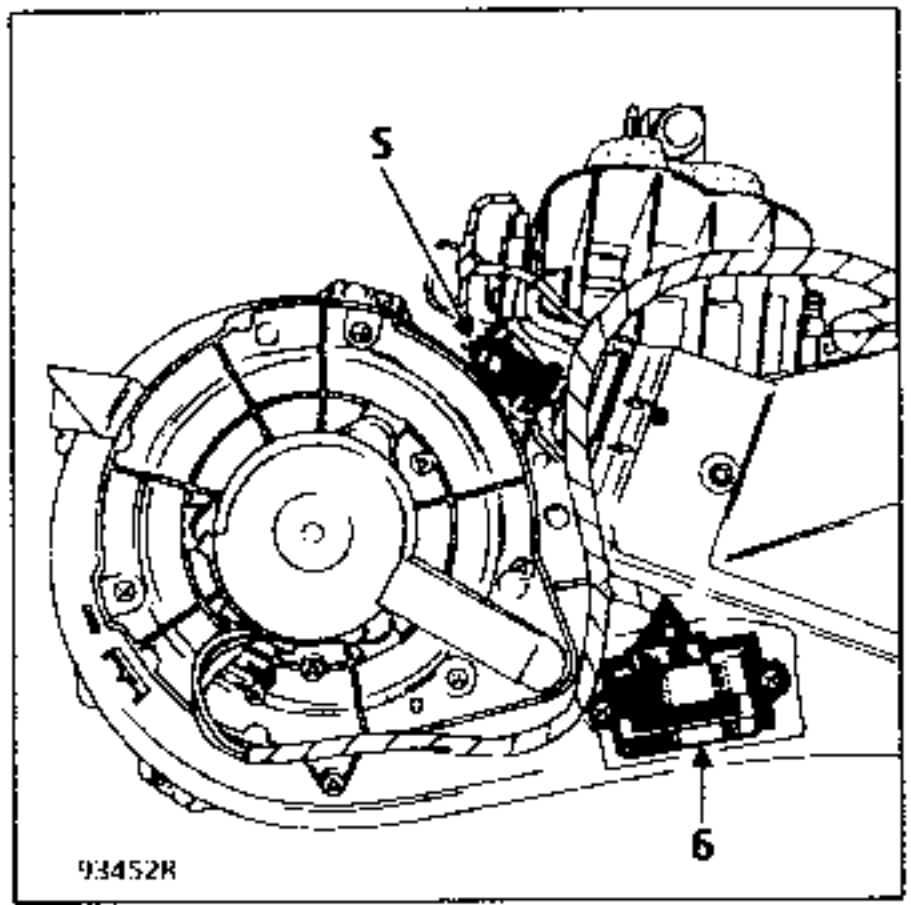
AIR CONDITIONING CONTROL KNOB (D)



This control has the same function as described in the paragraph entitled "**Air conditioning control slide**".

SPECIAL FEATURE OF THE SYSTEM

The temperature of the air from the evaporator cannot be regulated. It is set automatically by electronic thermostat (**6**) and sensor (**S**).



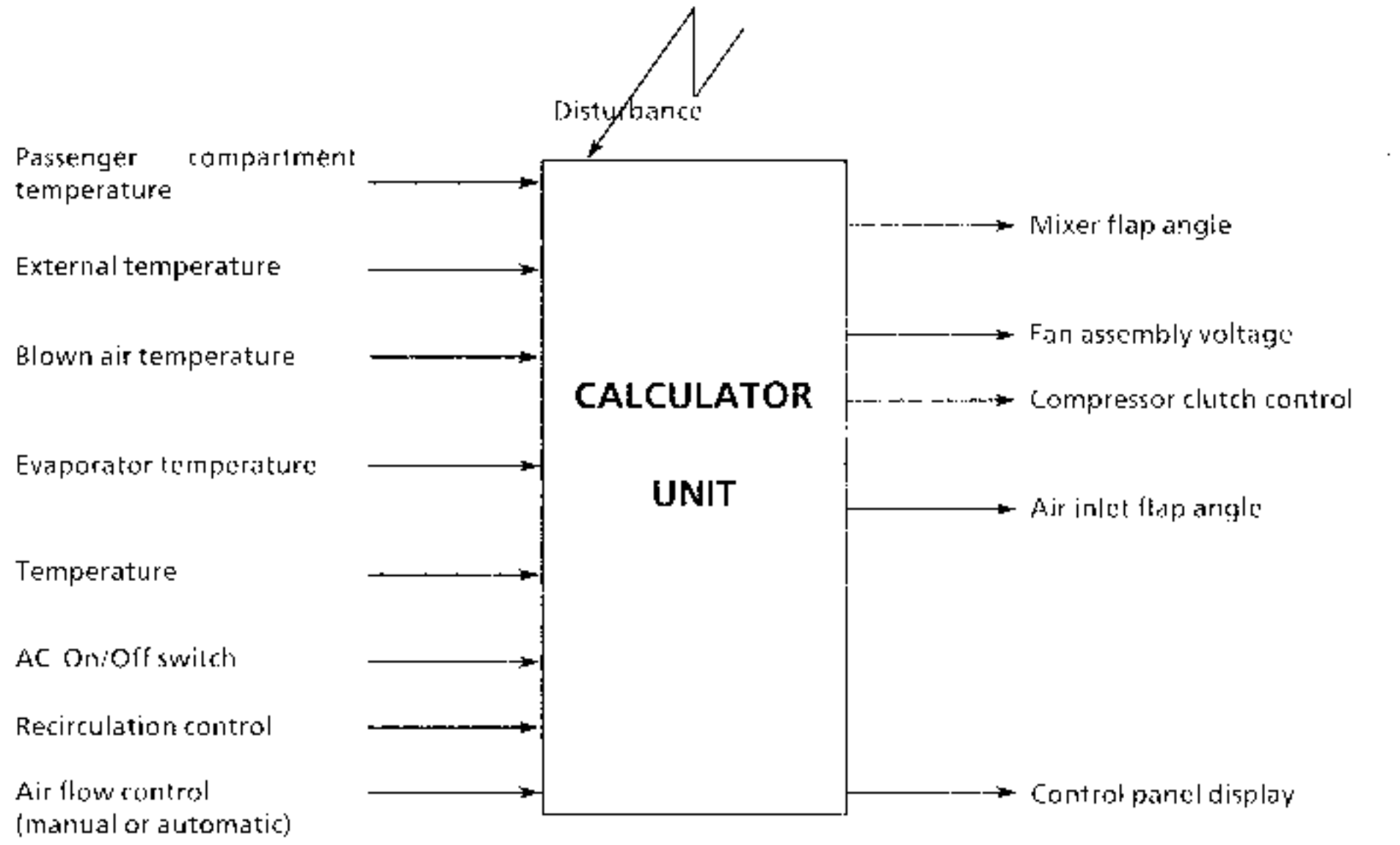
AS FROM MODEL YEAR 1990 - VERSION WITH TEMPERATURE REGULATION AND AIR CONDITIONING

As from model year **1990, Renault 21 "Phase 2"** vehicles may be equipped with a heating system with temperature regulation.

The aim of temperature regulation is to make the temperature inside the vehicle as comfortable as possible for the occupants, taking account of the different conditions which can prevail inside the passenger compartment.

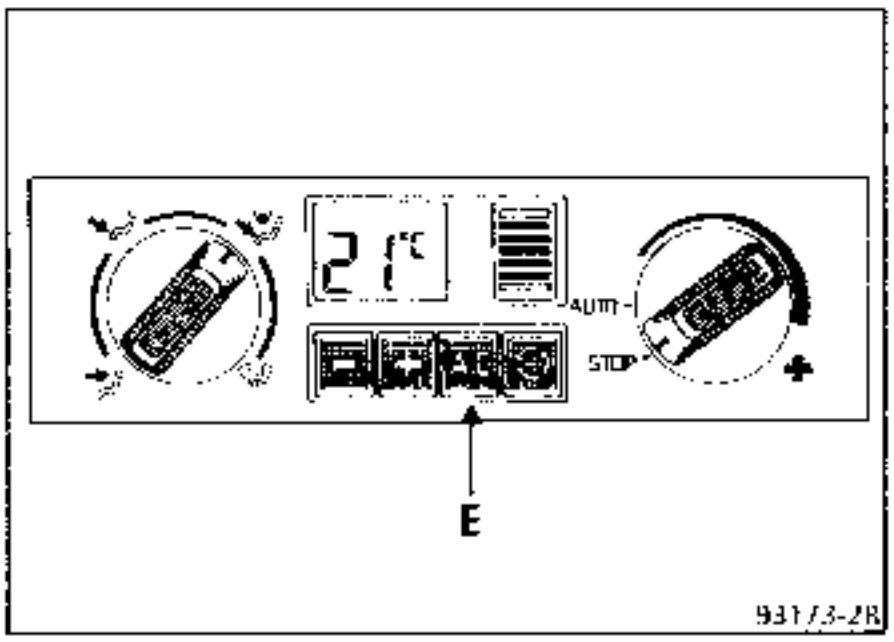
The temperature regulation system is electronically controlled by means of a computer integrated in the control unit

COMPOSITION OF THE SYSTEM





ADJUSTING THE TEMPERATURE



The two "-/+" keys have the same function as the one described in the **"regulated heating"** section. Only the temperature level is different :
14 °C to **28 °C**.

The temperature is not regulated when the level selected is **14 °C**.

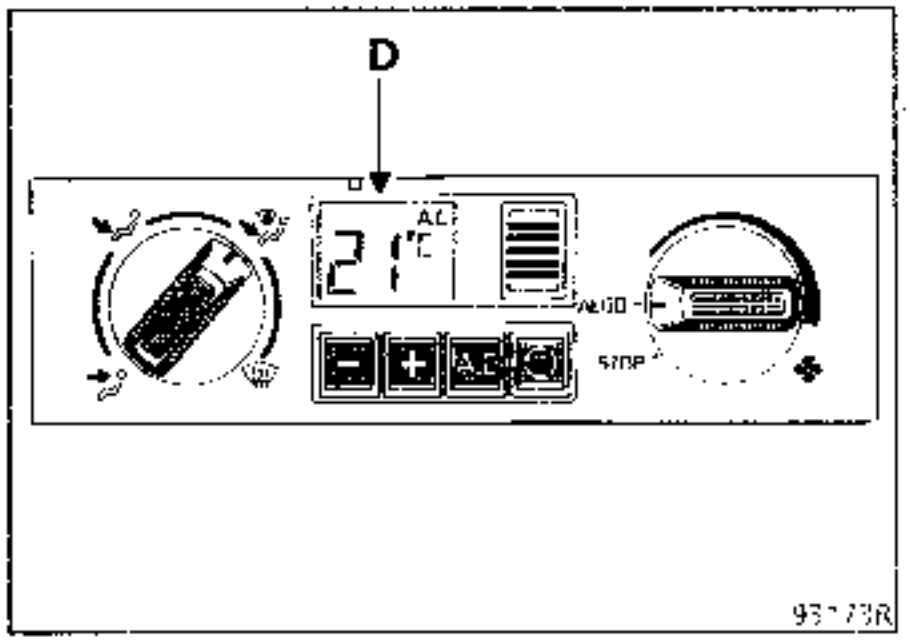
The temperature will be that obtained when the system is on its maximum performance setting.

If the external temperature is higher than the one selected, the air conditioning system will have to be activated in order to regulate the temperature.

If the air conditioning system is not in operation, the message "**A-C**" flashes on the display. Just press "**A-C**" (E) to activate the system.

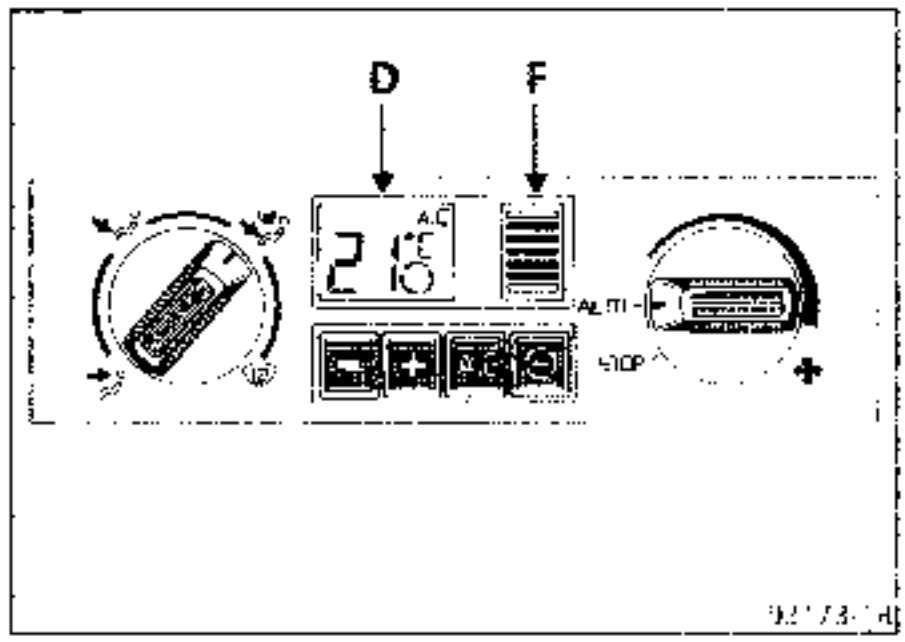
When there is a great difference **between the external temperature and the temperature level displayed**, in particular when the external temperature is very high, the air **RECIRCULATION** system will have to be activated in order to accelerate the reduction in temperature inside the passenger compartment. The system will return to the **"external air"** mode if conditions allow when the desired temperature has been reached.

AIR CONDITIONING ON/OFF KNOB



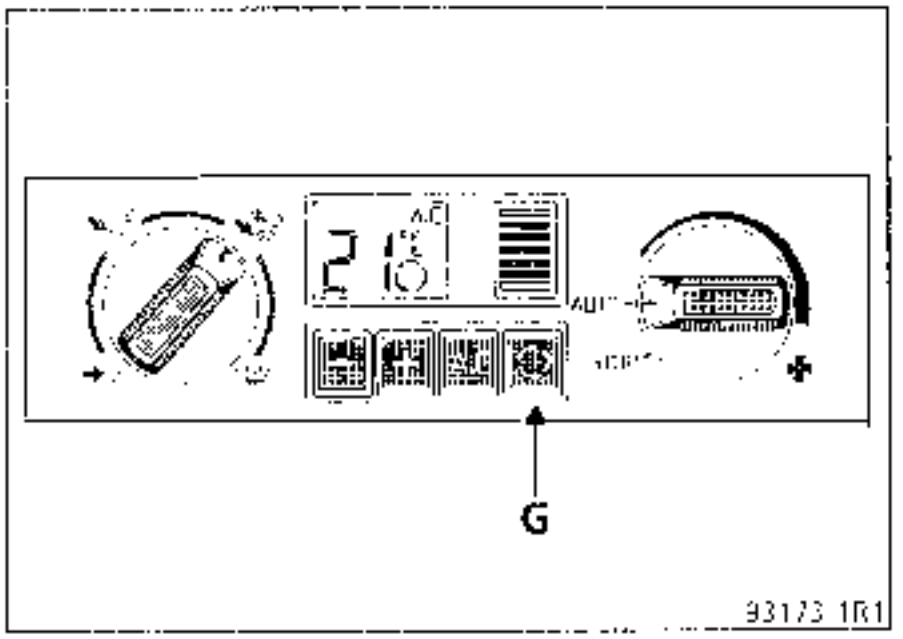
Press the "**A-C**" (E) key to activate the air conditioning system. The message "**A·C**" will appear on display (**D**). Cold air taken from outside the car is constantly renewed.

INTERNAL TEMPERATURE SENSOR (F) AND DISPLAY (D)



The internal temperature display and sensor have the same functions as those described in the **"Heating - Ventilation"** section.

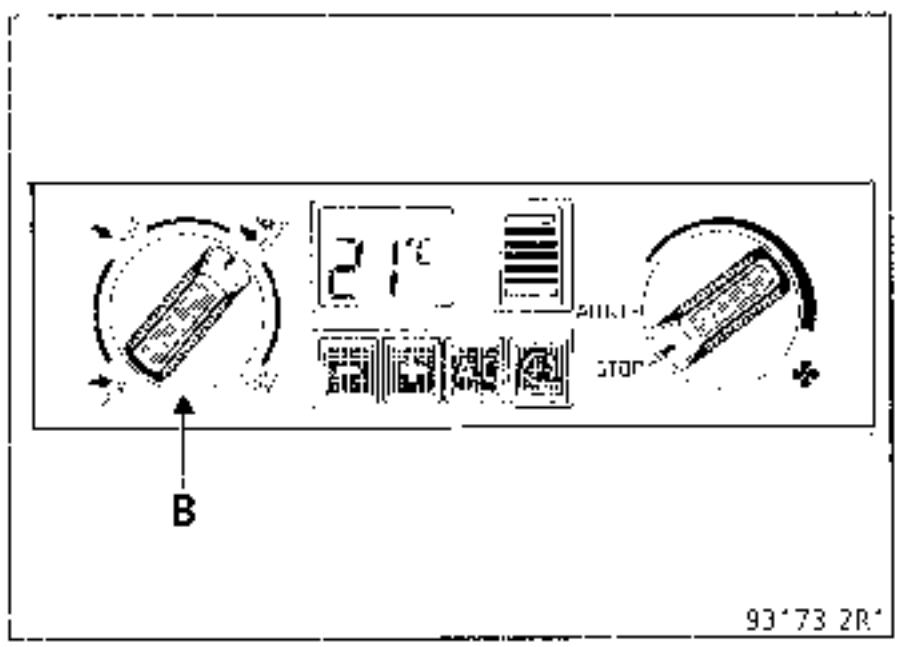
AIR RECIRCULATION CONTROL (G)



Press key (**G**) to activate the air recirculating system.

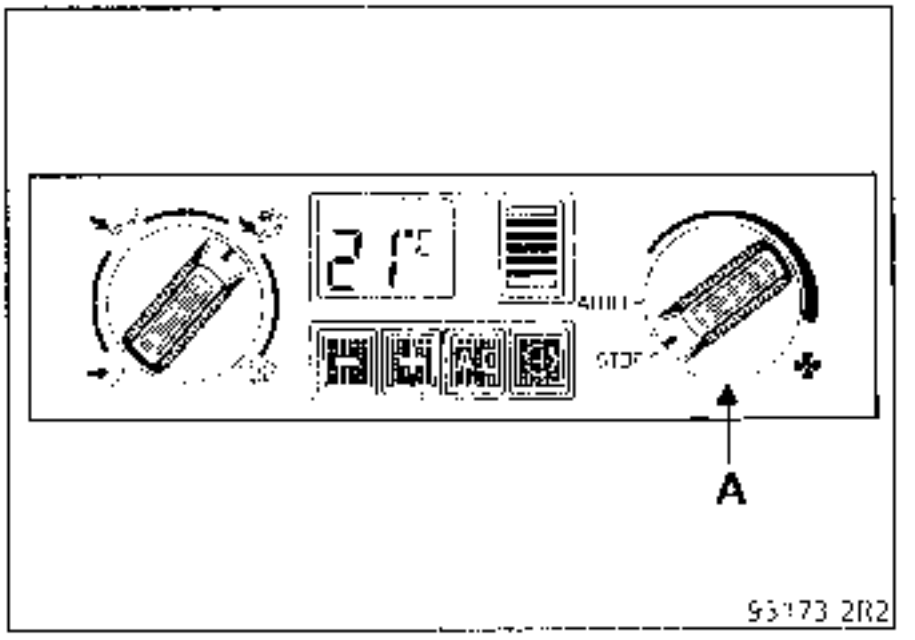
This control is has the same function as the one described in the section entitled "**Air conditioning control slide**".

AIR DISTRIBUTION DIAL (B)



This control has the same functions as those described in the "**Heating - Ventilation**" section.

AIR FLOW DIAL (A)



This dial has the same function as that described in the "**Regulated temperature**" section

SPECIAL POINT :

STOP SETTING : This setting enables the fan to be stopped and closes off the system's air intake. In this case, the temperature regulating system is not operative.

SPECIAL OPERATION OF THE L485

Compressor controlled by the engine injection computer.

The computer receives two types of data relating to the heating and ventilation system :

- request to start the air conditioning system,

- authorisation to start the compressor, depending on the temperature conditions and pressure in the air conditioning system.

These two data, and the engine speed, coolant temperature and inlet manifold pressure, are processed by the computer so that it can control the compressor's magnetic clutch (via a relay) and the idling speed.

- When there is a request for the air conditioning to be activated, the computer increases the idling speed from **800** to **1000 rpm**.

- When the computer receives the signal authorising the activation of the compressor, the computer checks that :

  a) the engine speed is less than **5000 rpm**, the coolant temperature is less than **105 °** and **the inlet manifold pressure is less than 1.5 bars**.

  b) the coolant temperature is less than **115 °C**.

  If one or other of the conditions **a)** and **b)** is not complied with, the computer cuts off the compressor or will not allow it to start.

THERMOSTAT (all types)

The fixed thermostat prevents the compressor operating if the temperature of the air from the evaporator is less than + **4 °C**.

6 : Air conditioning fan assembly electronic module
7 : Resistor unit controlling module
18 : Blown air temperature sensor
19 : Electronic thermostat
103 : Alternator
104 : Ignition switch
120 : Injection computer
124 : Heater control
171 : Air conditioning clutch
188 : Cooling fan assembly
206 : Air conditioning three purpose pressure switch
208 : Integral electronic ignition module
209 : Combined lighting/direction indicators switch stalk and horn push
224 : Power-assisted steering pressostat
225 : Diagnostic plug
234 : Fan assembly relay
241 : Lighting shunt or rheostat
245 : External temperature sensor
248 : Fan assembly thermal switch
251 : Coolant dual-purpose thermal switch
257 : Preheater unit
259 : Thermal switch
260 : Fuse box
262 : Air conditioning cooling fan assembly
274 : Air conditioning solenoid valve
292 : Lighting rheostat relay
298 : Blower device
316 : Ignition 4" relay
319 : Air conditioning control panel
320 : Air conditioning/basic fan motor assembly
321 : Air conditioning fan motor assembly resistor
322 : Power-assisted steering air conditioning diode
323 : Power-assisted steering air conditioning solenoid valve diode
334 : Thermal cut out

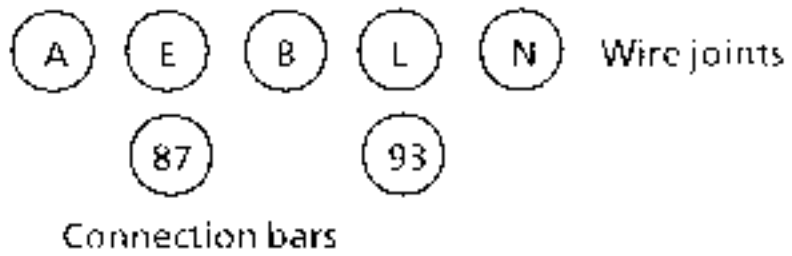
335 Fan assembly 1st speed relay
336 Fan assembly 2nd speed relay
337 Fan assembly 3rd speed relay
362 Battery - terminal plate
408 Evaporator sensor
412 Fast idling solenoid valve
417 Air conditioning recirculating relay
418 Passenger compartment temperature sensor fan
420 Mixer flap
474 Air conditioning compressor control relay
475 Recirculating motor

LIST OF JUNCTIONS

R5 Dashboard/heater bulkhead
R10 Dashboard/righthand side member
R11 Dashboard/lefthand side member
R17 Heater bulkhead/engine
R21 Engine/fan assembly
R28 Engine/lefthand side member
R58 Fan assembly/righthand side member
R59 Fan assembly/injection harness
R63 Lefthand side member/injection harness
R75 Fan assembly earth/fan assembly
R99 Dashboard/heating system
R138 Heater bulkhead/ABS
R139 Engine/ABS

LIST OF EARTHS

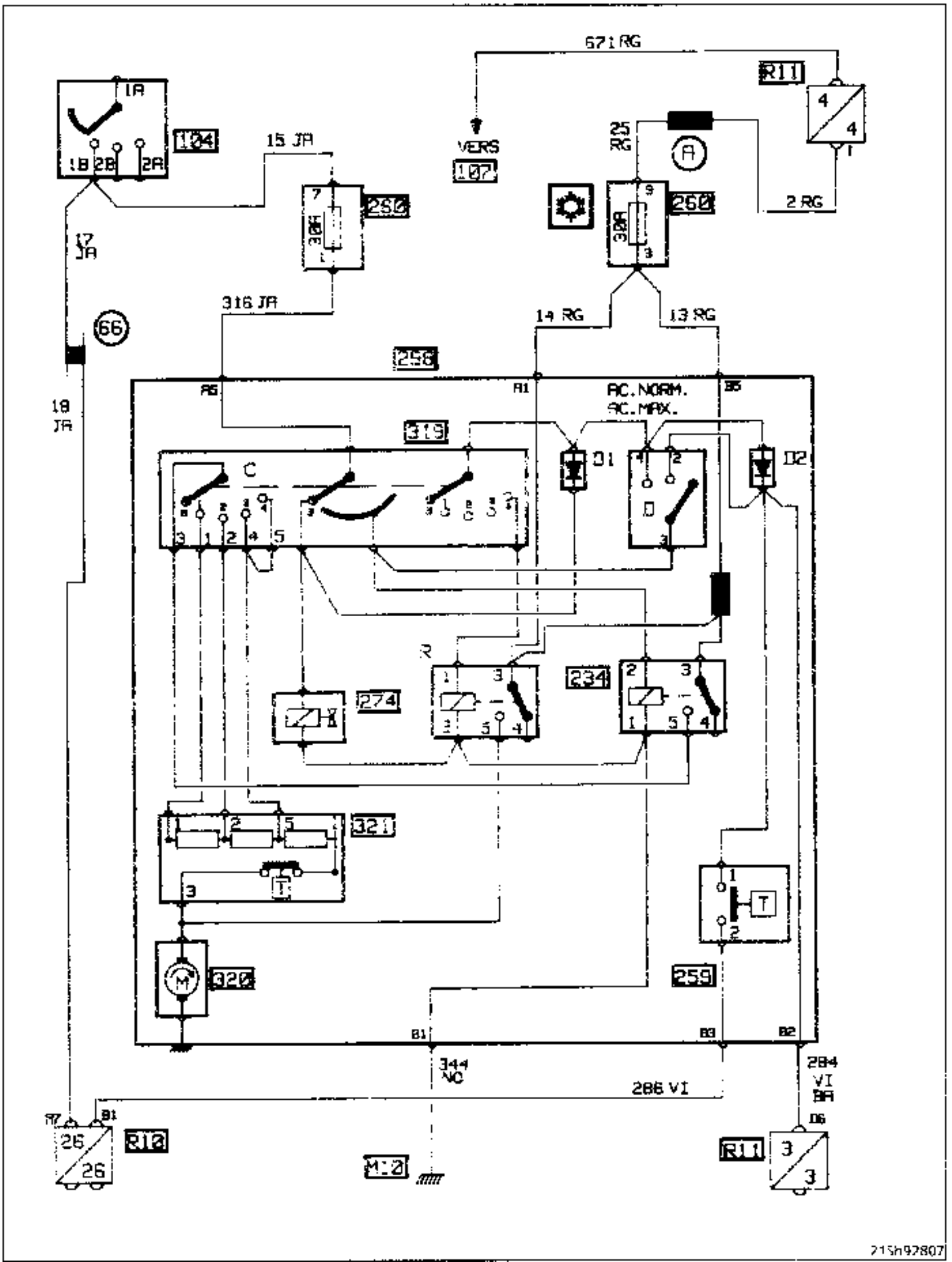
M4 Bodywork earth
M9 Front righthand pillar earth
M10 Front lefthand pillar earth
M16 Engine/bodywork earth



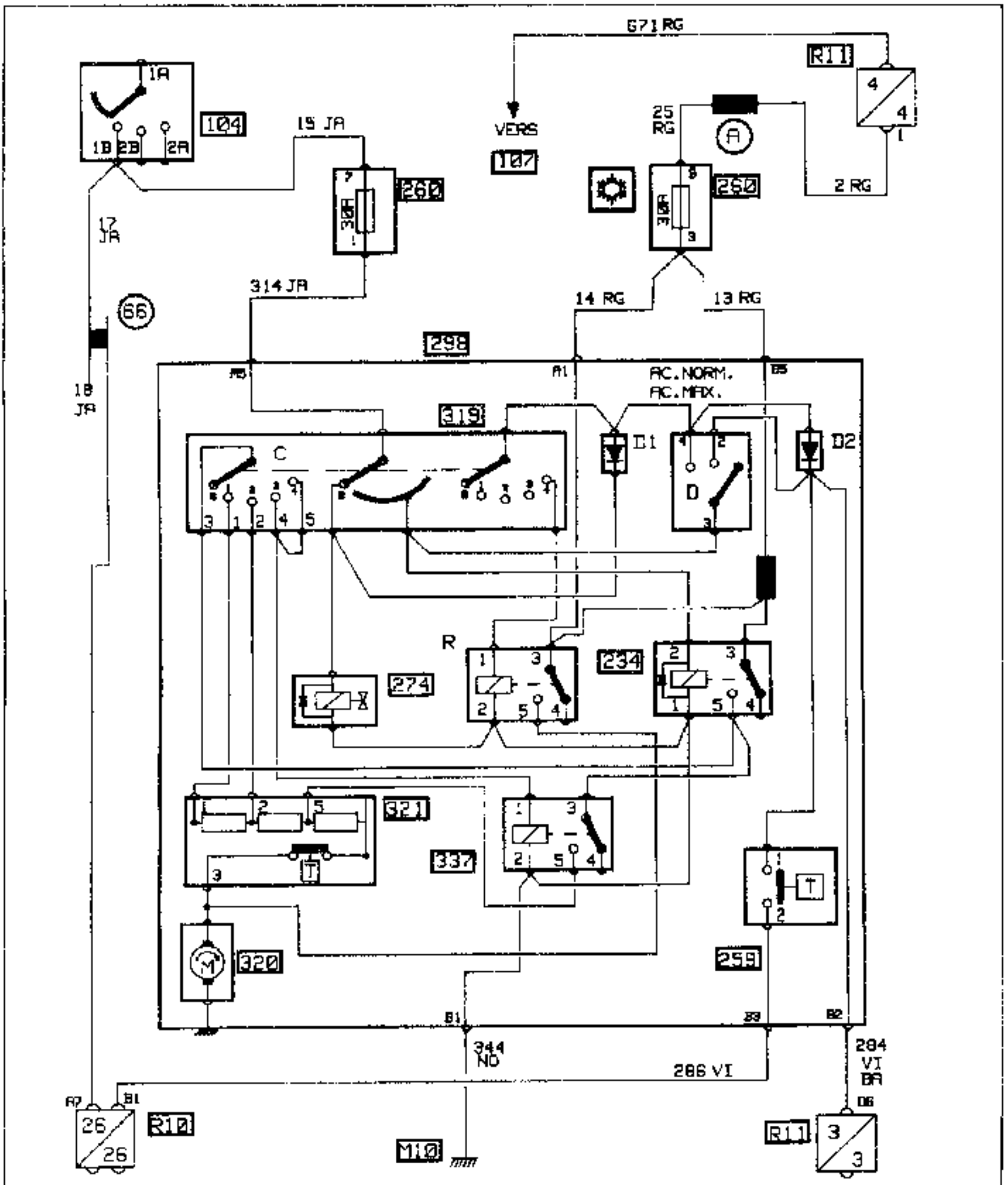
Wire joints

Connection bars

WIRING DIAGRAM - Passenger compartment end - ALL TYPES - 1987

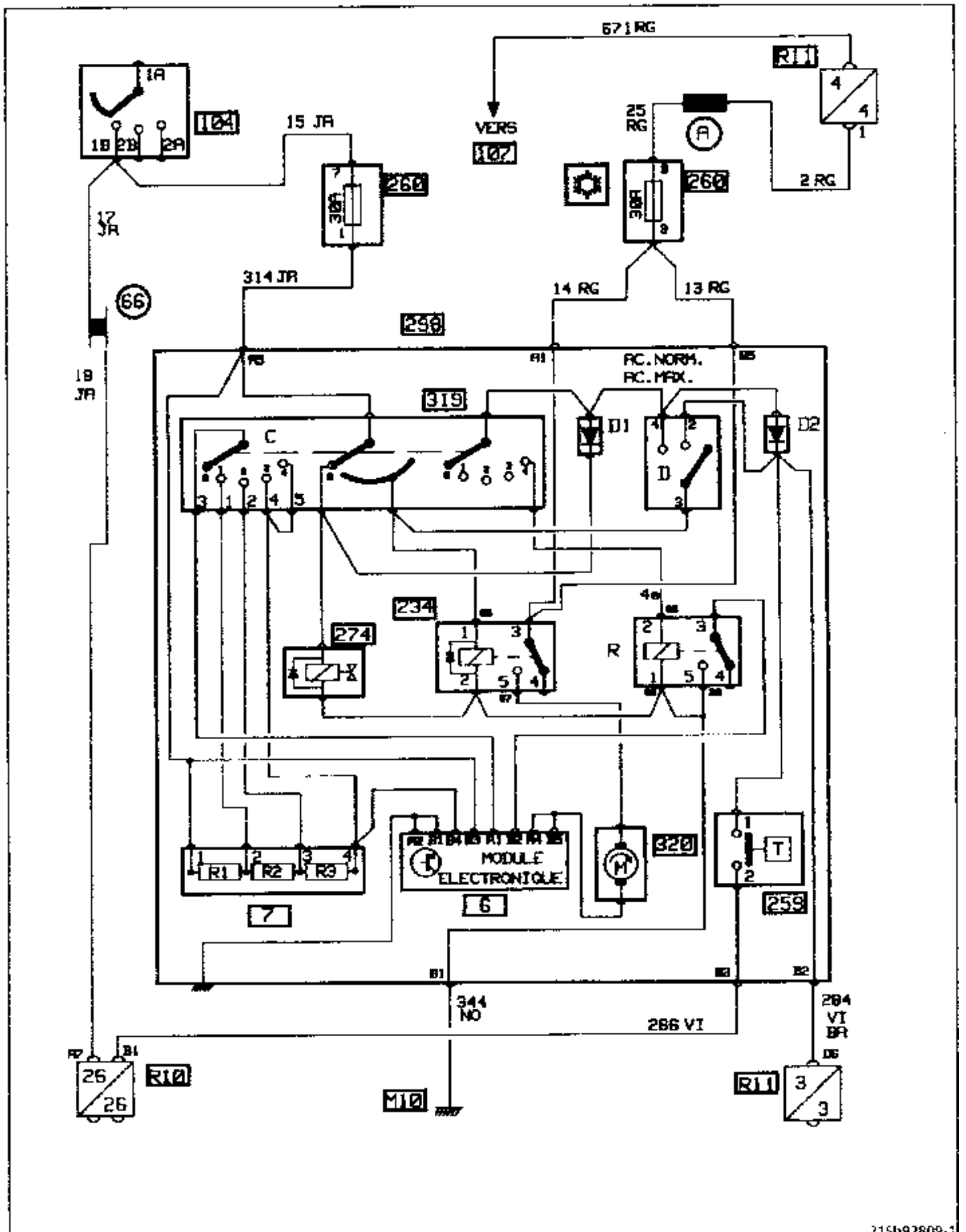


WIRING DIAGRAM - Passenger compartment end - ALL TYPES - 1988



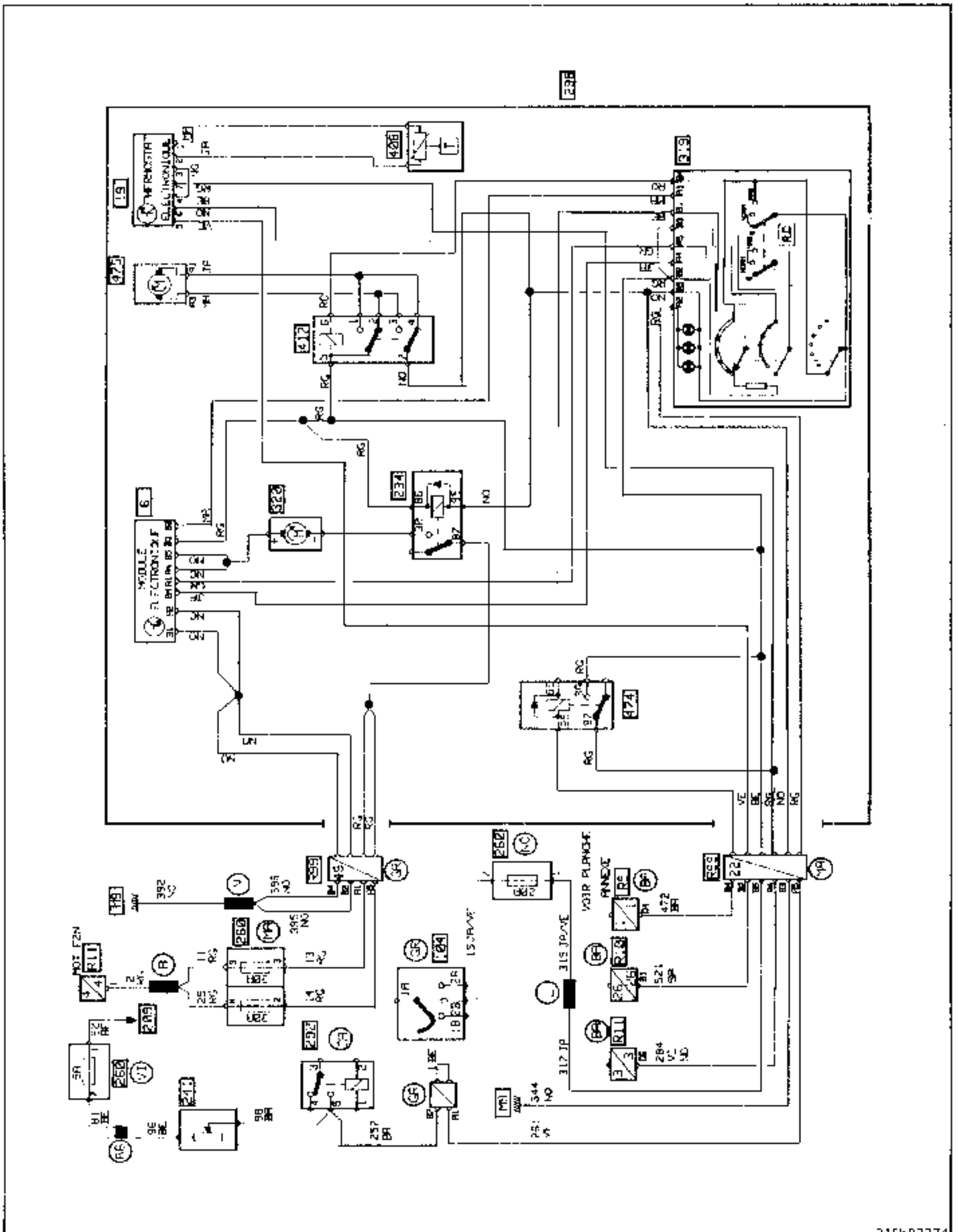
27Sh02808-1

WIRING DIAGRAM - Passenger compartment end - ALL TYPES - 1989



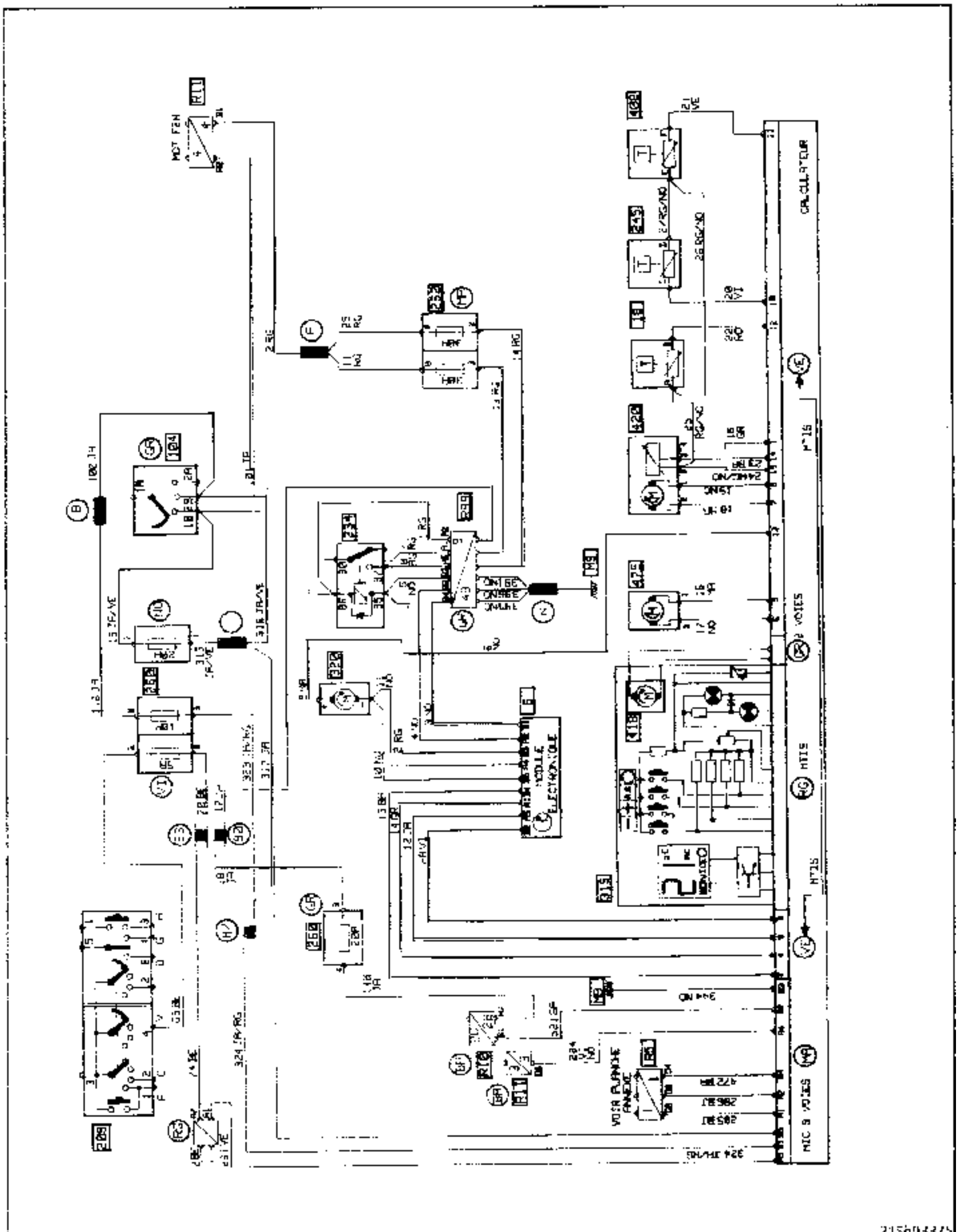
215h92809-1

WIRING DIAGRAM - Passenger compartment end - ALL TYPES - 1990 - DAI



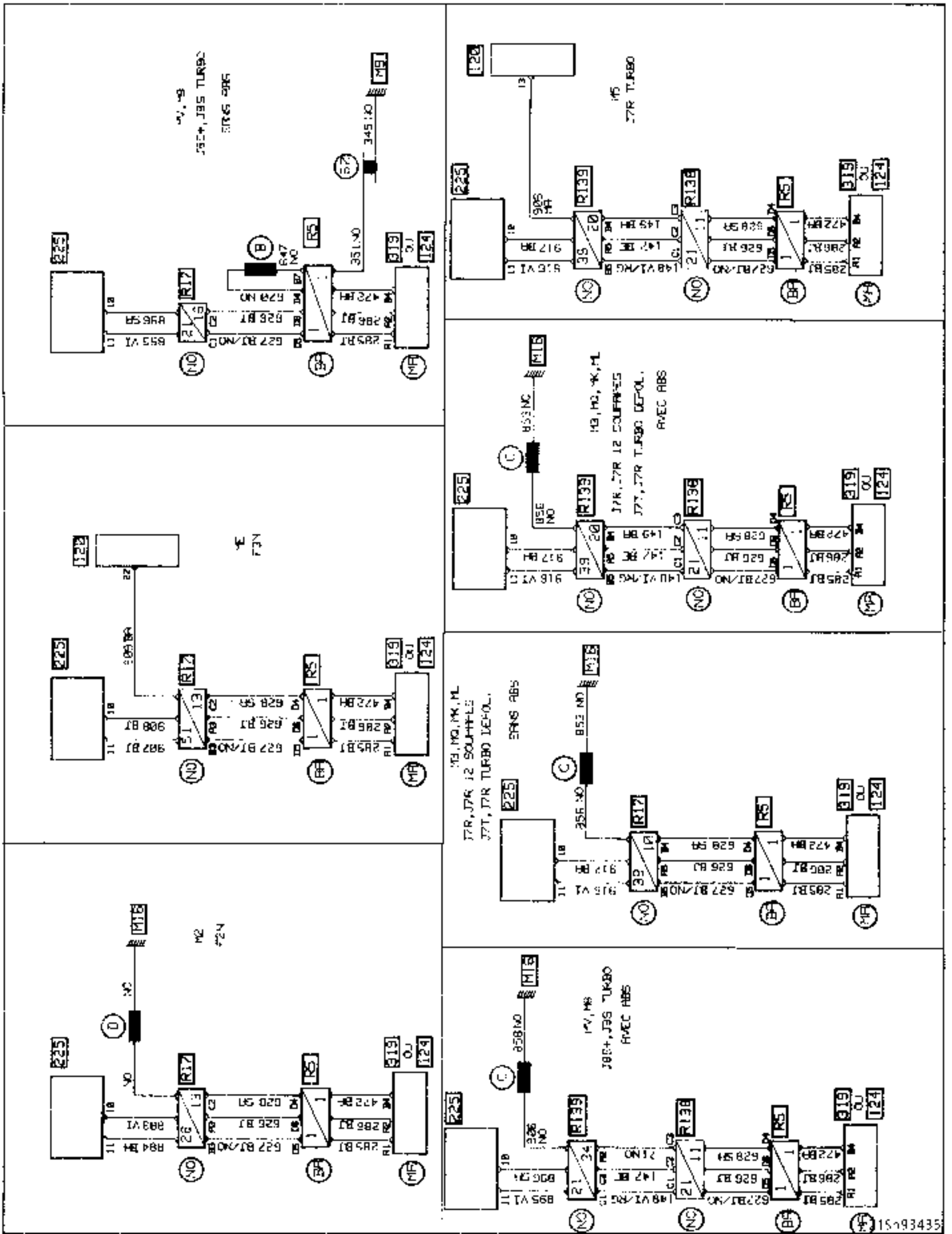
215h93374

WIRING DIAGRAM - Passenger compartment end - VERSION WITH REGULATED TEMPERATURE - 1990 model

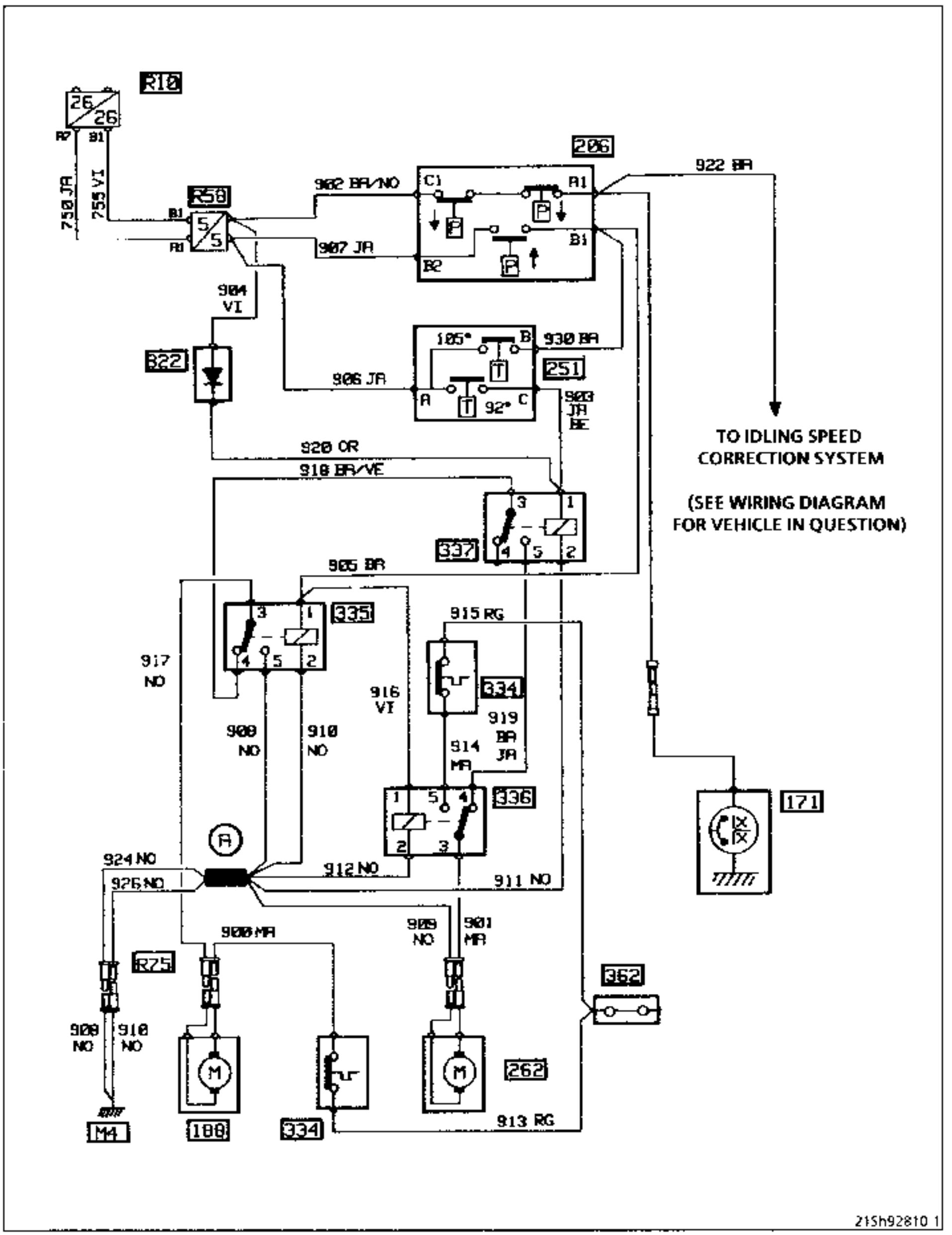


21Sh03375

WIRING DIAGRAM - Diagnostic plug appendix - 1990 model

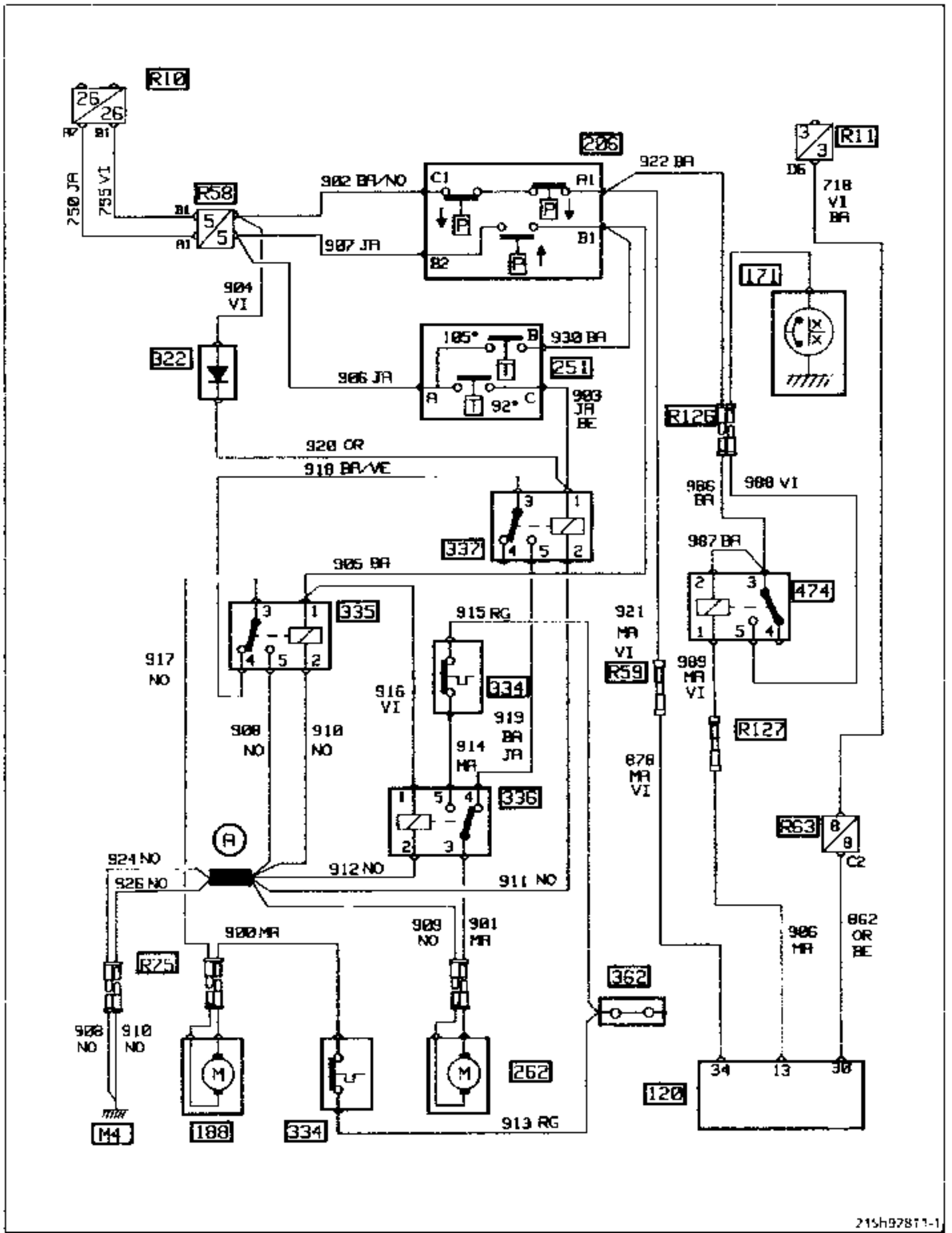


WIRING DIAGRAM - Engine end - X482 - X483 - X488 - X489 - 1987 - 1988 - 1989 models

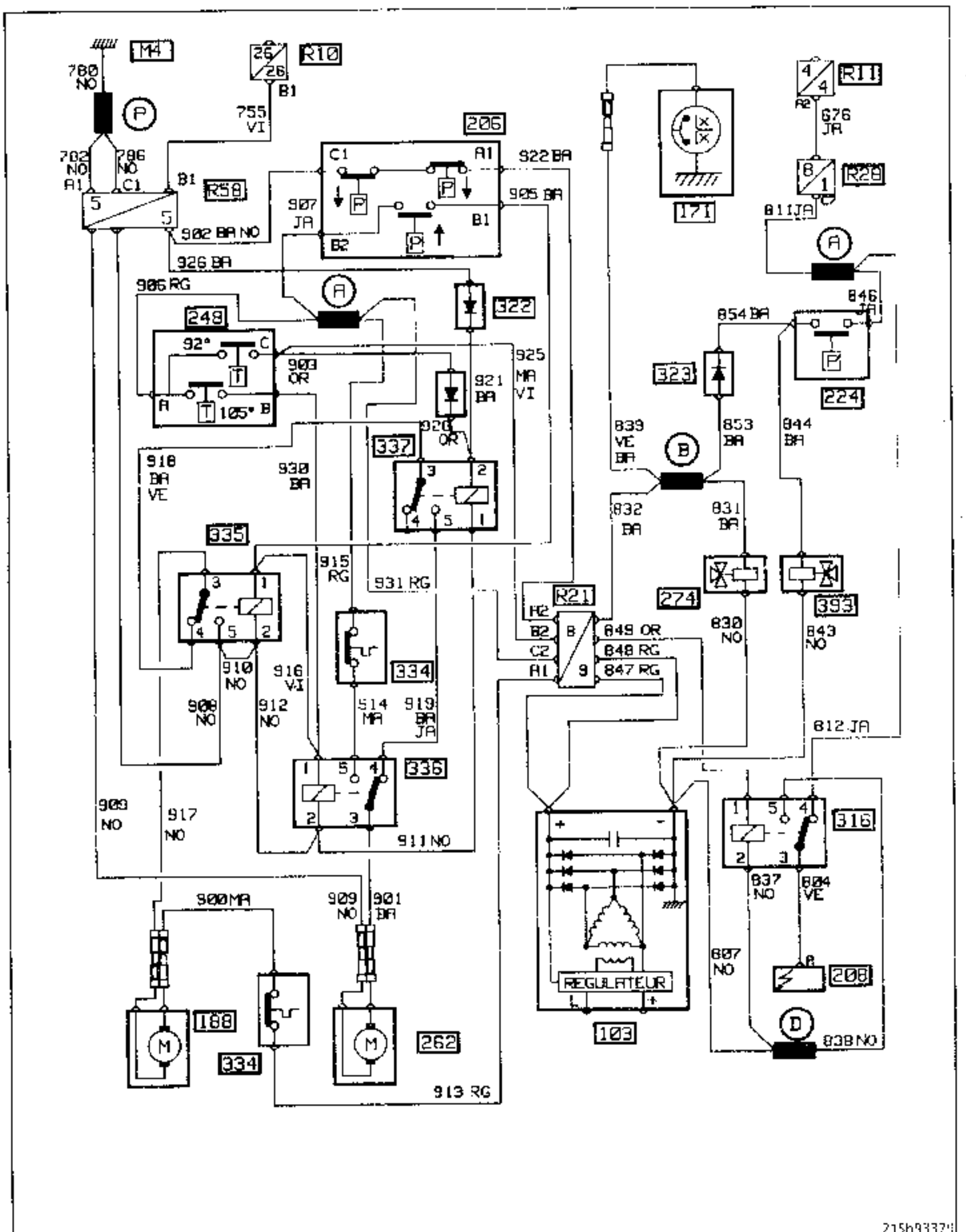


21Sh92810 1

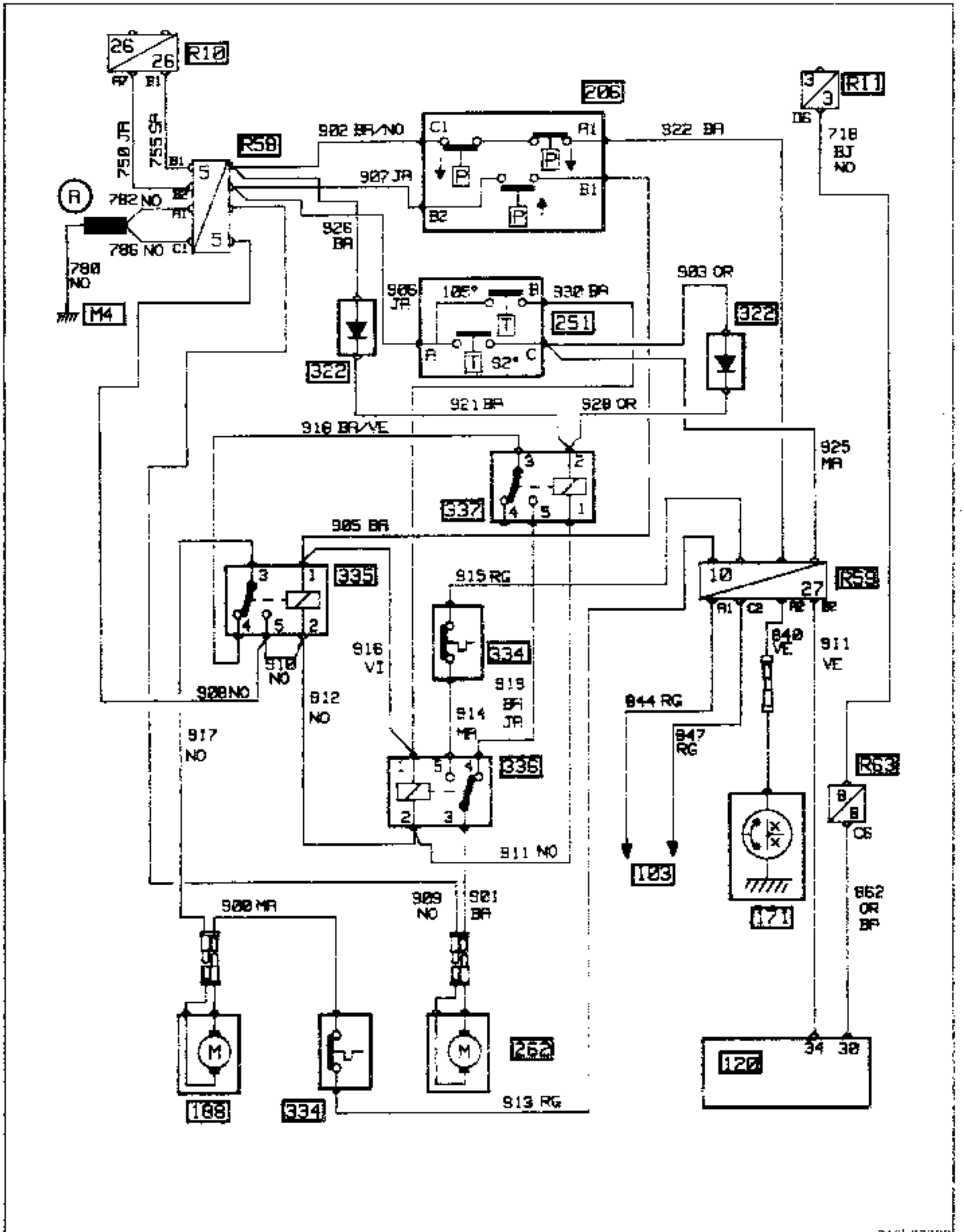
WIRING DIAGRAM - Engine end - L485 - 1988 - 1989 models



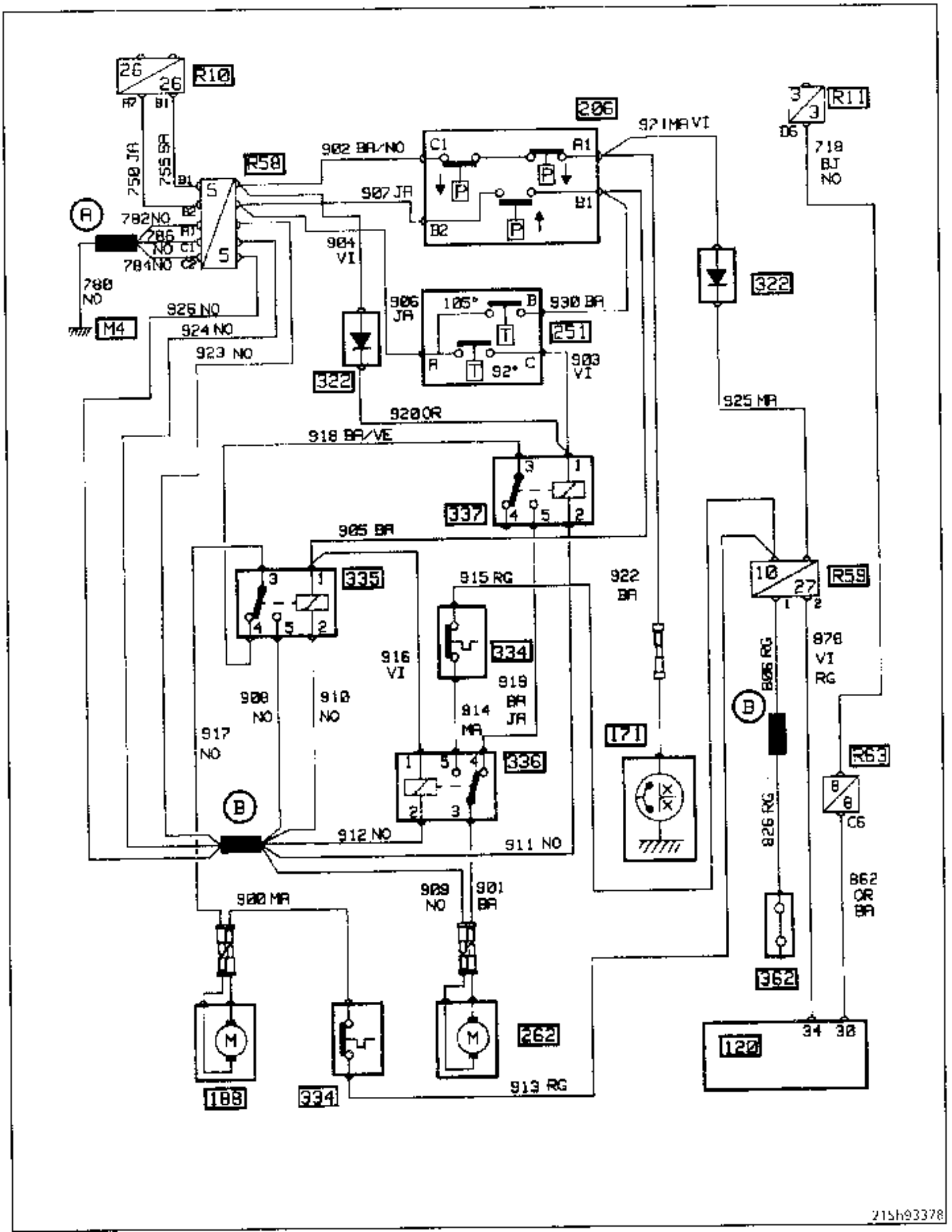
WIRING DIAGRAM - Engine end - F2N - 1990 model



WIRING DIAGRAM - Engine end - F3N - 1990 model

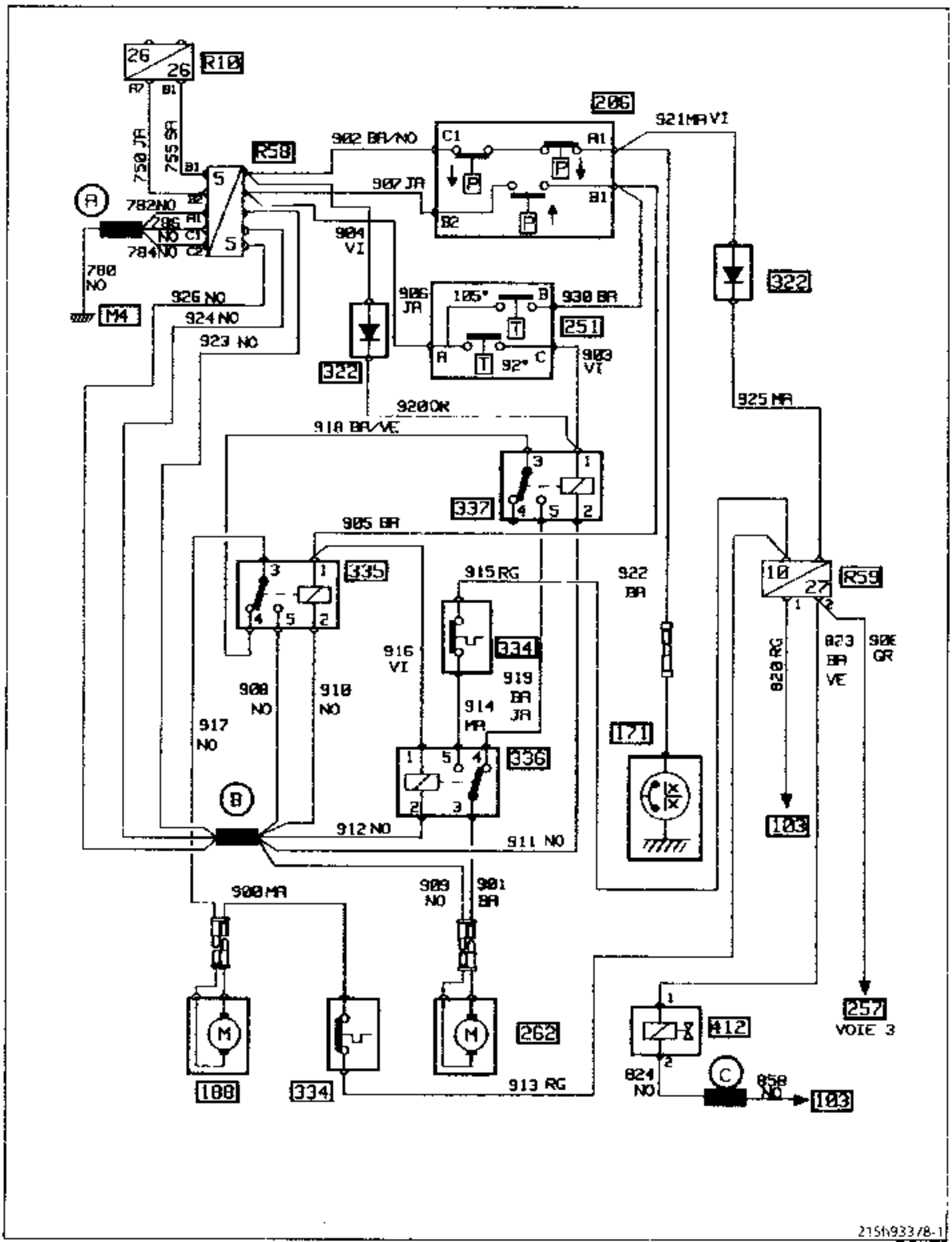


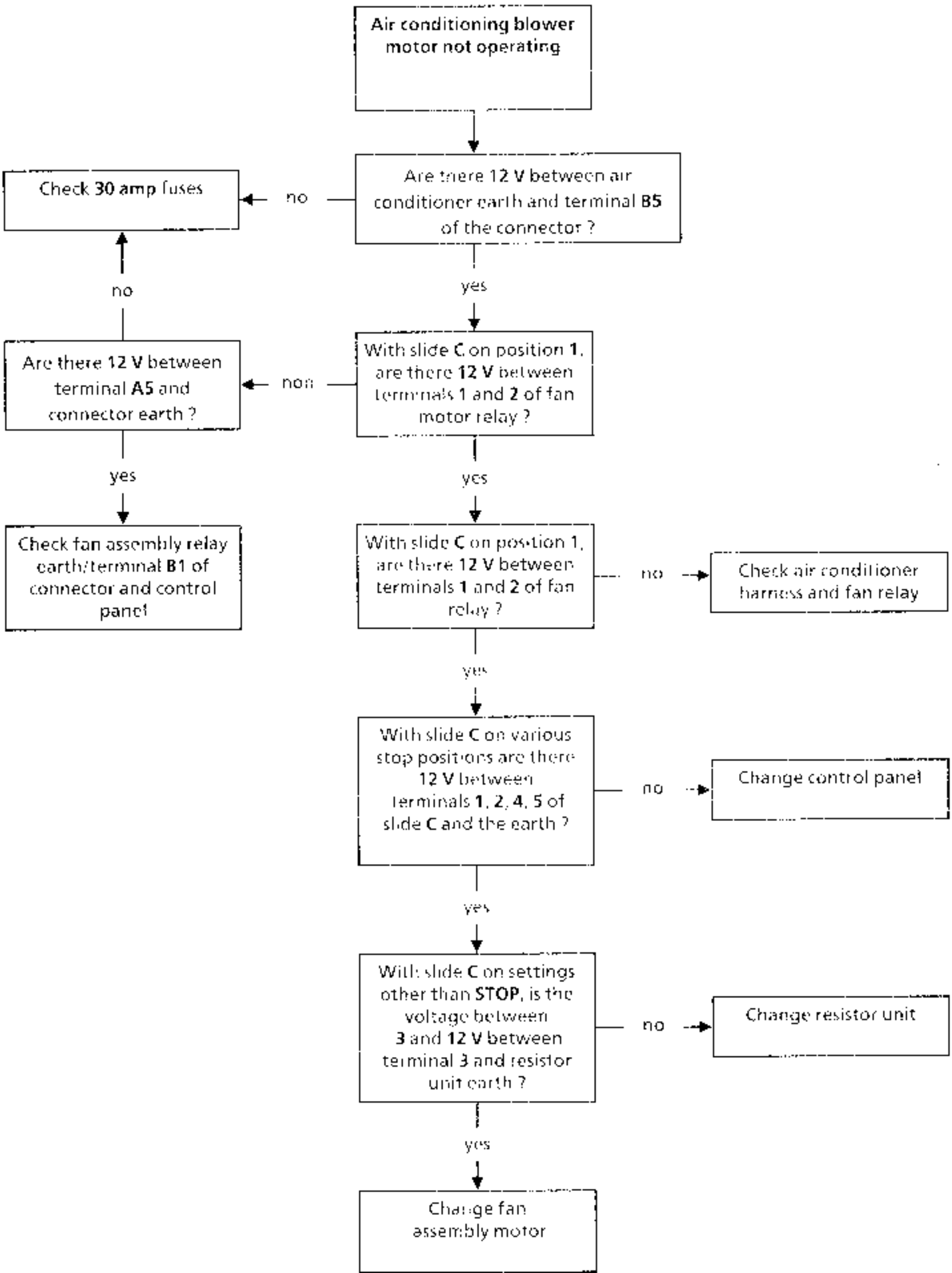
WIRING DIAGRAM - In-line (longitudinal) engine end (petrol) - 1990 model



215h93378

WIRING DIAGRAM - In-line (longitudinal) engine (diesel) - 1990 model

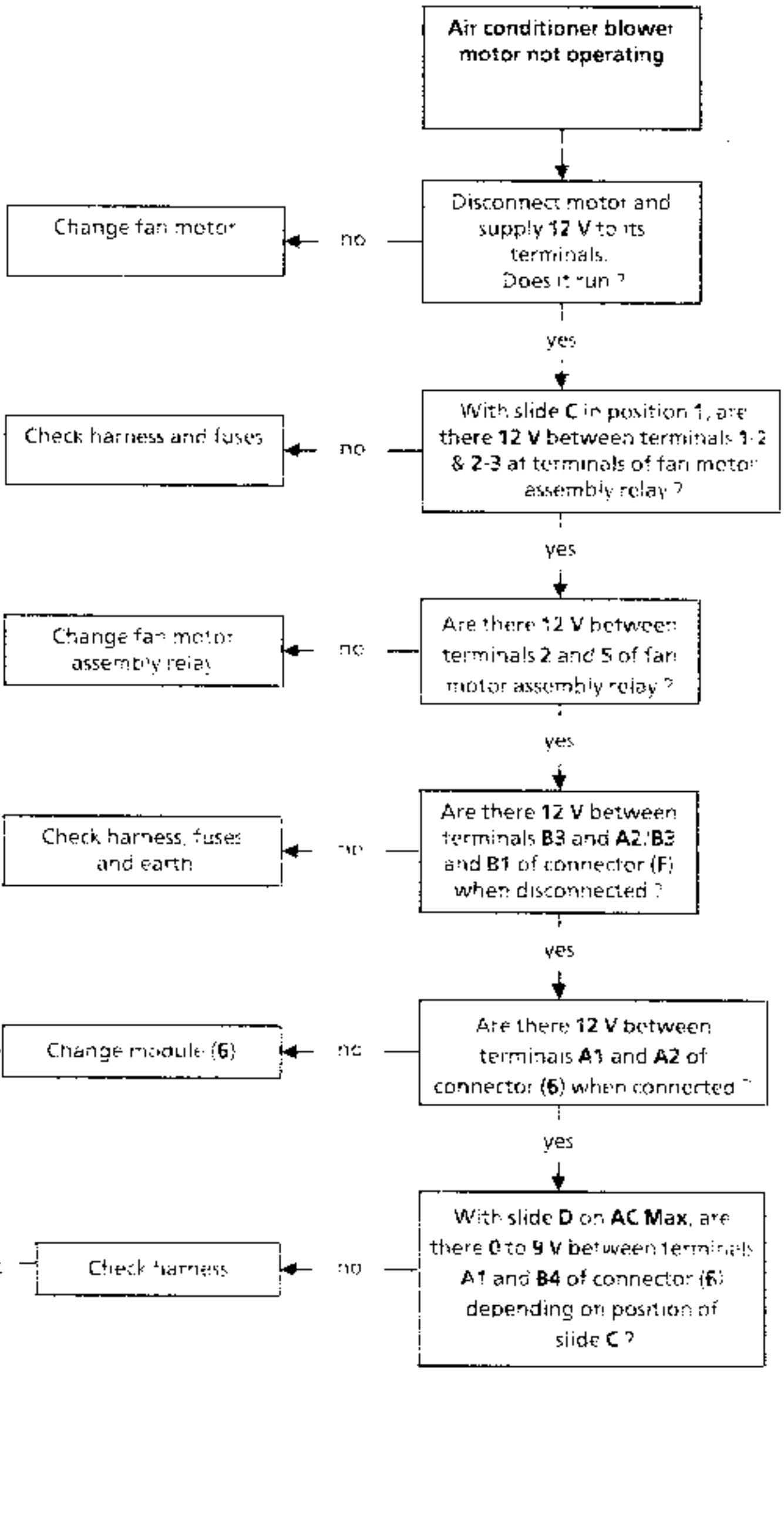



Air conditioning blower motor not operating
Are there 12 V between air conditioner earth and terminal B5 of the connector ?
no
Check 30 amp fuses
yes
With slide C on position 1, are there 12 V between terminals 1 and 2 of fan motor relay ?
non
Are there 12 V between terminal A5 and connector earth ?
no
yes
With slide C on position 1, are there 12 V between terminals 1 and 2 of fan relay ?
no
Check air conditioner harness and fan relay
Check fan assembly relay earth/terminal B1 of connector and control panel
yes
With slide C on various stop positions are there 12 V between terminals 1, 2, 4, 5 of slide C and the earth ?
no
Change control panel
yes
With slide C on settings other than STOP, is the voltage between 3 and 12 V between terminal 3 and resistor unit earth ?
no
Change resistor unit
yes
Change fan assembly motor

Note : Fan motor operating voltage between terminals **87** of fan motor assembly relay and **A5** or **B5** of connector **(6)**, positions :

0 = 0 V ± 0.5 V
1 = 2.8 V ± 0.5 V
2 = 5.2 V ± 0.5 V
3 = 9.4 V ± 0.5 V
4 = 9.4 V ± 0.5 V if AC 0 or Norm
4 = 12.5 V ± 0.5 V if AC Max

(See wiring diagram for markings).



Fan motor not operating

Disconnect connector and supply it with **12 V** between terminals **30** of relay **234** and terminal **A4** of module **6**. Does the motor run ?

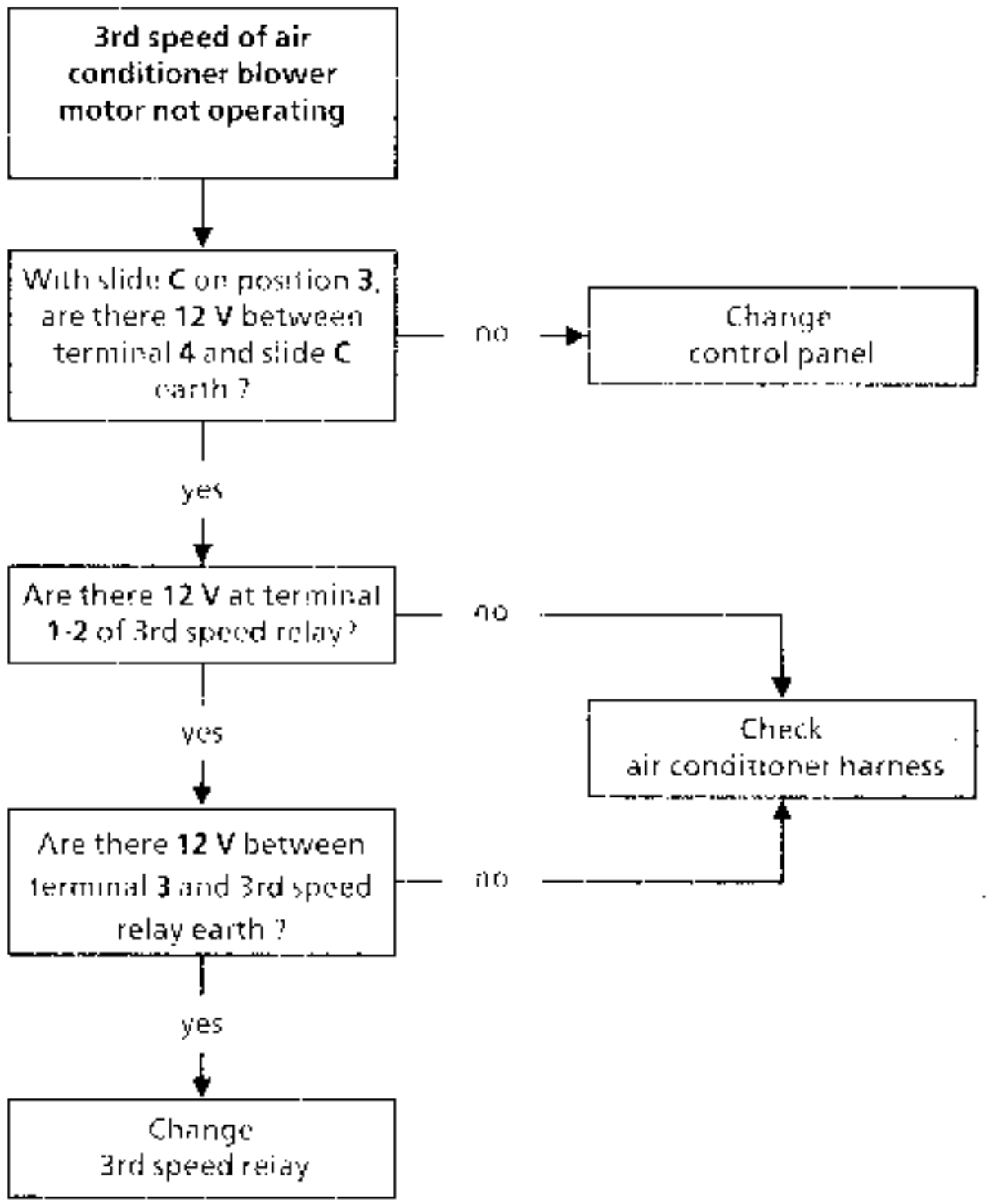
- no → Change fan motor
- yes → With ignition on, are there **12 V** at terminals **86/85** of relay **234** and when swithed off, at terminals and **86/87** ?
  - no → Check harness and fuse
  - yes → Are there **12 V** between terminals **30/85** ?
    - no → Change relay **234**
    - yes → Are there **12 V** between terminals **A2/B3** terminals **B1/B3** of **8-track** connector of module **6** when disconnected ?
      - no → Check harness fuse and earth
      - yes → Are there **12 V** between terminals **B3/B4** of **8-track** connector of module **6** when connected ?
        - no → Change electronic module **6**
        - yes → With slide (**D**) on **AC Norm** are there **0** to **12 V** between terminals **B3/A1** ?
          - no → Check harness
            - yes → Change electronic module **6**
            - correct → At terminals of panel **319**, do you read at terminals **B2/A5**, with slide control (**C**) in positions ?

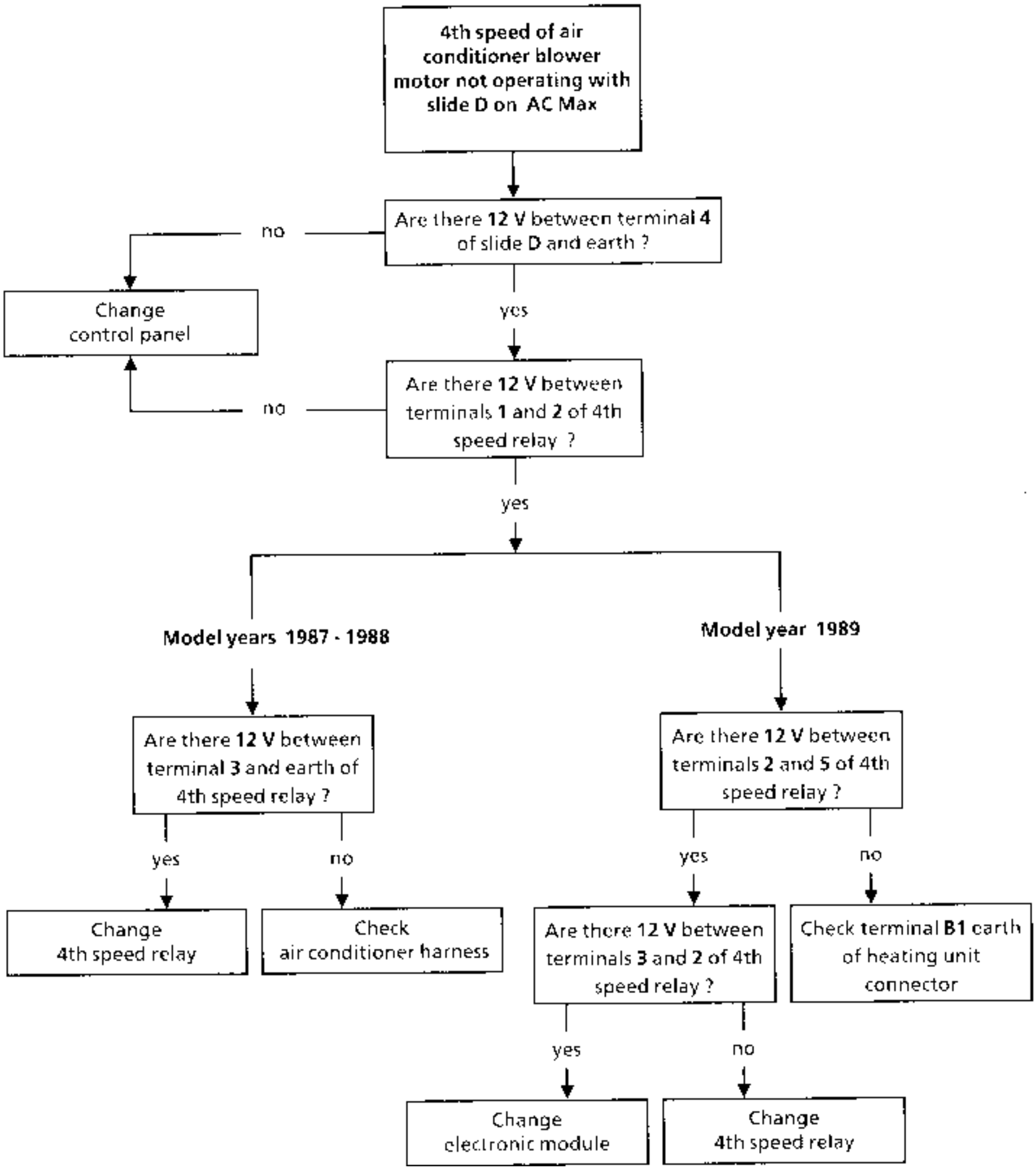
0	>	∞	Ω
1	=	1000	Ω
2	=	1400	Ω
3	=	1800	Ω
4	=	2250	Ω
5	=	2700	Ω
6	=	3100	Ω

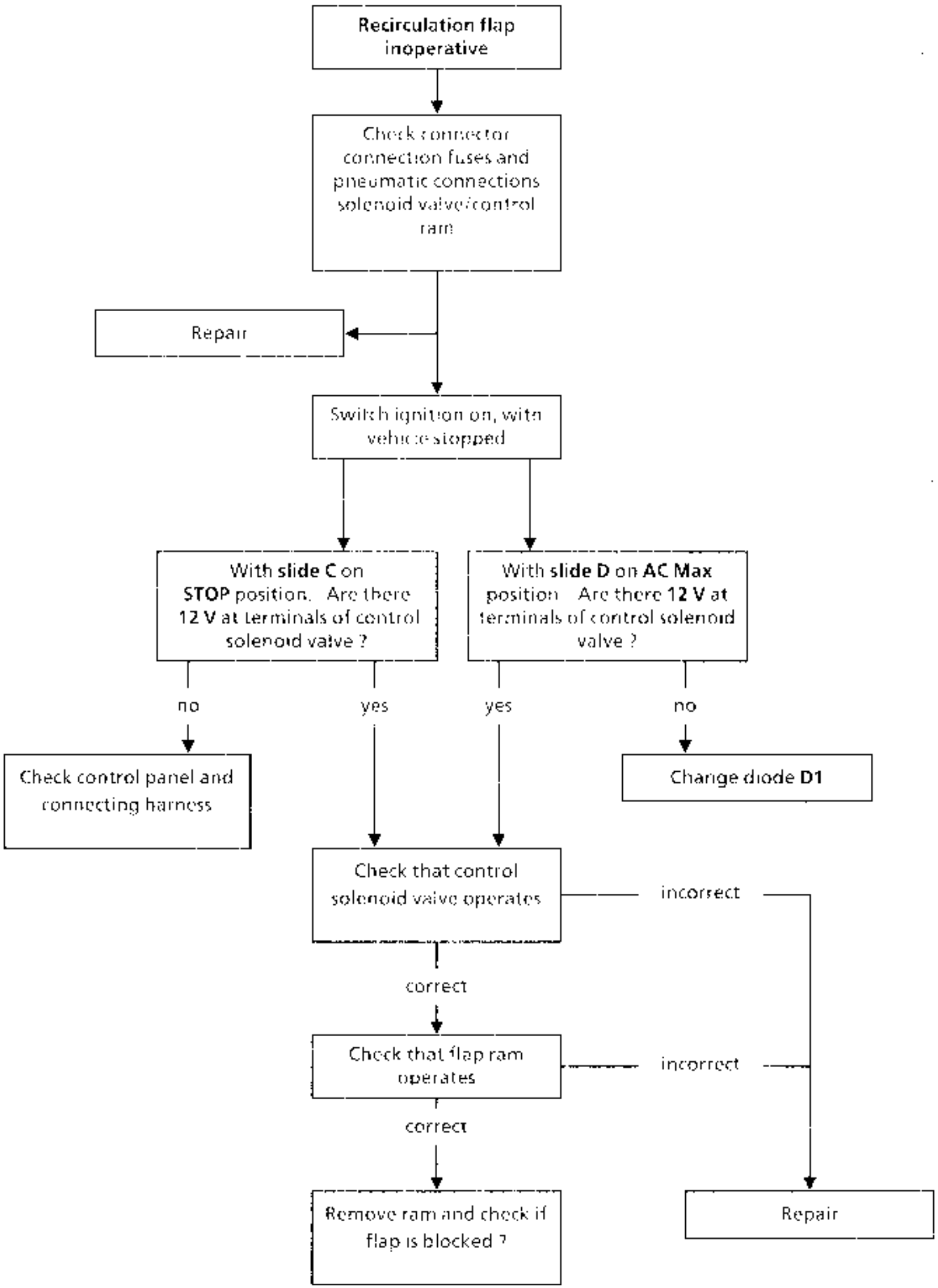
- no → Change control panel **319**

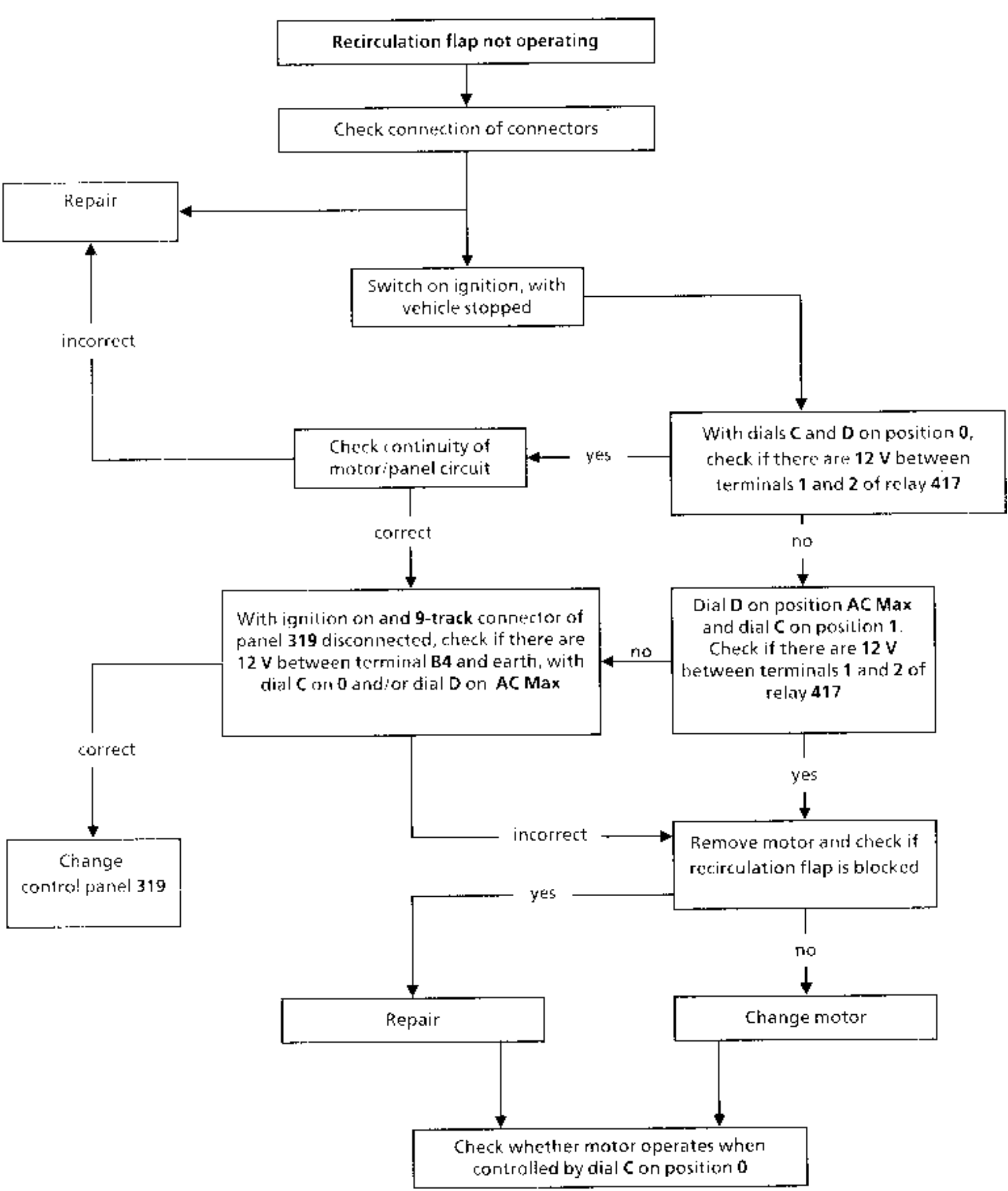
Note : Fan operating voltage measured between terminal **30** of relay **234** and terminal **A4** of electronic module **6** :

0	=	0	V	4	=	6.8	V
1	=	2.6	V	5	=	8.4	V
2	=	4	V	6	=	10.6	V
3	=	5.4	V	6	=	12	V **(AC Max)**

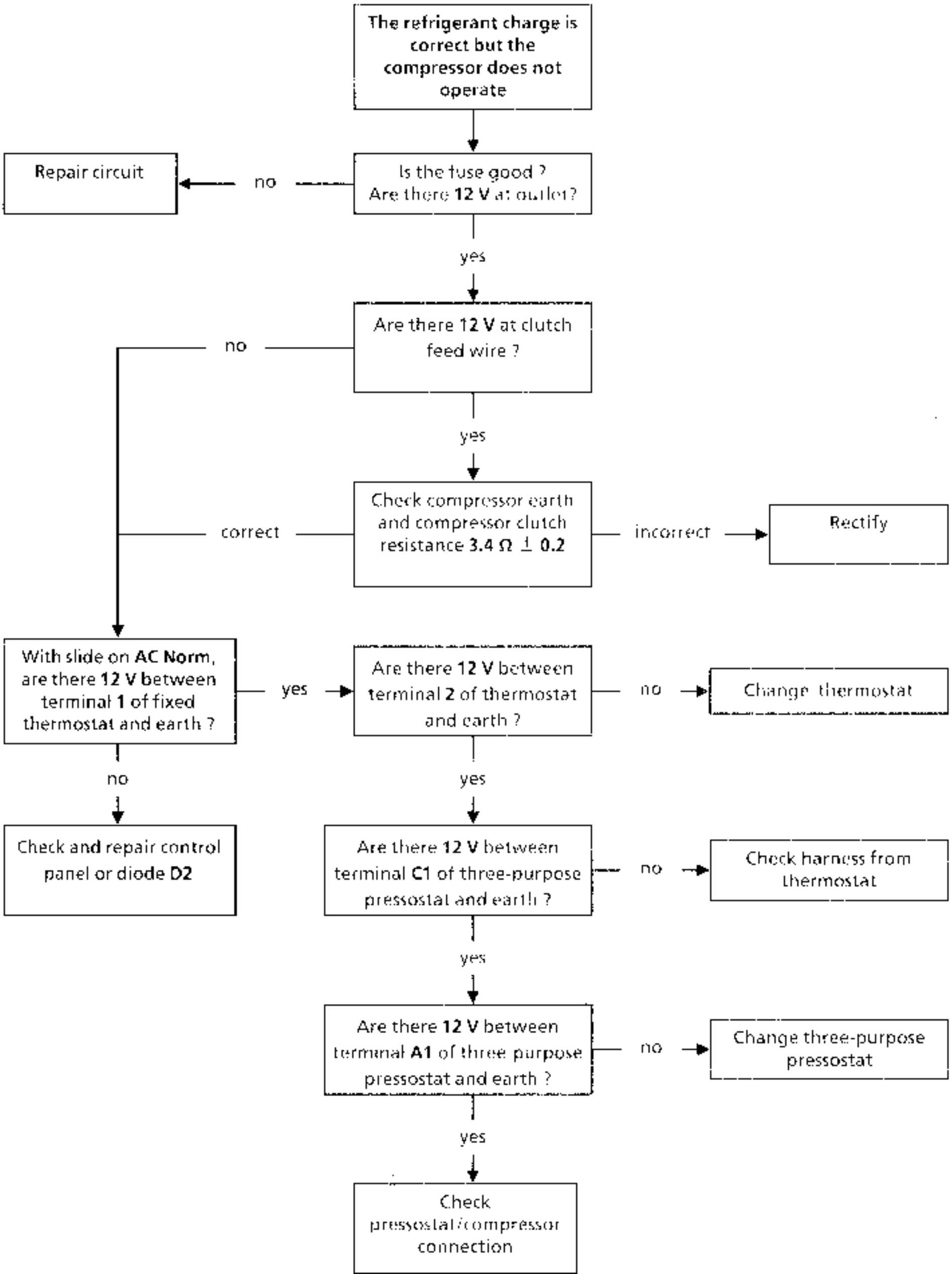

3rd speed of air conditioner blower motor not operating
With slide C on position 3, are there 12 V between terminal 4 and slide C earth ?
no
Change control panel
yes
Are there 12 V at terminal 1-2 of 3rd speed relay ?
no
Check air conditioner harness
yes
Are there 12 V between terminal 3 and 3rd speed relay earth ?
no
yes
Change 3rd speed relay


4th speed of air conditioner blower motor not operating with slide D on AC Max
Are there 12 V between terminal 4 of slide D and earth ?
no
Change control panel
yes
Are there 12 V between terminals 1 and 2 of 4th speed relay ?
no
yes
Model years 1987 - 1988
Are there 12 V between terminal 3 and earth of 4th speed relay ?
yes
no
Change 4th speed relay
Check air conditioner harness
Model year 1989
Are there 12 V between terminals 2 and 5 of 4th speed relay ?
yes
no
Are there 12 V between terminals 3 and 2 of 4th speed relay ?
Check terminal B1 earth of heating unit connector
yes
no
Change electronic module
Change 4th speed relay

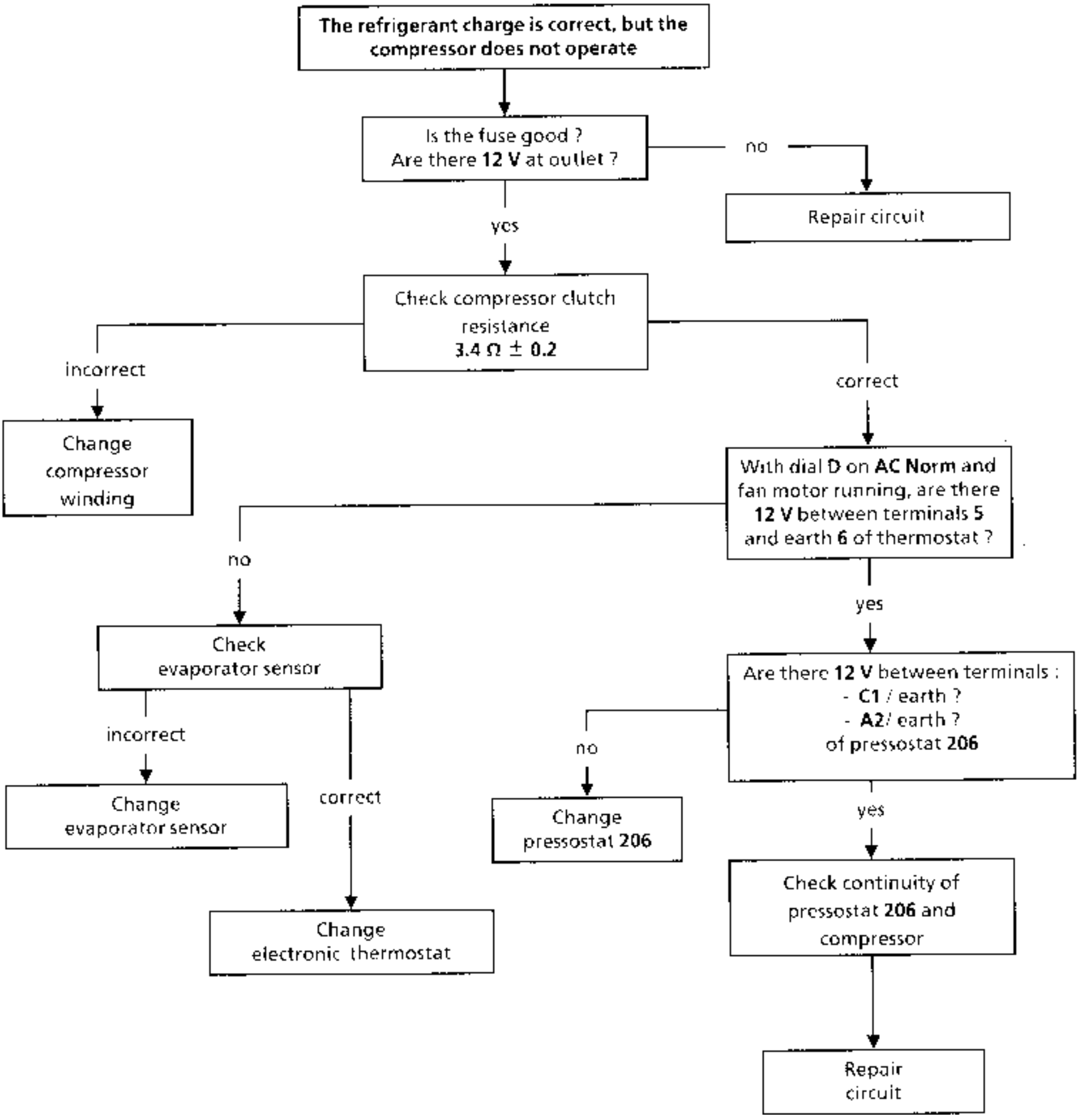

Recirculation flap inoperative
Check connector connection fuses and pneumatic connections solenoid valve/control ram
Repair
Switch ignition on, with vehicle stopped
With slide C on STOP position. Are there 12 V at terminals of control solenoid valve ?
With slide D on AC Max position Are there 12 V at terminals of control solenoid valve ?
no
yes
yes
no
Check control panel and connecting harness
Change diode D1
Check that control solenoid valve operates
incorrect
correct
Check that flap ram operates
incorrect
correct
Remove ram and check if flap is blocked ?
Repair

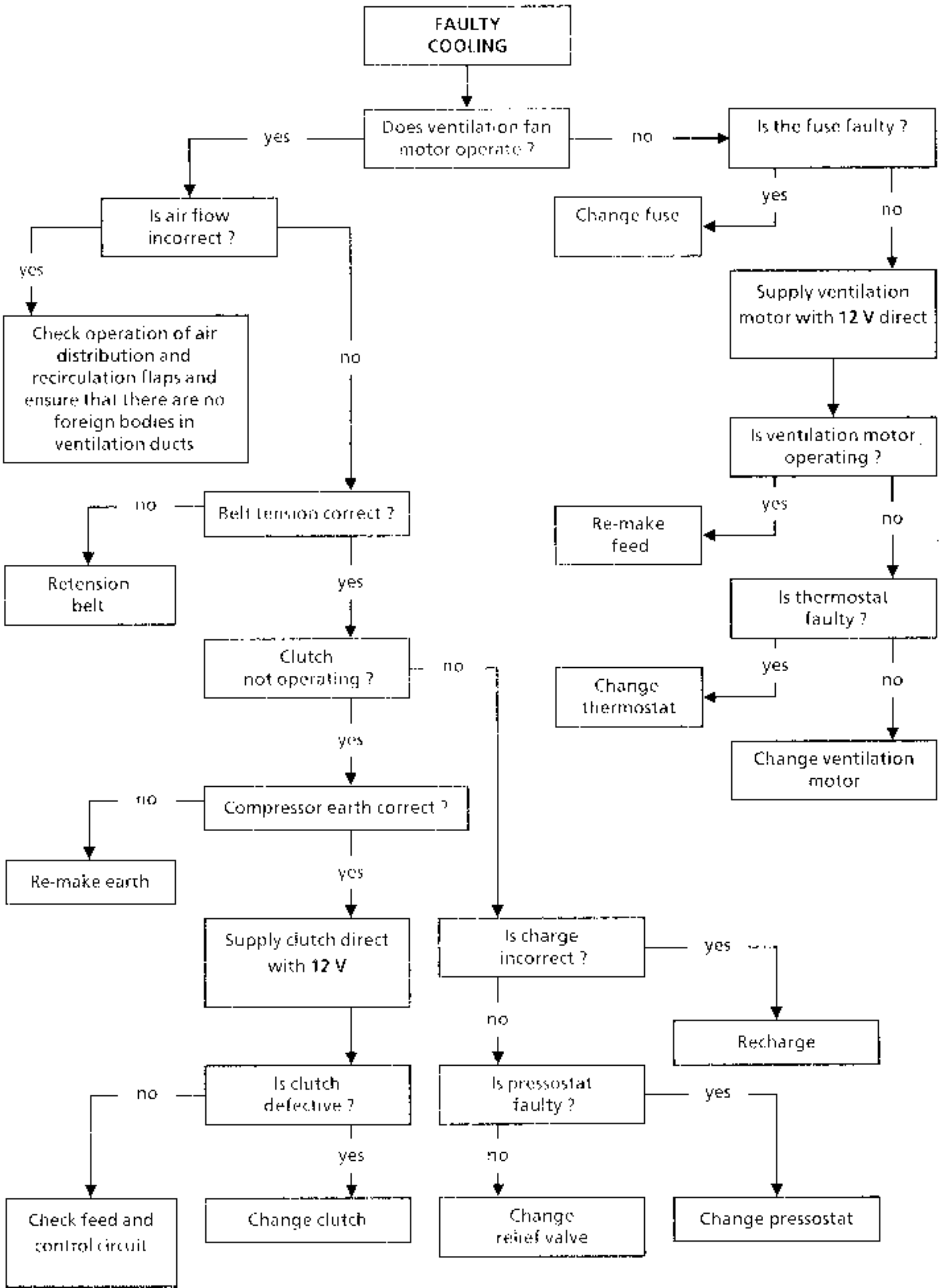

Recirculation flap not operating
Check connection of connectors
Repair
Switch on ignition, with vehicle stopped
incorrect
With dials C and D on position 0, check if there are 12 V between terminals 1 and 2 of relay 417
yes
Check continuity of motor/panel circuit
correct
no
With ignition on and 9-track connector of panel 319 disconnected, check if there are 12 V between terminal B4 and earth, with dial C on 0 and/or dial D on AC Max
no
Dial D on position AC Max and dial C on position 1. Check if there are 12 V between terminals 1 and 2 of relay 417
correct
yes
Change control panel 319
incorrect
Remove motor and check if recirculation flap is blocked
yes
no
Repair
Change motor
Check whether motor operates when controlled by dial C on position 0

The air conditioning system can only be checked if the workshop temperature is greater than + 4 °C.



NOTE : The air conditioning system can only be checked if the workshop temperature is greater than + **4 °C**.




FAULTY COOLING
Does ventilation fan motor operate ?
yes
no
Is air flow incorrect ?
yes
no
Check operation of air distribution and recirculation flaps and ensure that there are no foreign bodies in ventilation ducts
Belt tension correct ?
no
yes
Retension belt
Clutch not operating ?
no
yes
Compressor earth correct ?
no
yes
Re-make earth
Supply clutch direct with 12 V
Is clutch defective ?
no
yes
Check feed and control circuit
Change clutch
Is charge incorrect ?
yes
no
Recharge
Is pressostat faulty ?
yes
no
Change relief valve
Change pressostat
Is the fuse faulty ?
yes
no
Change fuse
Supply ventilation motor with 12 V direct
Is ventilation motor operating ?
yes
no
Re-make feed
Is thermostat faulty ?
yes
no
Change thermostat
Change ventilation motor

GENERAL

The computer integrated in the control unit has a system for self-testing the peripheral units of the air conditioning system with temperature regulation.

If an incident occurs on one of the units, a warning is triggered and the "**SERVICE**" warning light on the instrument panel illuminates.

At the same time, it instructs the system to operate in **defect mode**, which enables the driver to reach the nearest workshop without major damage being caused to the system.

The incident which caused the warning light to illuminate can be displayed using the diagnostic plug, the **XR 25** test box and the appropriate cassette.

When an incident has occurred it is stored in the computer's "**non-volatile memory**" when the ignition has been switched off. This memory can be consulted at any time using the **XR 25** test box and the appropriate cassette.

If one of the peripheral units of the temperature regulating system breaks down, the computer illuminates the "**SERVICE**" warning light and activates the various defect modes for the system, which can differ according to which components are defective.

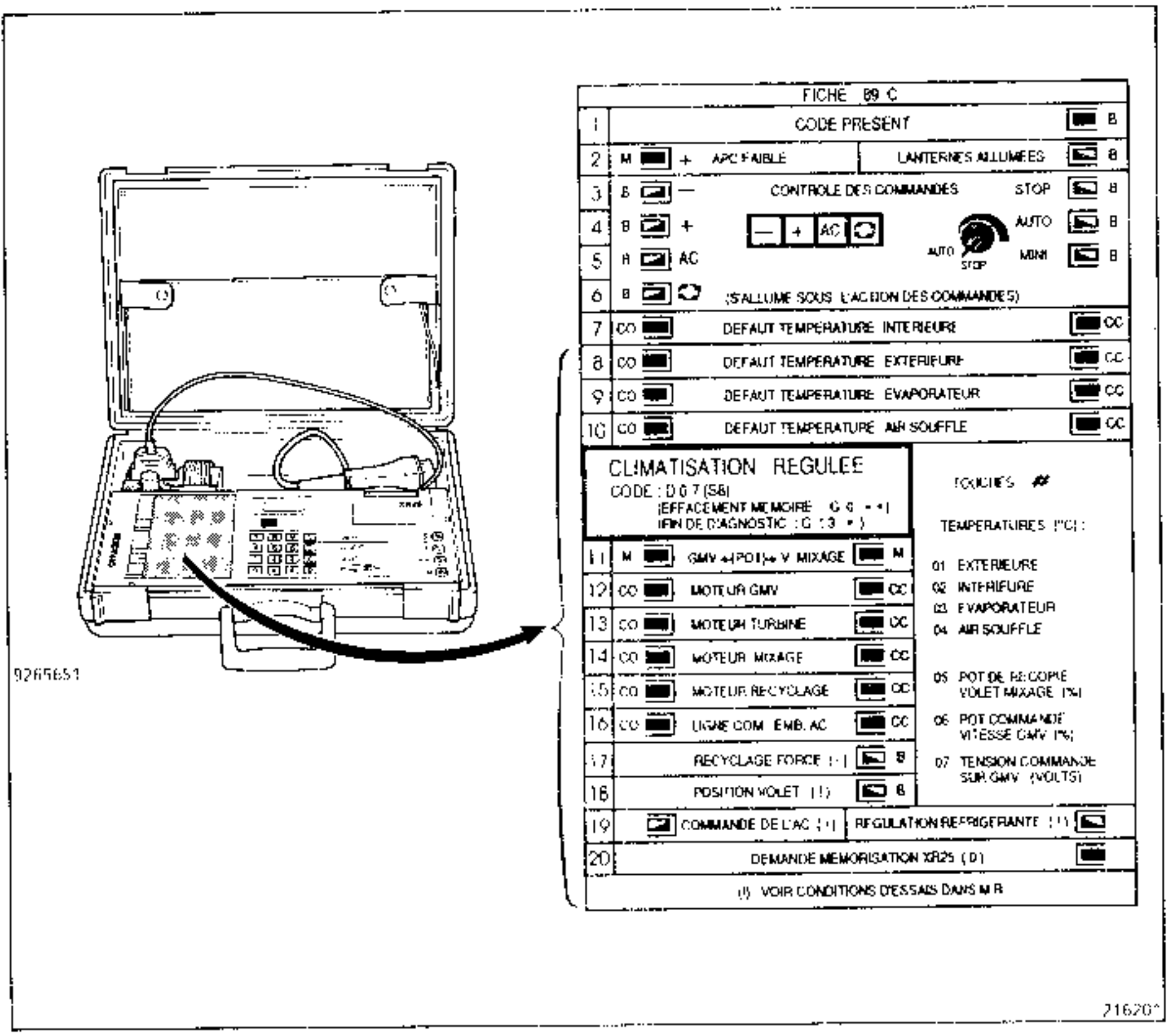
DEFECT MODES IN THE EVENT OF AN INCIDENT

Incident detected	Warning light illuminated	Corresponding defect mode
Internal temperature sensor	"SERVICE"	- Value imposed : 21 °C Fan voltage imposed : minimum
External temperature sensor	"SERVICE"	- Value imposed : external temperature stored when incident occurred - Air inlet flap on external air position
Evaporator temperature sensor	"SERVICE"	- AC control on stop
Blown air temperature sensor	"SERVICE"	- Value imposed : external temperature stored when incident occurred
Fan assembly control potentiometer	"SERVICE"	- AUTO instruction for the air flow operating mode
Mixer flap copying potentiometer	"SERVICE"	- Extreme hot or extreme cold depending on external temperature - Air inlet in recirculation mode or external air mode depending on external temperature
Mixer motor	"SERVICE"	Value imposed : external temperature stored when incident occurred - Air inlet flap on external air position
Recirculation motor	"SERVICE"	Stop motor
Fan motor	"SERVICE"	- Stop motor, stop AC control
AC clutch current supply line	"SERVICE"	- Stop AC control

The **XR 25** test box is essential for fault-finding the air conditioning system with temperature regulation, irrespective of the origins of the incident.

It has a microprocessor and provides access to all the data supplied by the various sensors and enables the diagnostic message sent by the computer to be read.

It therefore enables the "**non-volatile**" memory in the computer to be erased after each operation on the air conditioning system with temperature regulation.

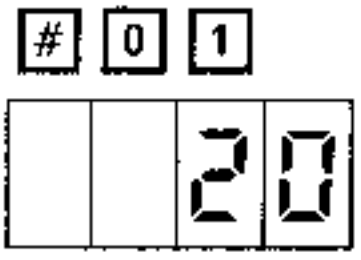


USING THE XR 25 WITH CASSETTE N° 8

Connect the XR 25 to the diagnostic socket.

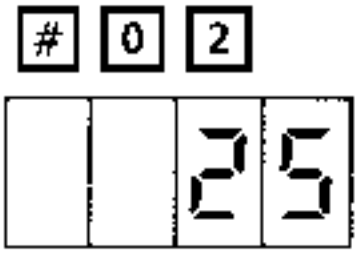
- Move selector to **S8**.
- Switch on the ignition
- Enter the special temperature regulation code [D] [0] [7] then enter [#] followed by two figures for accessing the various data emitted by the computer.

IMPORTANT : Fault-finding the temperature regulating system using the XR 25 test box slows down its operation to approximately one third its normal speed.



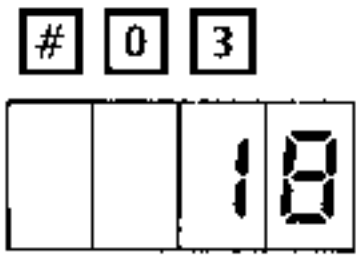
EXTERNAL TEMPERATURE : value given in degrees celsius

All versions with regulated temperature



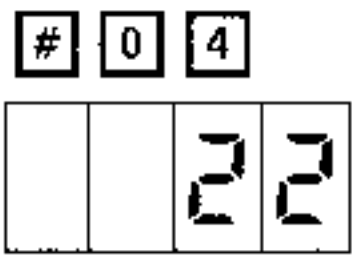
INTERNAL TEMPERATURE : value given in degrees celsius

All versions with regulated temperature



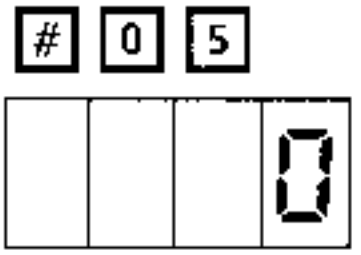
EVAPORATOR TEMPERATURE : value given in degrees celsius

Only on versions with air conditioning and regulated temperature



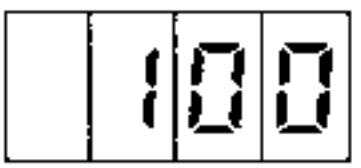
BLOWN AIR TEMPERATURE : value given in degrees celsius

All versions with regulated temperature

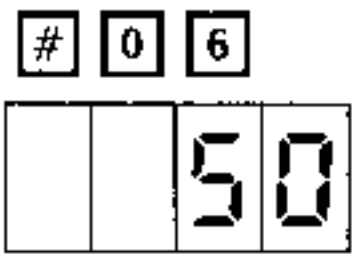


MIXER FLAP COPYING POTENTIOMETER

Value given as %
All versions with regulated temperature
0 % is the extreme cold setting

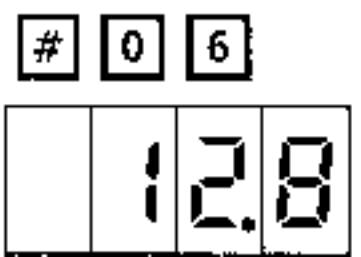


100 % is the extreme hot setting



FAN MOTOR SPEED CONTROL POTENTIOMETER

Value given as %
All versions with regulated temperature



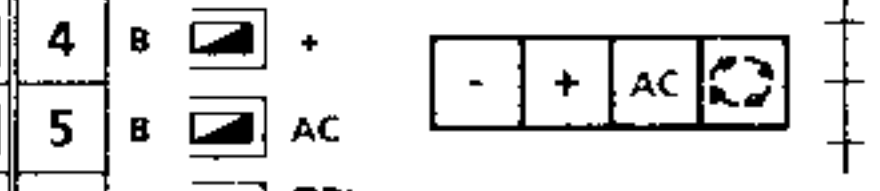
CONTROL VOLTAGE APPLIED TO FAN MOTOR

Value given as %
All versions with regulated temperature

Shows where the bargraph can illuminate

Fiche 89 S

1	CODE PRESENT		B
2	M + APC FAIBLE	LANTERNES ALLUMEES	B
3	B - CONTROLE DES COMMANDES	STOP	B
4	B +	AUTO	B
5	B AC	MINI	B
6	B (S'ALLUME SOUS L'ACTION DES COMMANDES)		
7	CO DEFAUT TEMPERATURE INTERIEURE		CC
8	CO DEFAUT TEMPERATURE EXTERIEURE		CC
9	CO DEFAUT TEMPERATURE EVAPORATEUR		CC
10	CO DEFAUT TEMPERATURE AIR SOUFFLE		CC



CLIMATISATION REGULEE

CODE : D07 (S8)
(EFFACEMENT MEMOIRE : GO**)
(FIN DE DIAGNOSTIC : G 13*)

11	M GMV ←(POT)→ VOLET MIXAGE		M
12	CO MOTEUR GMV		CC
13	CO MOTEUR TURBINE		CC
14	CO MOTEUR MIXAGE		CC
15	CO MOTEUR RECYCLAGE		CC
16	CO LIGNE COM. EMB. AC		CC
17	RECYCLAGE FORCE (!)		B
18	POSITION VOLET (!)		B
19	COMMANDE DE L'AC (!)	REGULATION REFRIGERANTE (!)	
20	DEMANDE MEMORISATION XR 25 (0)		

TOUCHES #

TEMPERATURES (°C)

01 EXTERIEURE
02 INTERIEURE
03 EVAPORATEUR
04 AIR SOUFFLE

05 POT DE RECOPIE VOLET DE MIXAGE (%)

06 POT COMMANDE VITESSE GMV (%)

07 TENSION COMMANDE SUR GMV (VOLTS)

(!) VOIR CONDITIONS D'ESSAIS DANS MR

Control panel not operating or fan motor operates at maximum speed

With the ignition on and brown connector of panel **319** disconnected, check if there are
- **12 V** between terminals **B1** and **B3**
- **12 V** between terminals **B5** and **B3**.

no

Check
harness and fuse

yes

Change
control panel **319**

Control panel operating abnormally

Illumination of the bargraph tested by pressing on the control panel keys

KEY DEPRESSED	RIGHTHAND SIDE OF BARGRAPH ILLUMINATES
–	3 illuminated
+	4 illuminated
AC	5 illuminated
	6 illuminated
KEY DEPRESSED	LEFTHAND SIDE OF BARGRAPH ILLUMINATES
STOP	3 illuminated
AUTO	4 illuminated
MANUAL	5 illuminated

One or more bargraphs not illuminating or extinguishing

Change the control panel

Incident : BARGRAPH 7 LH or BARGRAPH 7 RH ILLUMINATES
Internal temperature sensor

Change the
control panel (*)

* In the case where a bargraph is flashing, erase the fault memory using **GO**** and perform another test before changing the control panel.

Incident : BARGRAPH 8 LH ILLUMINATES
(Open circuit) External temperature sensor

Check connection of sensor and condition of electrical terminals. Repair if necessary.
Does the incident persist ?

no → Correct

yes ↓

Check sensor continuity.
Is it correct ?

non → Change the sensor

yes ↓

Disconnect green **MTIS** connector from control panel and check continuity of harness (**tracks 15** and **10** on **MTIS** and sensor connector).
Repair if necessary.
Does the incident persist ?

yes ↓

Change the control panel

Incident : BARGRAPH 8 RH ILLUMINATES
(short circuit) External temperature sensor

Enter # **01** on XR 25 and check temperature obtained on **XR25** and external temperature is ± **5 °C**.
Is it correct ?

no → Change external temperature sensor.
Does the incident persist ?

no ↓ Correct

yes ↓

Disconnect the green **MTIS** computer connector and check insulation of harness (**tracks 15** and **10** on **MTIS** and sensor connector). Repair if necessary.
Does the incident persist ?

yes → Change the control panel

yes ↓

Erase fault memory, enter **GO**** on **XR25** and perform another regulation test.
Does the bargraph illuminate again ?

no ↓ Correct

yes ↓ Change the control panel

Note : In the case where a bargraph is flashing, erase the fault memory using **GO**** and perform another test.

Incident : BARGRAPH 9 LH ILLUMINATES
(Open circuit) Evaporator temperature sensor

Check connection of sensor and condition of electrical terminals. Repair if necessary. Does the incident persist ?
- no → Correct
- yes ↓

Check sensor continuity. Is it correct ?
- no → Change the sensor
- yes ↓

Disconnect the green control panel connector and check harness continuity (tracks **12** and **15** of control panel connector and sensor connector). Repair if necessary. Does the incident persist ?
- no → Correct
- no ↓

Change the control panel

Incident : BARGRAPH 9 RH ILLUMINATES
(Short circuit) Evaporator temperature sensor

With the engine running, **AC** activated in recirculation mode, temperature on minimum cold (not regulated) doors and windows closed, check whether the compressor operates. Enter **#03** on **XR 25**. Do you read **1° < t < 5 °C** ?
- no → Change the evaporator sensor. Does the incident still persist ?
  - no → Correct
  - yes → Disconnect the computer green connector and check harness insulation (**tracks 11** and **15** of control panel connector and sensor connector). Repair if necessary. Does the incident persist ?
    - yes → Change the control panel
    - no → Correct
- yes ↓

Erase fault memory. Enter **GO**** on **XR 25** and perform another regulation test. Does the bargraph illuminate again ?
- no → Correct
- yes → Change the control panel

Note : In the case where a bargraph is flashing, erase the fault memory using **GO**** and perform another test.

Incident : BARGRAPH 10 LH ILLUMINATES
(Open circuit) Blown air temperature sensor at heater radiator outlet

Check sensor connection and condition of electrical terminals. Repair if necessary. Does the incident persist?
- no → Correct
- yes ↓

Check continuity of the sensor Is it correct?
- no → Change the sensor
- yes ↓

Disconnect green control panel connector and check continuity of harness (**tracks 11** and **15** of control panel connector and sensor connector). Repair if necessary. Does the incident persist
- no → Correct
- no ↓

Change the control panel

Incident : BARGRAPH 10 RH ILLUMINATES
(Short circuit) Air temperature sensor at heater radiator outlet

Check the ohms value of the sensor; if it is in short-circuit its value is less than **500 Ω**. Is the value obtained less than **500 Ω** ?
- yes → Change the sensor
- no ↓

Disconnect green computer connector and check insulation of harness (**tracks 11** and **15**) of control panel connector and sensor connector. Repair if necessary. Does the incident persist ?
- no → Correct
- yes ↓

Change the control panel

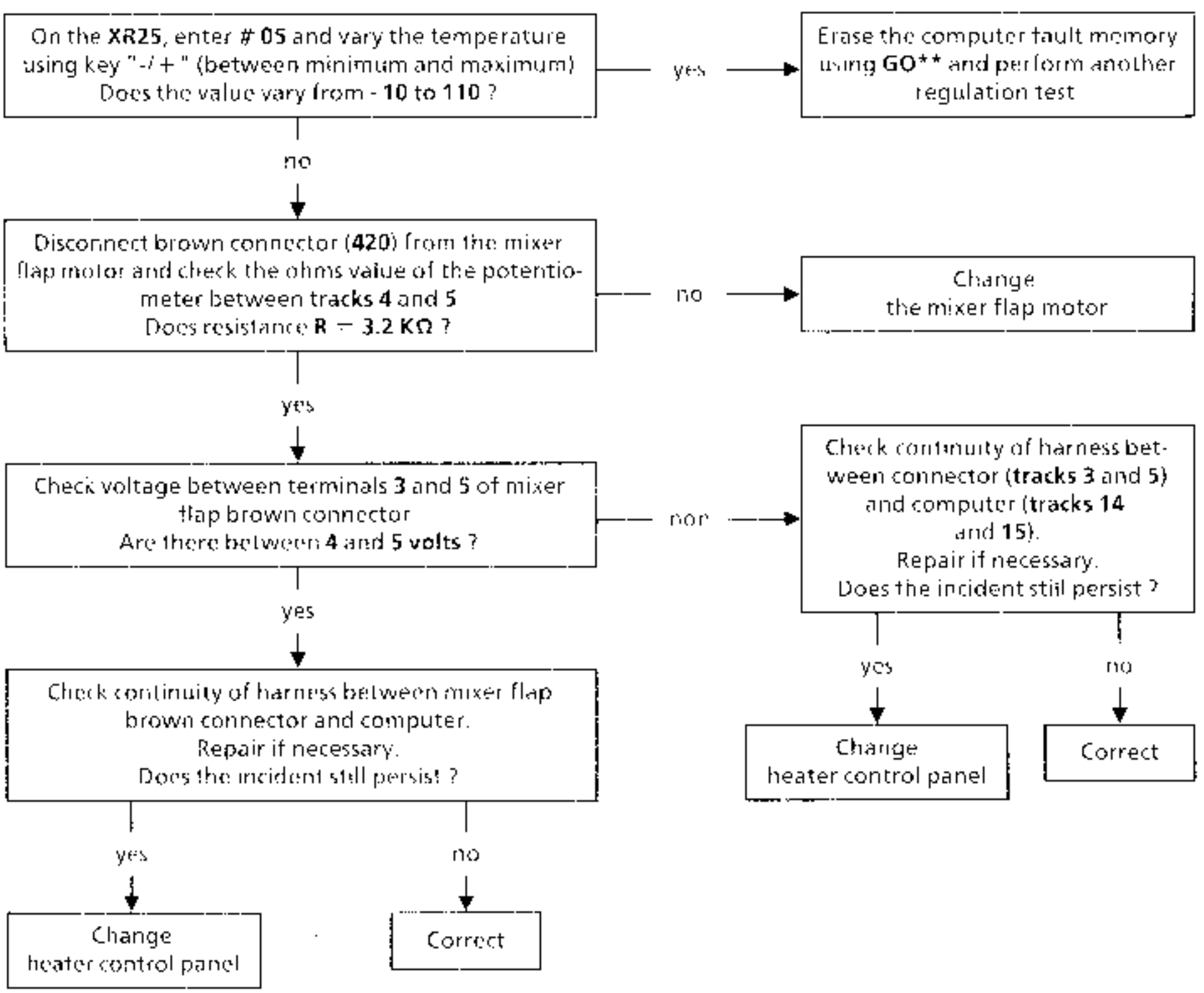
Note : In the case where a bargraph is flashing, erase the fault memory using **GO**** and perform another test.

Incident : BARGRAPH 11 LH ILLUMINATES
Mixer flap potentiometer control potentiometer

Change
the heater control panel (*)

* In the case where a bargraph is flashing, erase the fault memory using **GO**** and perform another test before changing the control panel.

Incident : BARGRAPH 11 RH ILLUMINATES
Mixer flap recopying potentiometer



Note : in the case where a bargraph is flashing, erase the fault memory using **GO**** and perform another test.

Incident : BARGRAPH 12 LH OR RH ILLUMINATES
Fan motor

Does the fan motor operation in the manual setting ?
- no → Change the control panel
- yes ↓

Check fan motor supply fuse. Repair if necessary. Does the incident still persist ?
- no → Correct
- yes ↓

Disconnect fan motor relay connector **234** and supply terminal **87** with **12 V** and connect track **A4** or **B5** of electronic module to earth.
Does the fan motor operate ?
- no → Change fan motor
- yes ↓

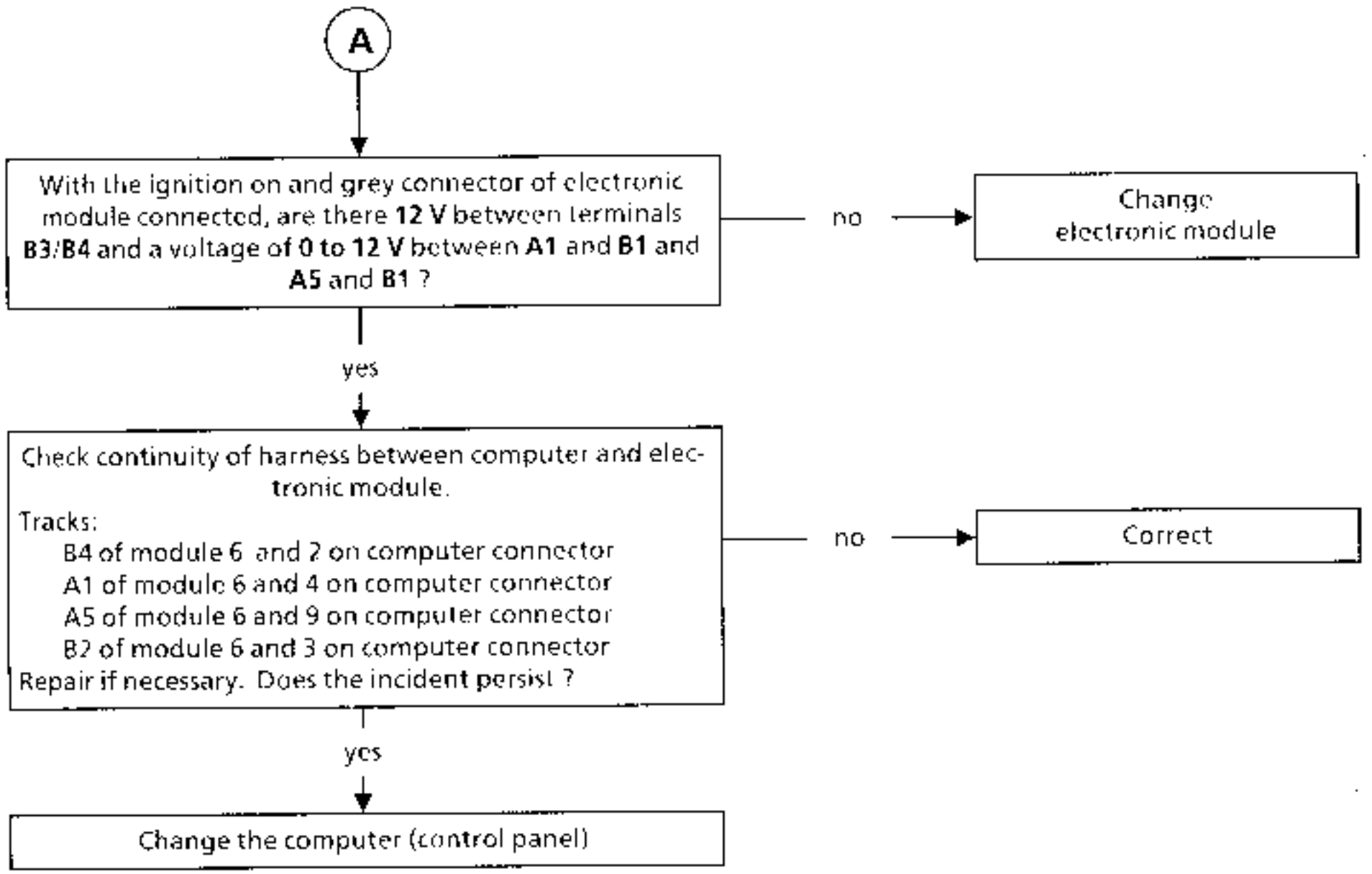
With the ignition on, check if there are **12 V** between terminals **85** and **86** of fan motor relay **234**.
Are there 12 V?
- no → Check coil relay supply harness (**tracks 85** and **86**) and repair
- yes ↓

On fan motor relay connector **234**, shunt terminals **87** and **30** and connect electronic module **track A4** or **B5** to earth.
Does the fan motor operate ?
- no → Change fan motor relay **234**
- yes ↓

Check harness between fan motor relay **234** (track 30 + AVC).
Repair if necessary. Does the incident still persist ?
- no → Correct
- yes ↓

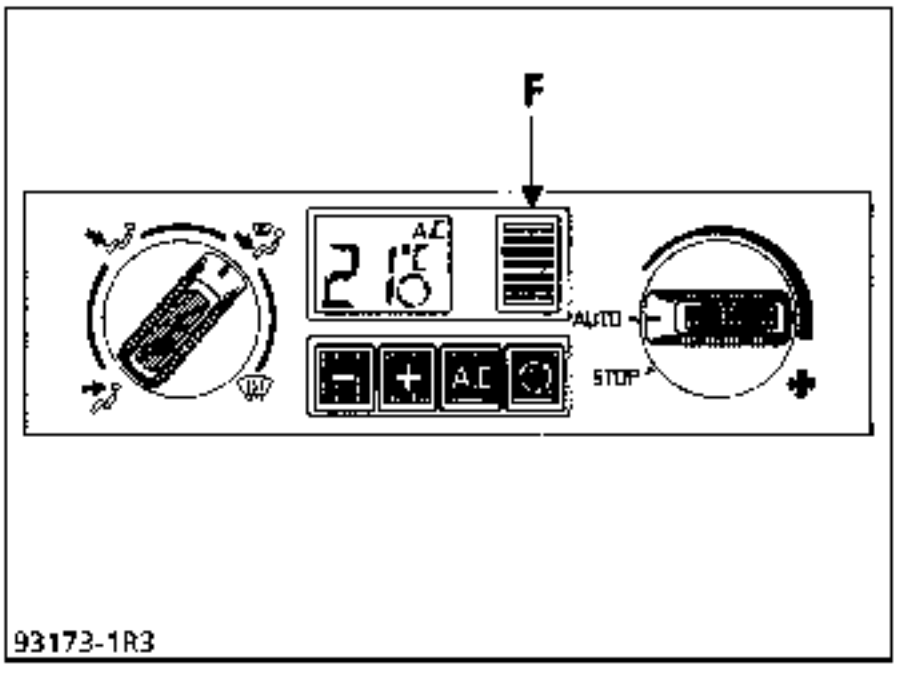
With electronic module disconnected and ignition on, are there **12 V** between terminals **B3/B1** and **B3/A2** and **B3/B5** on grey connector ?
- no → Check harness and repair
- yes ↓

(A)



Note : In the case of a bargraph flashing, erase the fault memory using **GO**** and perform another test.

Incident : BARGRAPH 13 LH OR RH ILLUMINATES : (Impeller motor)



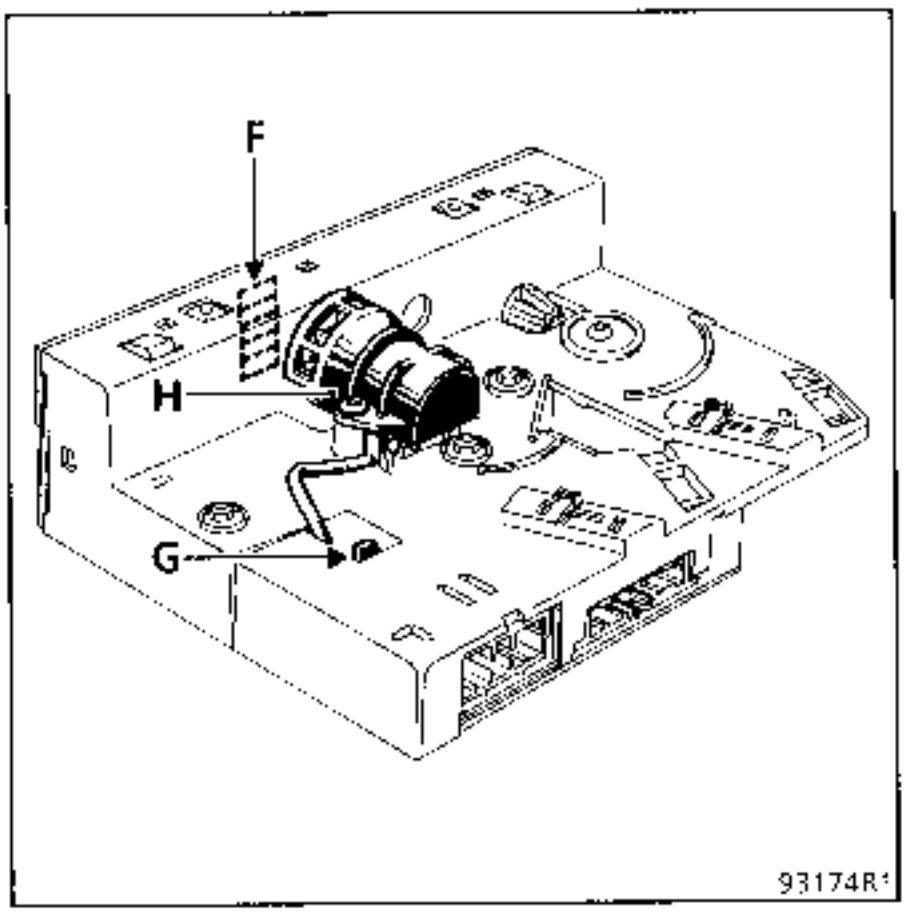
Checking the passenger compartment temperature sensor

With the ignition on, use a small piece of paper (such as a pocket handkerchief) placed in front of the temperature sensor to check that it is sucked in.

The paper is not sucked in

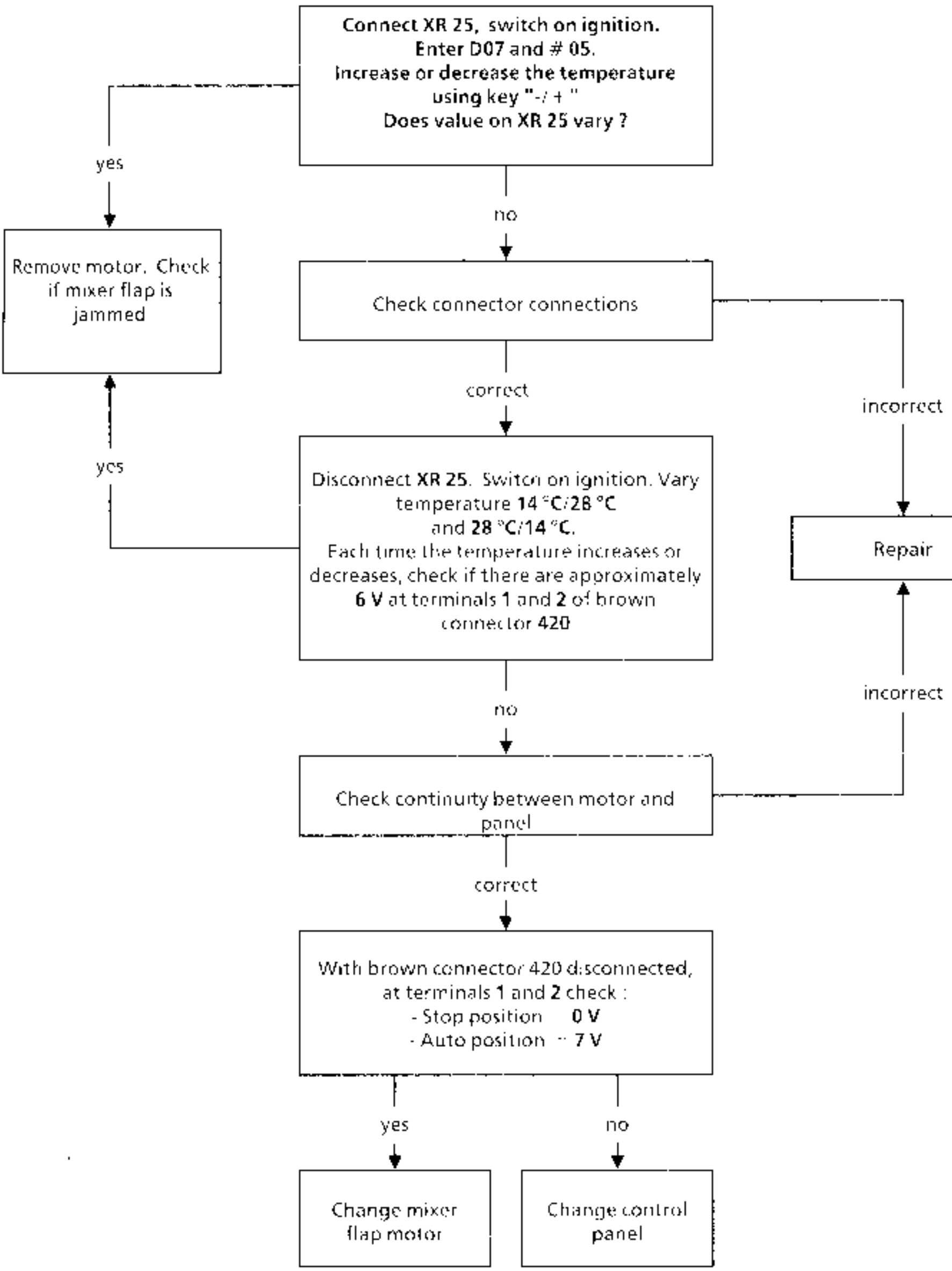
With the ignition on, are there **12 V** at outlet **G**

- yes → Change impeller motor **H**
- no → Change the control panel



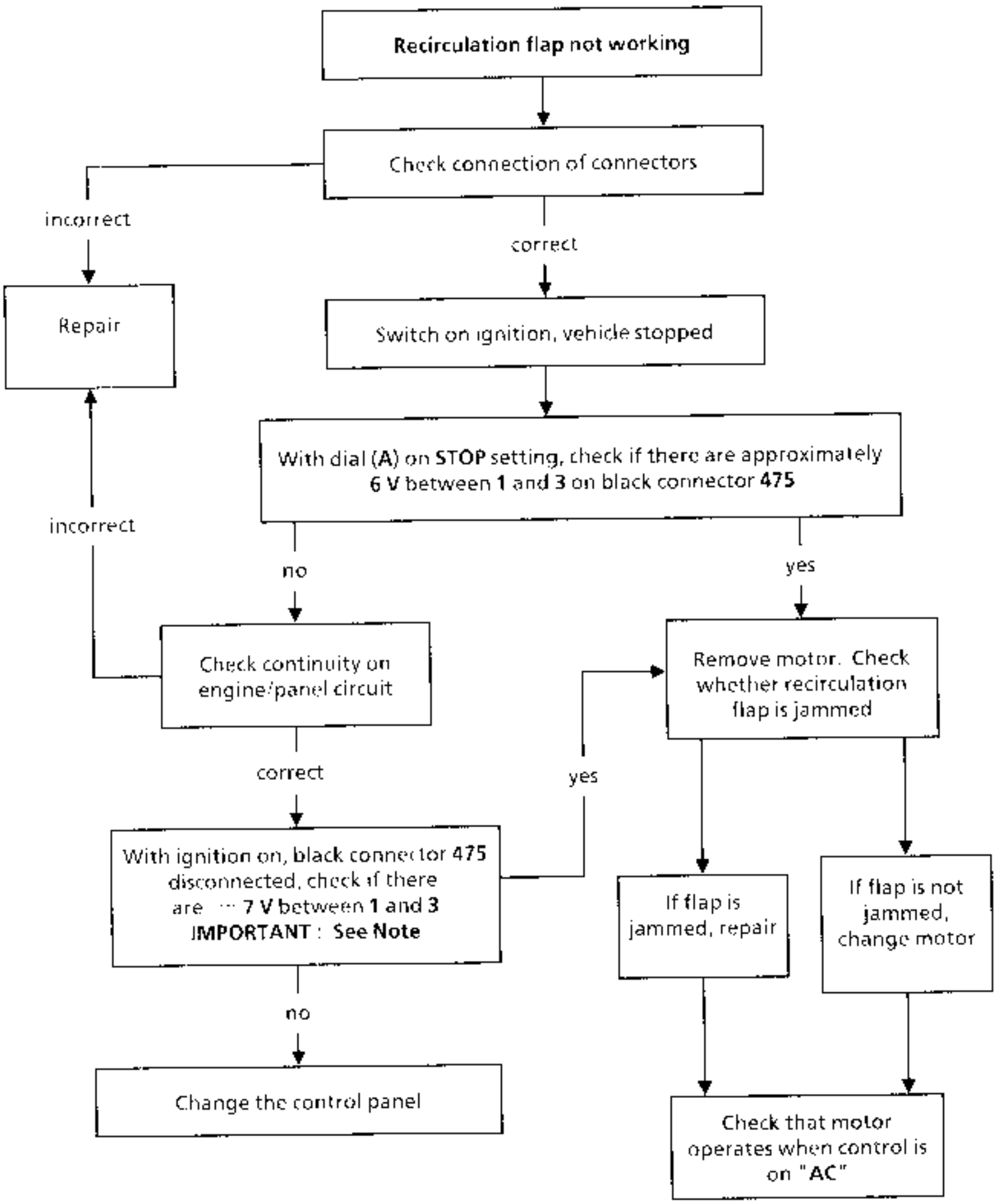
Note : In the case of a bargraph flashing, erase the fault memory using **GO**** and perform another test.

Incident : BARGRAPH 14 LH OR RH ILLUMINATES : (Mixer flap motor)



Note : In the case of a bargraph flashing, erase the fault memory using **GO**** and perform another test.

Incident : **BARGRAPH 15 LH OR RH ILLUMINATES :** (Recirculating motor)



Note :

- This operation must only be performed if the **SERVICE** warning light is off. If the light is on, disconnect the battery and then reconnect it. The operator then has approximately **8 seconds** to perform the operation before the **SERVICE** warning light comes on again,
- In the case of a bargraph flashing, erase the fault memory using **GO**** and perform another test.

Incident : BARGRAPH 16 ILLUMINATES ON RIGHTHAND SIDE
(Short circuit) AC clutch control line

Check compressor clutch resistance
R = 3.2 Ω ± 0.2.
Change the clutch if necessary.
does the incident persist?

no → Correct

yes

Check the two diodes located on cooling circuit electrical system.
Repair if necessary.
Does the incident still persist ?

no → Correct

yes

Check continuity of coils on cooling fan relays (marks **335, 336, 337**).
Change the relays if necessary
Does the incident still persist ?

no → Correct

yes

Check insulation of harness supplying relay coils (marks **335, 336, 337**) and compressor clutch supply.
Change relay if necessary.
Does the incident still persist ?

no → Correct

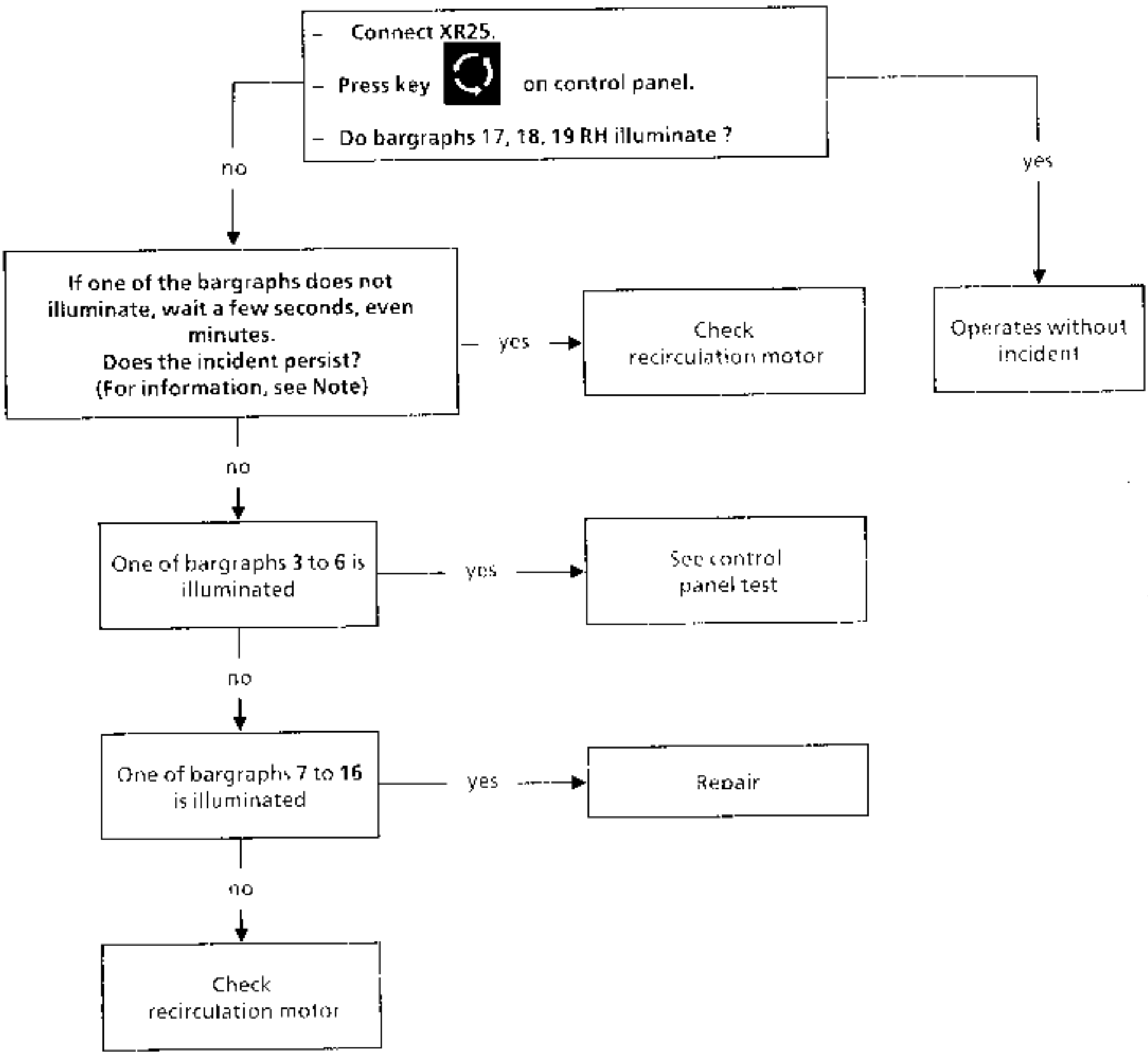
yes

Change the control panel

Note :

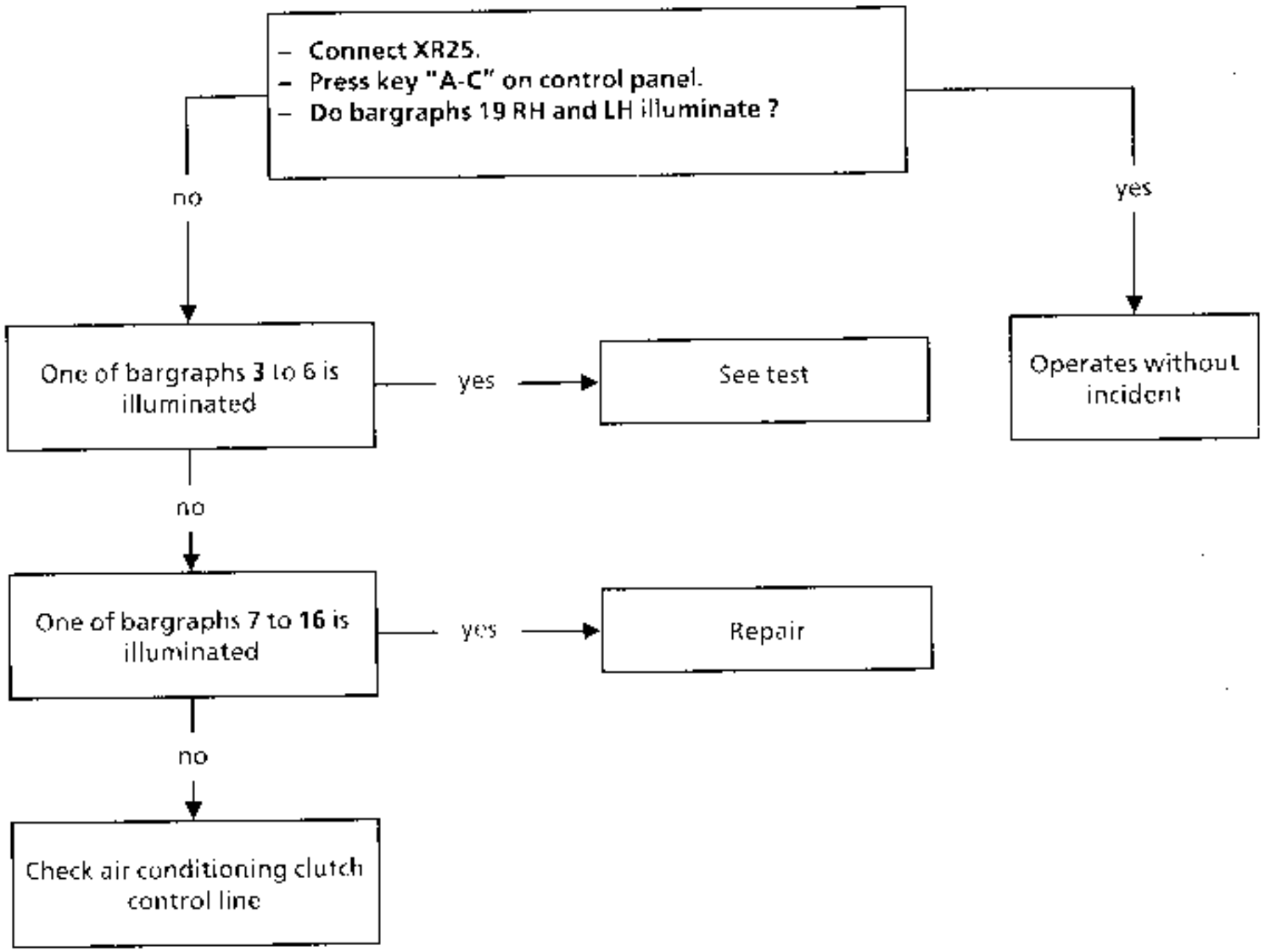
- fault-finding is only available for short-circuits on the **AC** clutch, cooling circuit relays and diodes,
  for diesel-engined vehicles, if the compressor still does not operate and bargraph **16** is not illuminated, refer to fault-finding **section 13 "pre-heater unit"**.

Checking activation of the air recirculation system (Bargraphs 17, 18, 19 RH)



Note : After starting the temperature regulation system in cold weather, the system's computer may block the recirculation data for a few seconds. Only bargraph **17** will be illuminated. In addition, when there is a very large difference between the "**external temperature and the temperature displayed**", in particular when the external temperature is very high, the regulating temperature system requires the automatic recirculation system to be activated. Bargraphs **18** and **19** righthand side will illuminate

Checking activation of the air conditioning system (Bargraph 19)



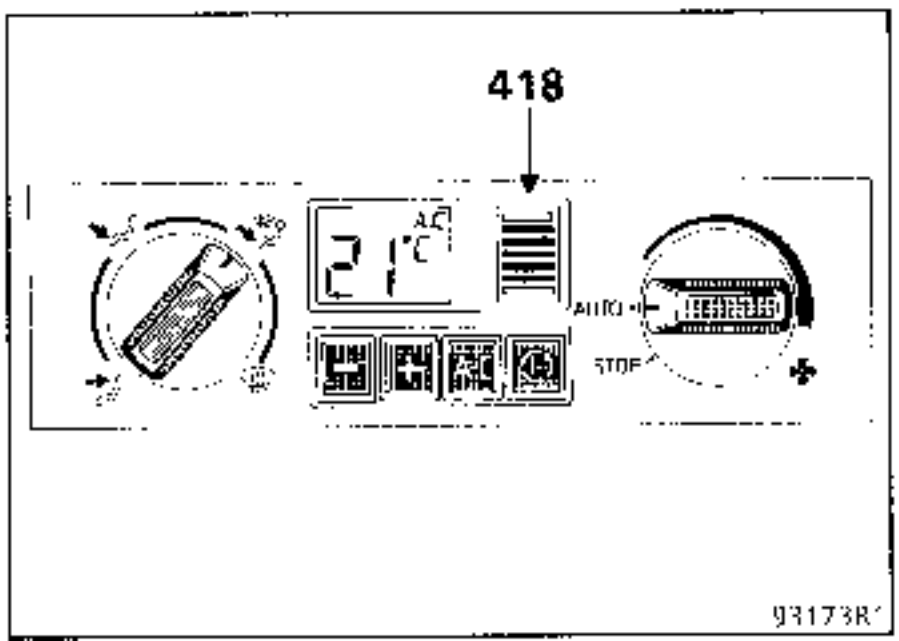
Checking blown air, external and internal temperature sensors

DEGREES CELSIUS	THERMAL RESISTANCE(Ω)
10	49000 to 60000
- 5	37300 to 45700
0	29000 to 35500
5	22500 to 27500
10	18000 to 21600
15	14000 to 17000
20	11300 to 13800
25	9000 to 11000
30	7300 to 8500
35	5800 to 7000
40	4700 to 5600
45	4000 to 4500

These values are given as an example and have no relevance to fault-finding as their thermal range is too great.

Internal temperature sensor (418)

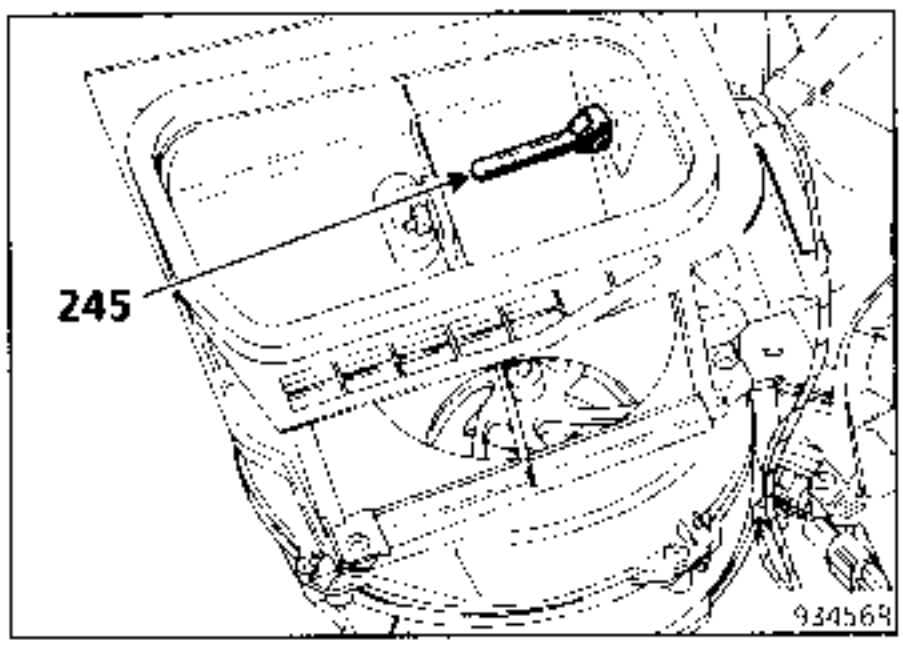
This is a thermistor with a negative temperature coefficient, integrated in the control panel printed circuit. If the sensor is faulty, the control panel will have to be replaced.



External temperature sensor (245)

This is a thermistor with a negative temperature coefficient located in the air conditioner air intake.

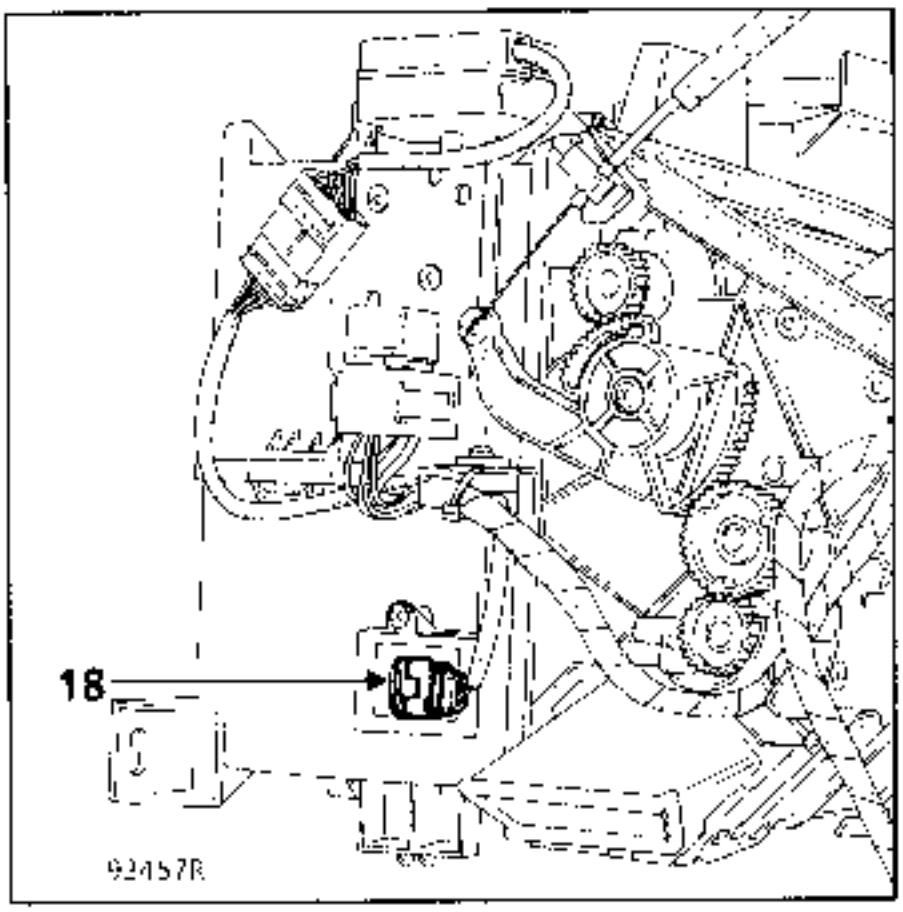
It is interchangeable and can be reached through the air intake duct at the water box end.



Blown air temperature sensor (18)

This is a thermistor with a negative temperature coefficient located downstream of the radiator.

It can be reached directly from inside the vehicle at the pedal assembly end and is located on the air conditioning heater device.



Checking the evaporator temperature sensor (408)

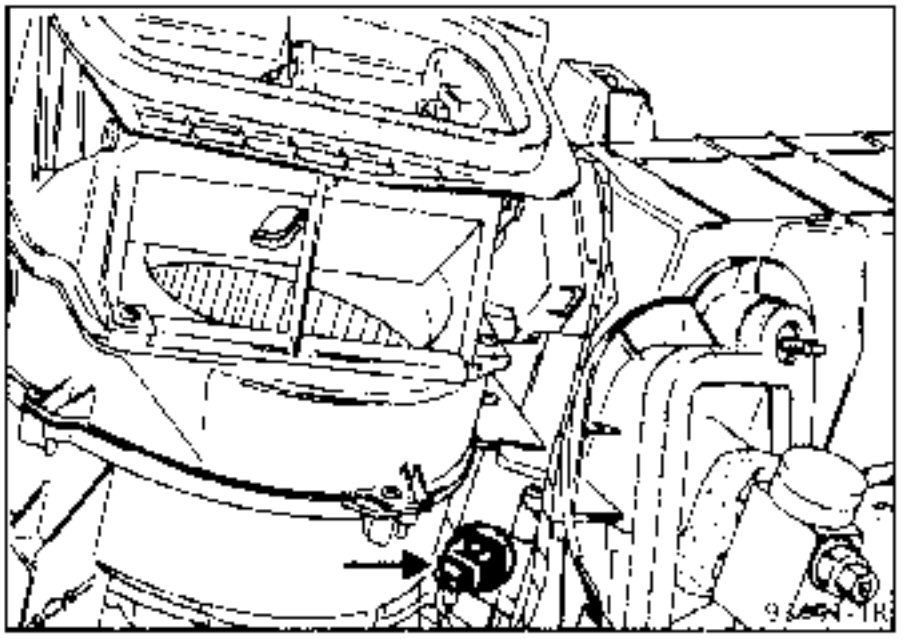
DEGREES CELSIUS	THERMAL RESISTANCE (Ω)
- 10	24300 to 30500
- 5	19000 to 23300
0	14700 to 18000
5	11400 to 14000
10	9000 to 11000
15	7100 to 8700
20	5600 to 6900
25	4500 to 5500
30	3600 to 4400
35	3000 to 3500
40	2400 to 2900
45	2000 to 2300

These values are given as an example.

Evaporator temperature sensor

This is a thermistor with a negative temperature coefficient, located in the evaporator.

It can be reached directly on the air conditioning heater device when the glove box and air conditioner soundproofing have been dismantled.



MIXER MOTOR (420)

the mixer flap is assisted by an electric motor with a potentiometer for checking the position of the flap.

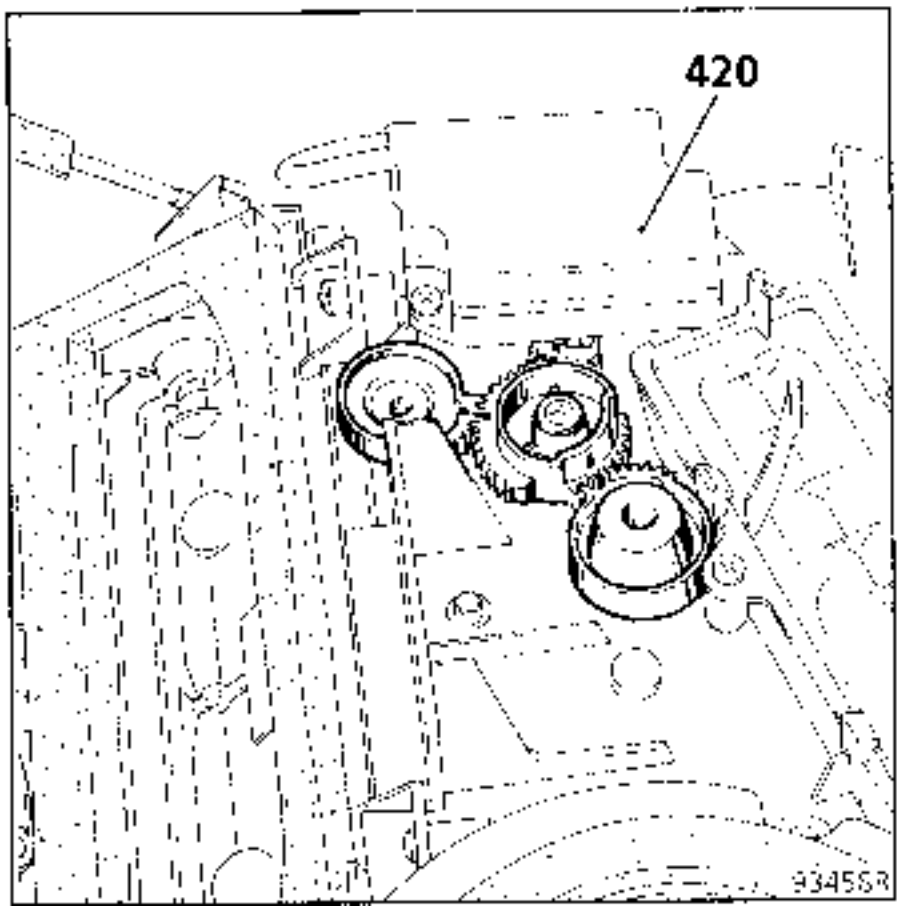
The motor is permanently supplied with approximately **7 volts** power in the extreme **HOT** or **COLD** settings.

In the intermediate setting, the voltage is **0 volts**.

The motor can be reached after the dashboard and the air conditioner have been dismantled.

If the motor has to be replaced, it is supplied with its connector and output drive gear. It is pre-set for fitting to the air conditioner

On refitting, the marks on the drive gears for the flap and motor **must be aligned**.

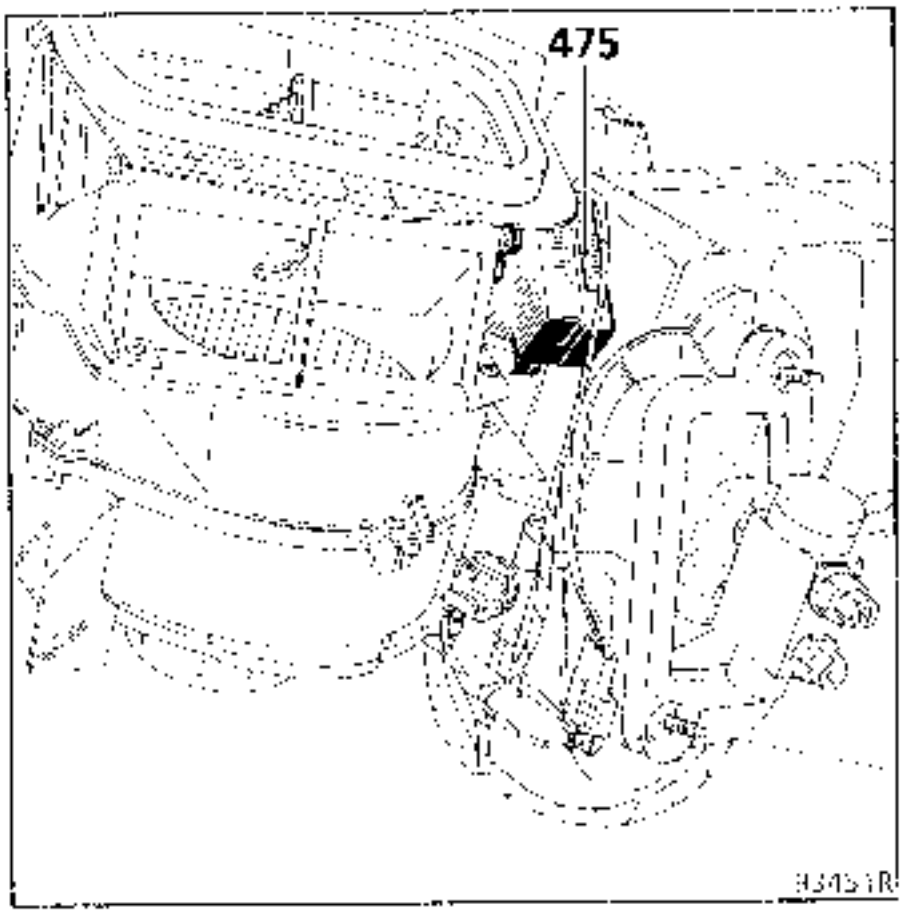


RECIRCULATING MOTOR (475)

The flap is moved by an electric motor which is always supplied with power and only stops in the extreme end setting.

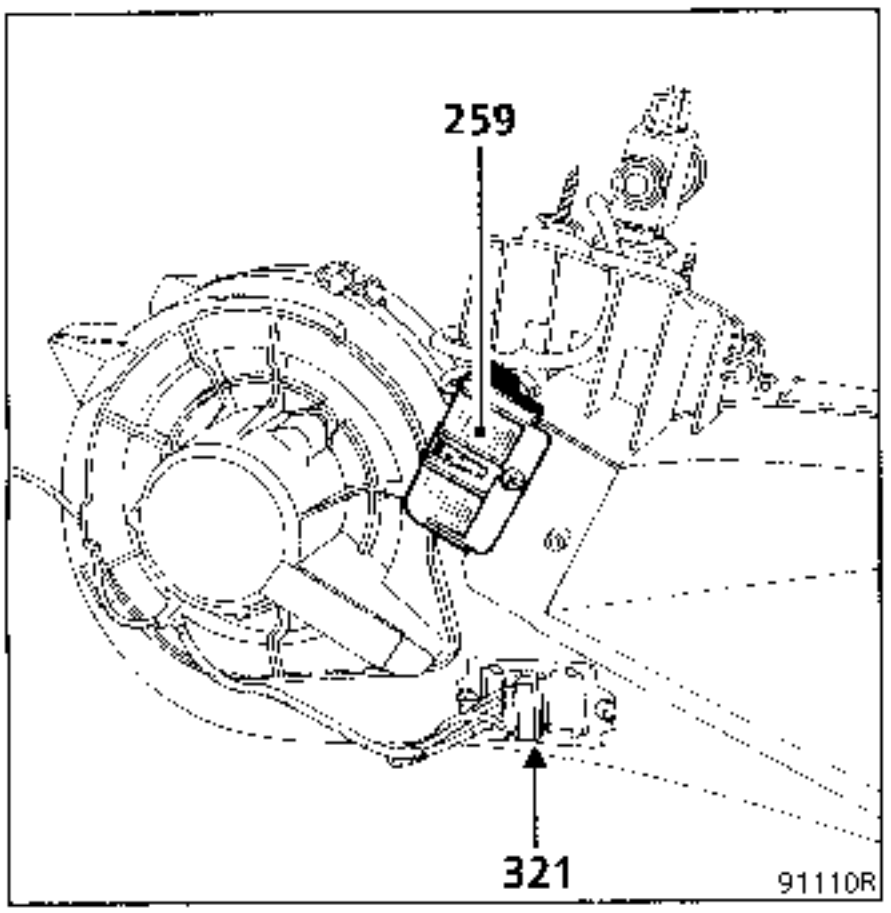
The recirculating motor can only be reached when the dashboard and air conditioner have been removed.

If the motor is replaced, the new one is equipped with a connector and lever.



FIXED THERMOSTAT

Fixed thermostat (**259**) is located under the air conditioning assembly, near the fan.



Remove the engine anti-noise shield under the dashboard.

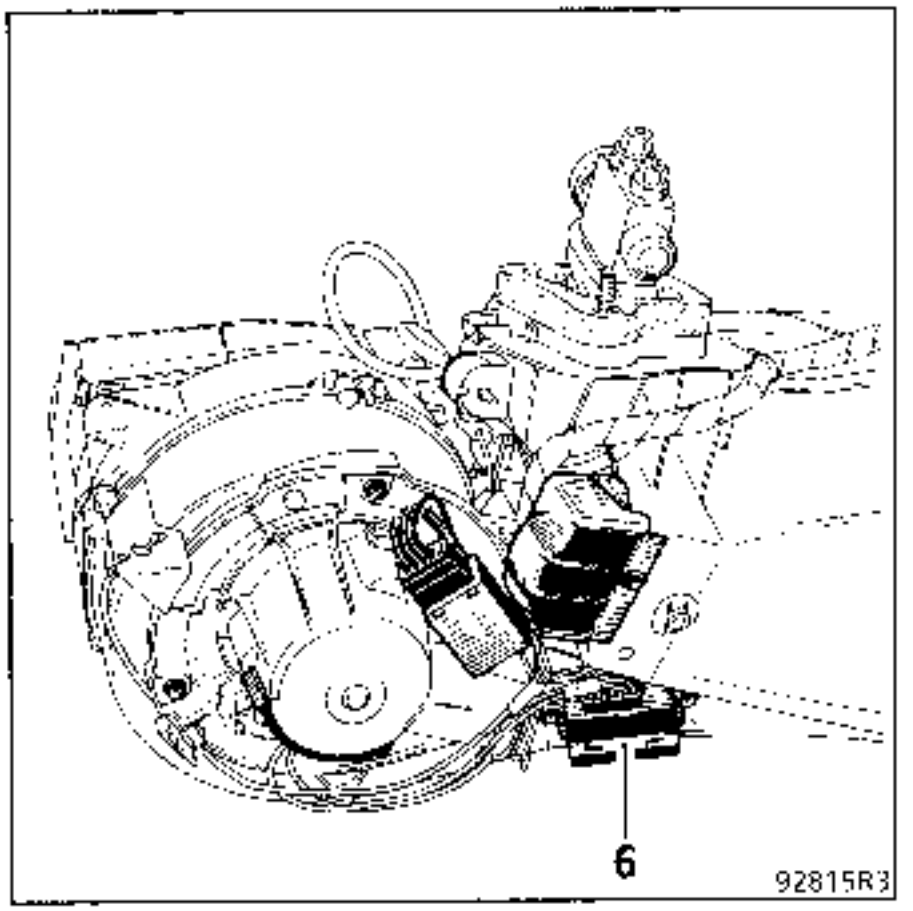
Remove the thermostat mounting screw.

Take out the thermostat, disengaging the thermostatic tube.

SPEED VARIATION DEVICE (6) OR FAN MOTOR RESISTORS (321)

These components are located under the air conditioning assembly, near the fan motor.

They are remove and refitted according to the method described on **page 61-39**.

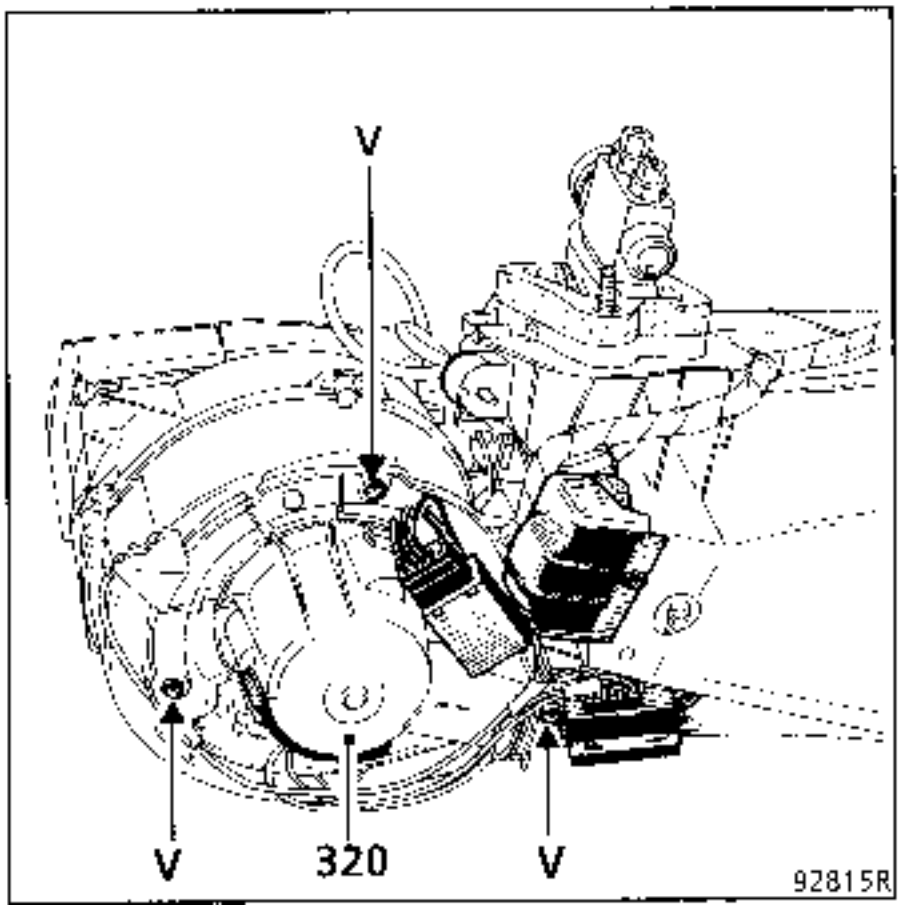


FAN MOTOR (320)

Fan motor (**320**) is reached through the passenger compartment.

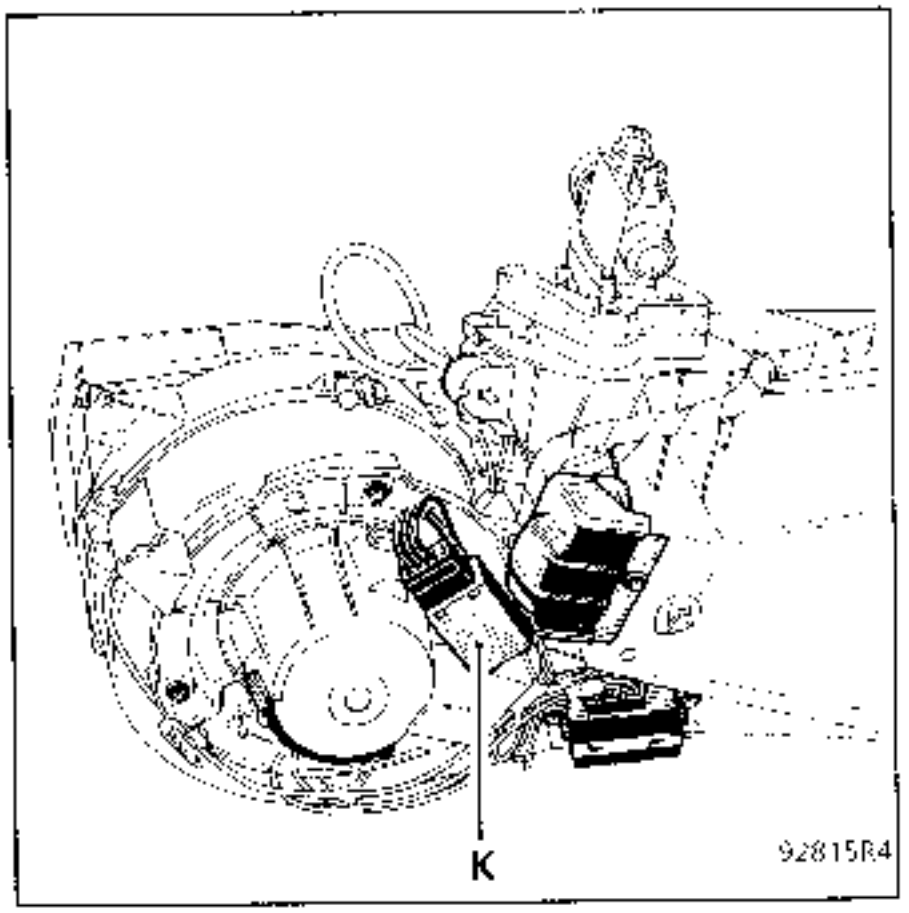
It is mounted on the air conditioner by means of three bolts (**V**).

It is removed when the righthand glove box and anti-noise shield have been removed.

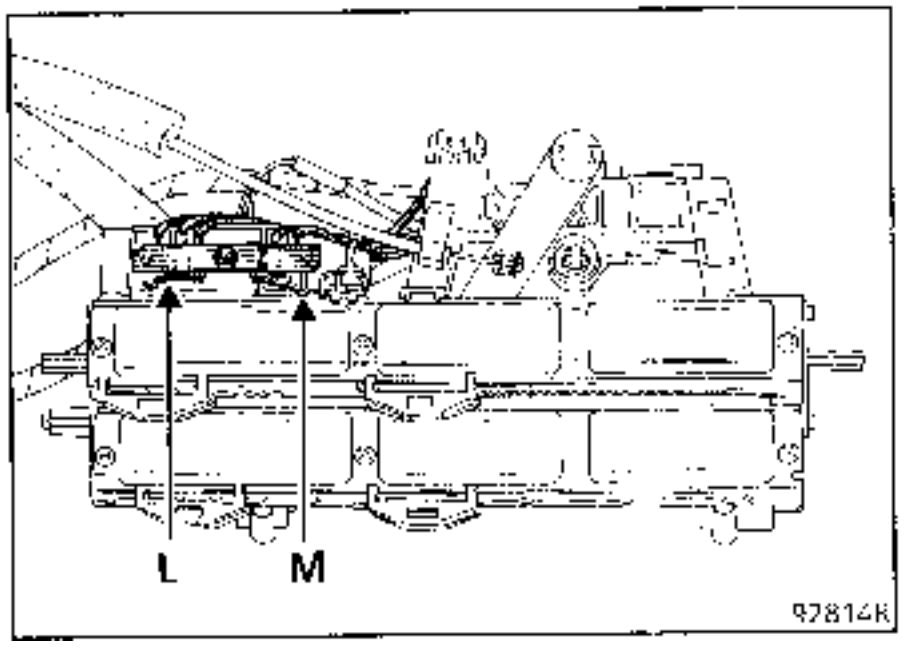


LOCATION OF THE CONTROL UNITS

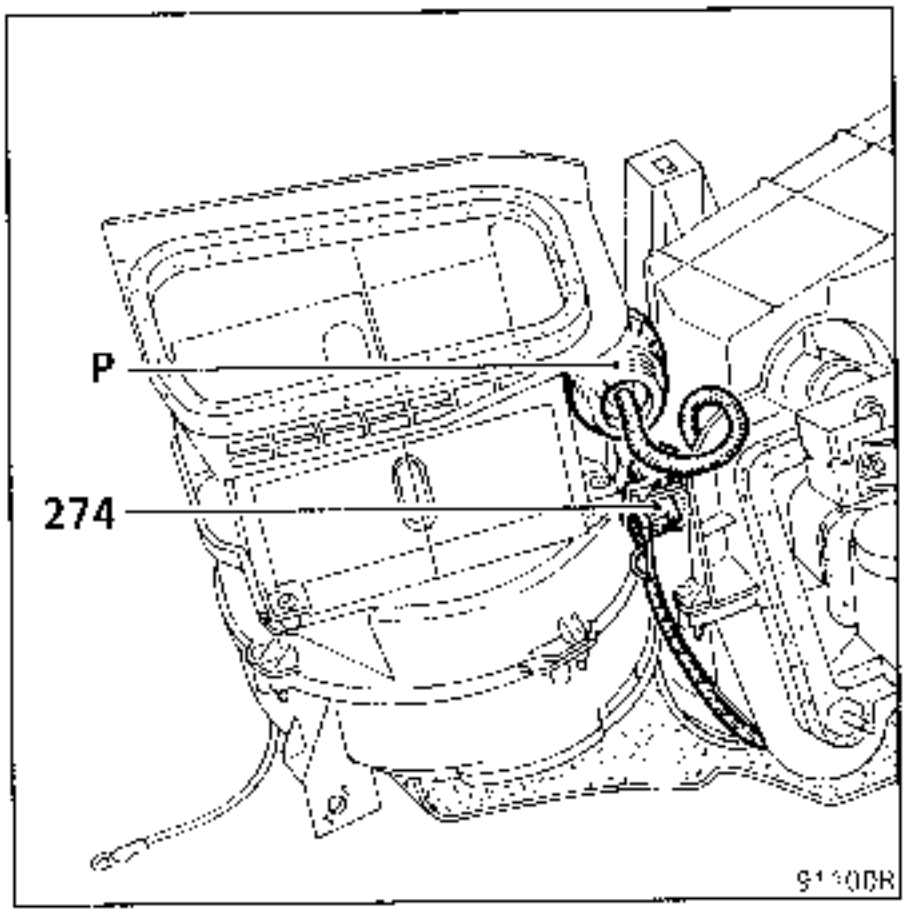
The third speed relay (**K**) is located under the air conditioning fan, near the fixed thermostat.



The micro-switches for controlling fan assembly relay (**L**) and fan assembly 4th speed relay (**M**) are under the control panel.



Solenoid valve (**274**) controlling the recirculating flap diaphragm is on the righthand side of the evaporator, near diaphragm (**P**).



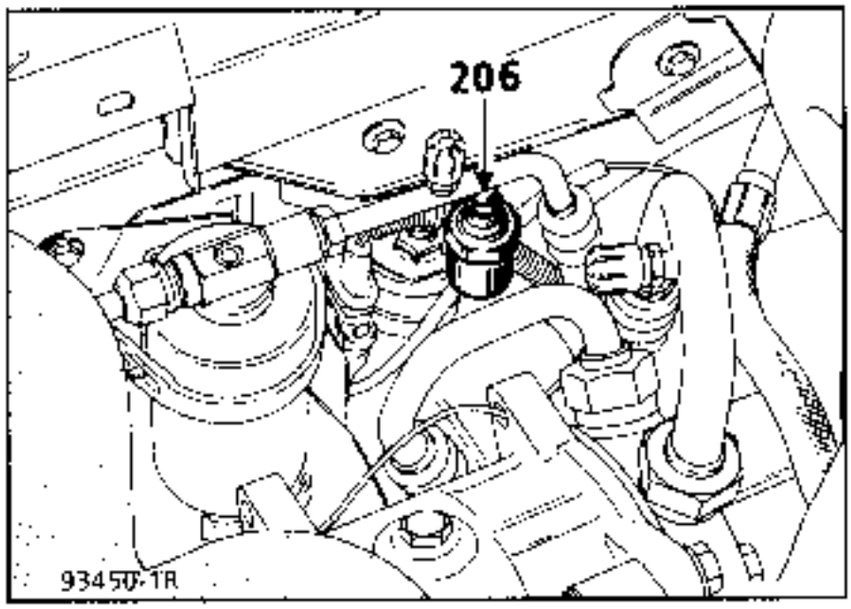
THREE-PURPOSE PRESSOSTATS (206)

The three-purpose pressostat for protecting the refrigerating system has the three following functions :

- low pressure (**2 bars**),
- high pressure (**27 bars**),
- cooling fan motor (**19 bars**).

The low and high pressure pressostats are mounted in series between **A1** and **C1** on the connector (see "**Engine harness**" wiring diagram).

The pressure for triggering the cooling fan motor is fed between **B1** and **B2** (see "**Engine harness**" wiring diagram).



All operations on the pressostat can be performed without the refrigerant circuit having to be drained as they are mounted on a **SKRADER** valve.

The compressors fitted to the **Renault 21** are of the **SANKYO** alternating axial type,
- type **SD 709-709** for the **J engine**,
- type **SD 510** for the F **engine**.

During model years **88** and **89** the **SD 709** compressors have been fitted as standard to all versions.

It is possible to check the compressor oil level.

For compressors with **5 pistons** :
- use a locally manufactured dipstick,

For compressors with **7 pistons** :
- level measured using a charging station when adding oil,
- when removing the compressor, drain the oil completely and refill with the recommended quantity.

NOTE : To contribute towards the environment the latest series of X48 vehicles are equipped with air conditioning system which use refrigerant fluid type R134a. See "**General**" section and the "**New Refrigerant R134a Air Conditioning**" workshop manual for its use.

For all other information concerning the maintenance of the compressors, consult the "**Air Conditioning**" workshop manual.

REMOVAL - REFITTING

Bleed the refrigerant circuit.

Disconnect the hoses and blank off the apertures at the compressor and hose ends.

Disconnect the electrical feed from the compressor.

If necessary, remove the compressor mounting strengtheners.

Slacken the drive belt.

Remove the compressor mounting bolts and the compressor itself.

NOTE : When refitting circuits operating with **R12** type refrigerant, the threaded unions are to be greased with ELF **RIMA 100** compressor oil.

On reassembly, check the compressor drive belt tension (see **section 11**).

REMOVAL - REFITTING

Disconnect the battery.

Drain refrigerant fluid circuits and the engine cooling circuit.

Disconnect engine coolant hoses from the radiator (C).

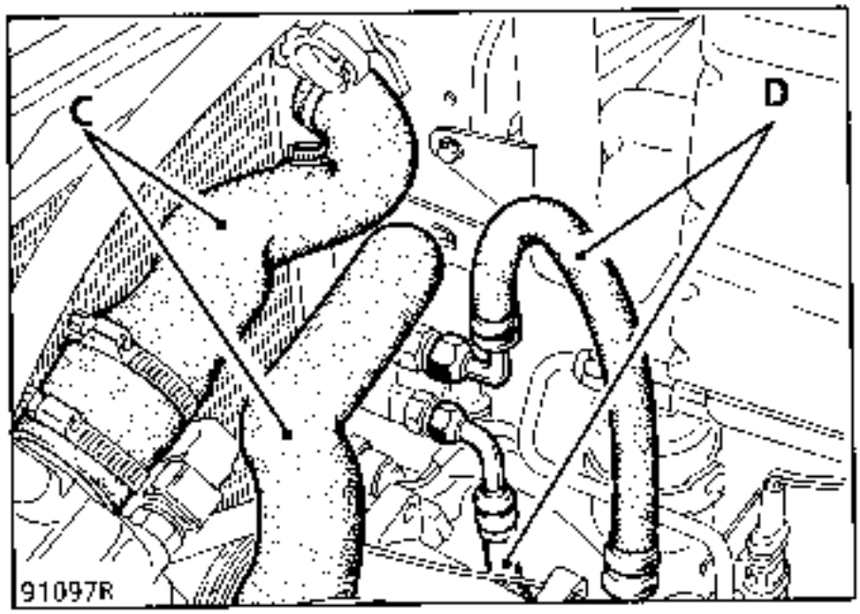
Disconnect the refrigerant fluid hoses from the condenser (D) (take care, the ends are very fragile).

Blank off the disconnected hoses and the ends of the condenser.

Disconnect the electrical connections for the fan motors.

Remove the upper cross member.

Take out the radiator condenser assembly.



On refitting, proceed in the reverse order to removal.

Top up the engine coolant (see "**Engine**" section) and top up the refrigerant fluid (see "**Air Conditioning**" workshop manual).

REMOVAL - REFITTING

The evaporator is located in the passenger compartment under the dashboard.

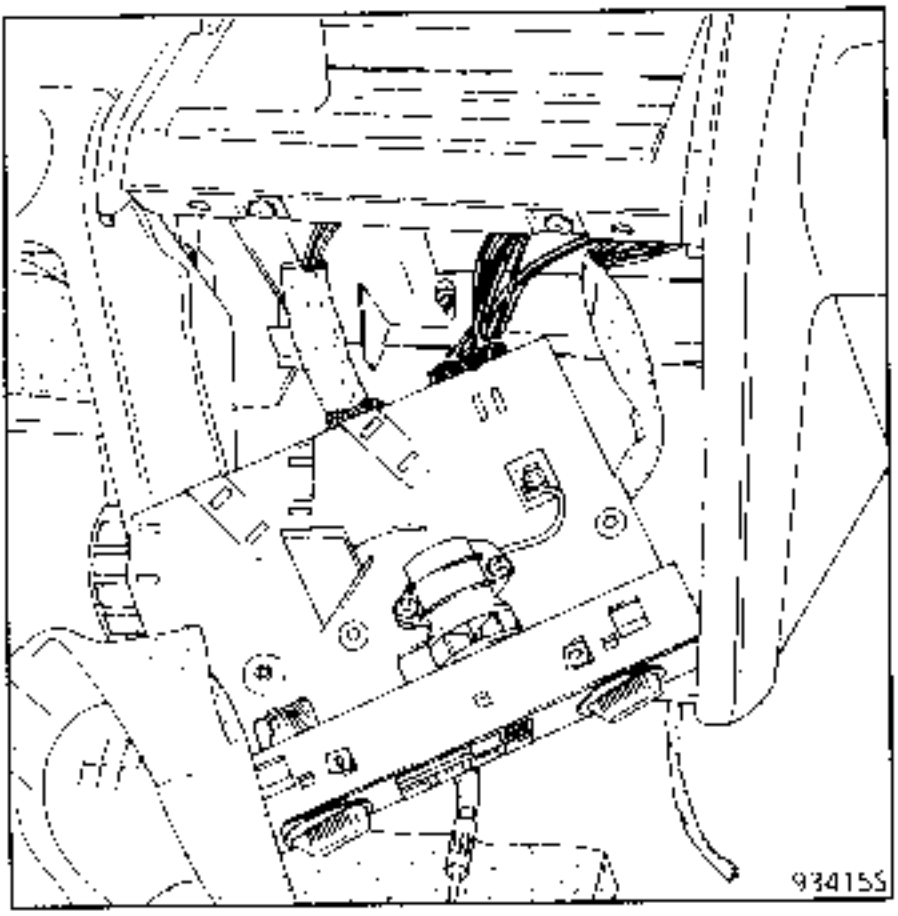
The evaporator can only be removed when the air conditioning assembly has been removed.

Disconnect the battery.

Remove the console and dashboard (see **MR 291** - "**Electrical**" section).

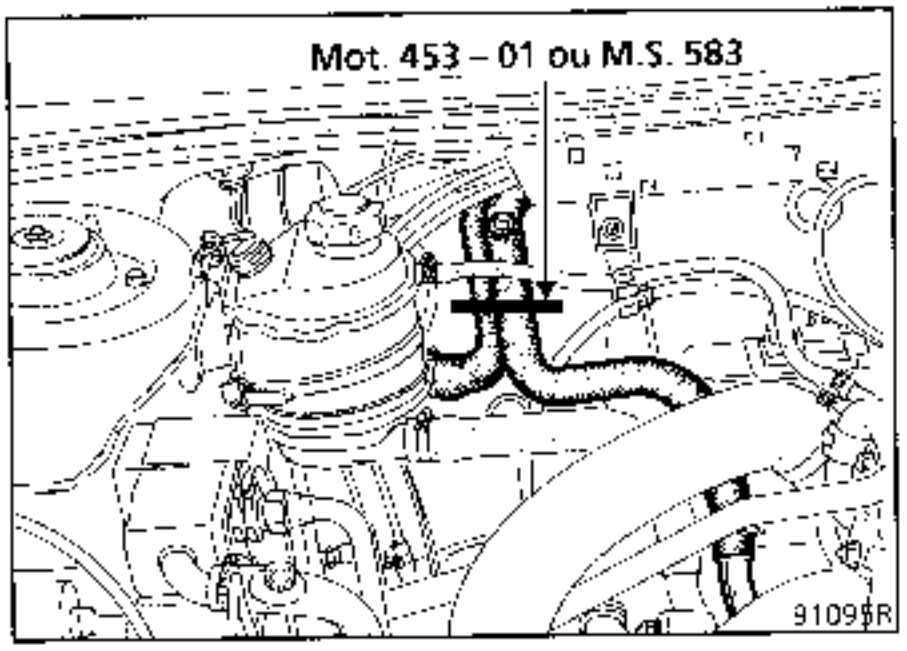
Leave the cable-controlled assembly coupled to the blower device.

Disconnect the block connectors.

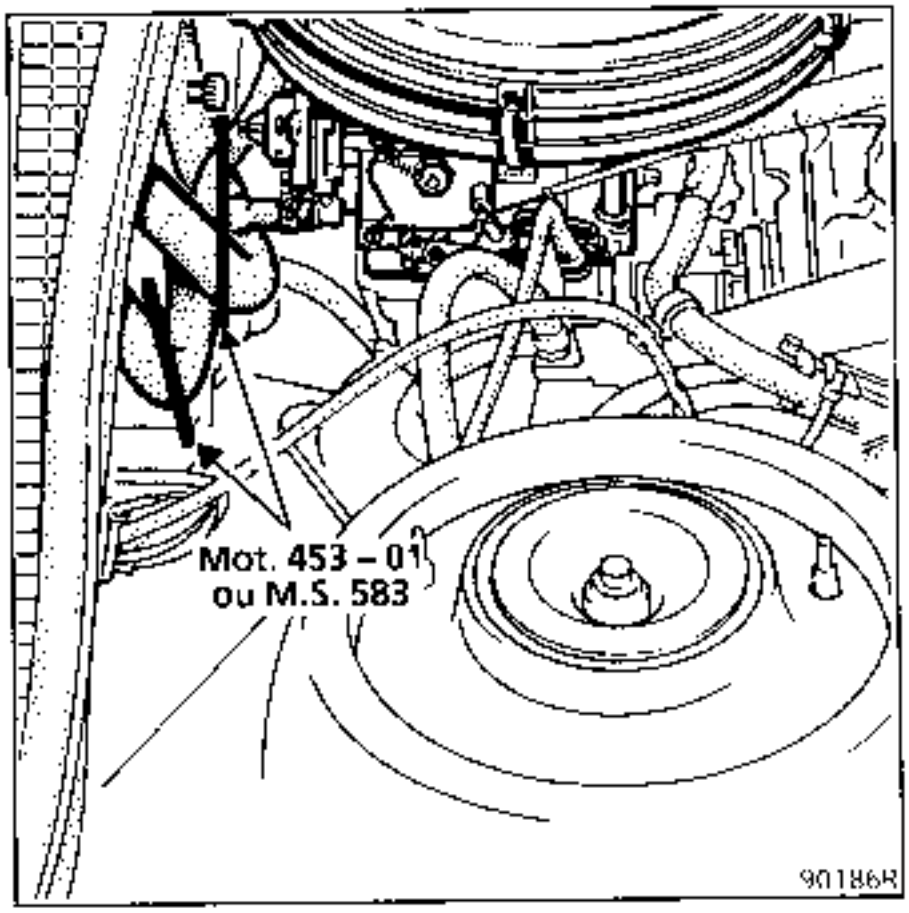


Fit clamps to the heater system coolant hoses (using tool **Mot. 453-01** or **M.S. 583**).

IN-LINE ENGINE



TRANSVERSE ENGINE



REMOVAL - REFITTING (continued)

Disconnect the following hoses :

- radiator coolant hose,
- relief valve refrigerant hose,
- vacuum chamber low pressure hose (thin hose).

Blank off the apertures in the refrigerant and relief valve hoses.

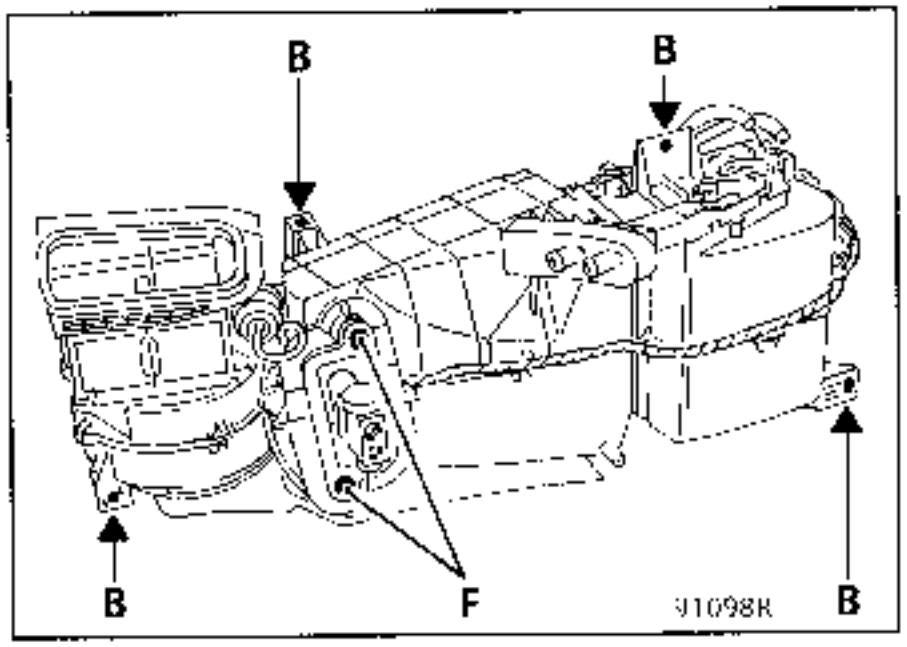
Remove the expansion bottle and low pressure chamber.

Remove the two nuts (**F**) securing the relief valve on the bulkhead.

Remove the four bolts (**B**) securing the air conditioner to the bulkhead.

Remove the air conditioning assembly, by freeing it at the rear.

REFITTING



Proceed in the reverse order to removal.

Ensure that the air conditioner is perfectly leaktight when mounted on the bulkhead.

Top up the engine coolant (see "**Engine**" section).

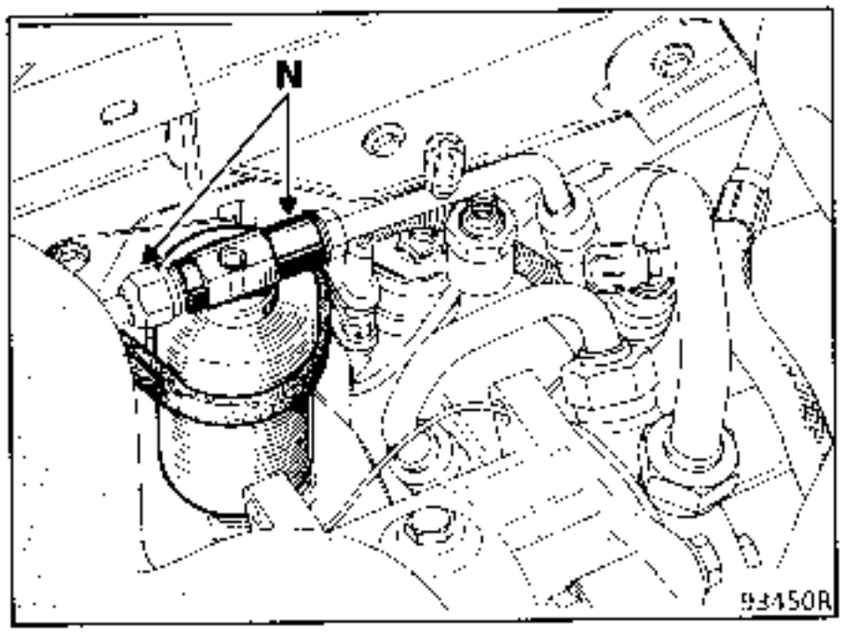
Fill the refrigerant fluid system (see "**Air Conditioning**" manual).

REPLACING

Drain the refrigerant circuit using the charging unit (see method described in the "Air Conditioning" manual).

Disconnect connection hoses (N).

Fit plugs to the apertures.

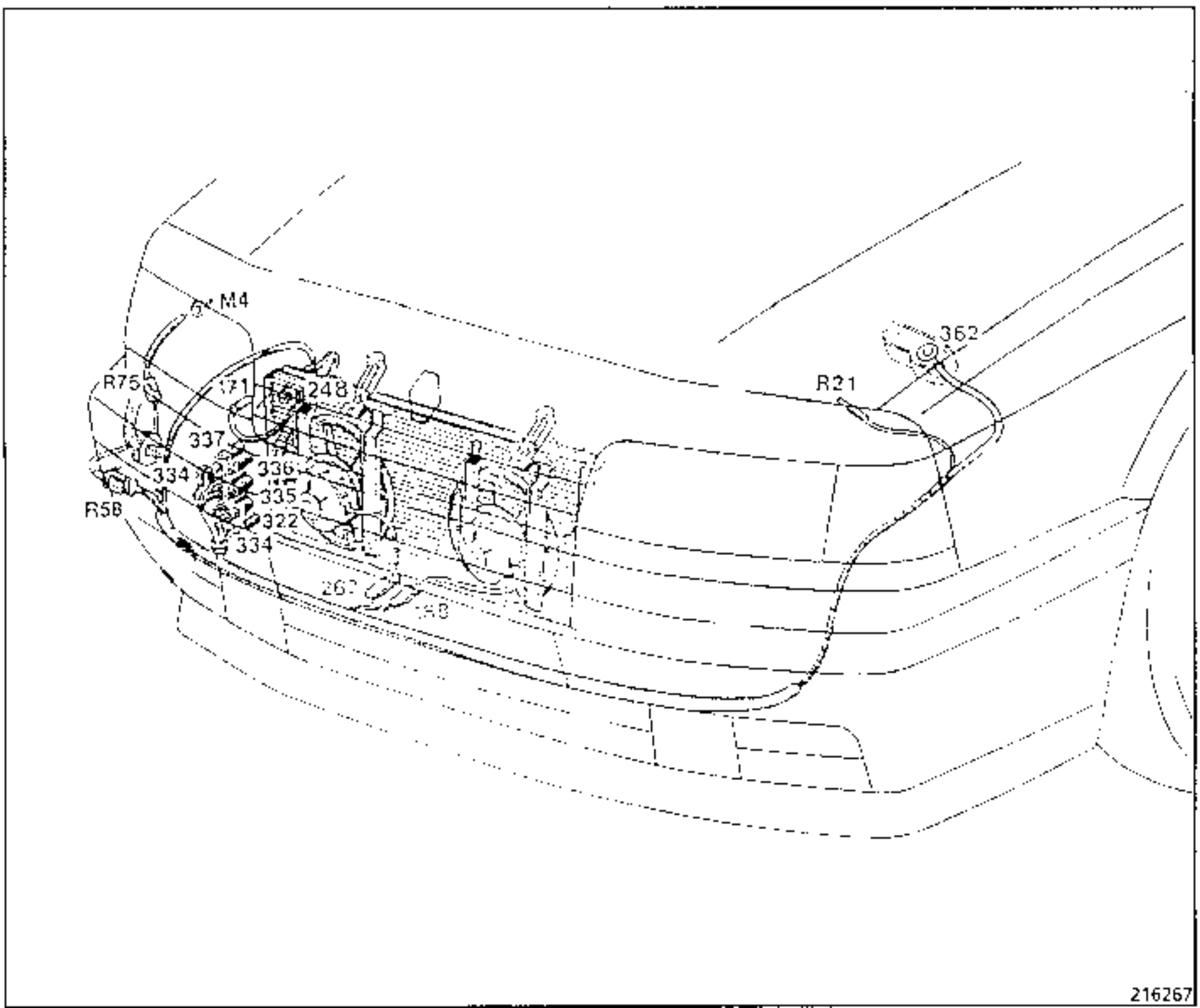


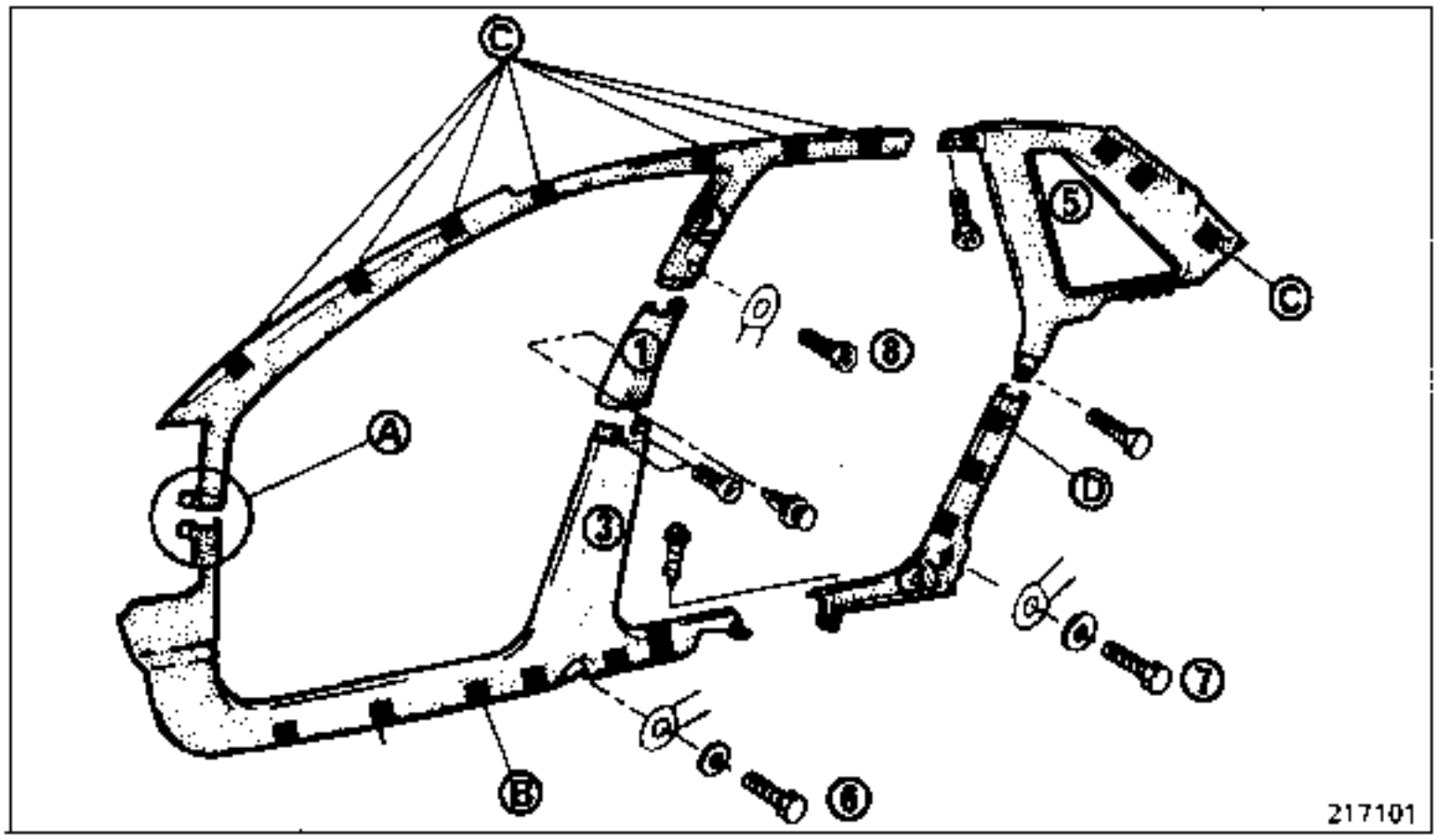
On reassembly, oil the threads using compressor oil and ensure that the seals are in good condition.

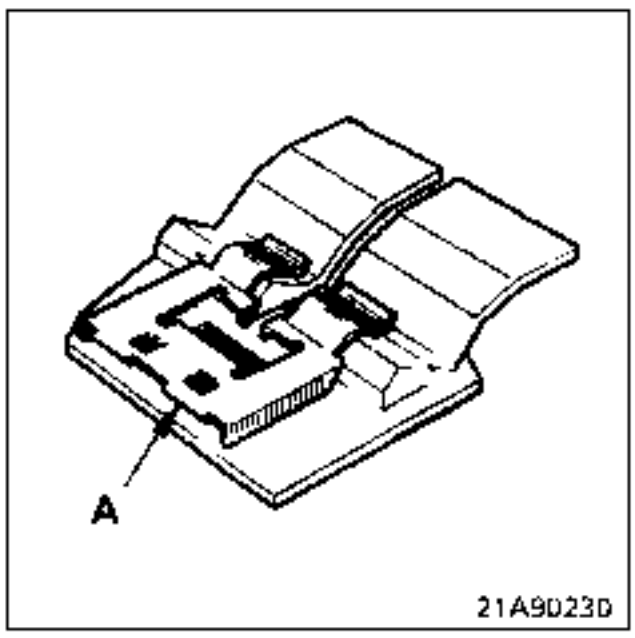
LOCATION OF COMPONENTS

171 Air conditioning clutch
188 Cooling fan motor assembly
248 Fan motor thermal switch
262 Air conditioning cooling fan assembly
322 Air conditioning diode
334 Thermal cut-out
335 Fan motor 1st speed relay
336 Fan motor 2nd speed relay
337 Fan motor 3rd speed relay
362 Battery + terminal plate

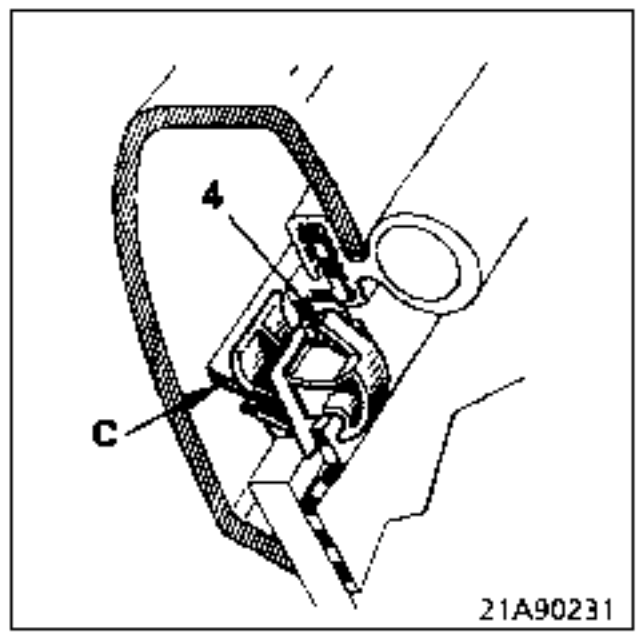
M4 Bodywork earth
R21 Engine/fan motor assembly
R58 Fan motor assembly/righthand side member
R75 Fan motor assembly earth/fan motor assembly



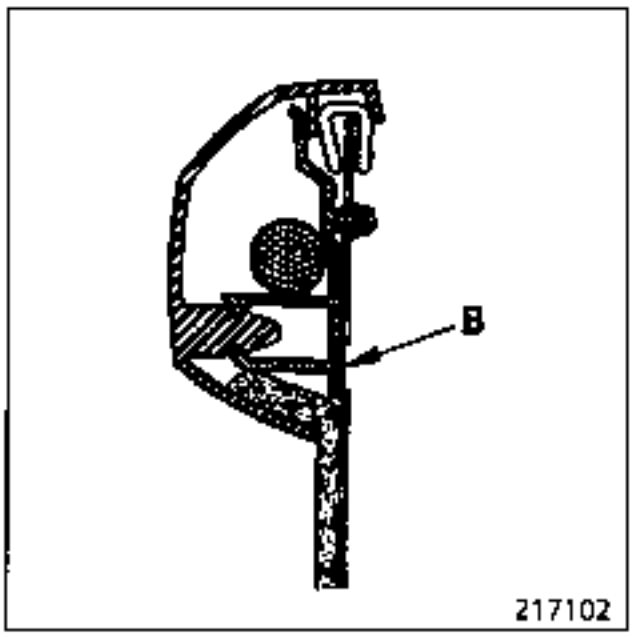




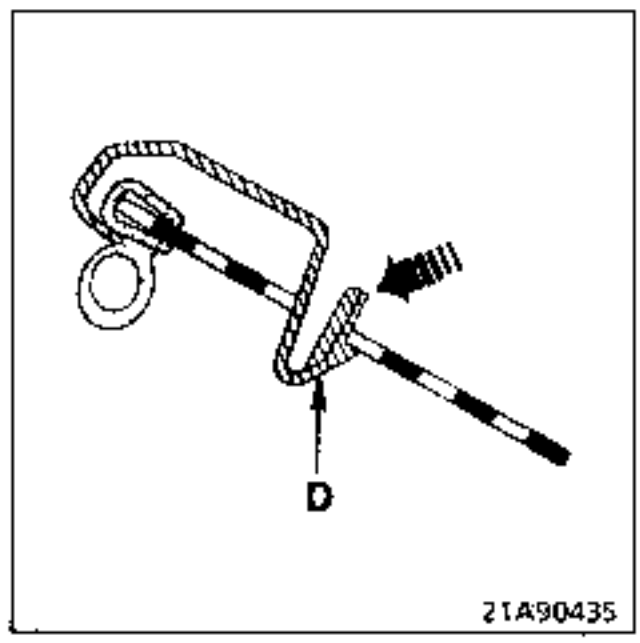
A Snap fastening



C Snap fastening



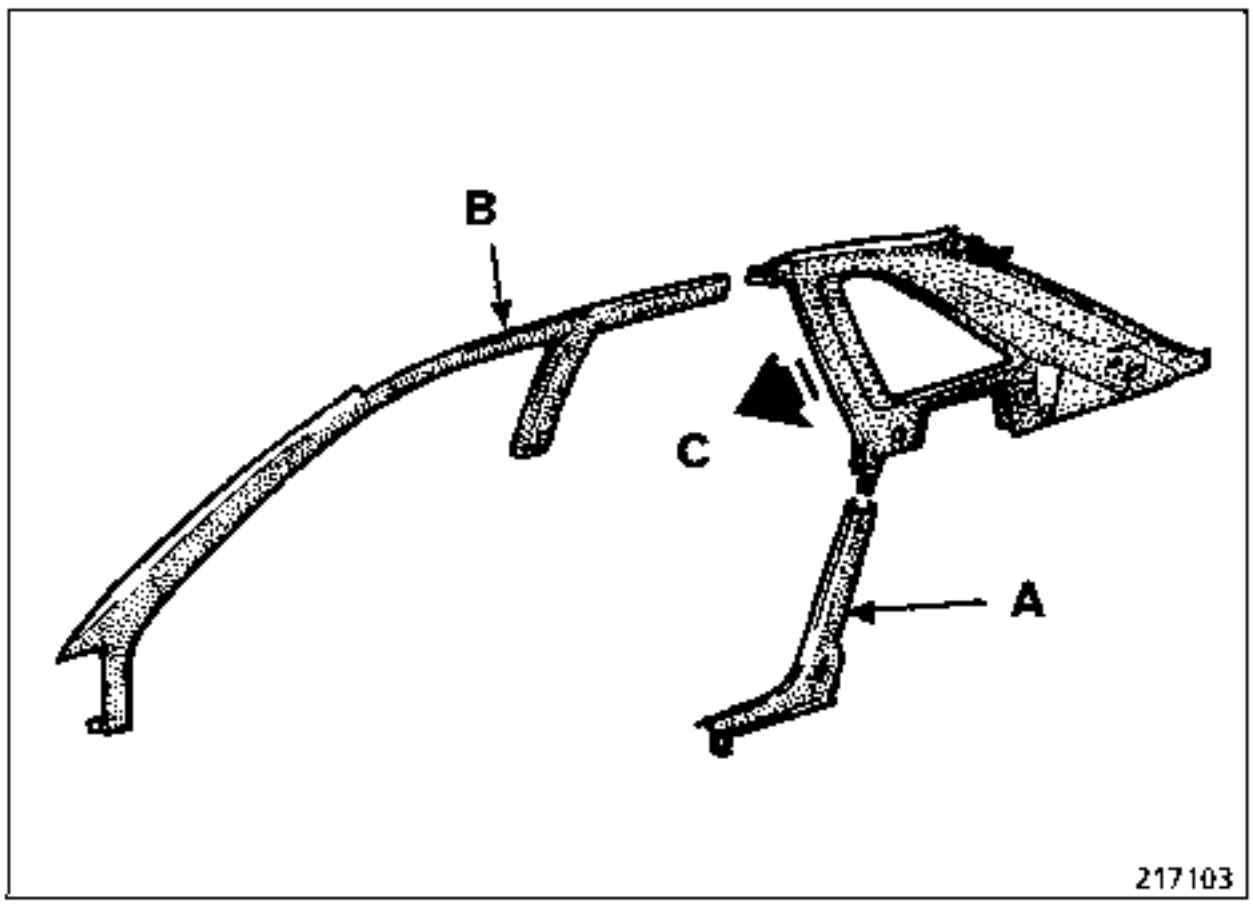
B Snap fastening



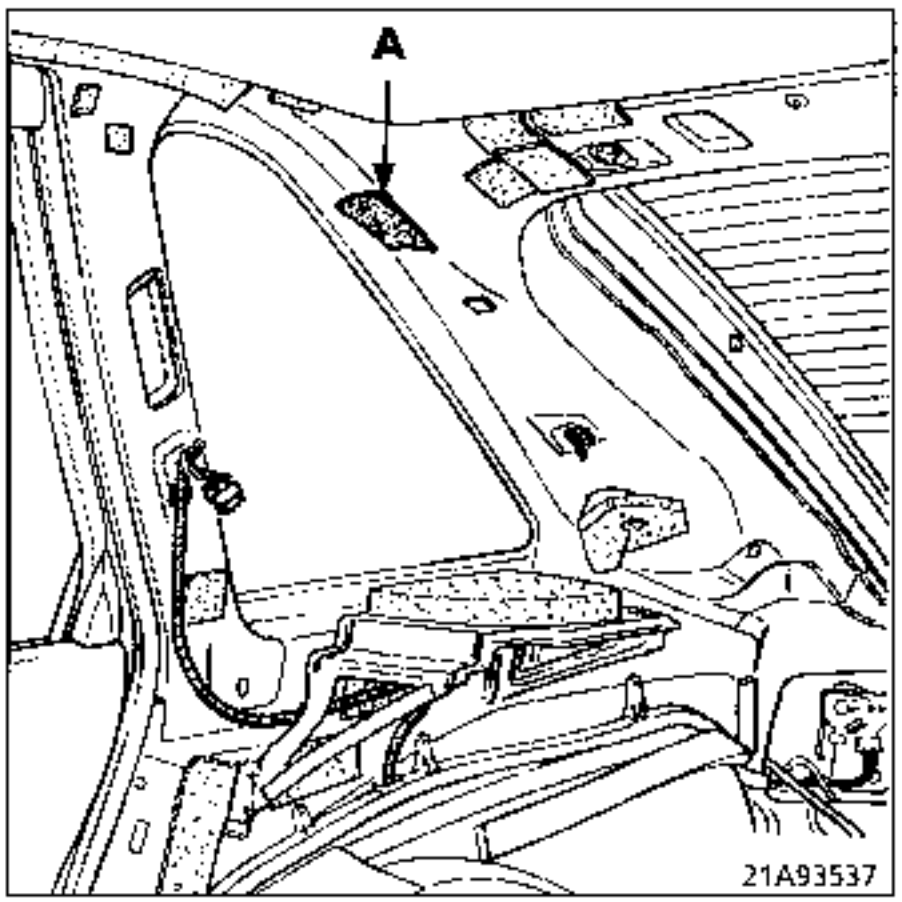
D Snap fastening for trim

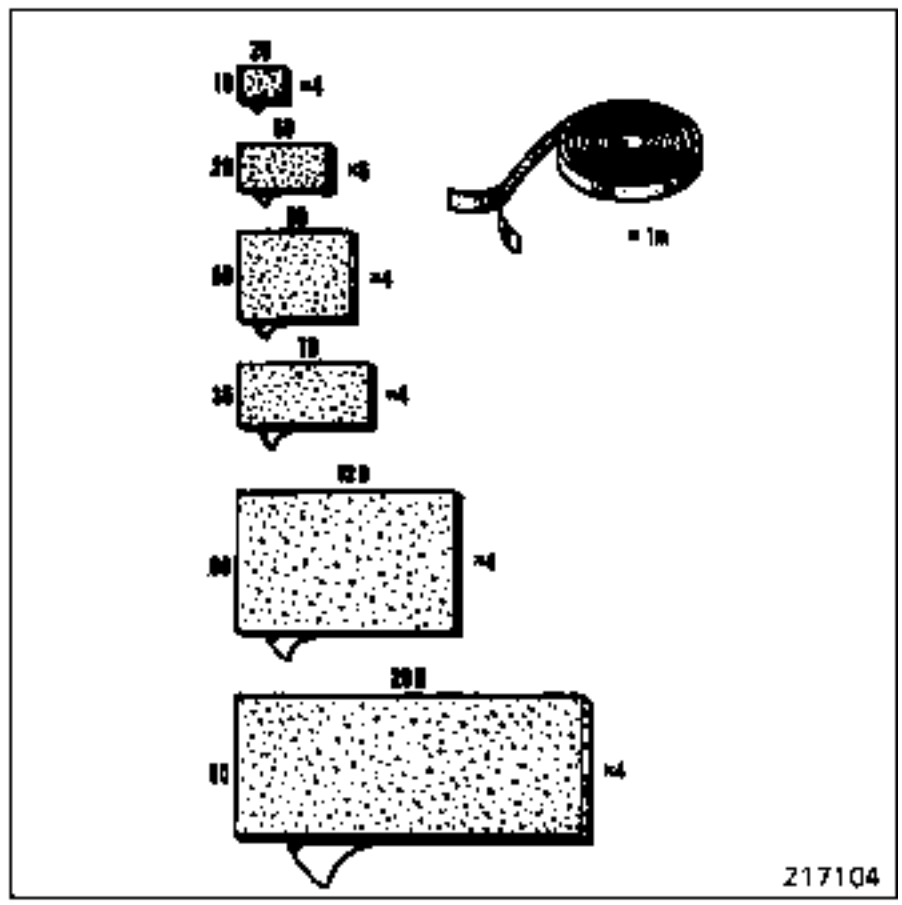
Note : Removing the fastenings :
Snap fastening B is destroyed on removal.
Snap fastening C is removed by inserting a small flat screwdriver to push on tab 4.

To remove :
Trim 5 remove **8 - 1 - 2 - 4.**
Trim 3 remove **1 - 6.**
Trim 4 remove **7.**
Trim 2 remove **8 - 1.**

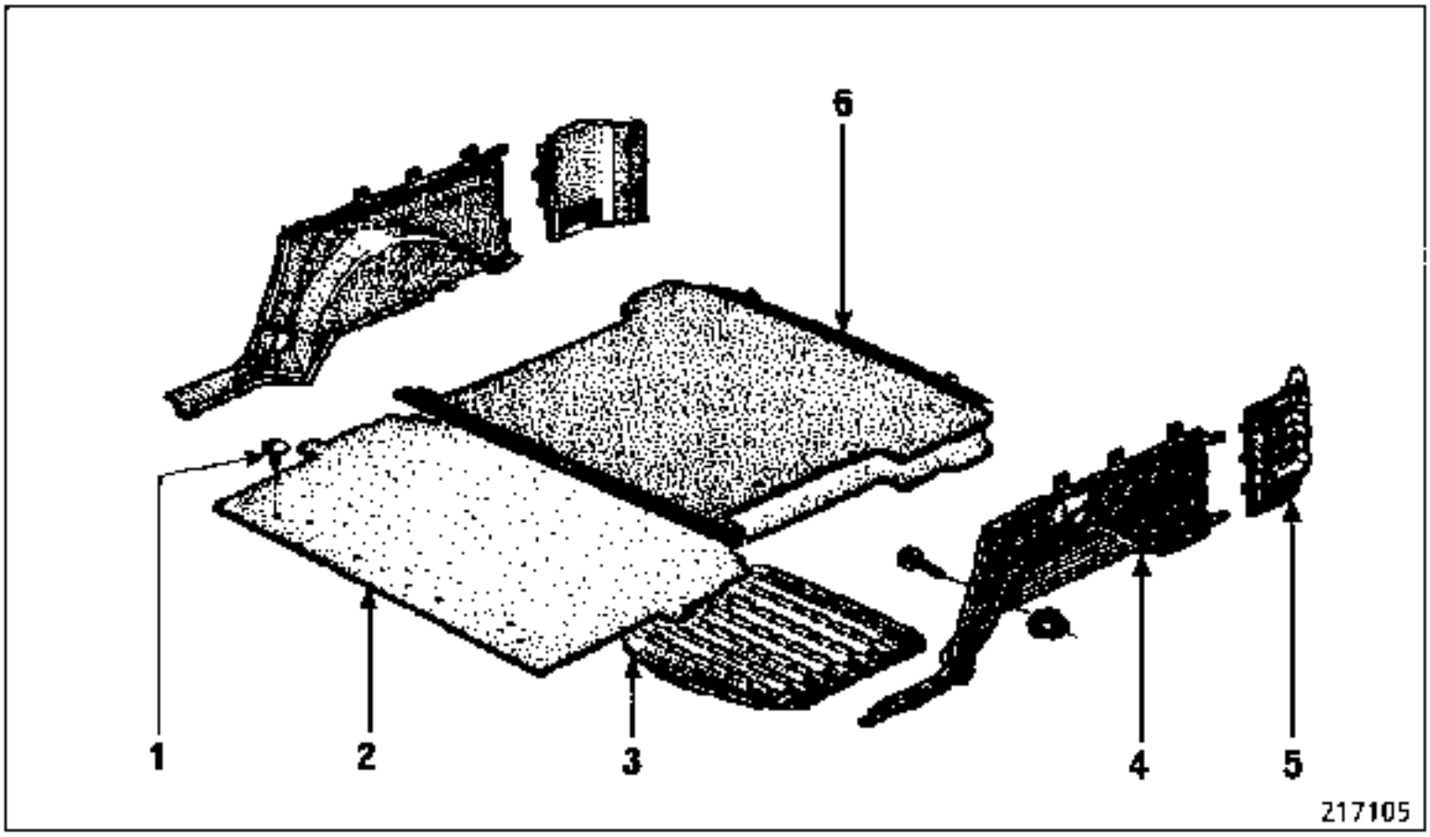


In order to remove the rear quarter panel trim, the rear pillar trim (A) must be removed as well as part of the body side upper trim (B). When the securing screws have been removed, free the trim by moving it towards the front of the vehicle (C).





(A) Set of self-adhesive foam pads for all vehicles, Part No : **77 01 465 051.**



1 - "Fir tree" type pressure clip

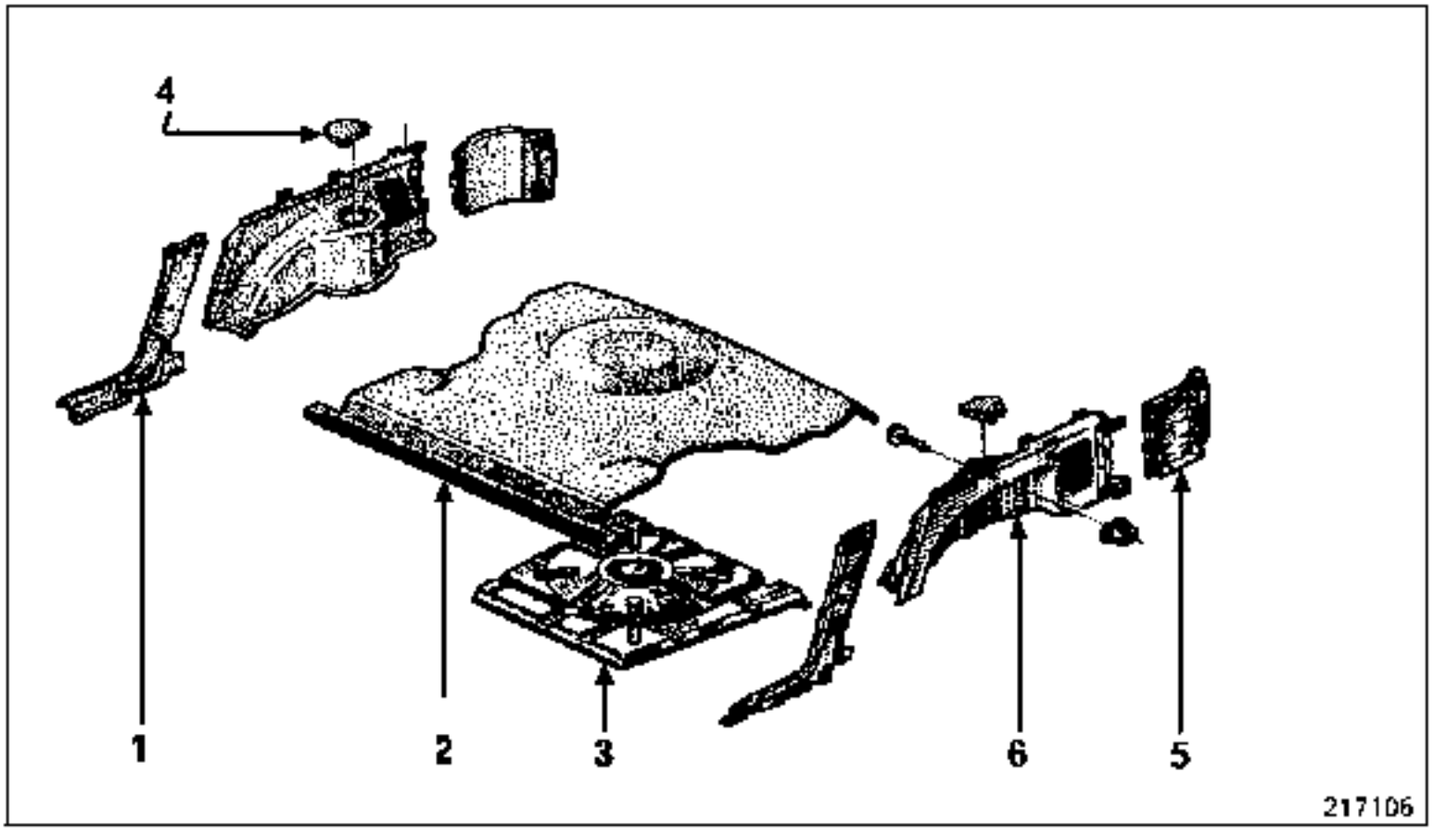
2 - Under-carpet

3 - Emergency spare wheel cover

4 - Wheel arch trim

5 - Small door

6 - Carpet



1 - Rear pillar trim

2 - Carpet

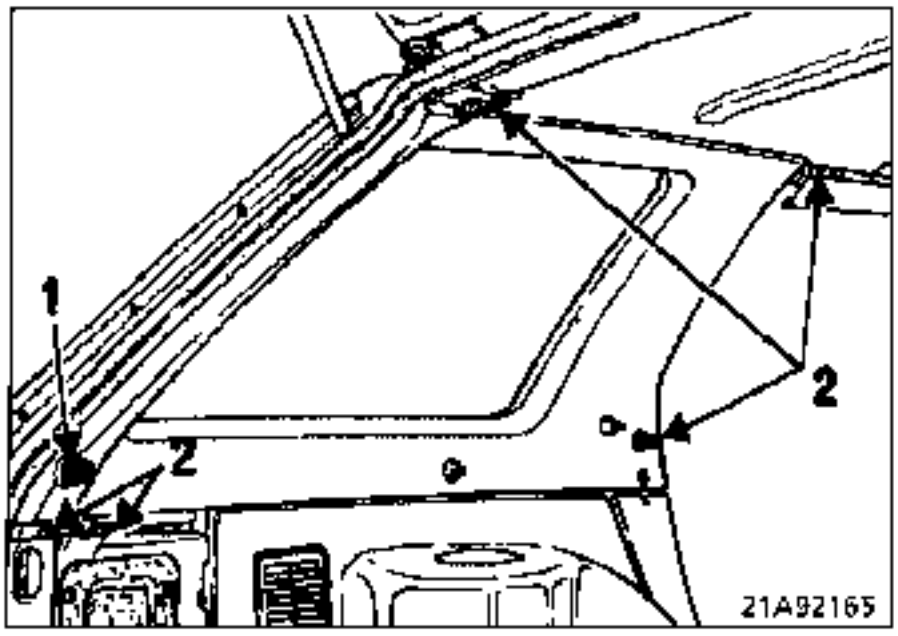
3 - Emergency spare wheel cover

4 - Shock absorber cover

5 - Small door

6 - Wheel arch trim

REMOVAL



Remove the rear headlining.

Unpick the end of the upper side trim from the body side.

Tilt the rear seat back.

Remove the rear mounting (1) from the self-winding luggage cover.

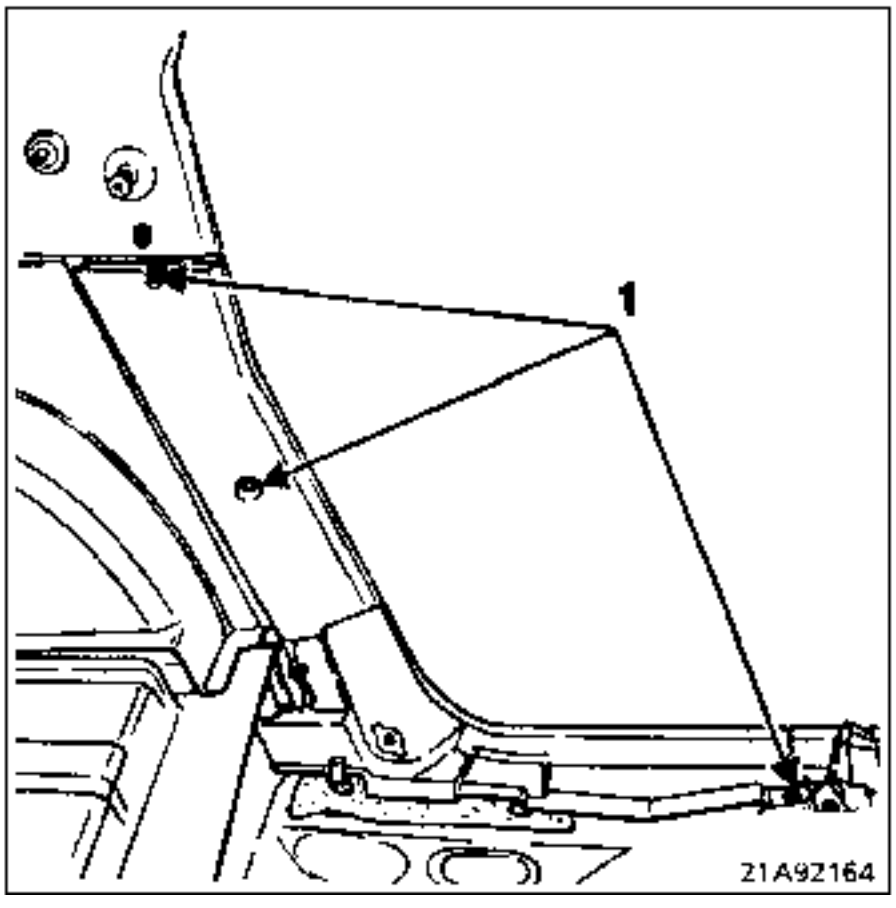
Remove the catch from the rear seat back.

Remove the five screws (2) holding the trim.

Unpick the trim and remove it.

Rear lower body side trim (4 x 4 vehicle)

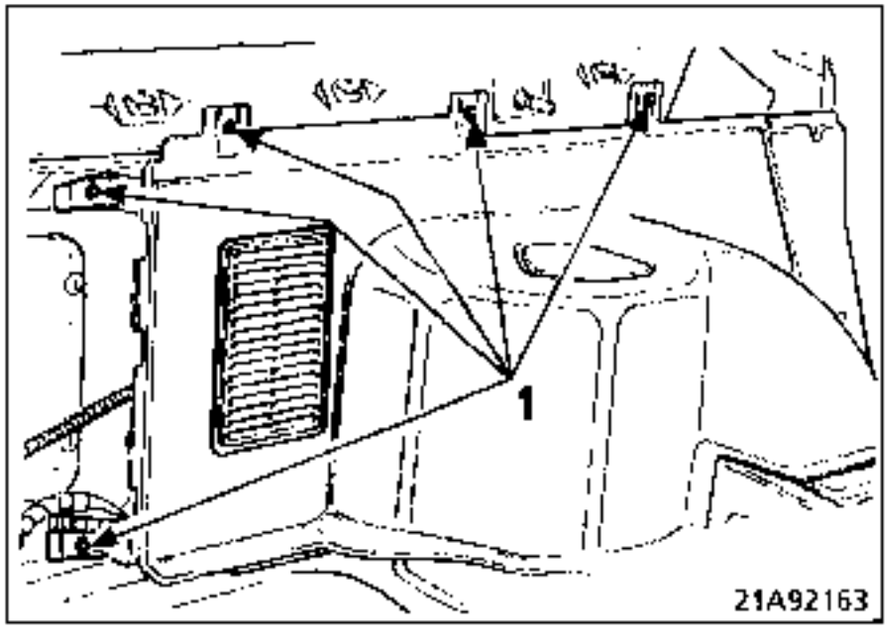
REMOVAL



Remove the lower mounting for the seat belt.

Remove the three screws (1) and remove the trim.

REMOVAL

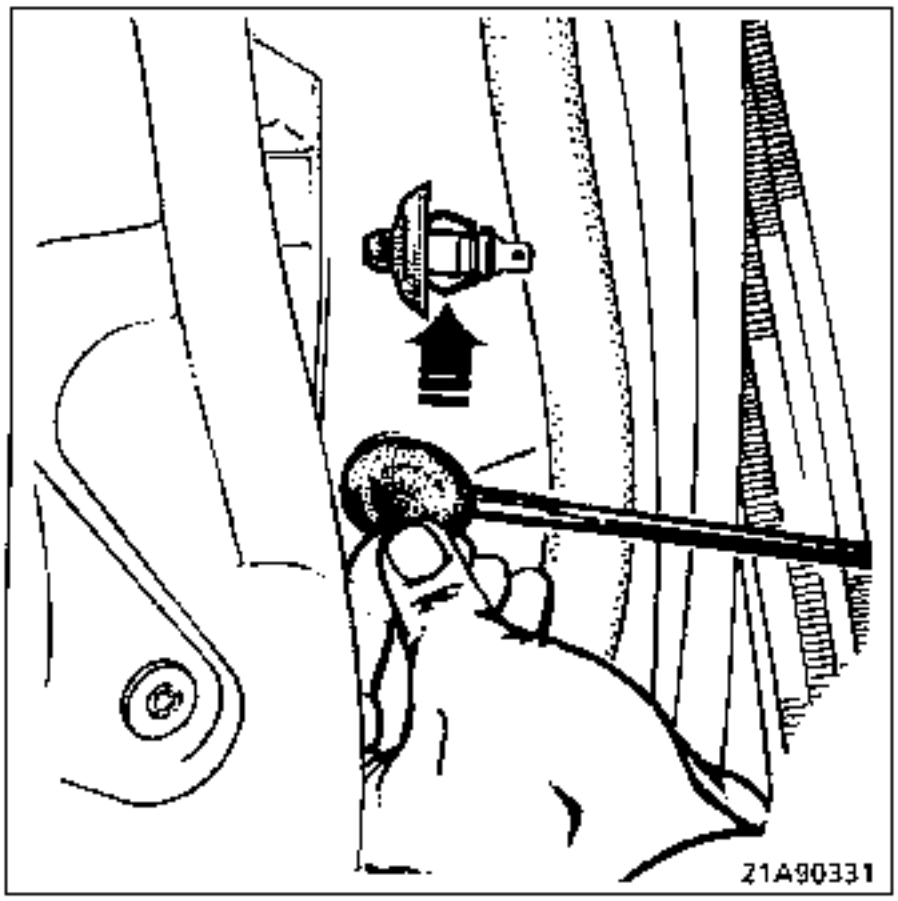


Remove the rear headlining.

Remove the upper rear body side trim.

Remove the five screws (1) and remove the trim.

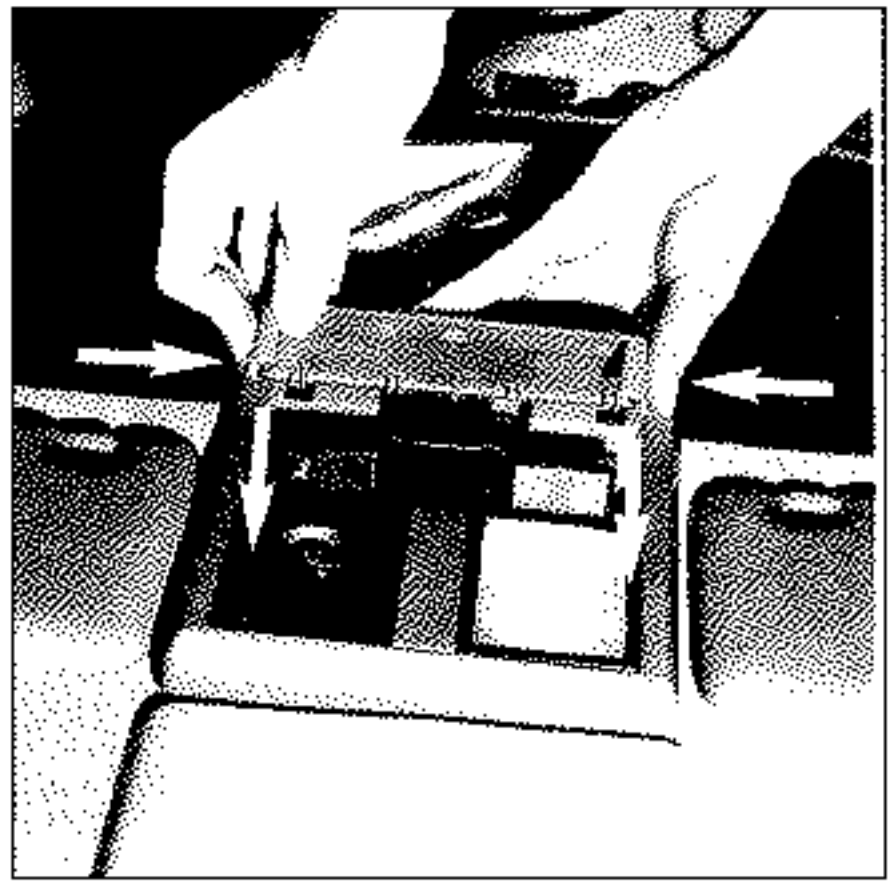
Lighting switch



This vehicle is equipped with a new type of interior lighting switch which operates when the door is opened.

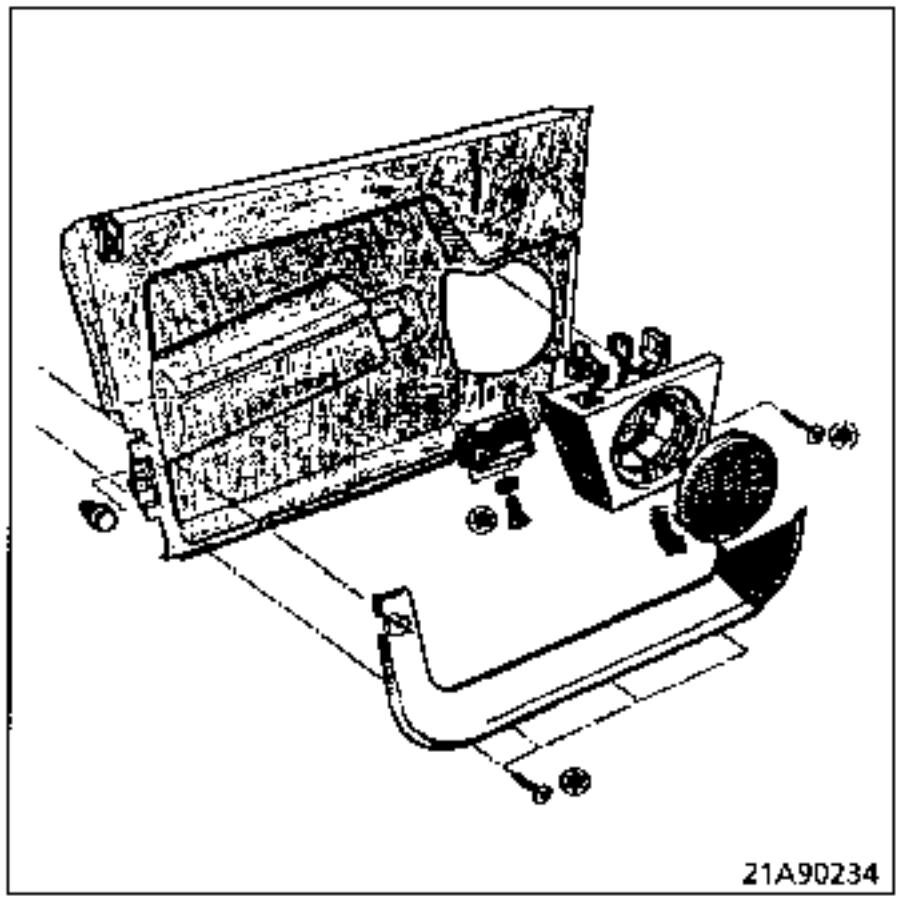
Push on the tab and lever it off with a flat screwdriver at the same time.

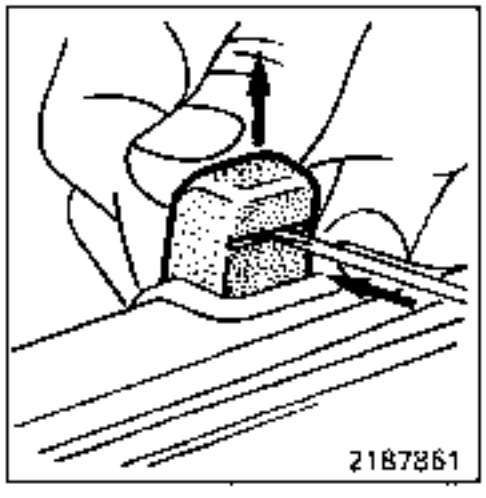
Passenger compartment lighting

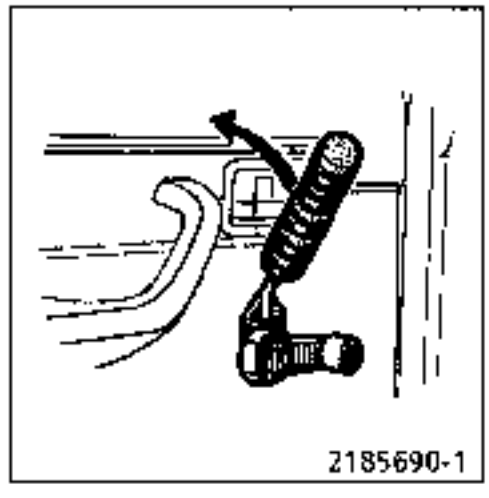


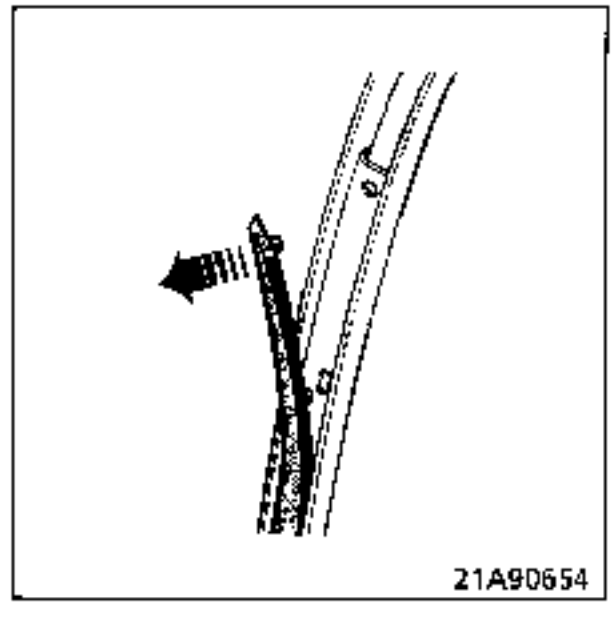
Push the two sides of the cover together so as to unclip the tabs. Tilt the cover forwards.

The assembly is secured by two screws.





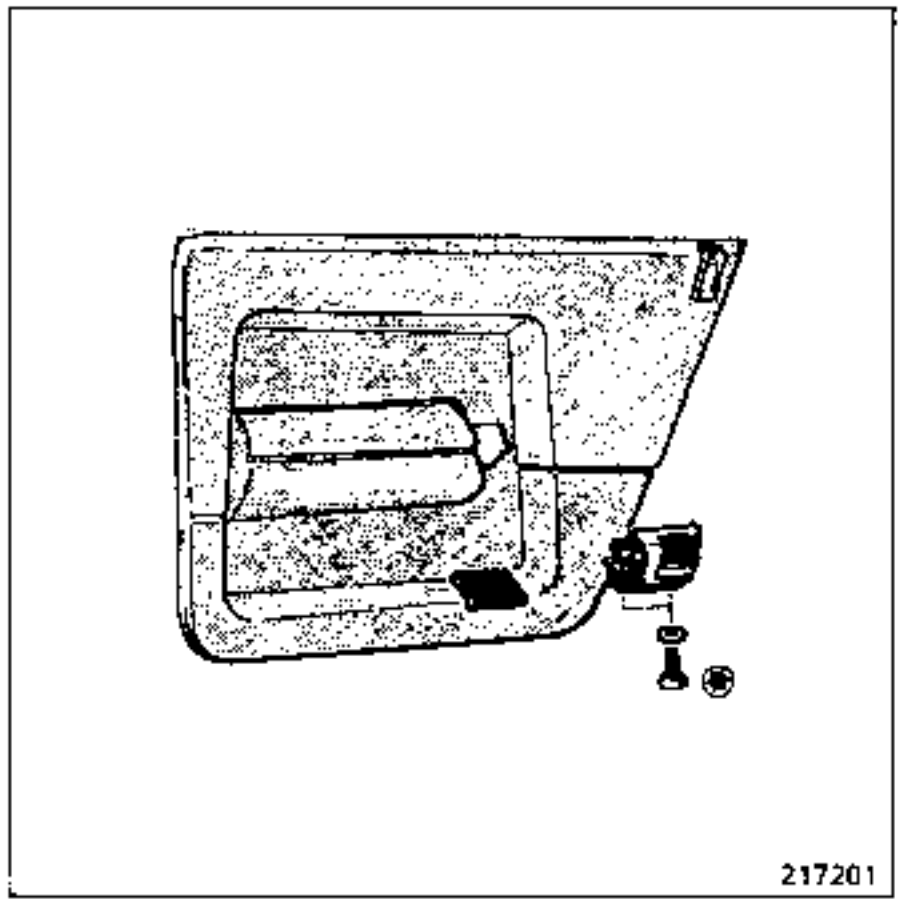


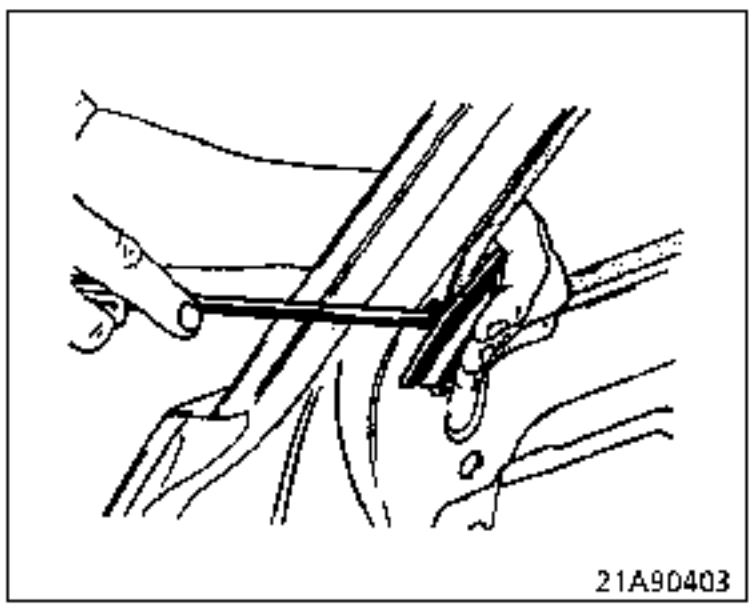


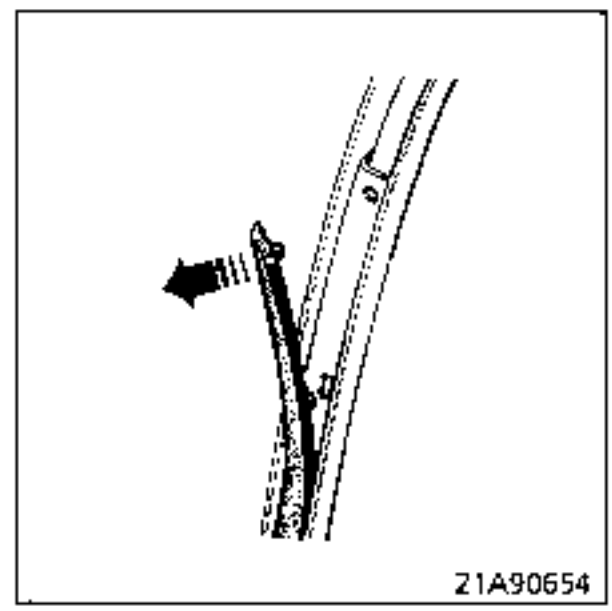
The plastic sheet is removed by cutting the mastic using a blade.

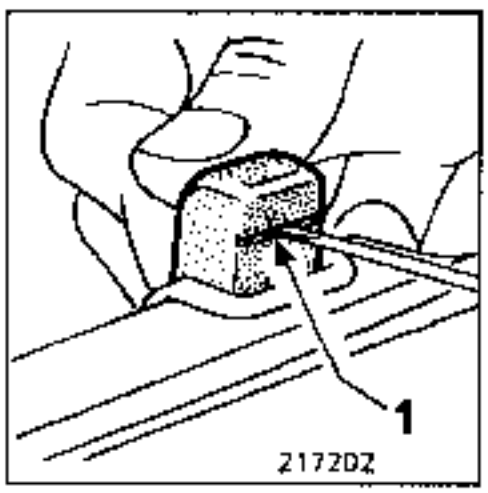
The slide pad for the window secured to the upright is removed using a flat screwdriver.

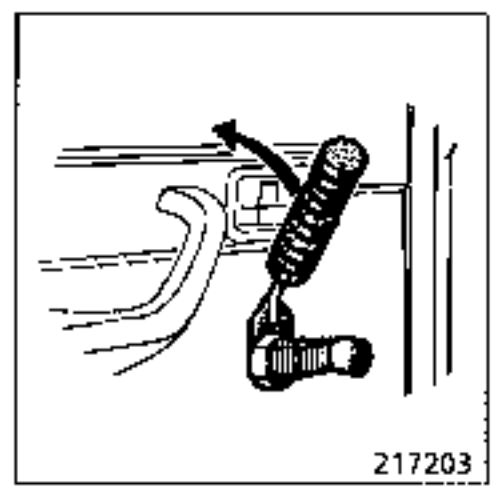
Raise the upper section and push the part downwards to remove it.





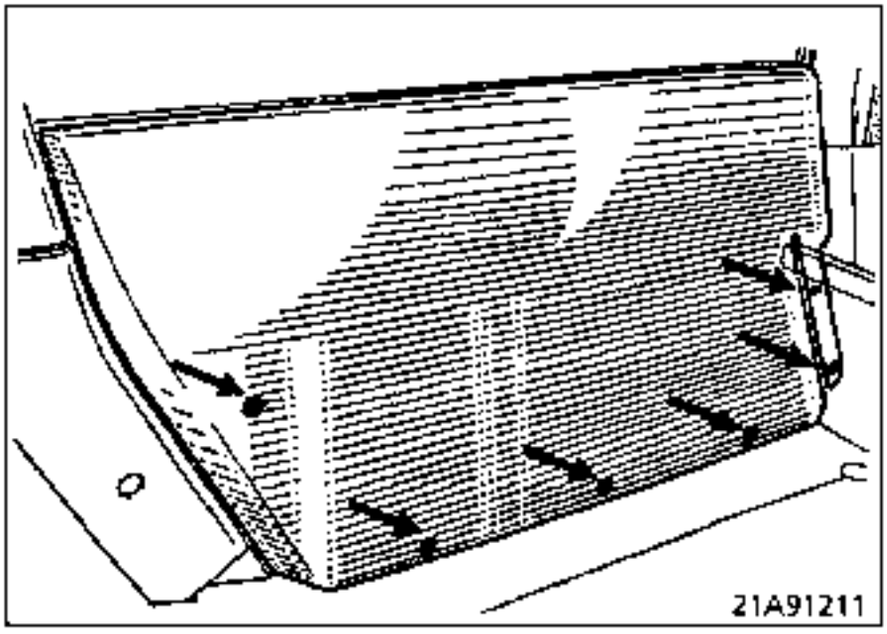






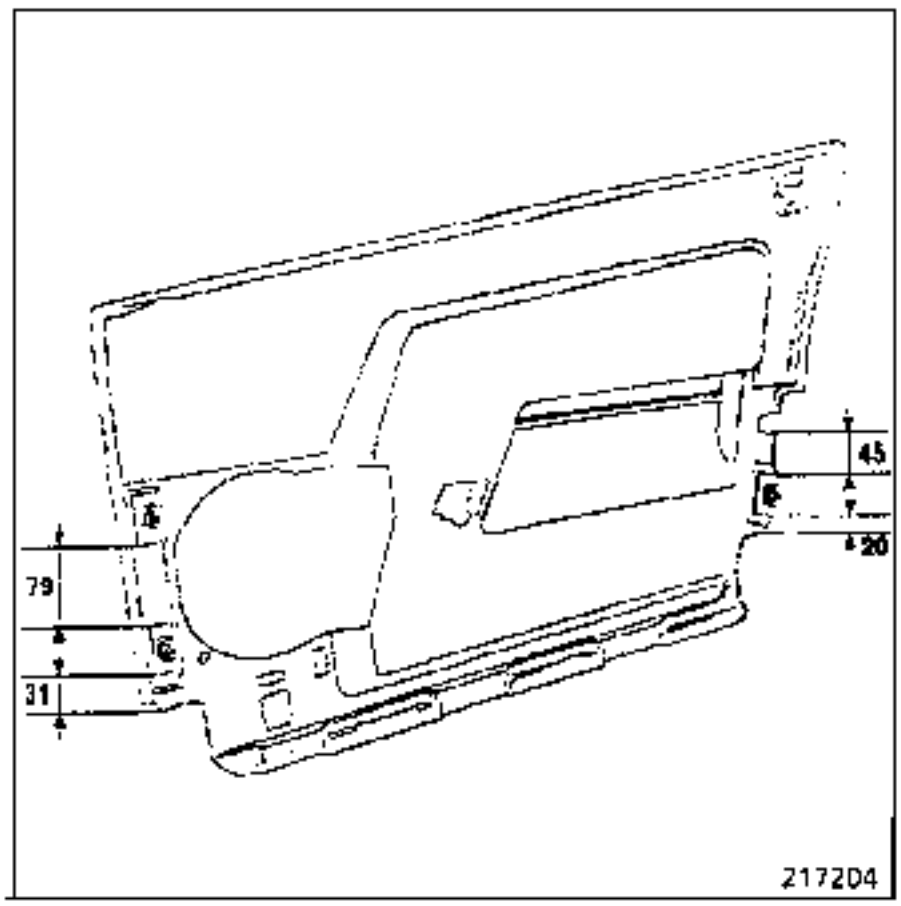
The plastic sheet is removed by cutting the mastic using a blade.

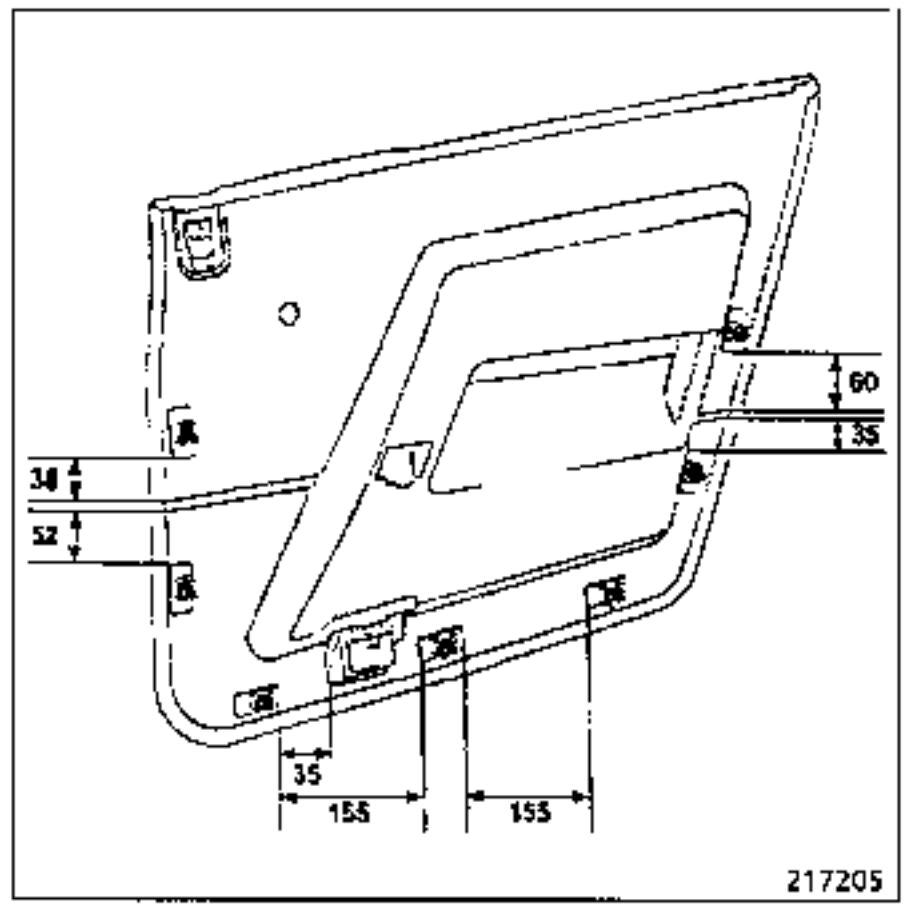
(1) Raise and turn by a quarter turn, then proceed in the same way as for locking the front door.



REMOVING THE PLASTIC TRIM PANEL

- The plastic trim panel is secured by 6 "fir tree" type pressure fasteners. Use tool **FACOM D115**.
- Push the plastic trim panel upwards in order to free the inner rubbing strip (1).





When removing a door trim panel, one or more clip mounting bars may come unstuck from the trim.

The bar can be stuck back using the **3M** two-part product, Part No : **77 01 421 117**.

METHOD

1 - Roughen the part of the bar to be stuck (use **P80** abrasive paper).

2 - Squeeze out the required amount (see instructions supplied with the product).

Proportions for the mixture : **50 %** of the white part.
50 % of the black part.

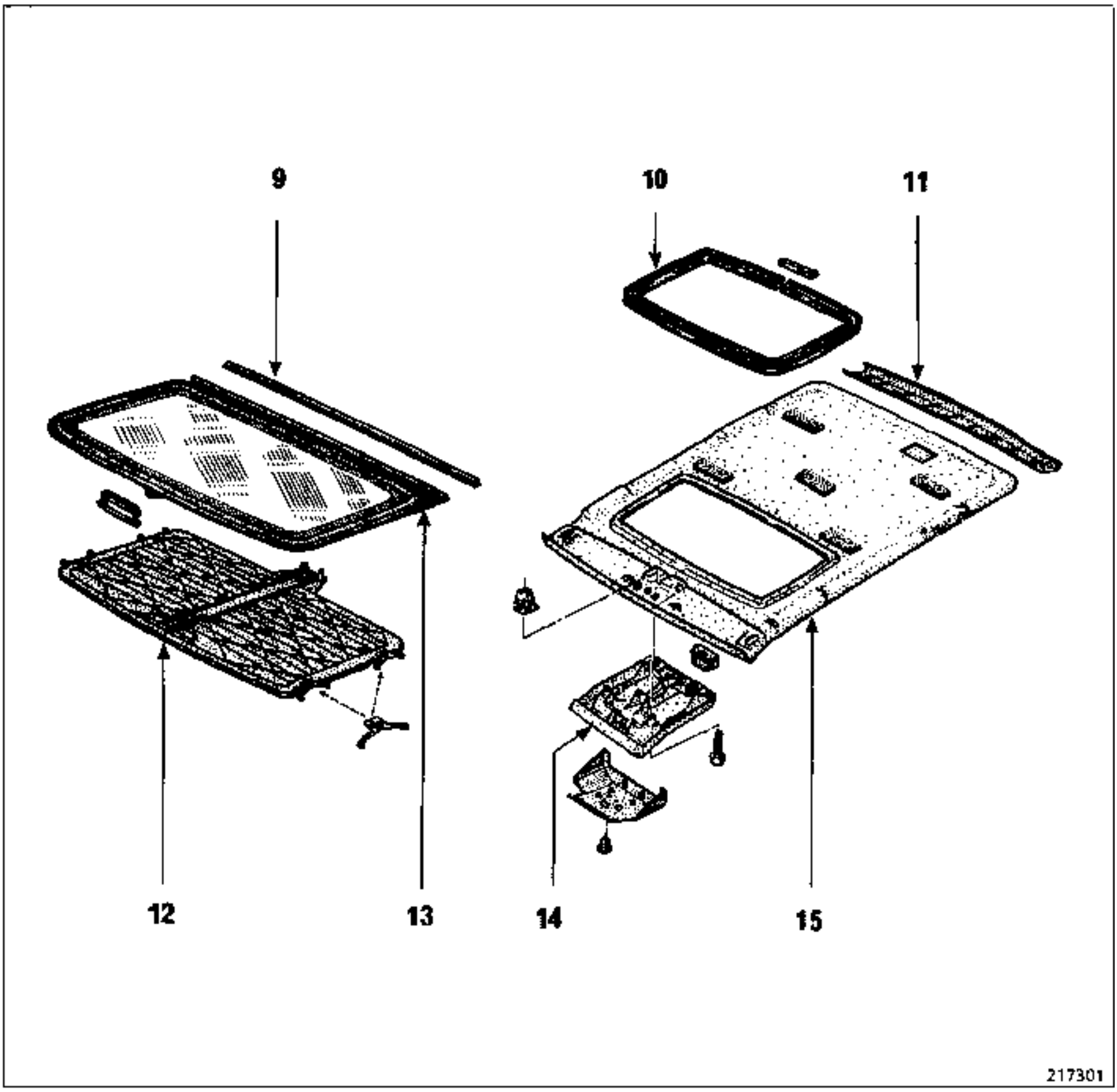
3 - Mix the two components together well to obtain a homogeneous paste.

4 - Apply the mixture to the part of the bar to be stuck.

5 - Place the bar in its original position (see diagram for dimensions) and press gently to spread the adhesive.

6 - Leave the adhesive to harden for **10 to 15 minutes**.

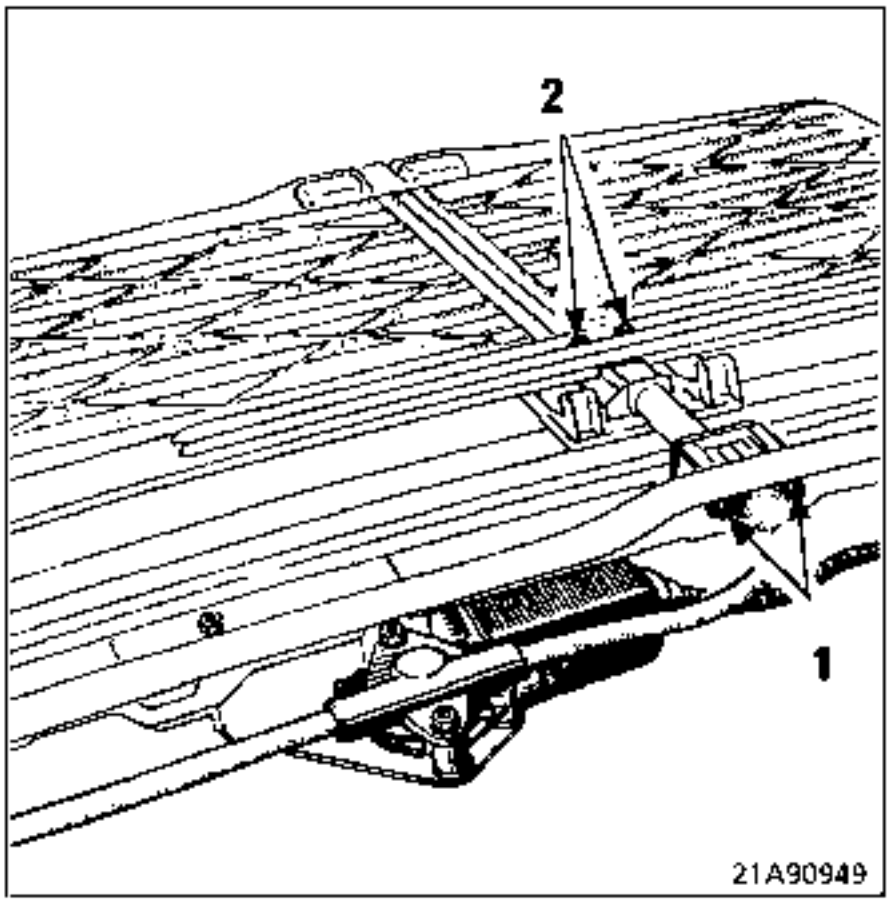
DESCRIPTION OF PARTS



9 - Sliding panel seal
10 - Finishing profile
11 - Roof rear cross member trim
12 - Screen
13 - Sliding panel glass
14 - Roof console
15 - Headlining

REMOVING THE SCREEN

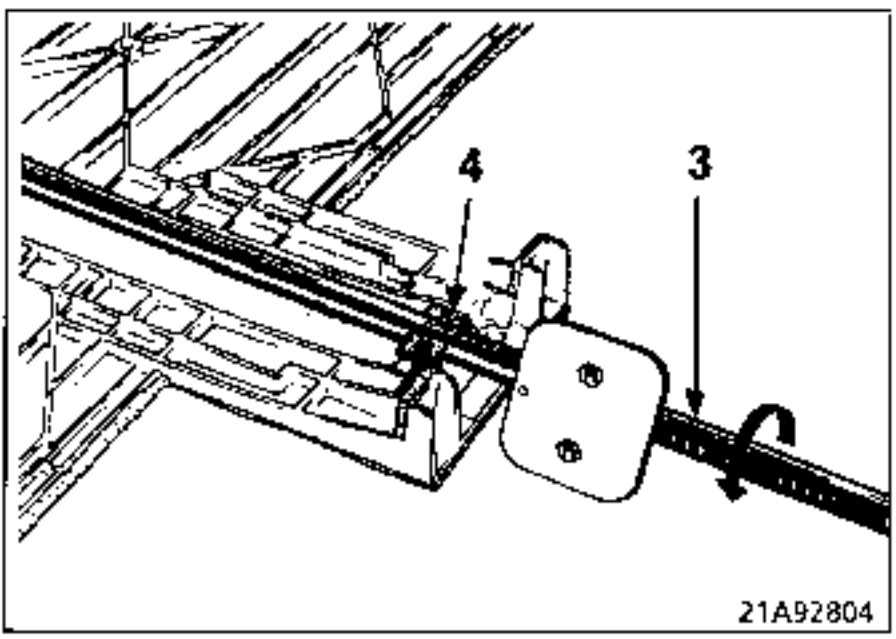
Note : The rain channel must be removed in order to perform this operation.



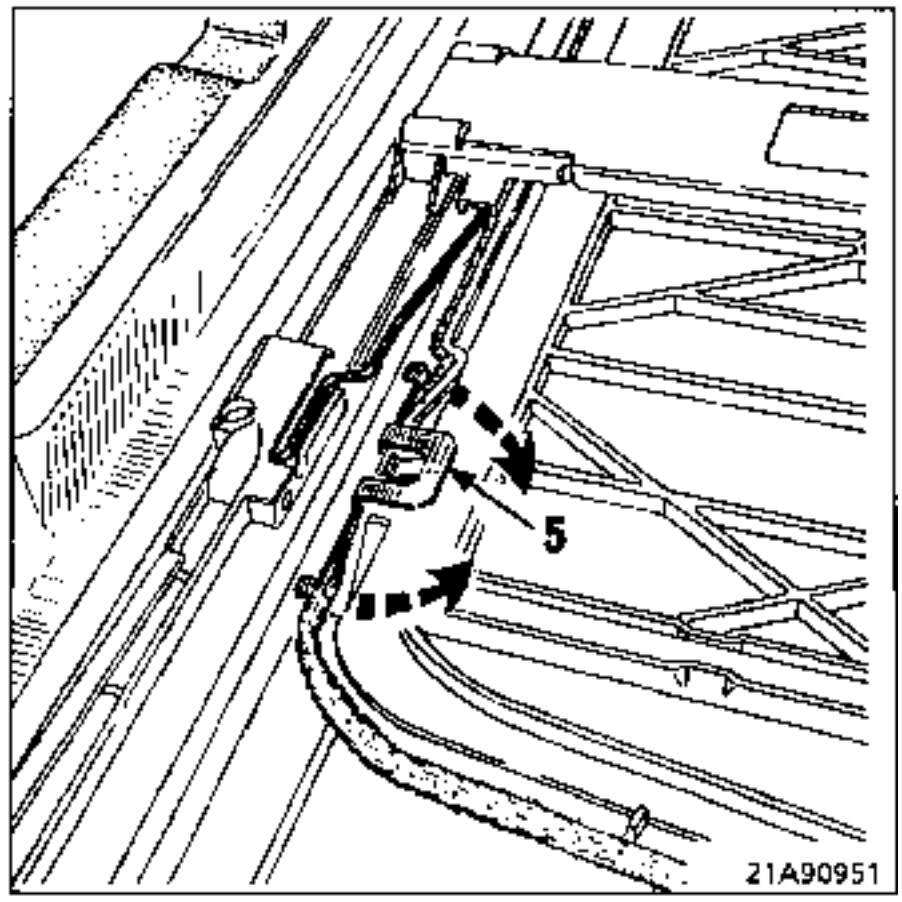
Remove the 2 nuts (1) securing the control cable sheathing to the rain channel.

Remove the 2 screws (2) securing the control cable end piece to the centre cross-piece of the mechanism.

Move the mechanism to the "open" position.



Turn the guide tube (3) on its shaft, around hook (4), to separate it from the screen.

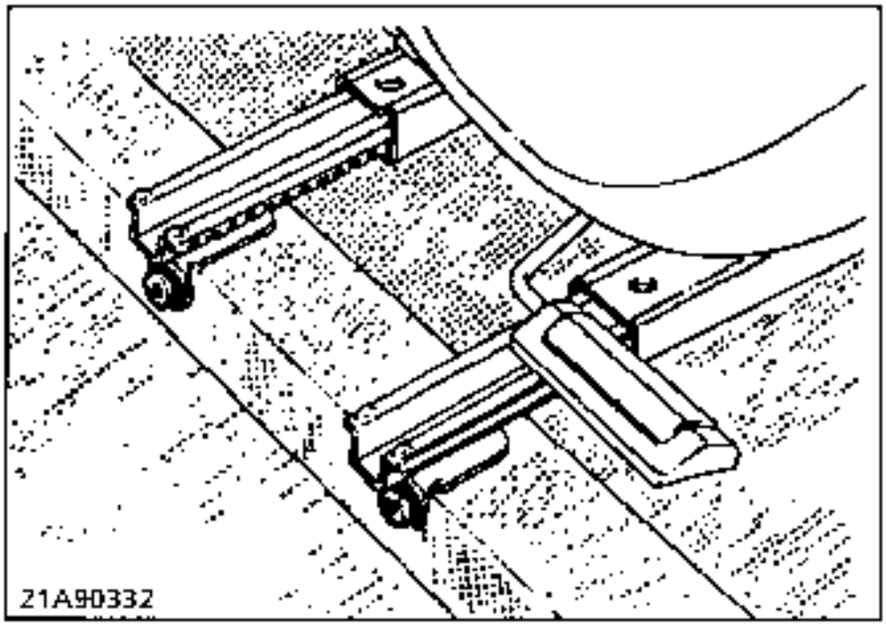


Using a screwdriver, free the guide springs (5) from the rails and remove the screen.

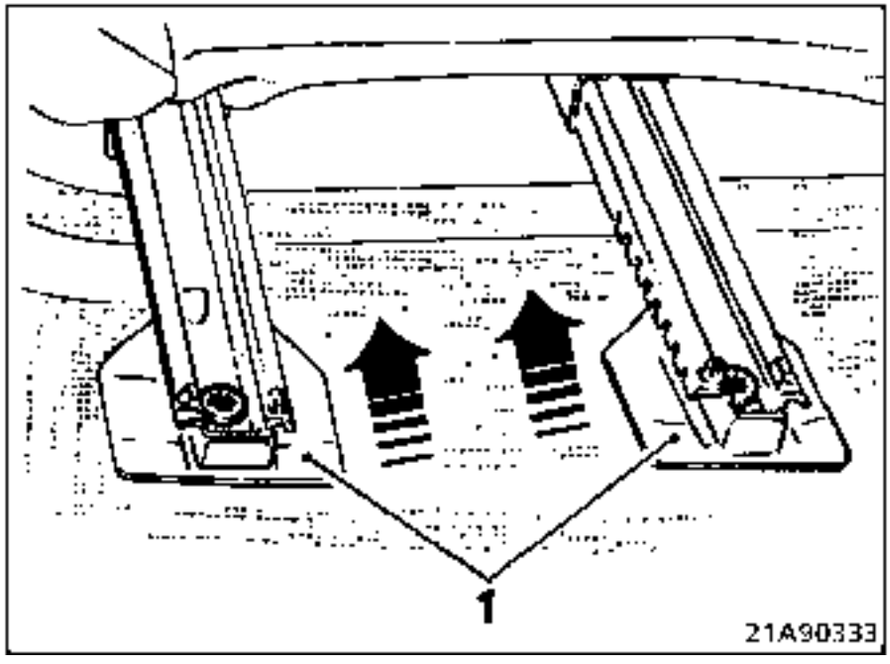
REMOVAL

Remove :

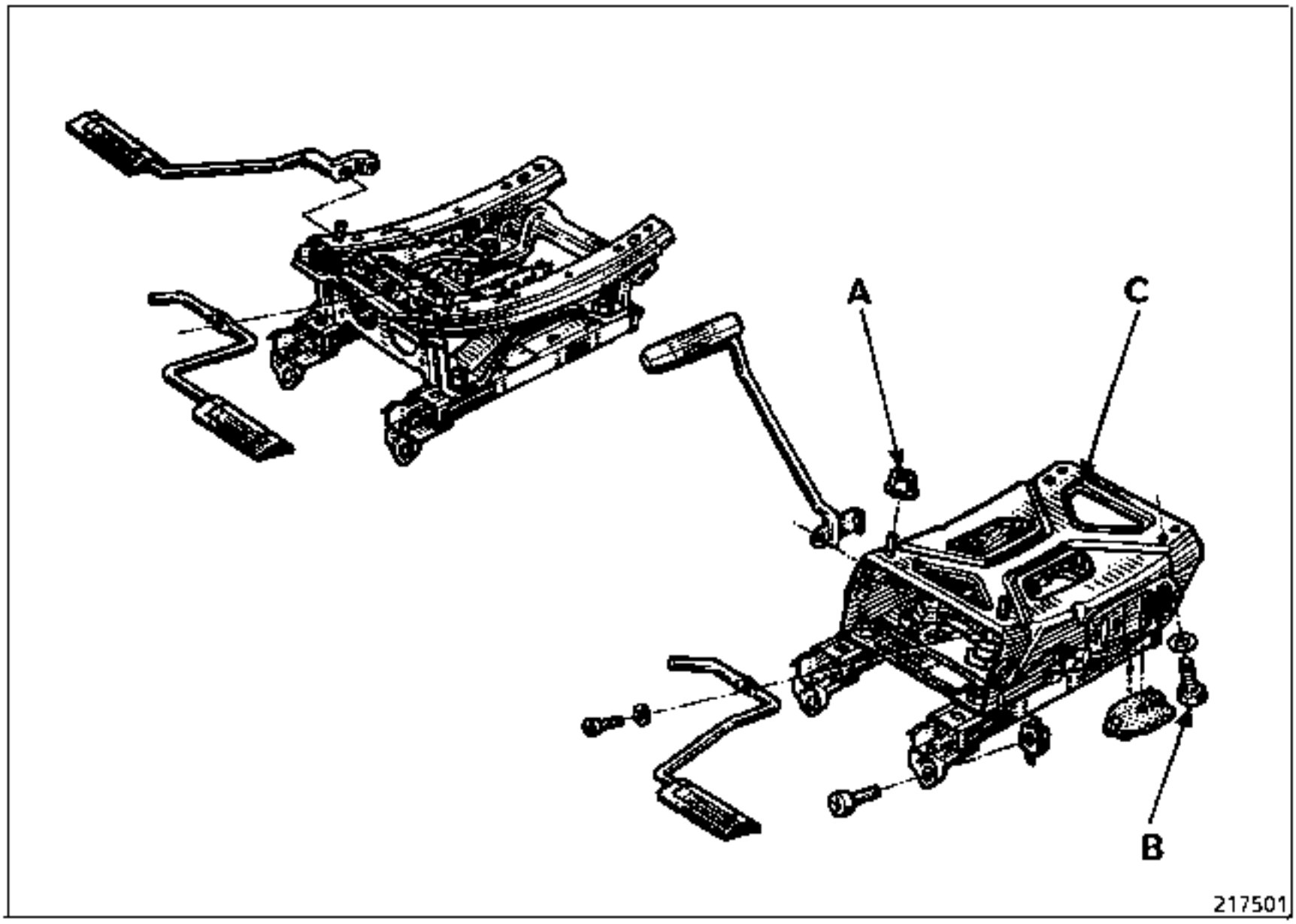
- the two front mounting screws,



- the two rear mounting screws,
- the seat with the two anchorage plates (1), pulling it towards the front.

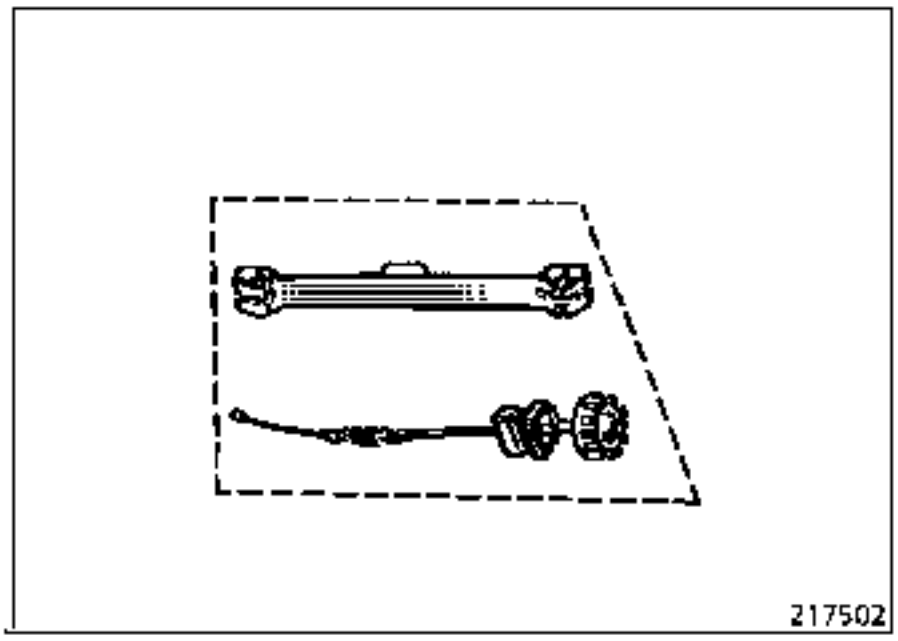


REMOVAL - REFITTING



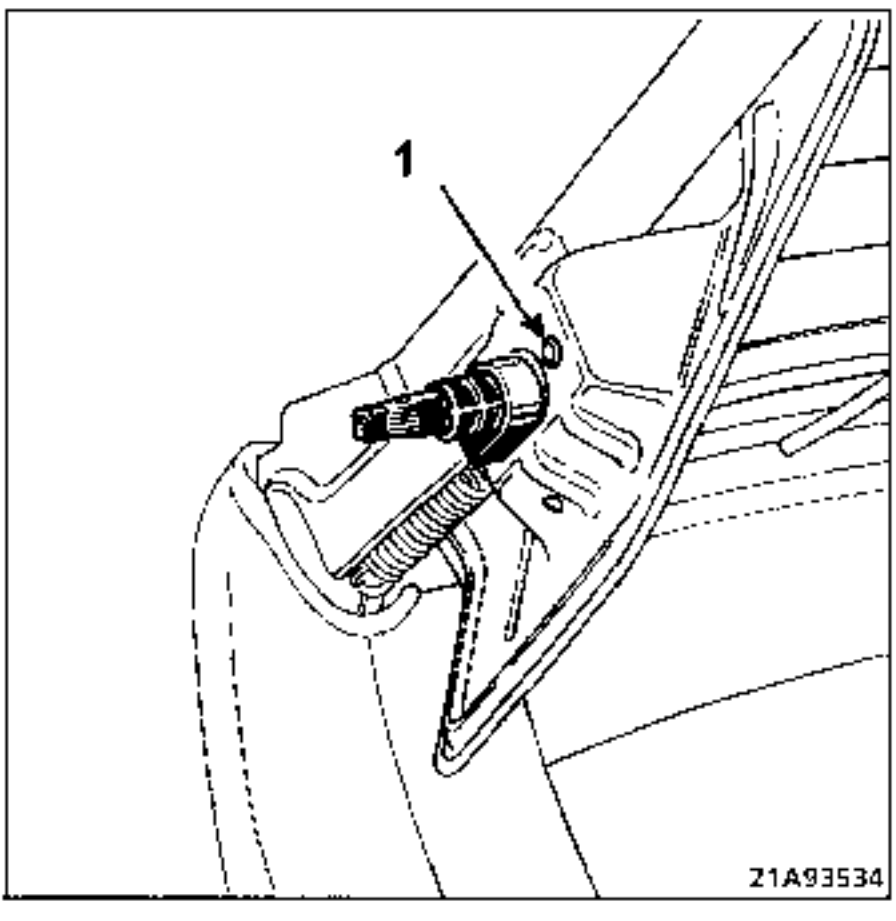
After removing the seat and stripping the seat section, unscrew the two nuts (**A**) and bolts (**B**) to separate the seat frame from the sub-frame (**C**).

LUMBAR ADJUSTMENT

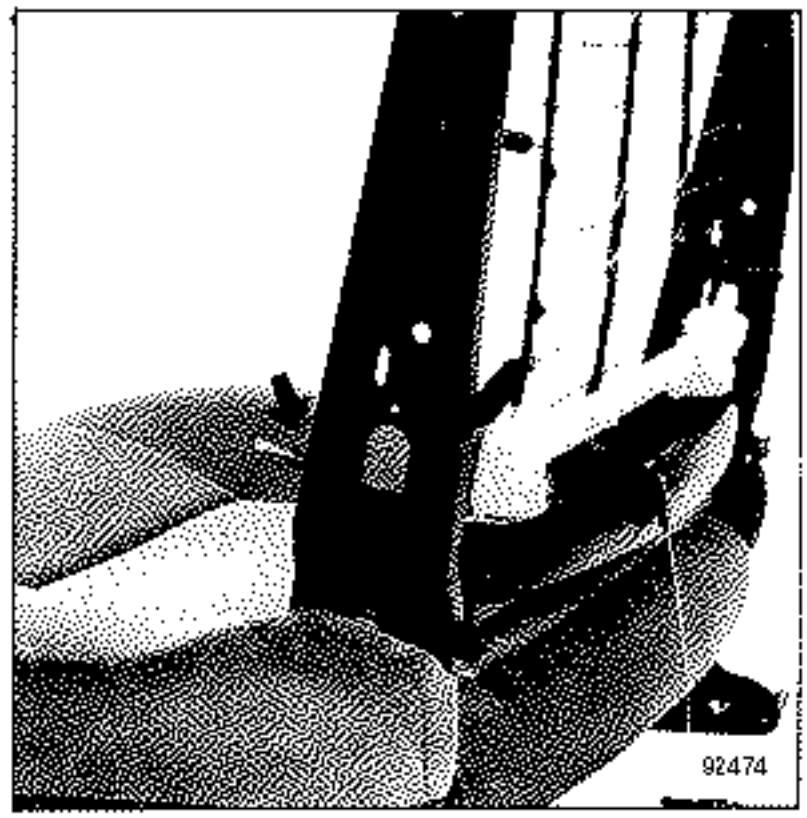


REMOVAL

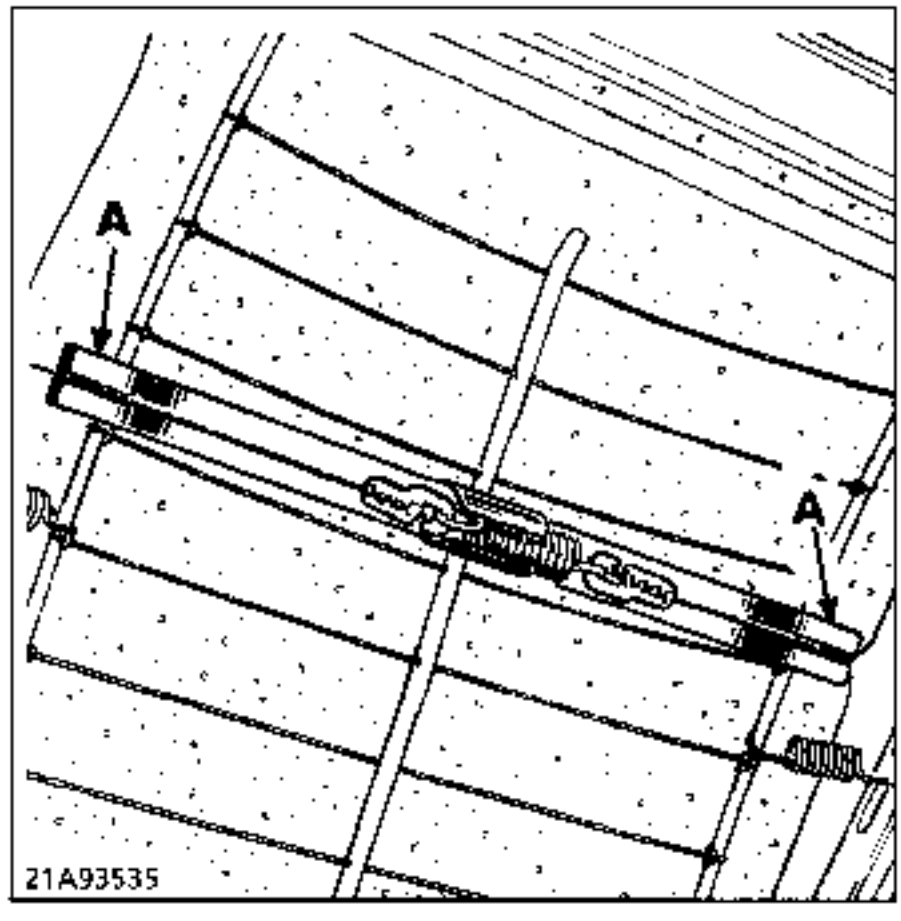
After stripping the seat back, adjust the mechanism so that it is in the "extended" position.



Remove the control mounting rivet.



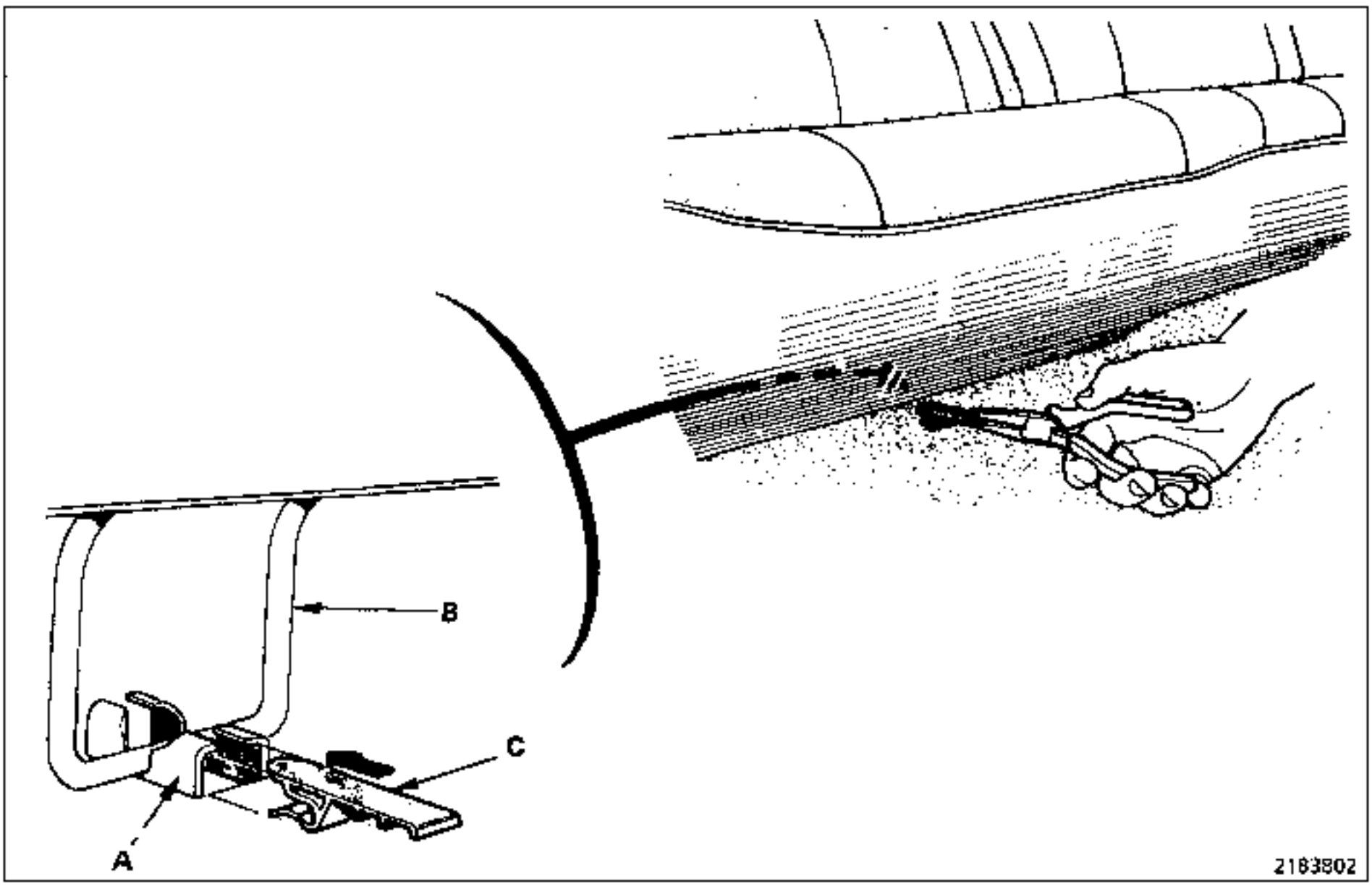
Using a pair of pliers, remove the cable stop and pass the cable through the seat frame.



Unclip the plastic guide (A).

On refitting, assemble the two cables on the centre spring.

REMOVING THE SEAT



A Mounting bar

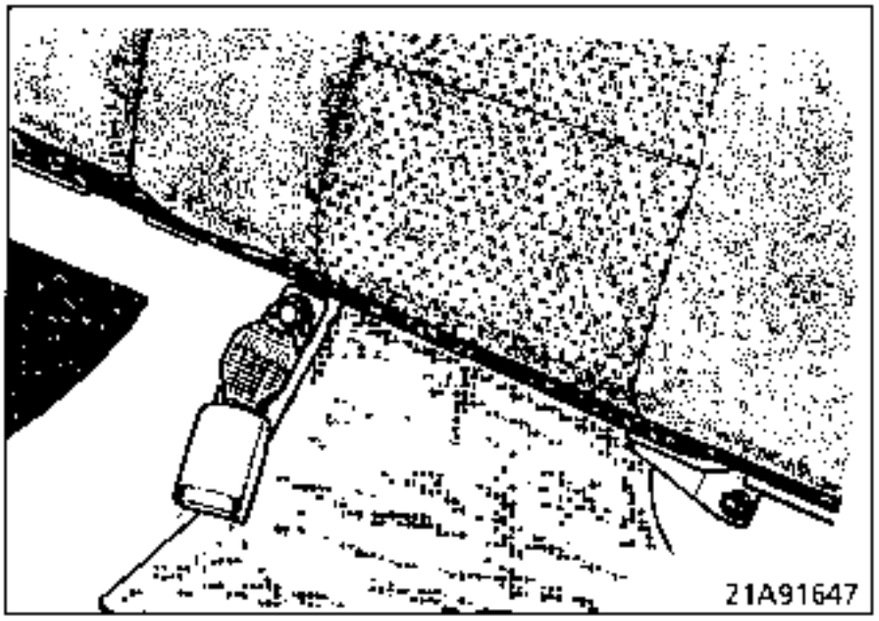
B Bench seat frame

C Mounting tab

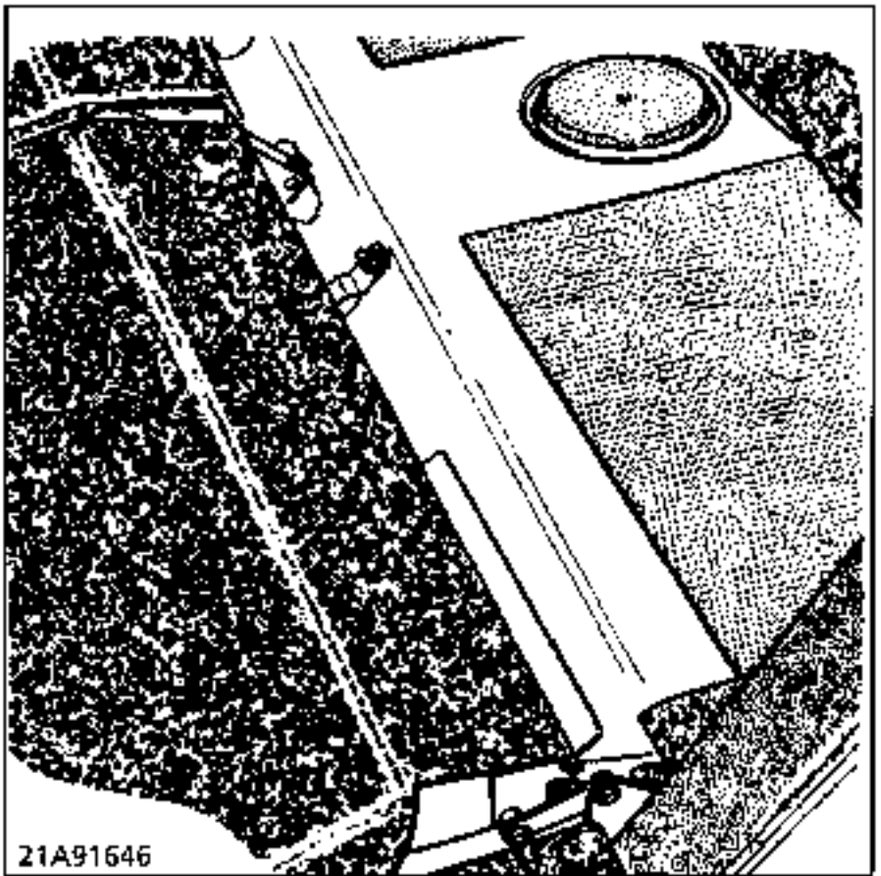
REMOVING THE SEAT BACK

Remove :

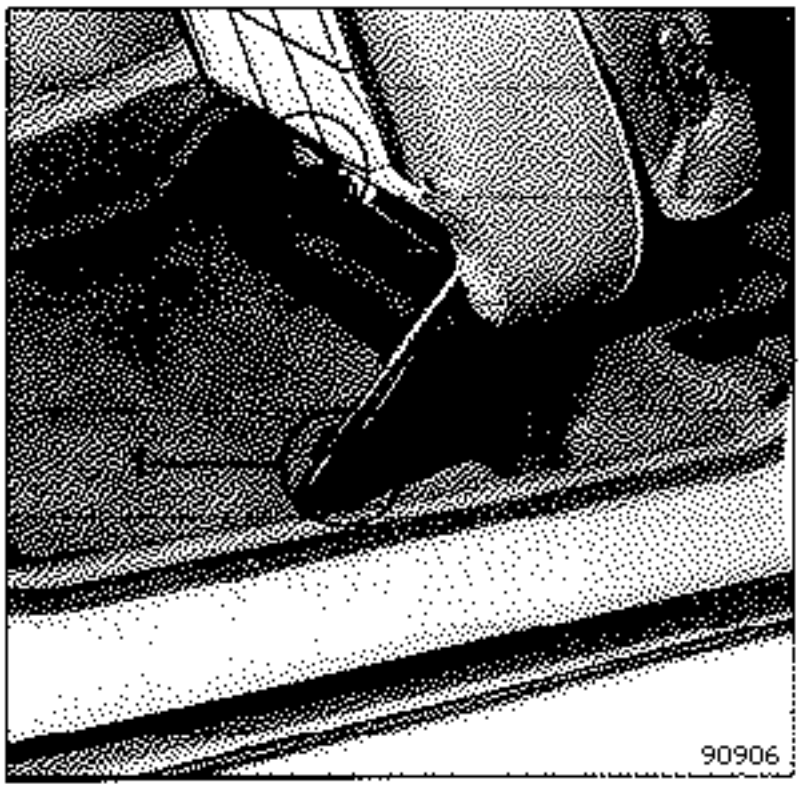
- the bolts securing the seat belt stems,



- the nuts securing the assembly of the two seat backs (2/3 and 1/3 split seat).

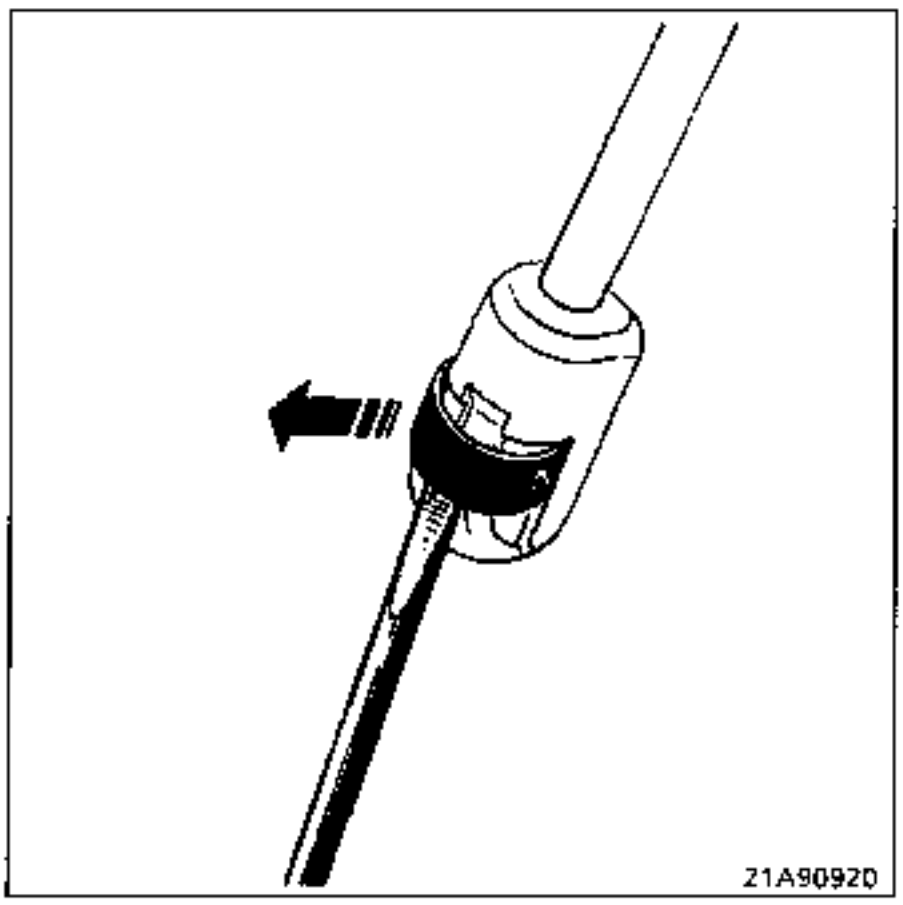


Removal



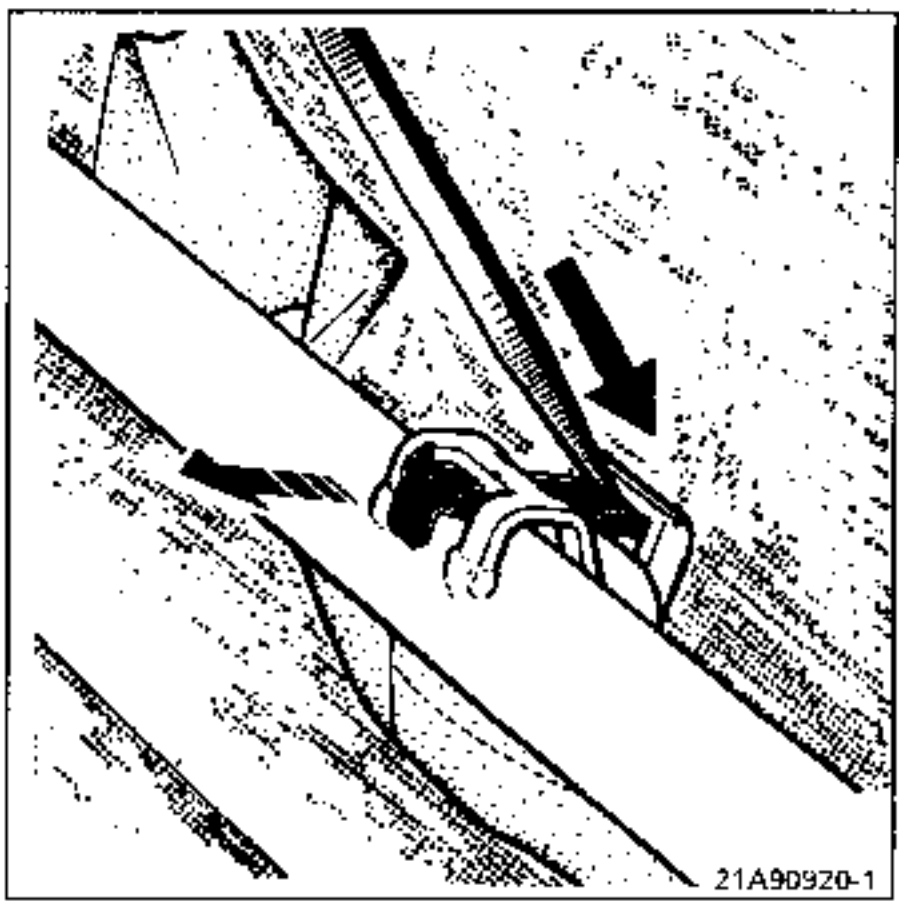
Unclip the compensator - detail **1**.

Remove the hinge clip - detail **2**.



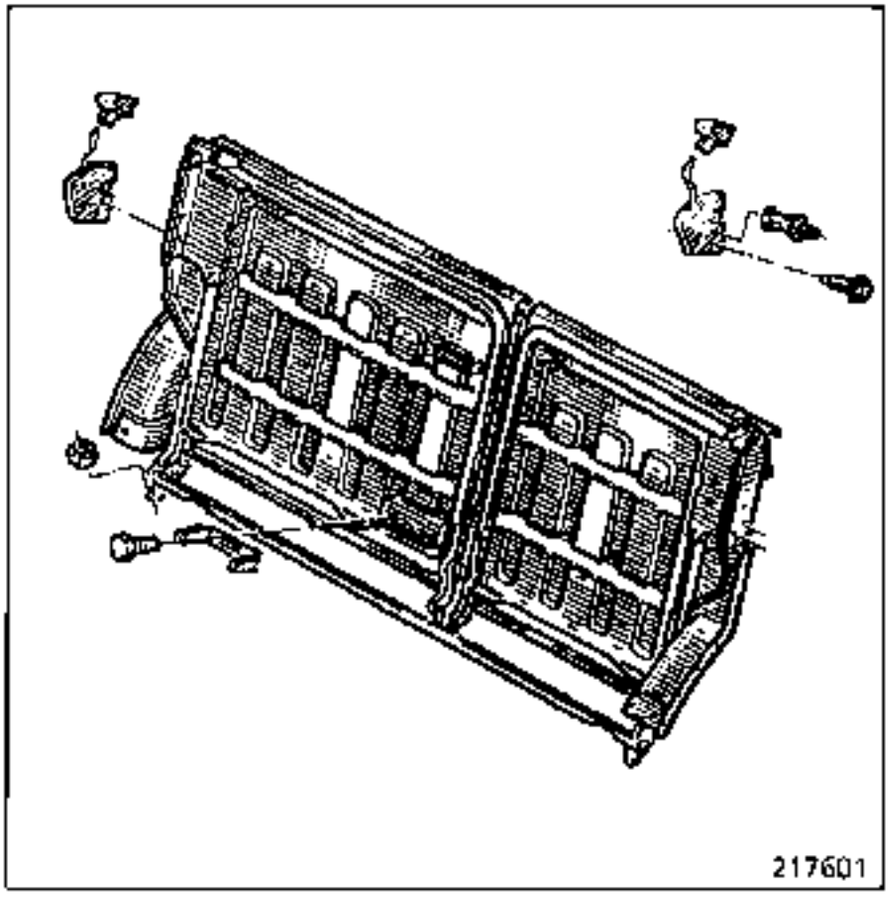
DETAIL 1

Using a screwdriver, open the retaining clip but do not remove it from its location.

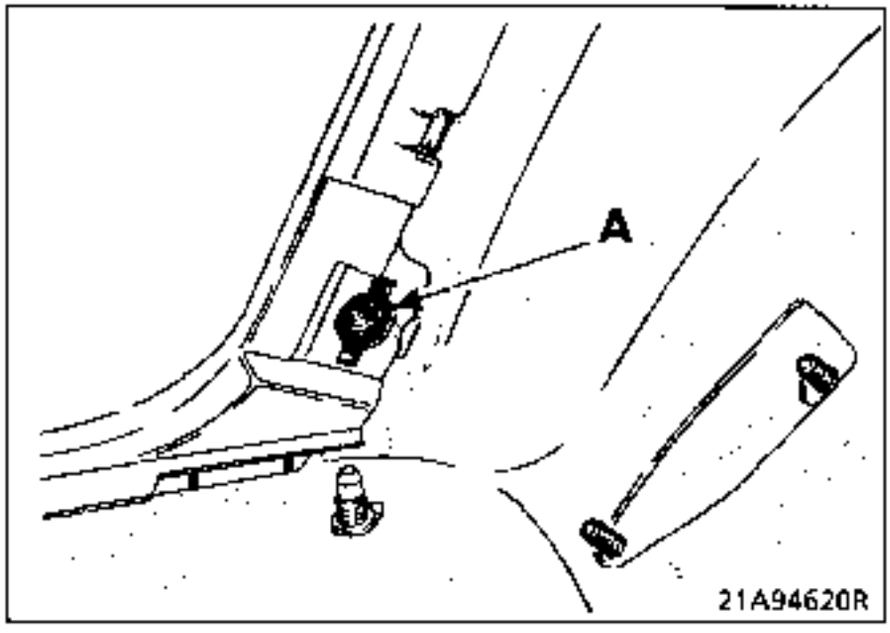


DETAIL 2

Using a screwdriver, remove the clip by pressing on it as shown in the diagram.



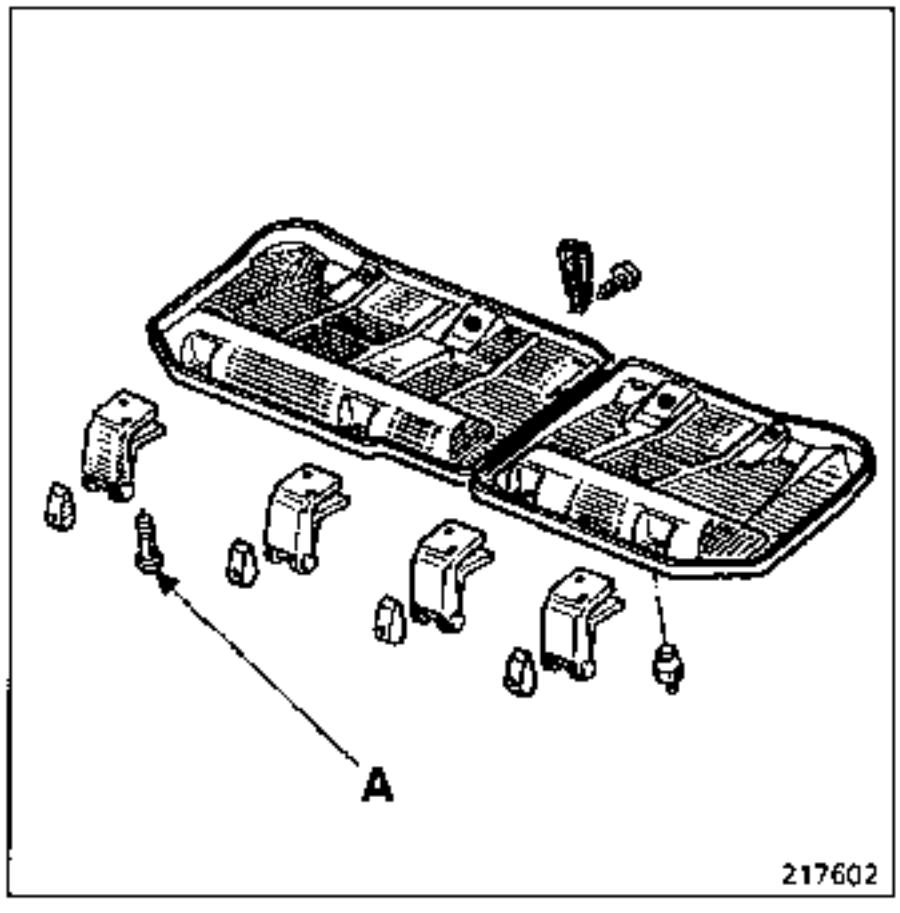
REMOVAL



Undo the seat locks.

Remove the rear lower seat belt mounting (A).

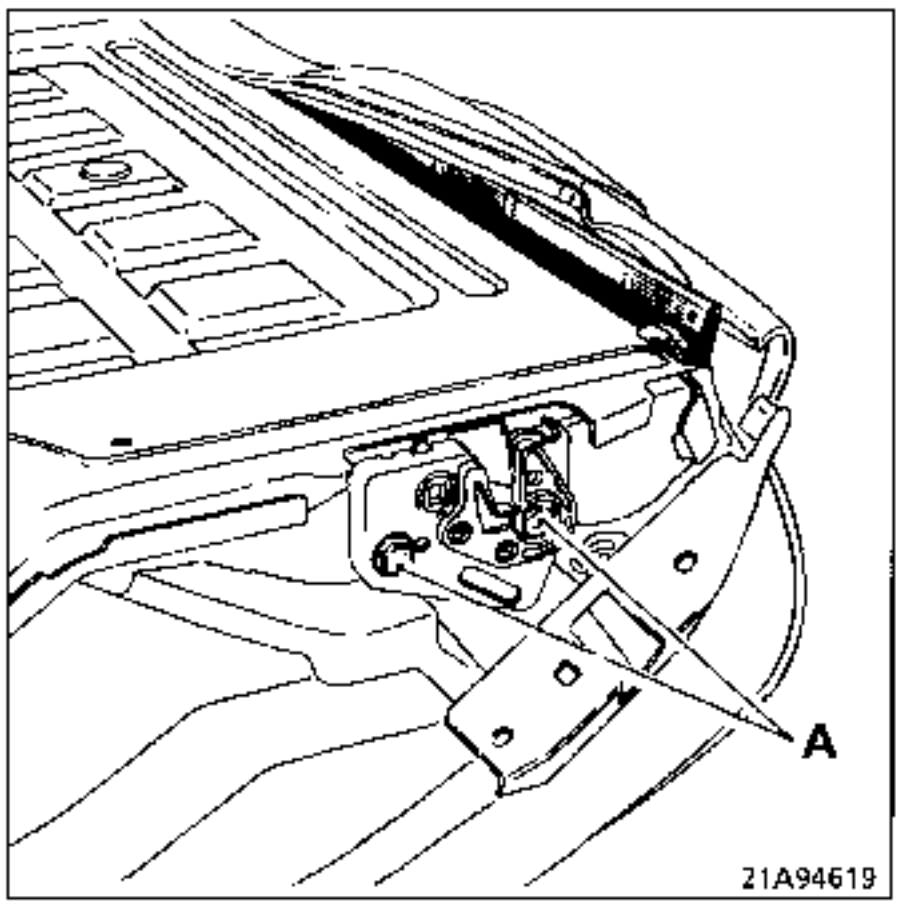
Remove the four securing nuts.



REMOVAL

After tipping the bench seats forwards, remove the bolts (A).

Seat lock 1/3 - 2/3



REMOVAL

After removing the trim from the seat back concerned, remove the lock by undoing the two bolts (A).

STRIPPING THE SEAT

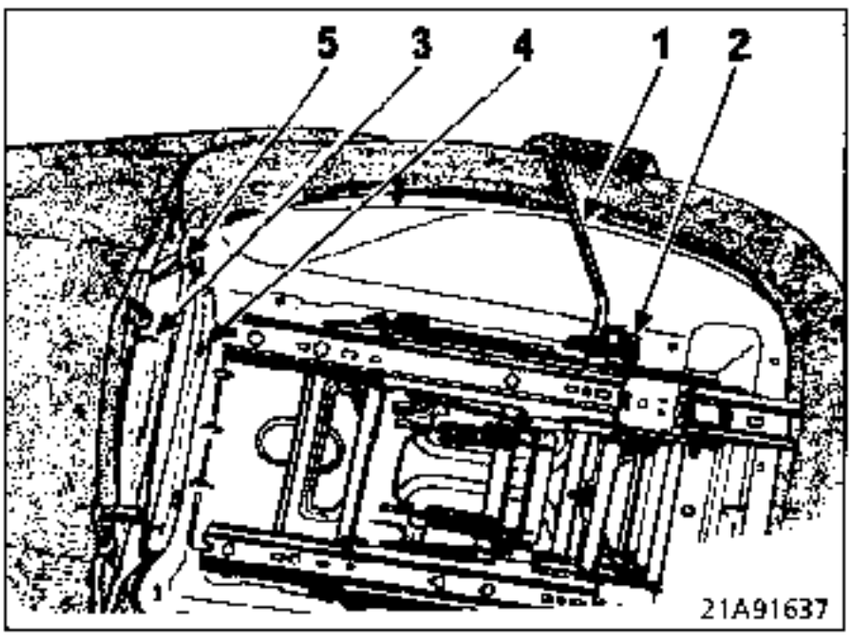
Remove handle (1)by unscrewing screw (2).

Unpick :

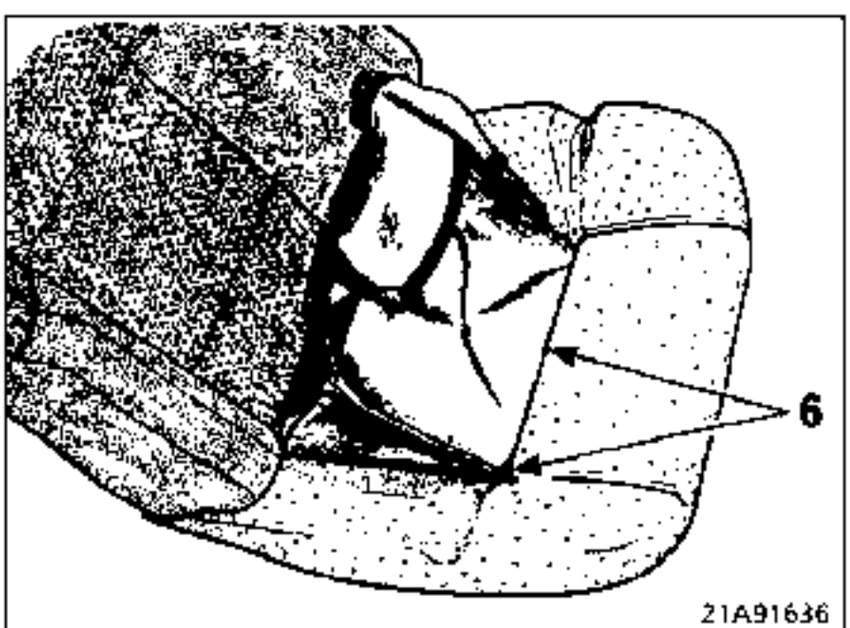
- the two hooks (3),
- the periphery of the trim (4).

Cut the two "pig's nose" clips (5).

Fold back the trim over the top of the seat section.



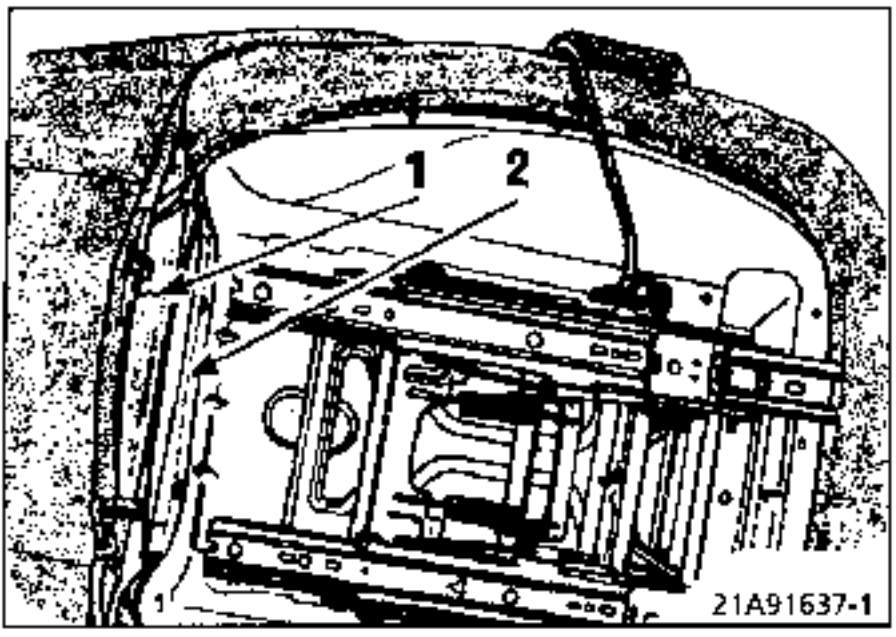
Cut clips (6) securing the three trim rods to the foam.



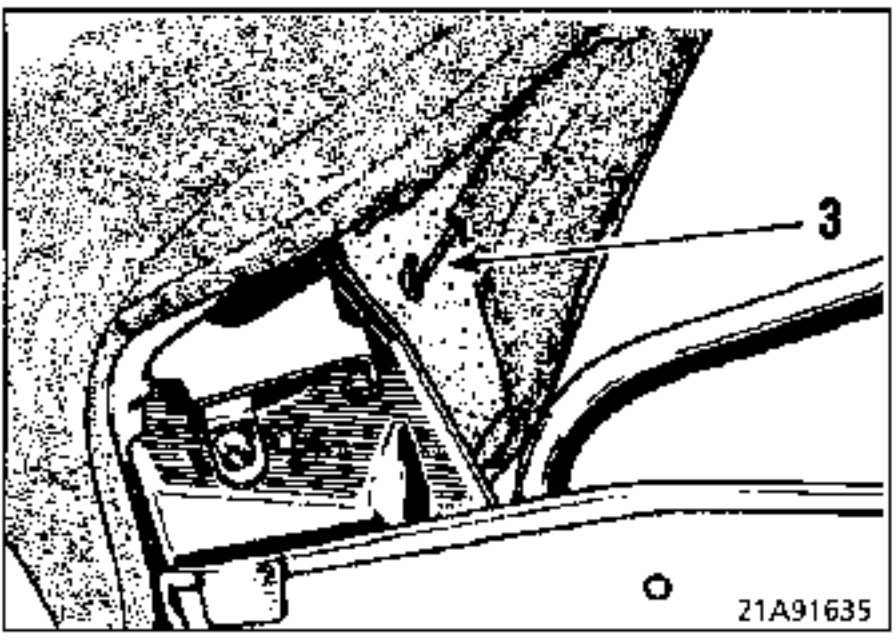
STRIPPING THE SEAT BACK

Unpick :

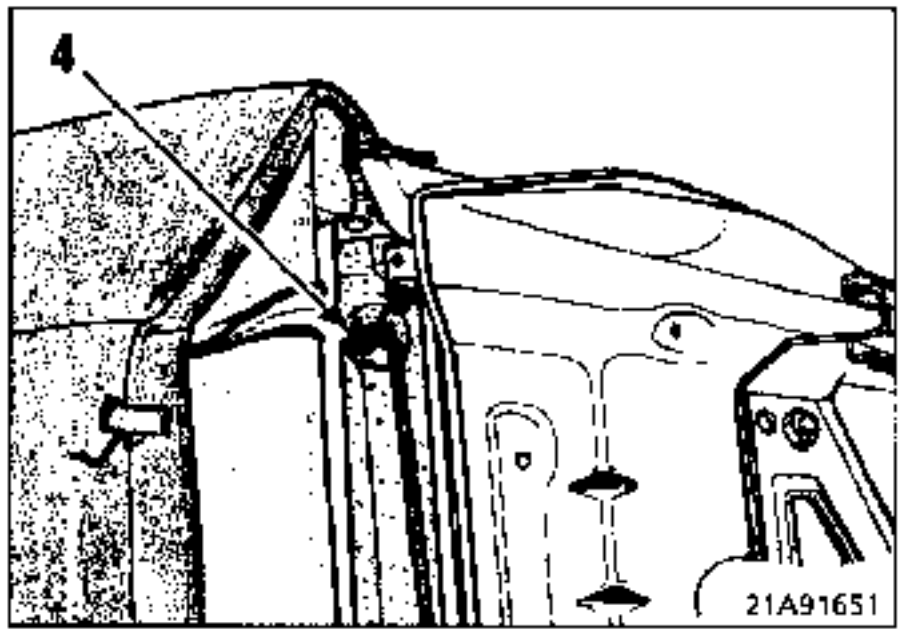
- the two hooks (1),
- the trim (2),

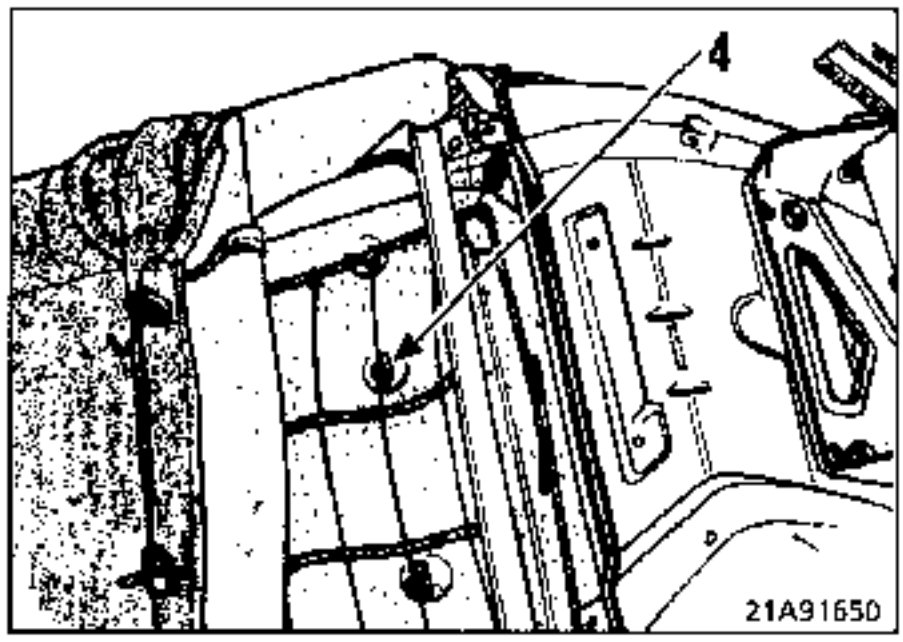


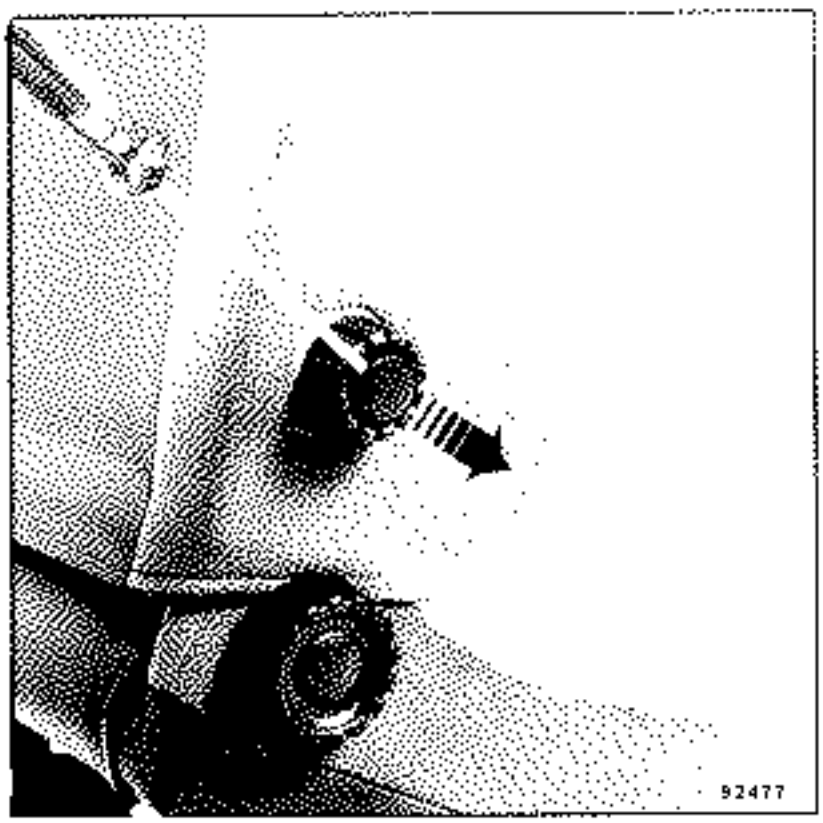
- the two pins (3) located either side of the seat.



Cut the "pig's nose" type clips (4) securing the trim to the seat frame.

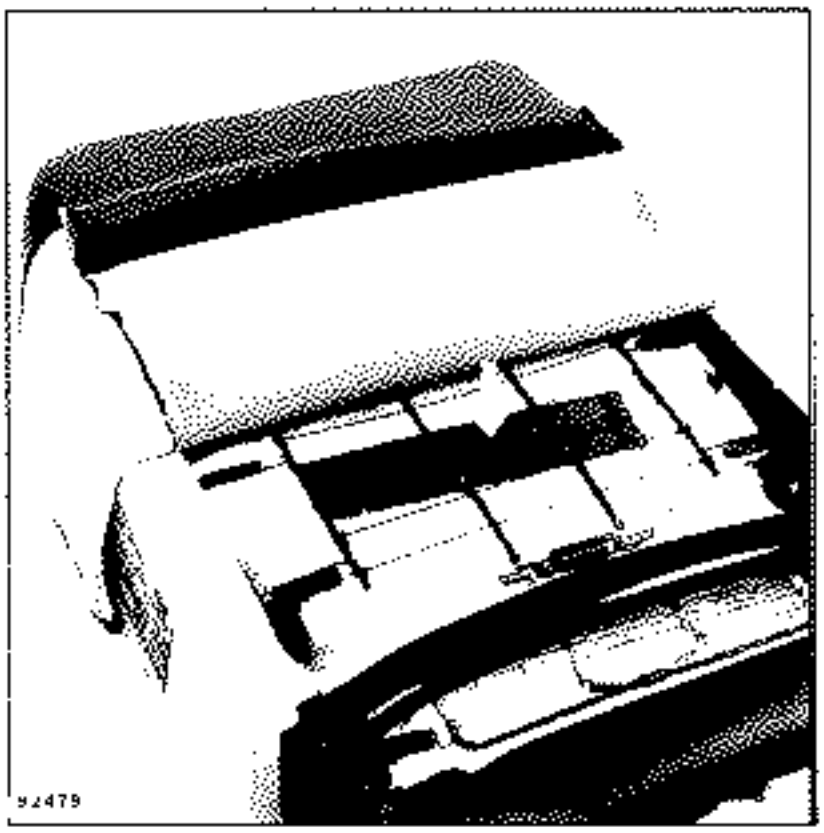




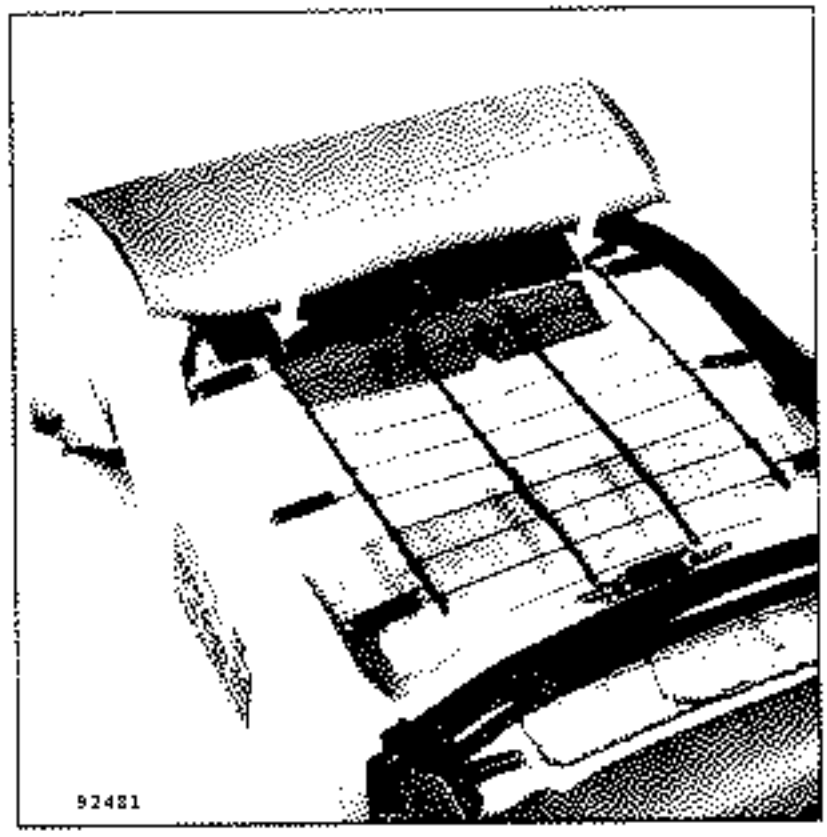


If the seat is equipped with this, use a screwdriver to remove the central clip from the seat back adjusting knob and the knob itself, by pulling on it to remove it.

From behind the seat, remove the two hooks and unclip the two hooks holding the trim.

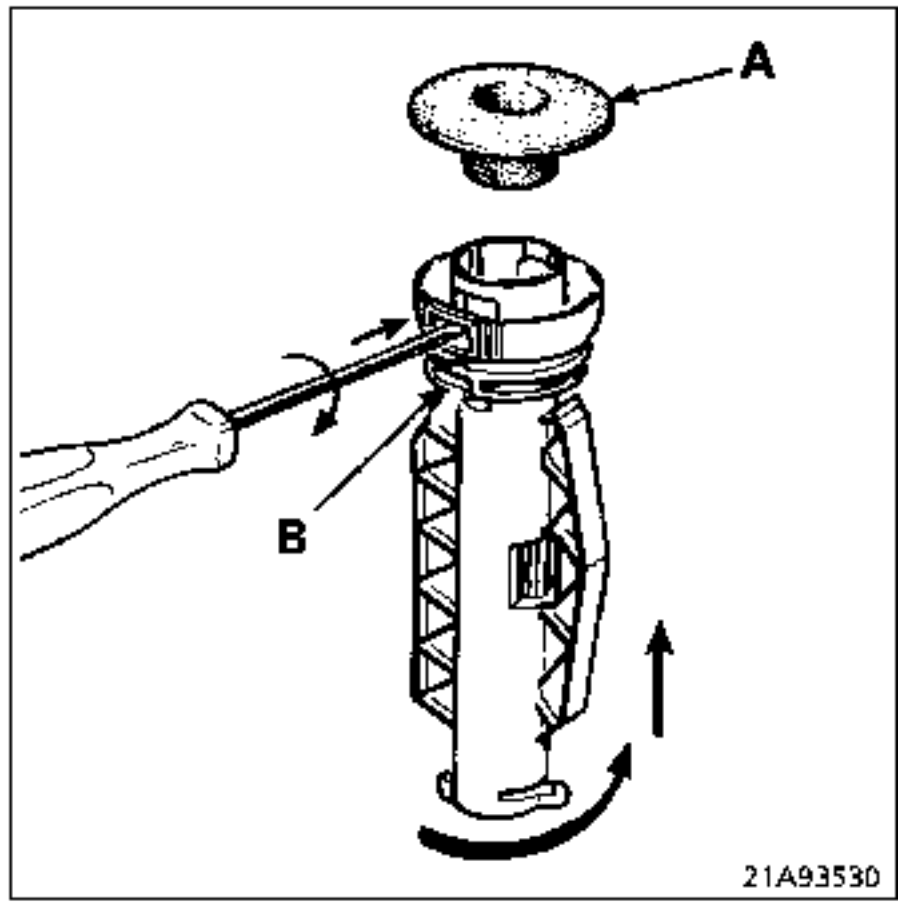


Lift up the trim. Pass the cardboard used to stretch the fabric through the foam.



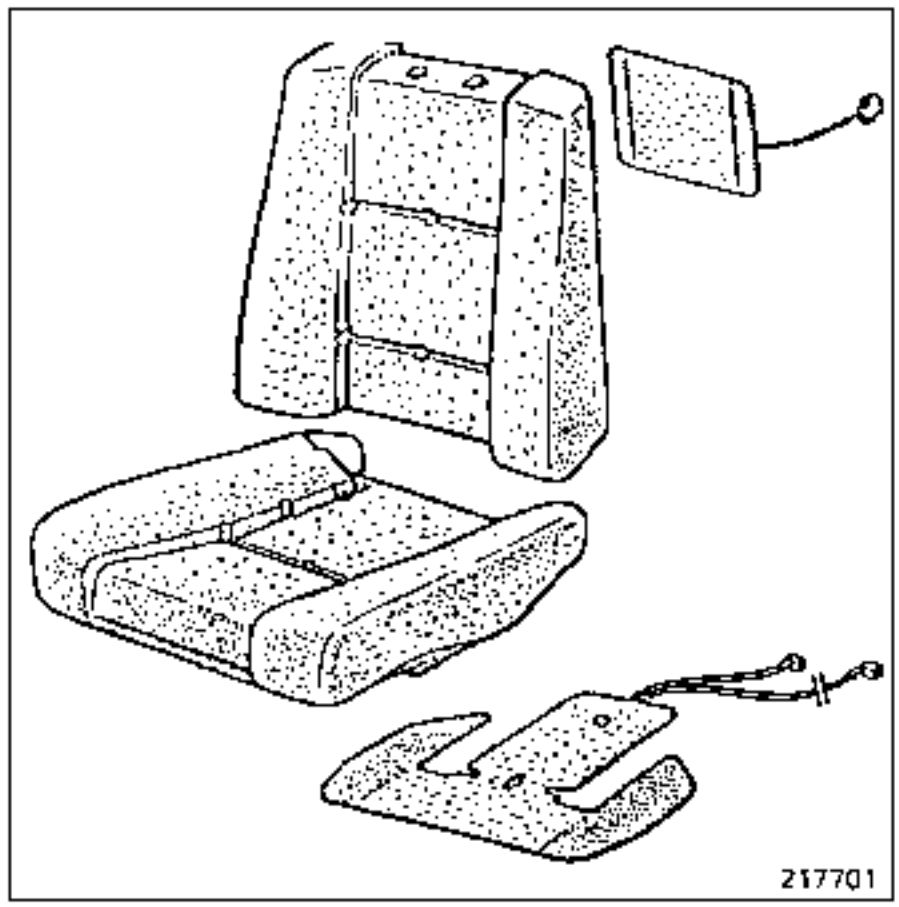
Lift the trim up further.

Cut the two clips securing the upper rod and pass the second piece of cardboard through the foam to separate it from the trim.



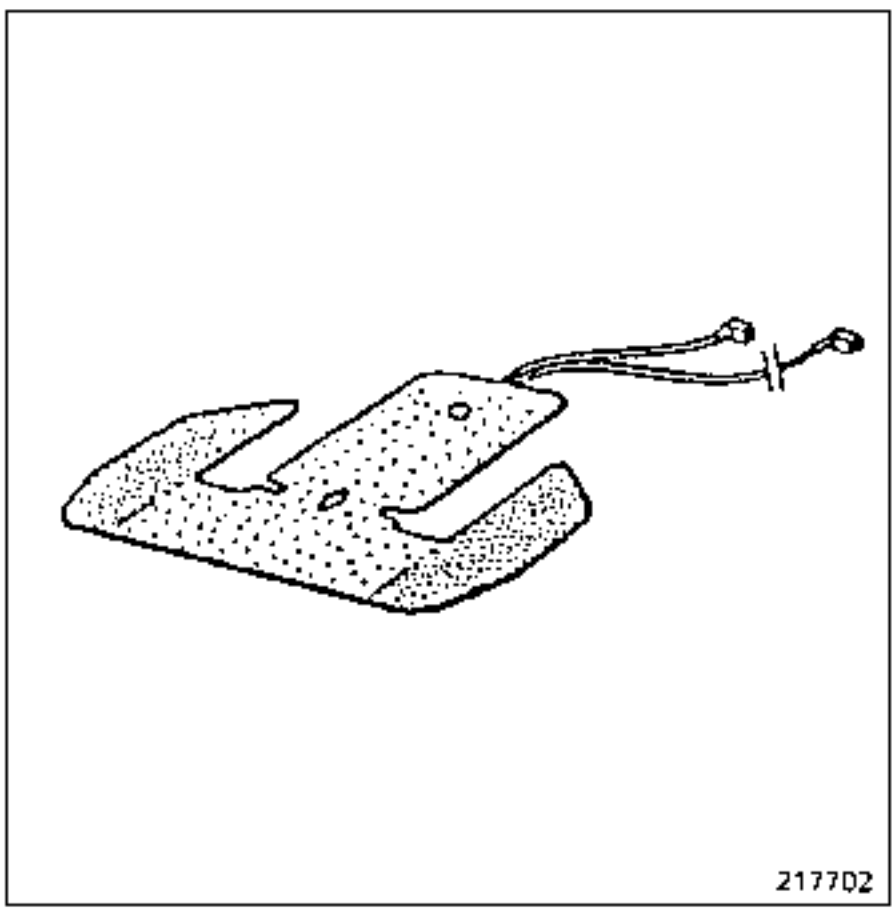
In order to remove the trim completely, unclip the two covers (A) from under the trim.

To remove the head restraint guides, lift tabs (B) and turn them in the direction shown above.

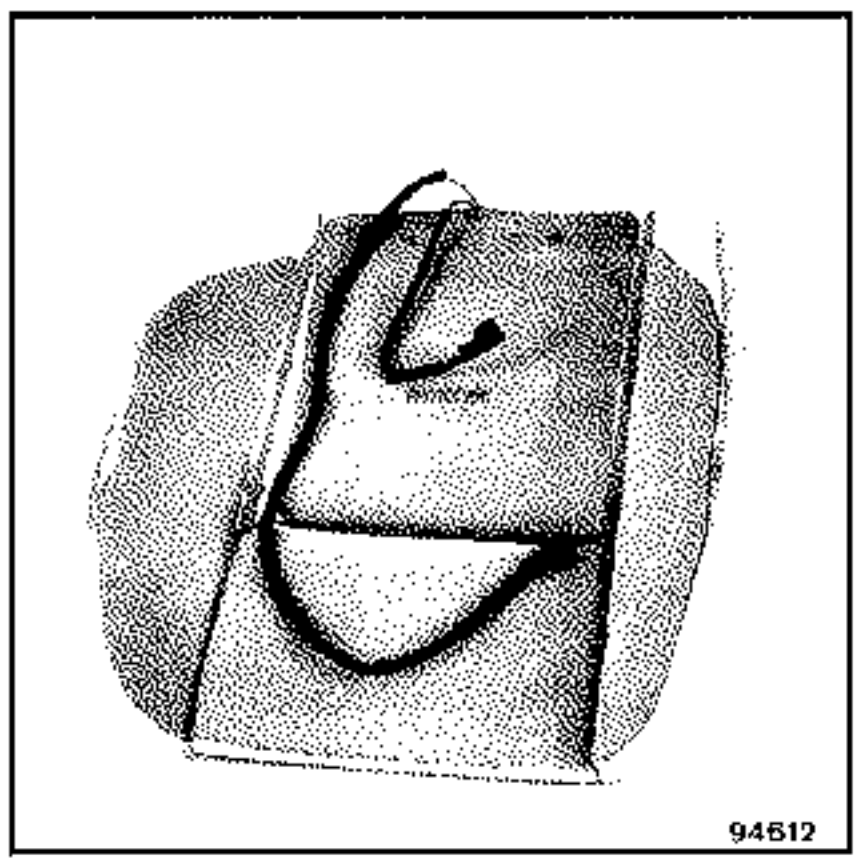


Seat back, Part No : **77 00 809 758**
Bench seat, Part No : **77 00 809 757**

REMOVAL



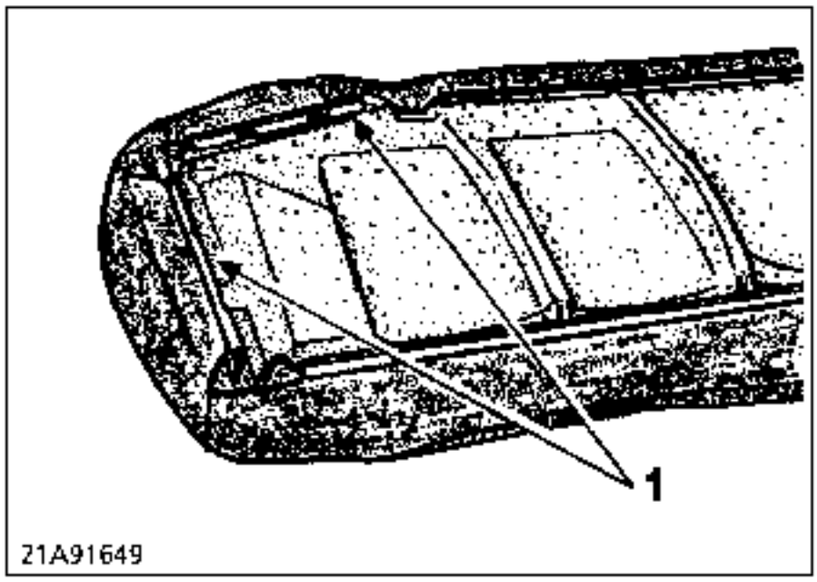
After removing the trim, carefully unstick the heating unit from the foam.



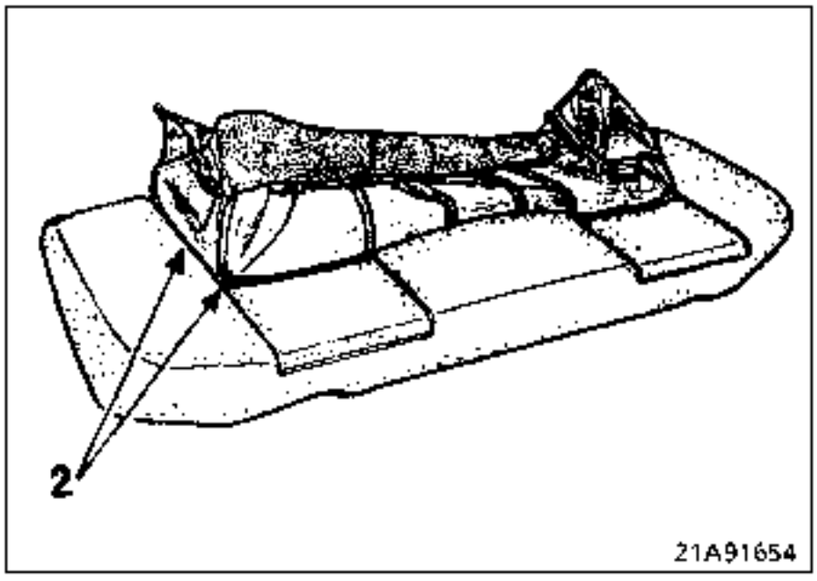
To refit it, simply stick the system back down into the same position.

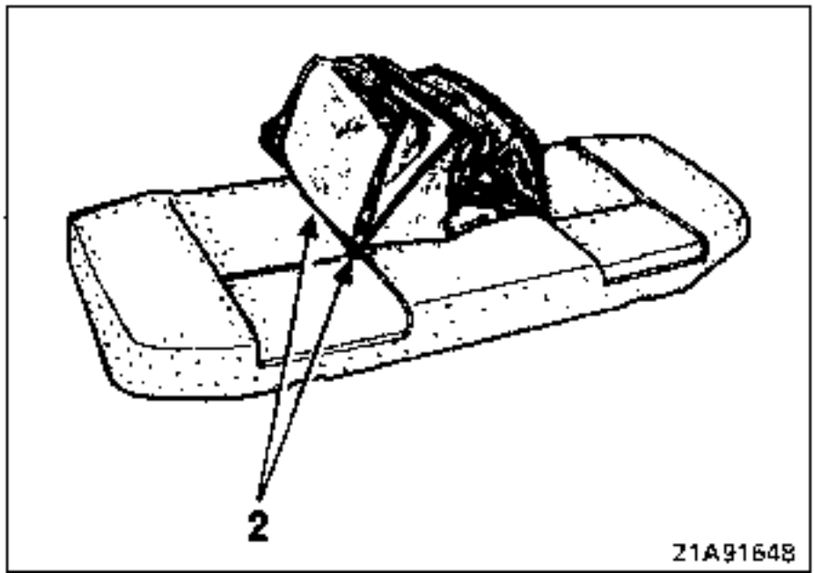
STRIPPING THE SEAT SECTION

Unclip the plastic corner pieces (1) from the edge of the trim.



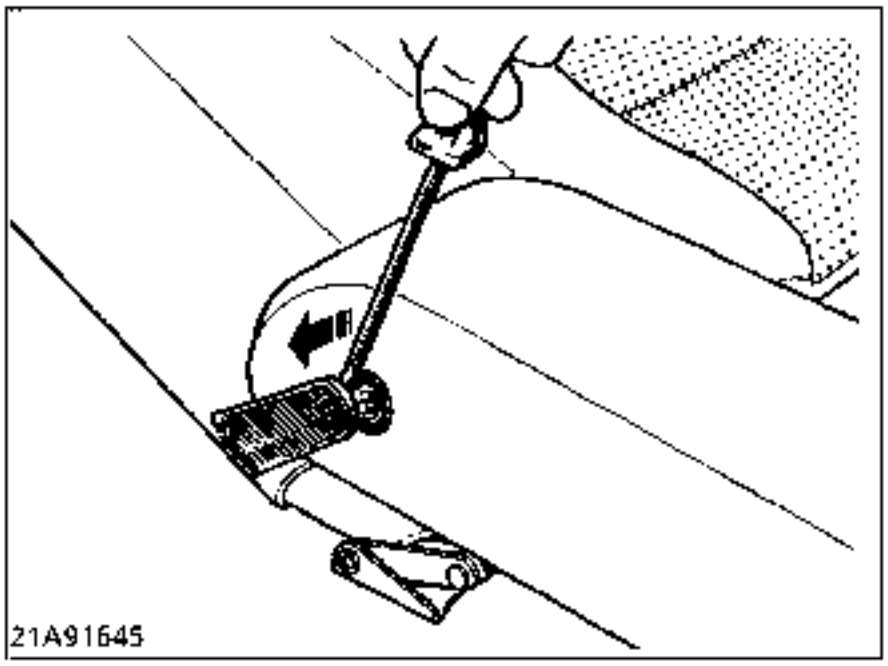
Cut the "pig's nose" type clips (2) securing the trim to the foam.



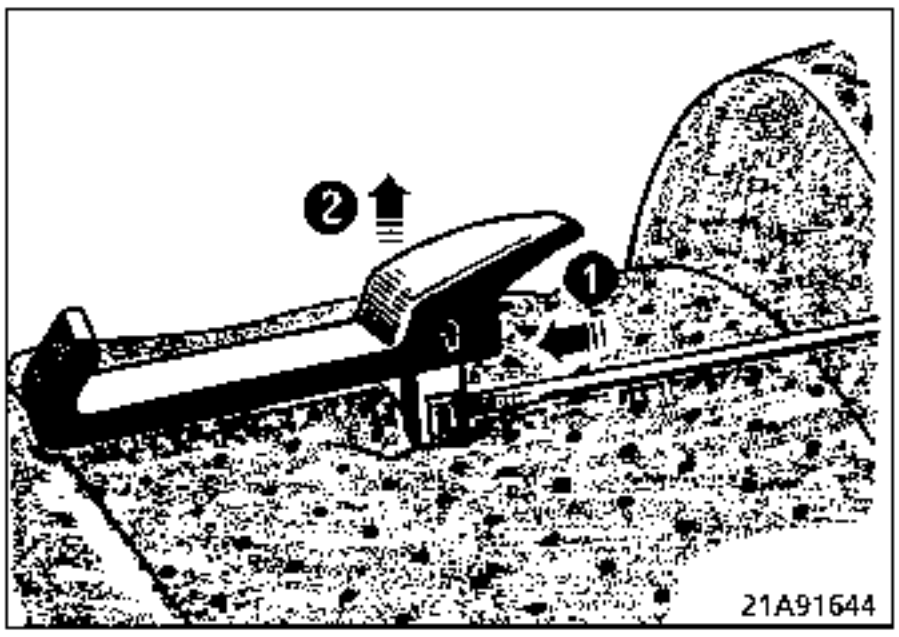


STRIPPING THE SEAT BACK (2/3 split seat)

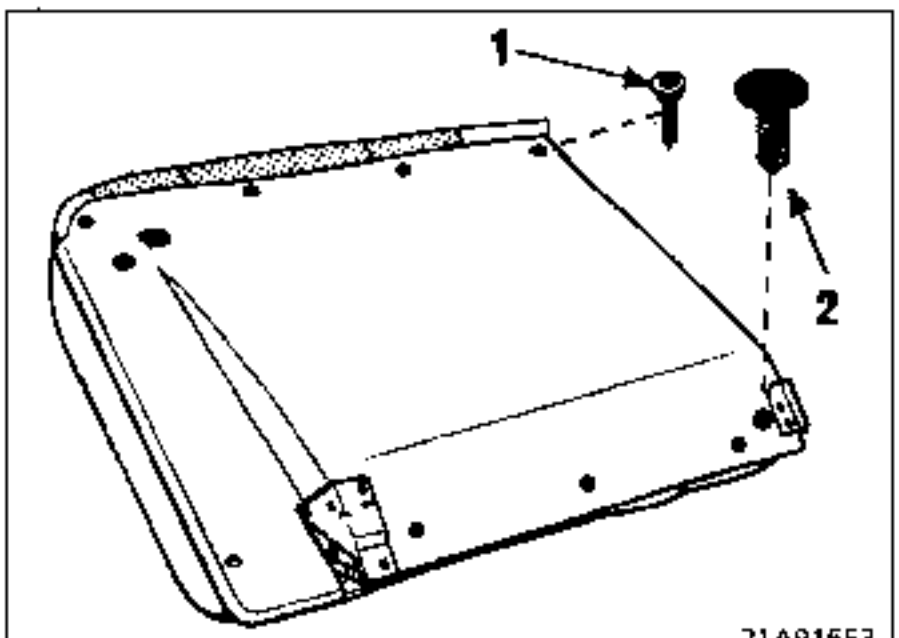
Remove the arm rest.



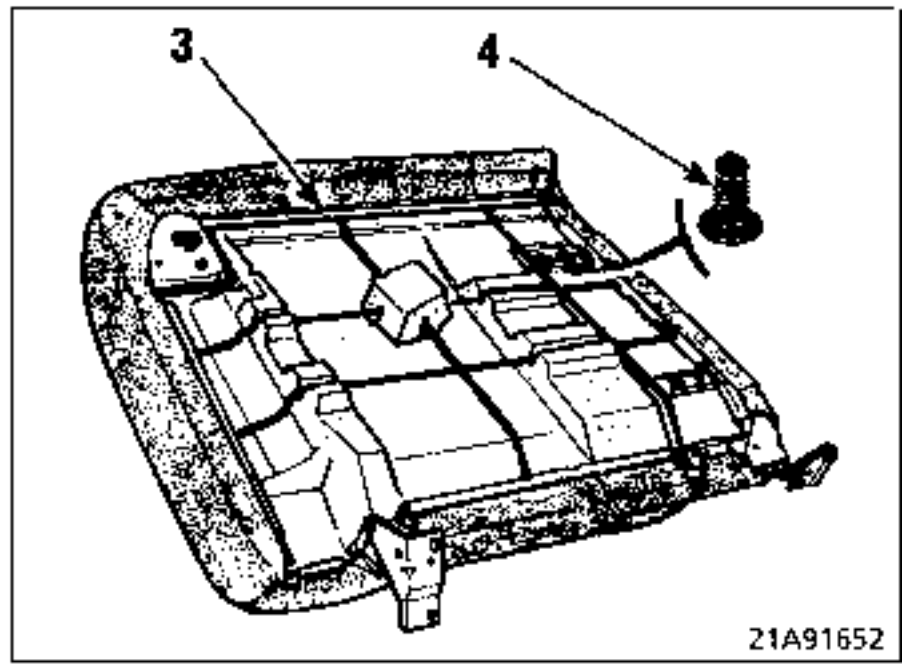
Unclip the seat back tilting handle.



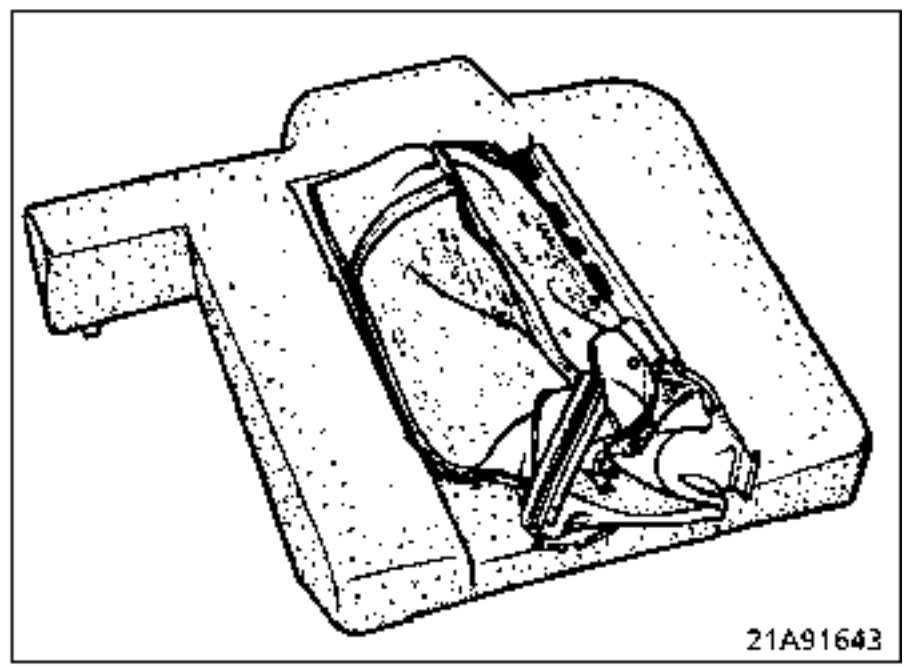
Remove screws (1) and the two clips (2) securing the trim for the rear of the seat.



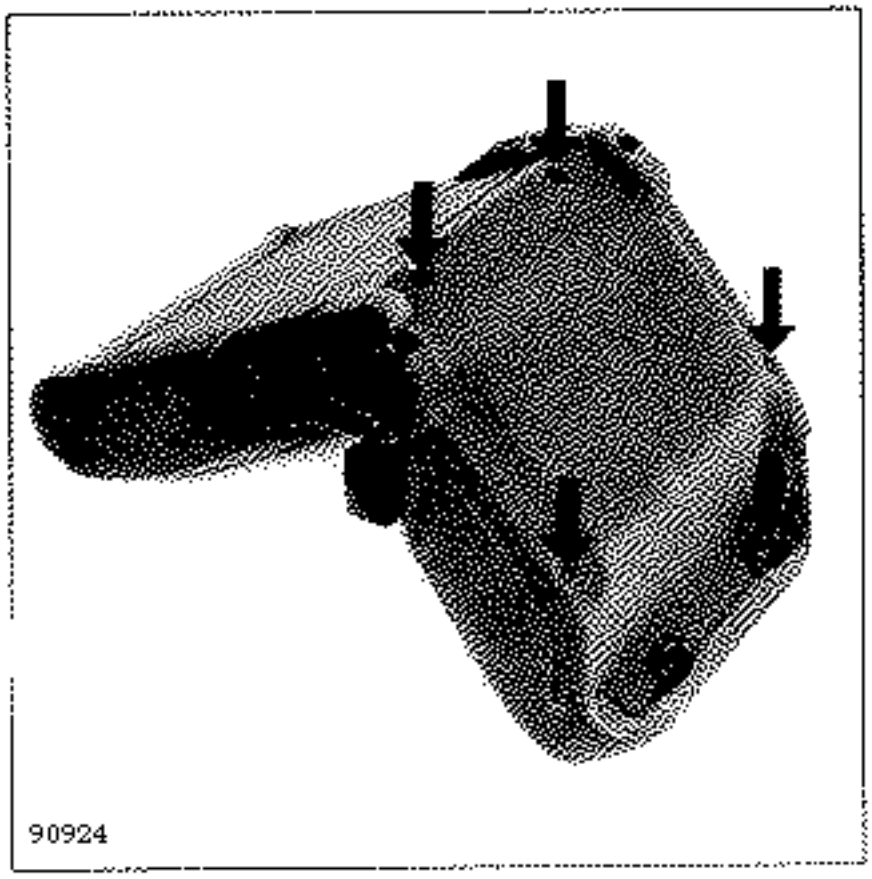
Unpick the plastic corner pieces (3) and the "fir tree" type pressure fasteners (4) securing the trim to the frame.



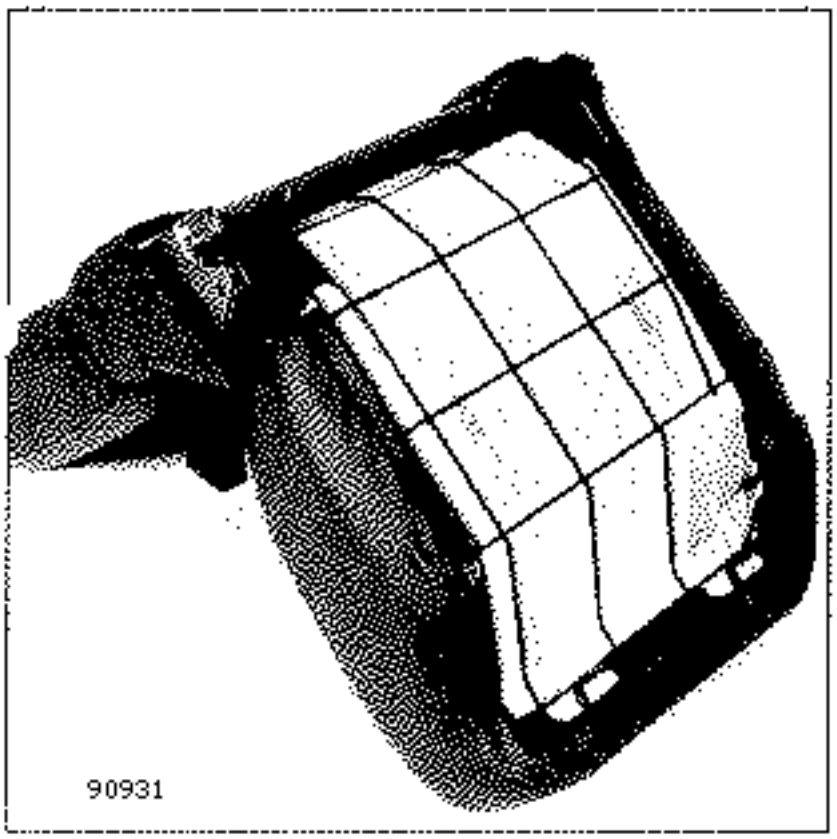
Cut the "pig's nose" type clips securing the trip to the foam.



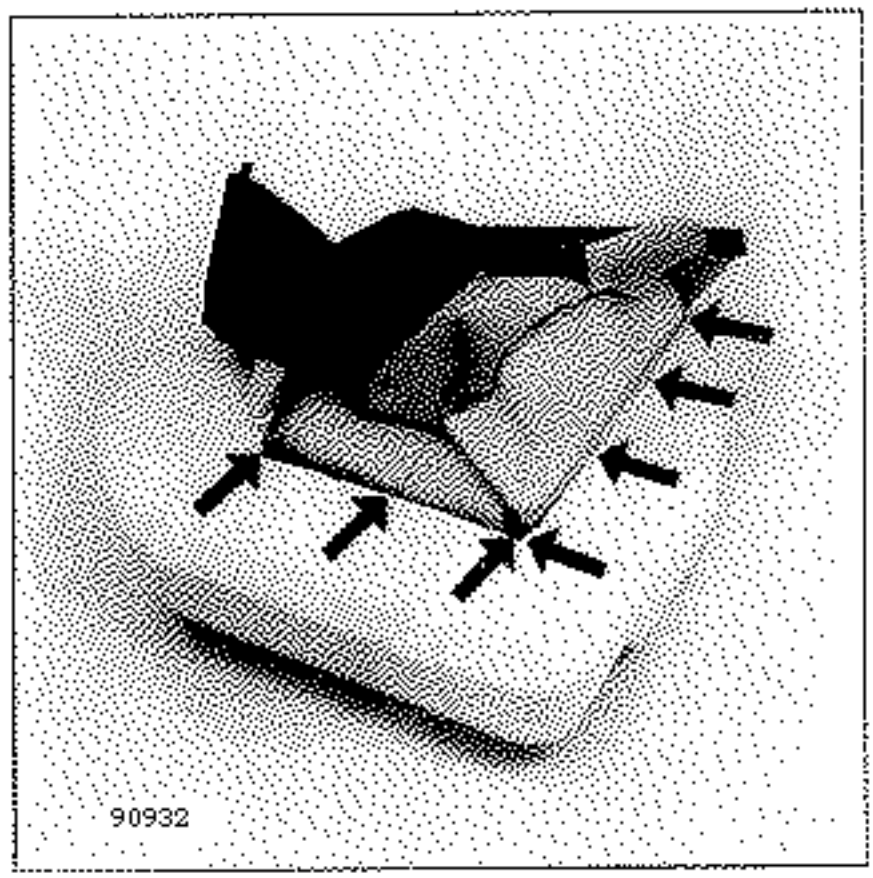
STRIPPING THE SEAT SECTION



Remove the base of the seat secured by plastic pins (the pins will have to be replaced).

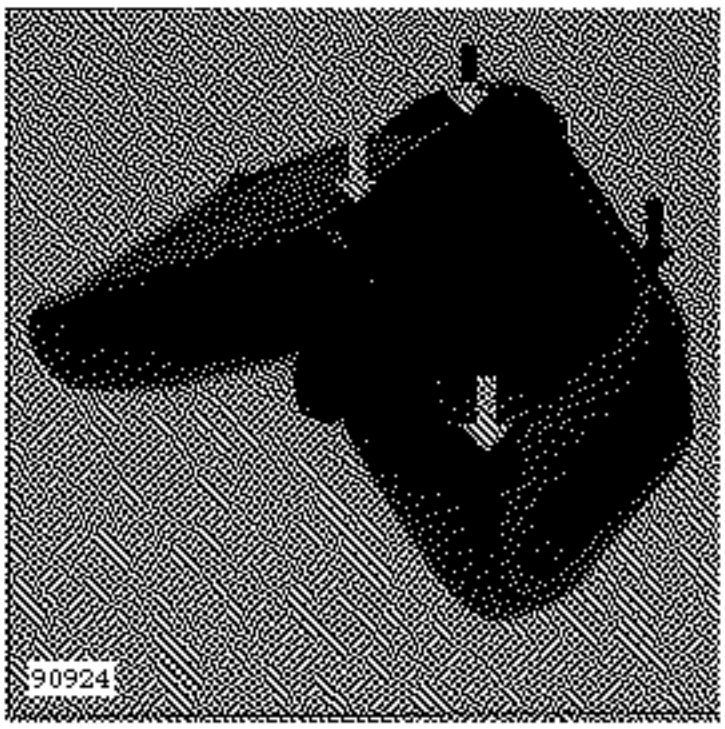


Unclip the plastic corner pieces securing the seat trim to the frame.

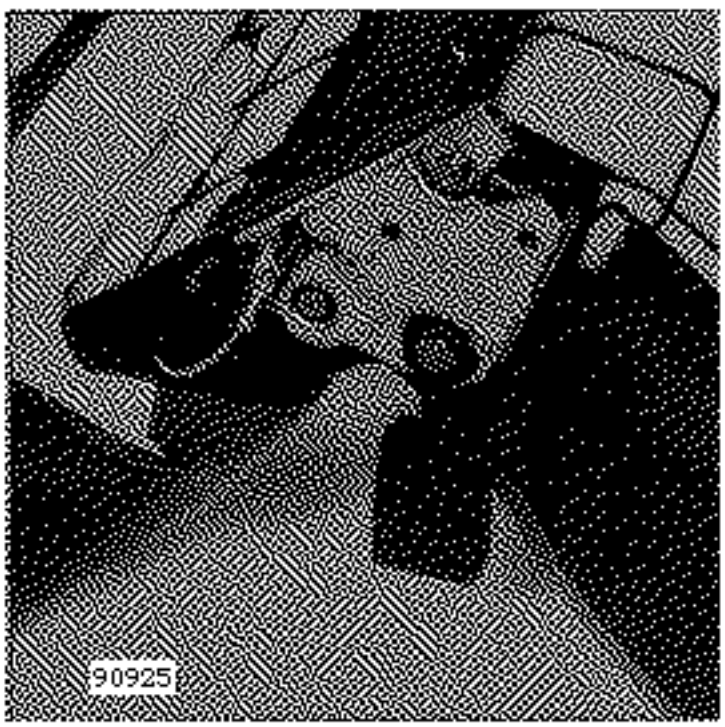


Use a pair of pliers to cut the "pig's nose" type clips securing the trim to the seat.

REPLACING THE MECHANISM AND STRIPPING THE SEAT BACK



Remove the side trim on the locking plate side and the base of the seat (the latter is secured by plastic pins which will have to be replaced).

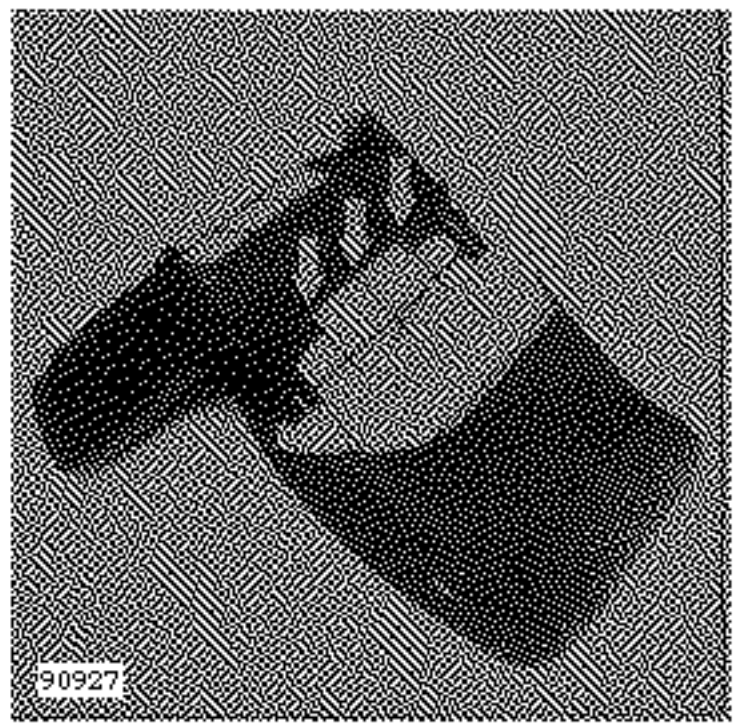


Slacken the nuts retaining the sheathing stop.

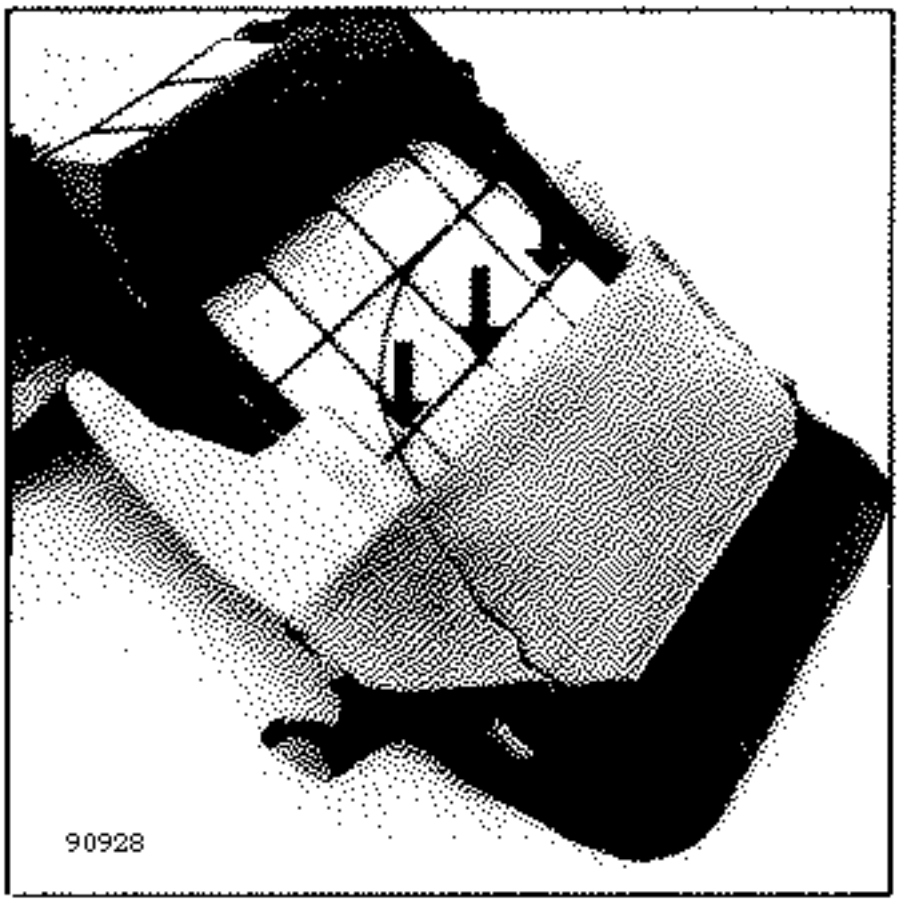
Remove the plate mountings and separate the plate from the cable.



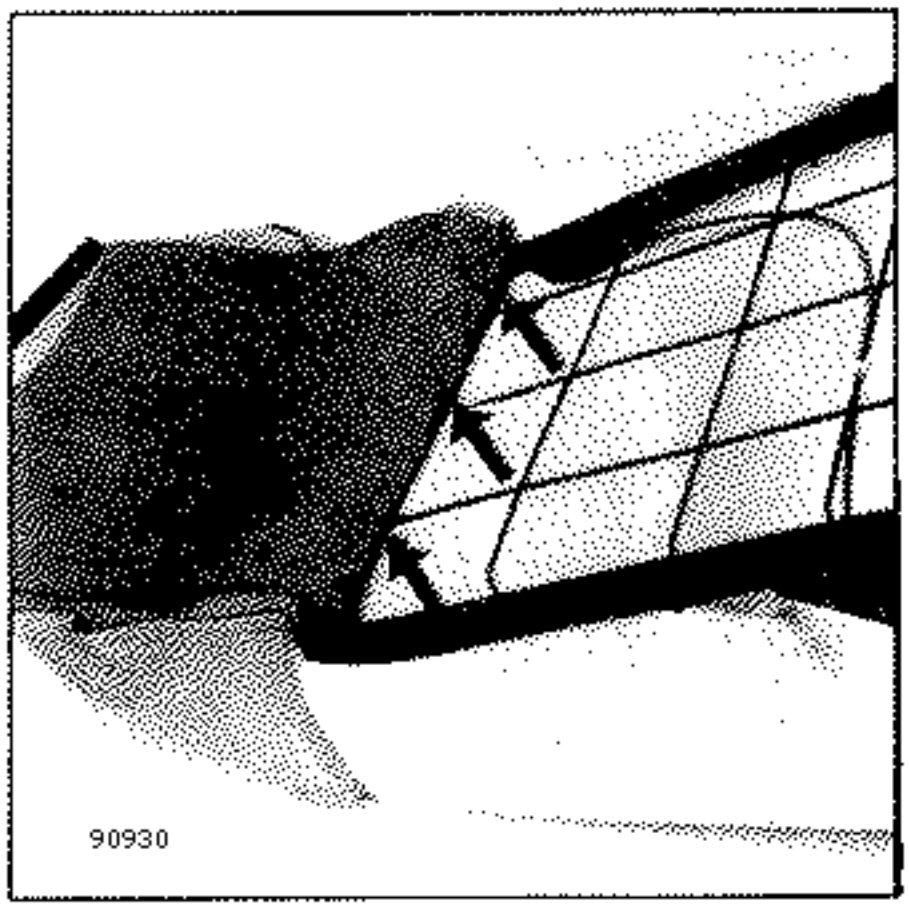
Remove the handle (pull the control knob to remove).



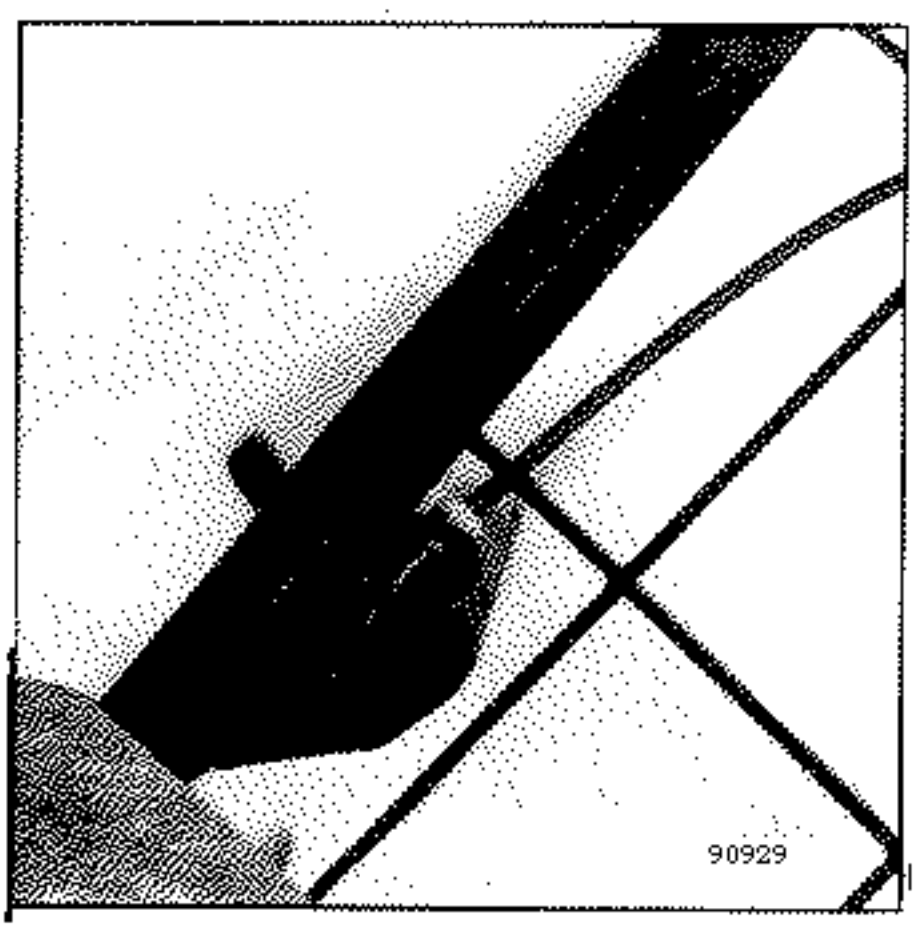
Strip the seat back, cutting the "pig's nose" type clips after marking their location on the frame (for refitting).



Cut the three centre clips and fold back the trim so as to reach the other end of the cable.

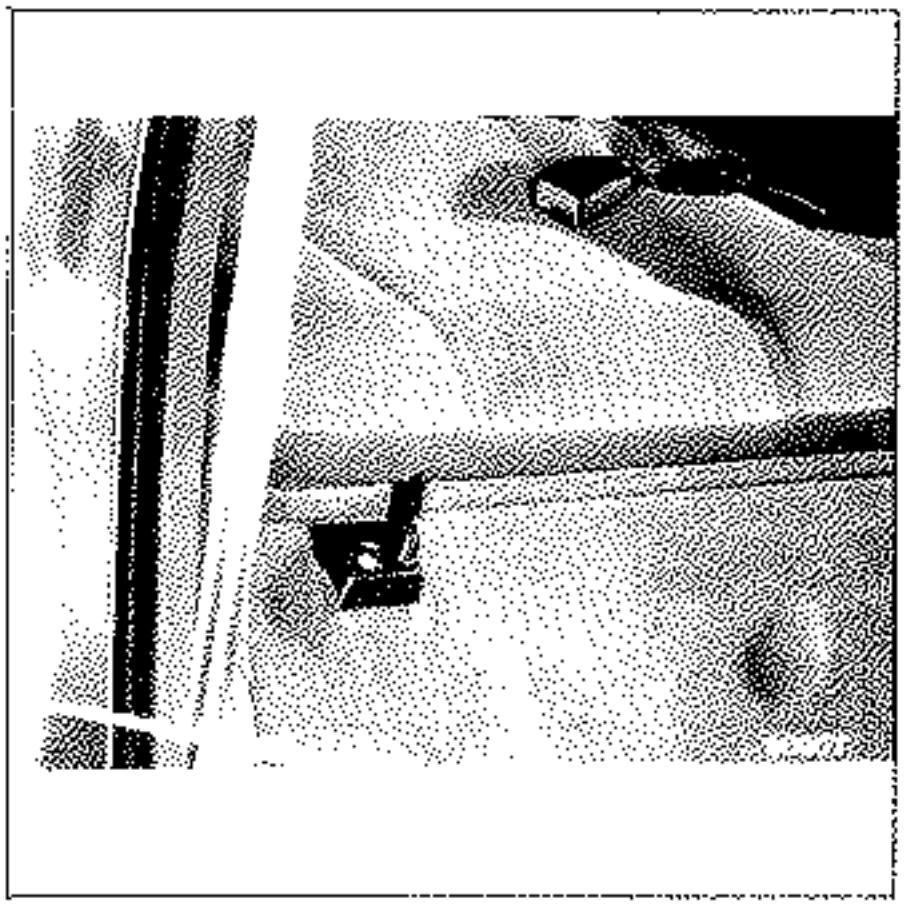


To complete removal of the trim, cut the "**pig's nose**" type clips using a pair of pliers.



Cut the plastic clips securing the sheathing to the frame and disengage the end of the cable from the lever.

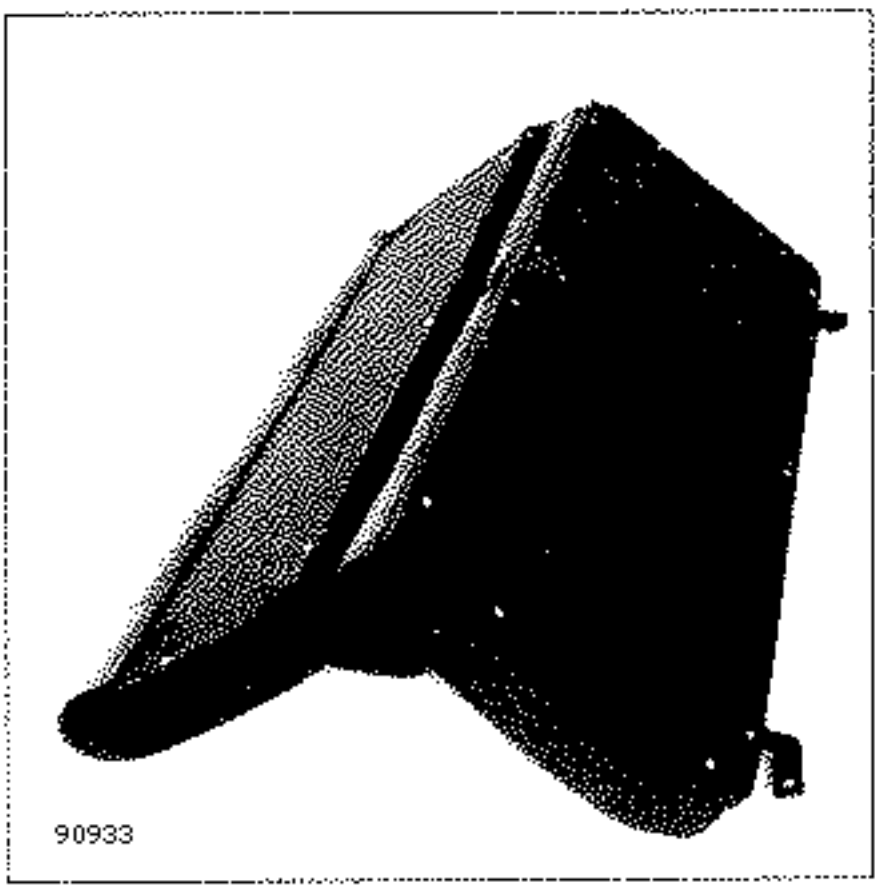
REMOVAL



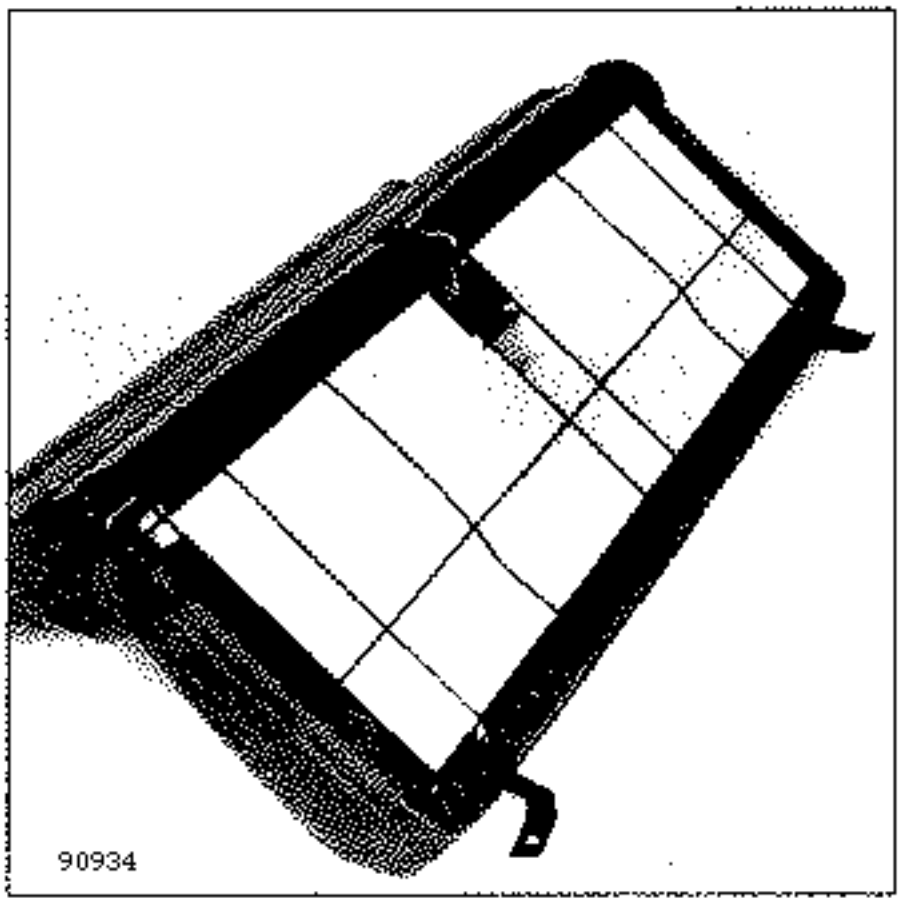
Remove the mounting bolts from the hinges.

Fold up the bench seat and remove it.

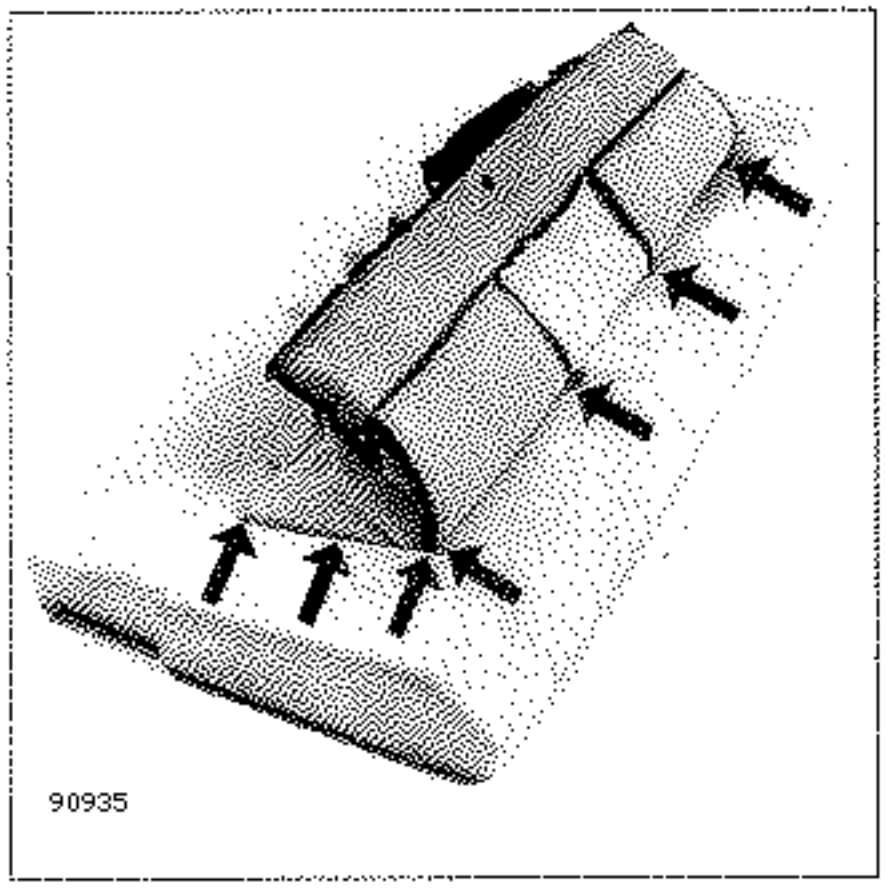
STRIPING THE BENCH SEAT



Remove the base of the seat secured by plastic pins (these pins will have to be replaced).

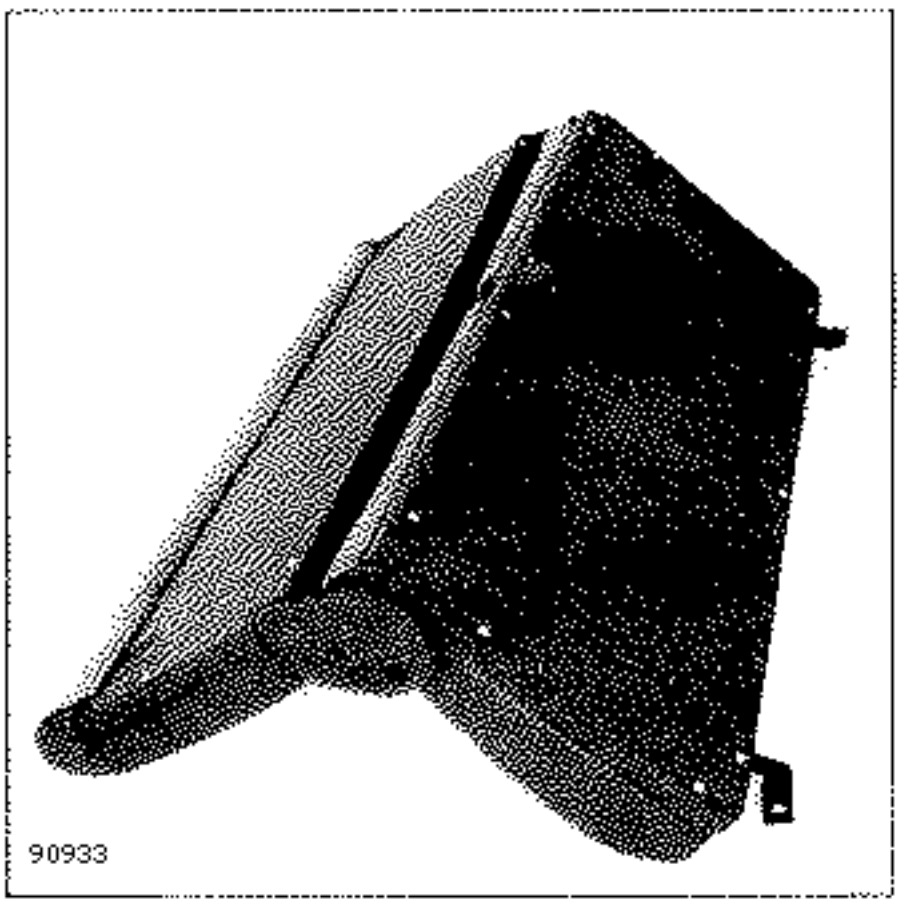


Unclip the plastic corner pieces securing the seat trim to the frame.

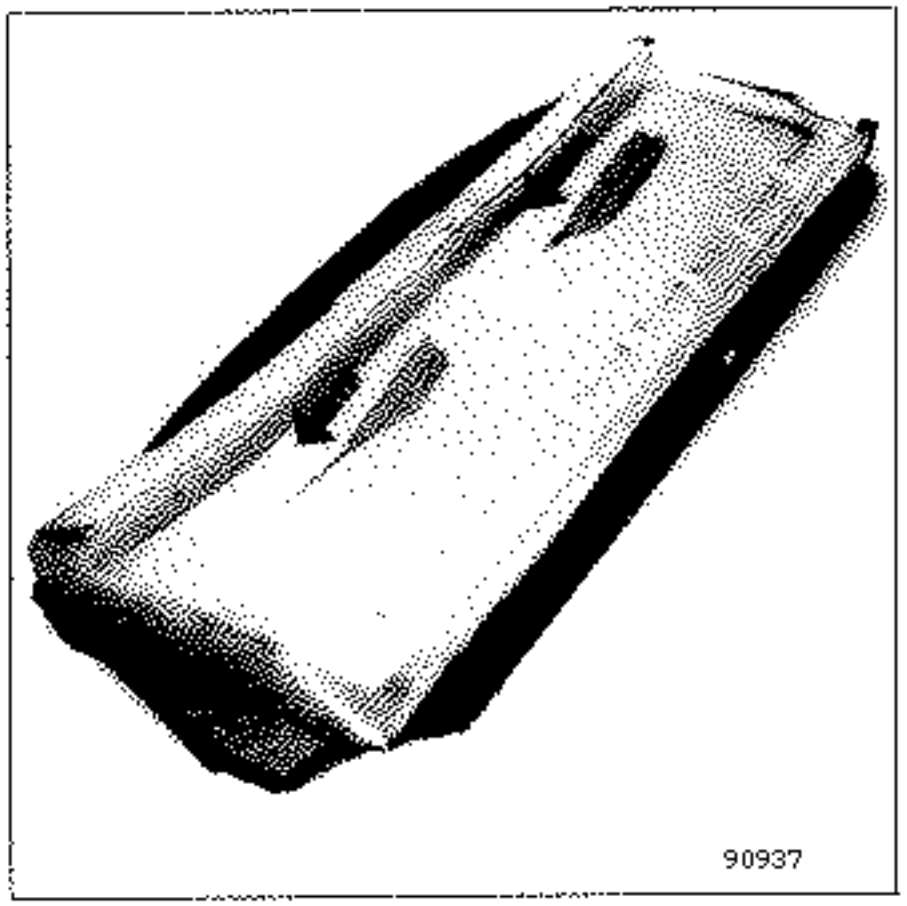


Using a pair of pliers cut the "pig's nose" type clips securing the trim to the seat.

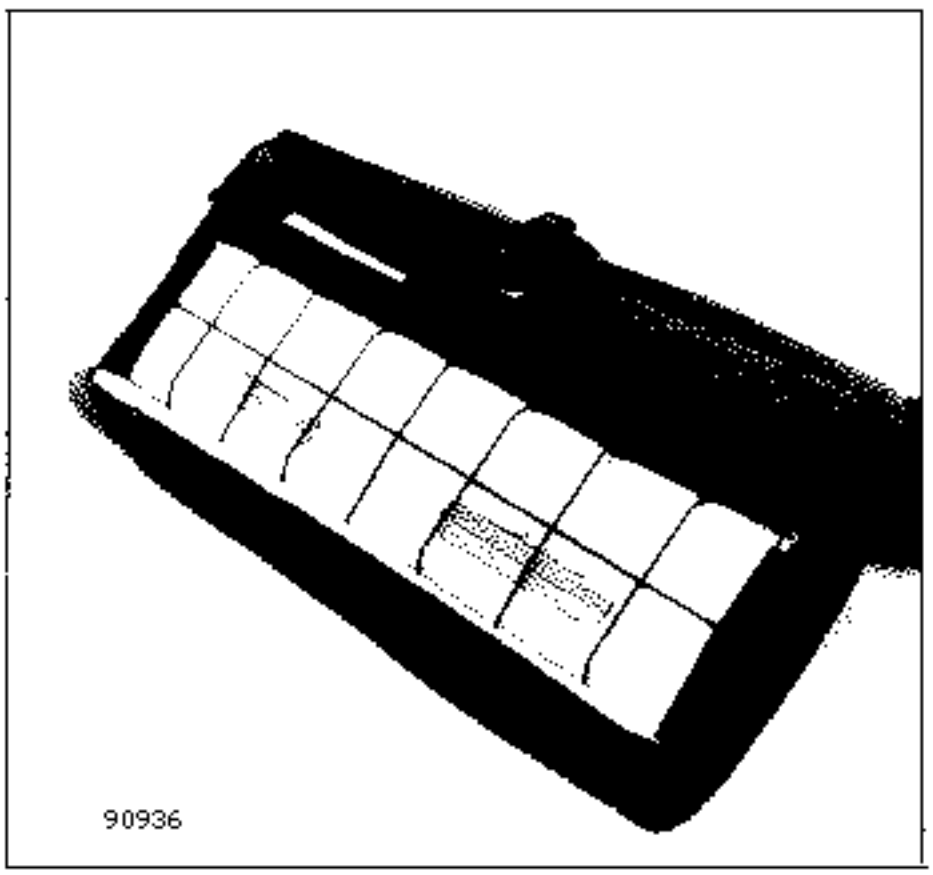
STRIPPING THE SEAT BACK



Remove the rear of the seat back secured by the plastic pins (these pins will have to be replaced).

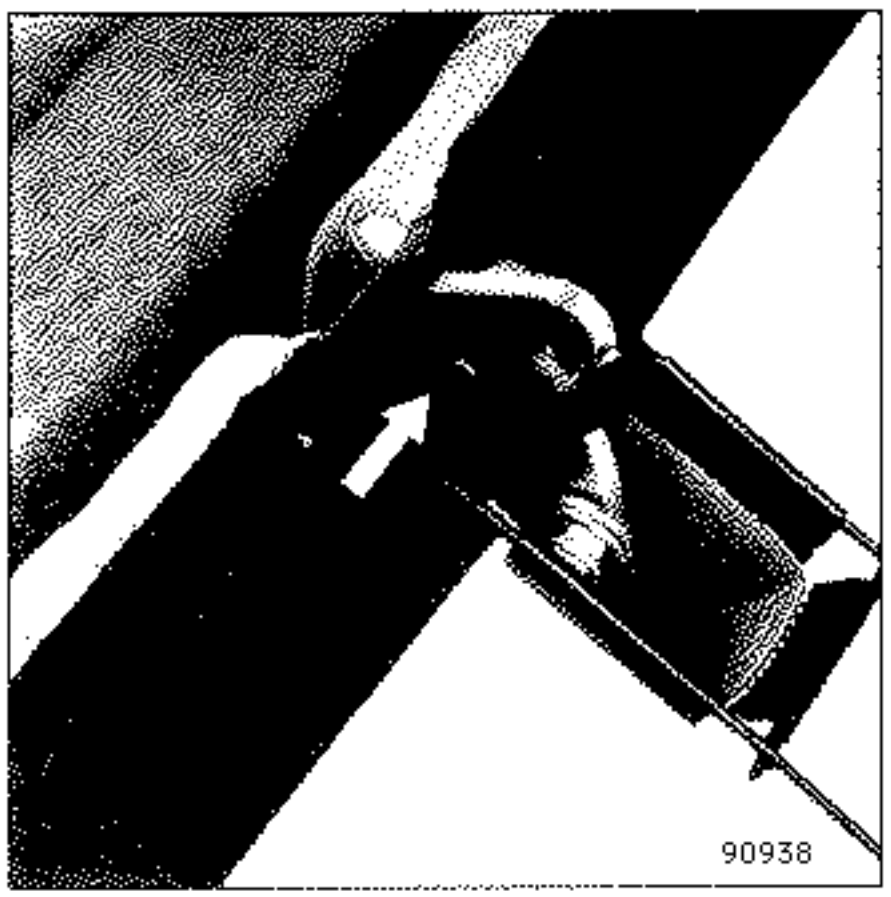


Remove the trim, passing the cardboard lugs through the seat foam.



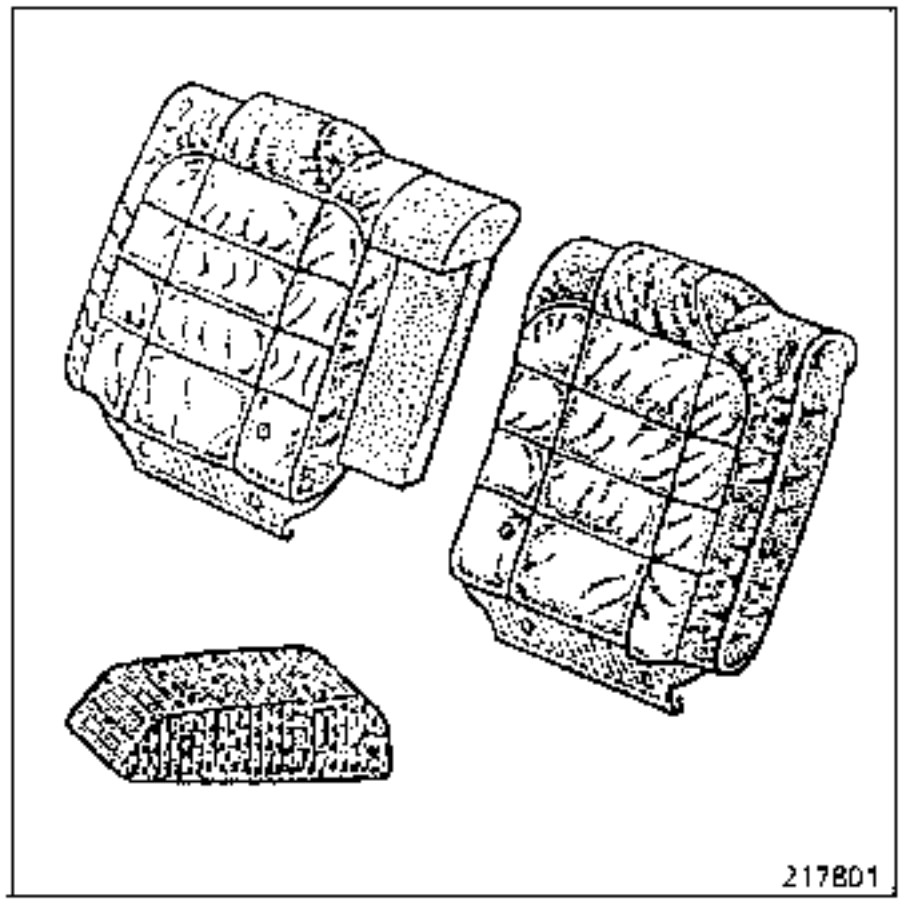
Unclip the plastic corner pieces securing the seat back trim to the frame.

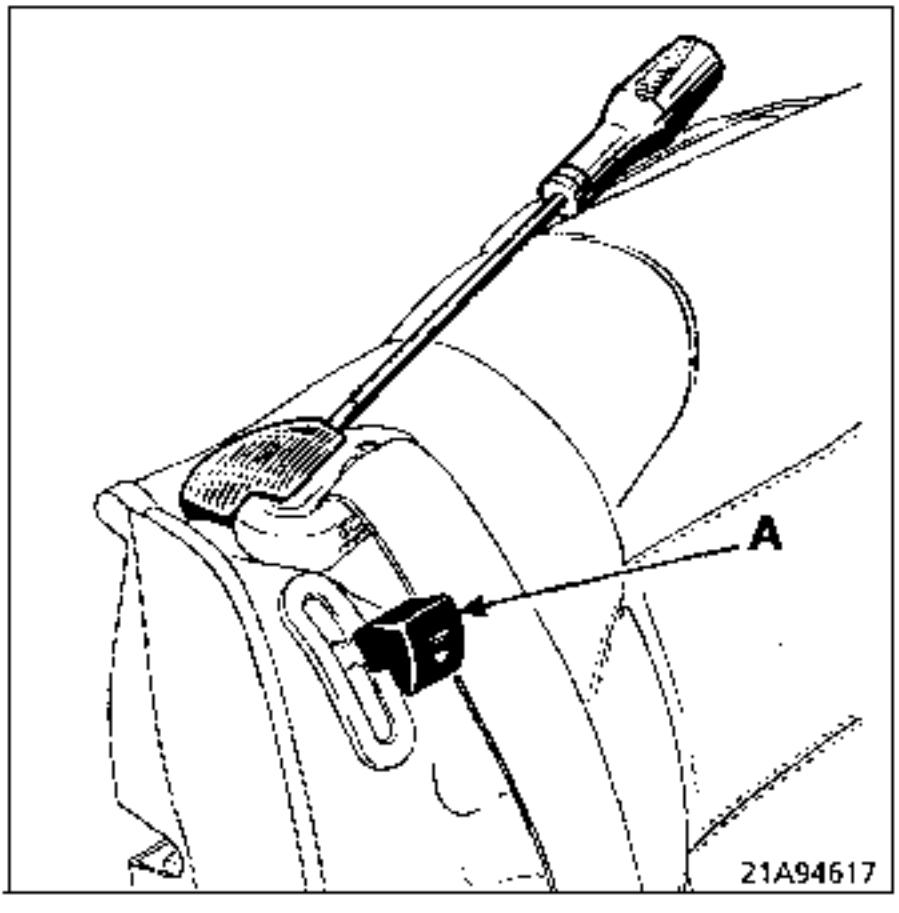
LOCKING THE BENCH SEAT IN PLACE



The locking mechanism is in a single part and is secured by a bolt.

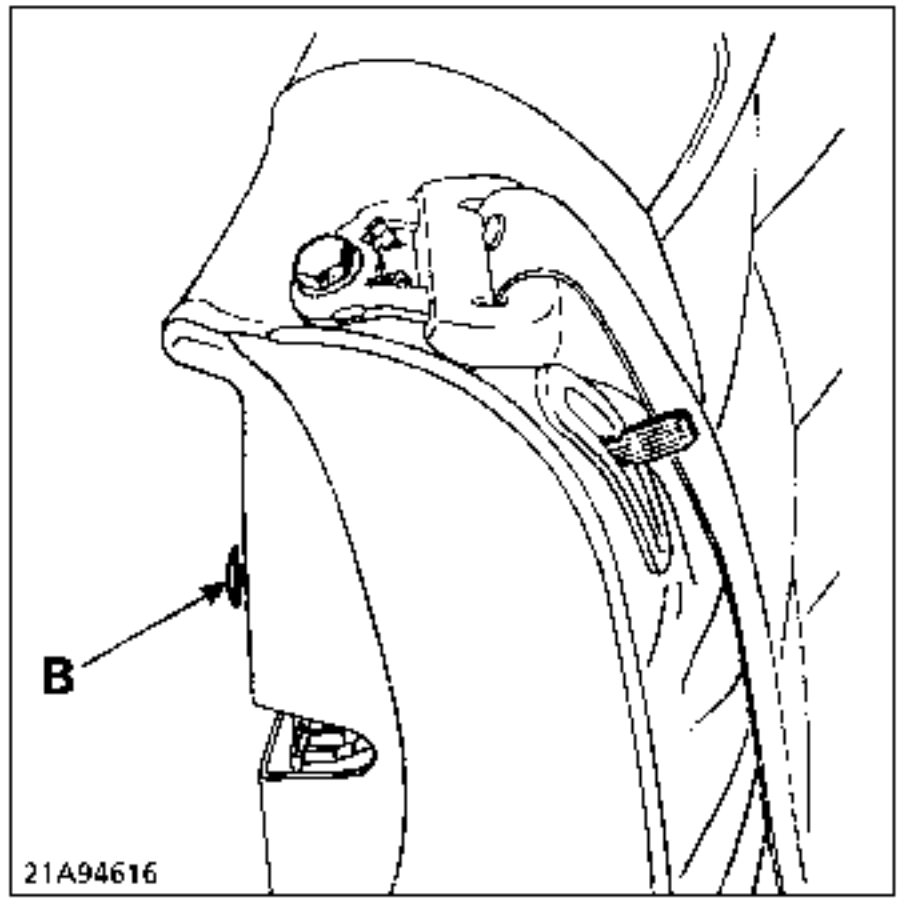
The seat belt anchorages are mounted directly on the plate.



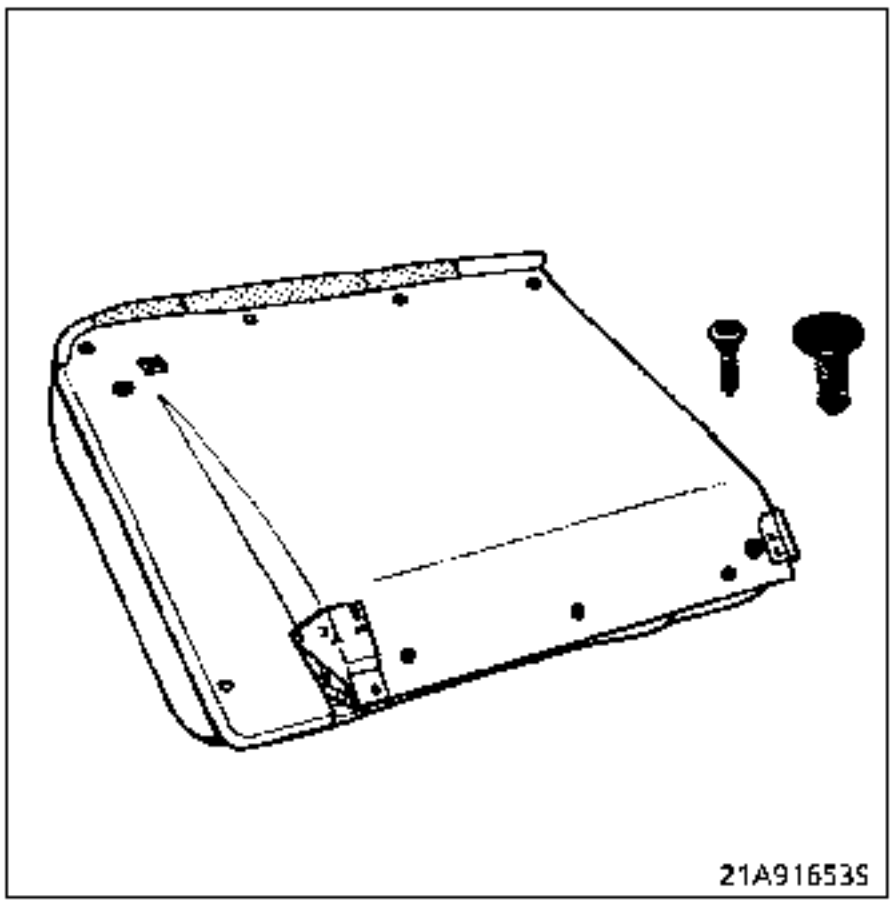


After removing the seat, remove handle (A).

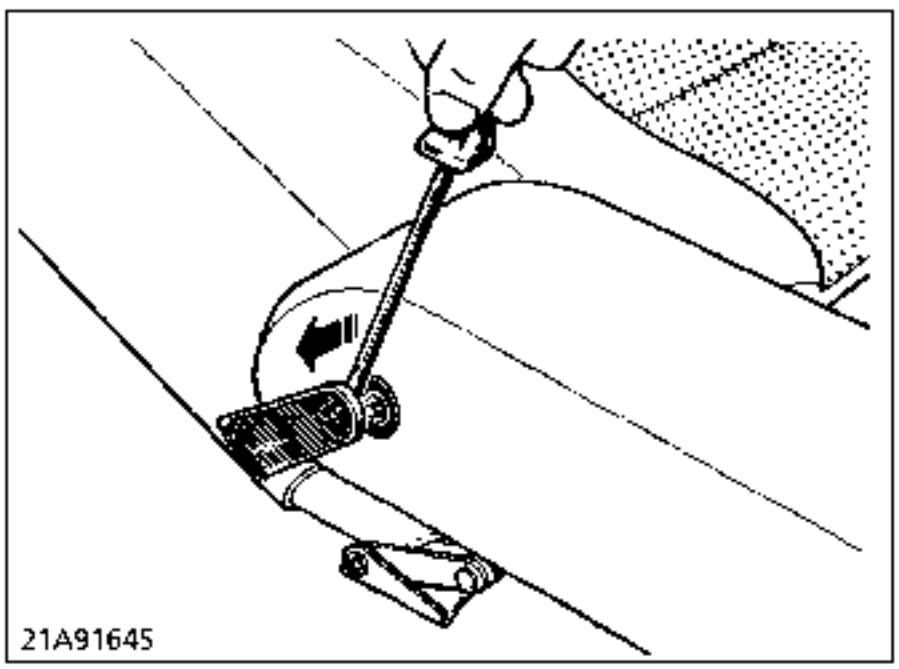
Remove the upper seat belt securing cover.



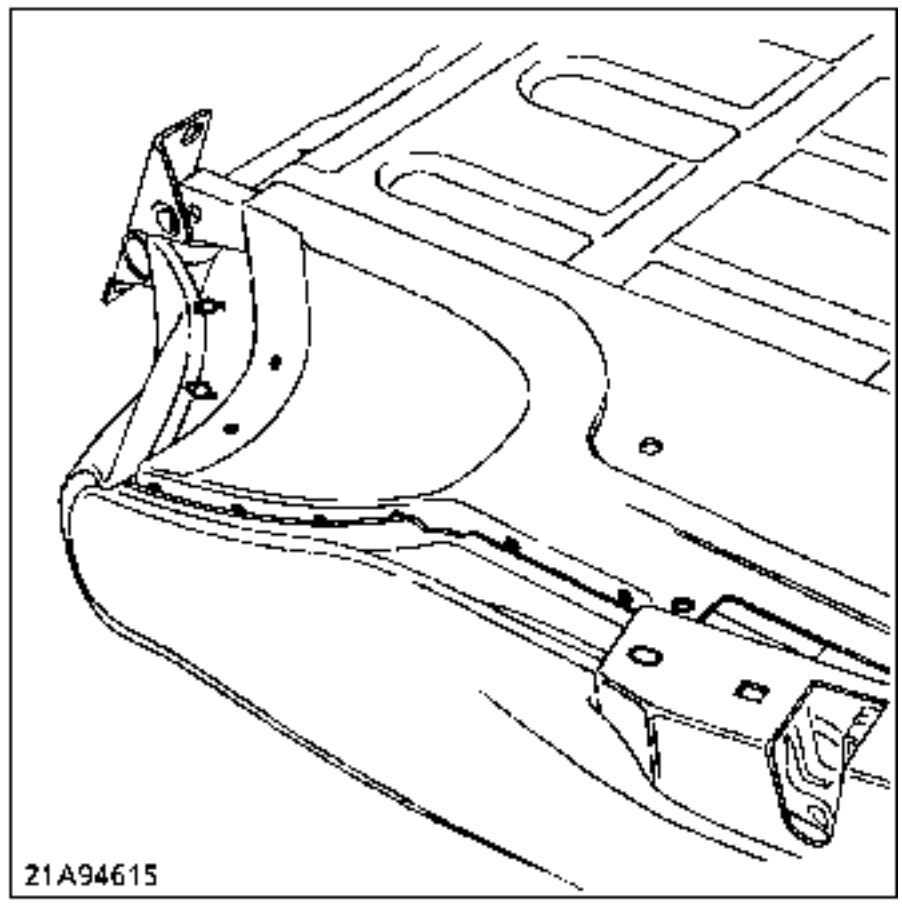
Remove the locking cover clips (B).

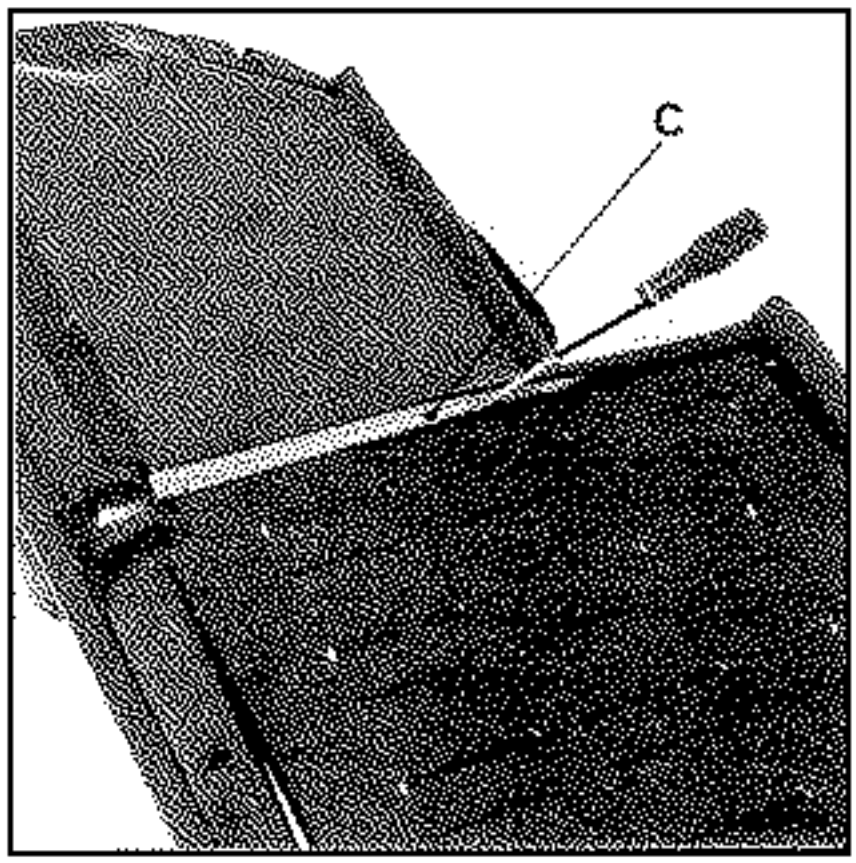


Remove the rear cover ("fir tree" type clips).

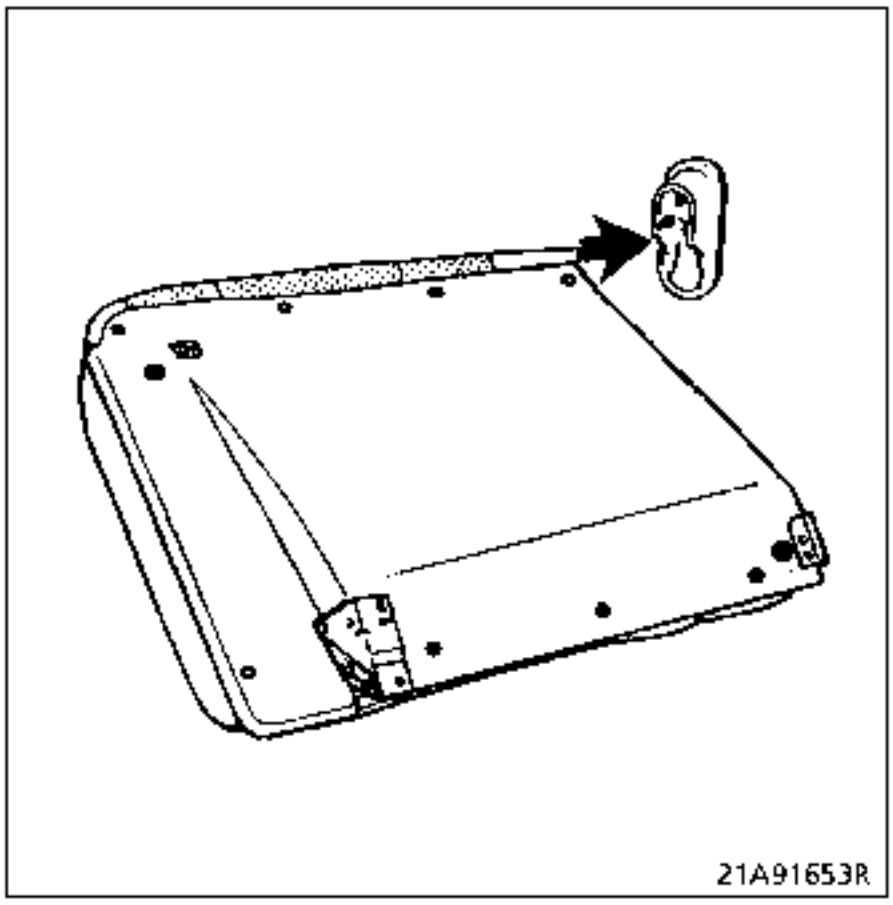


Remove the central arm rest.

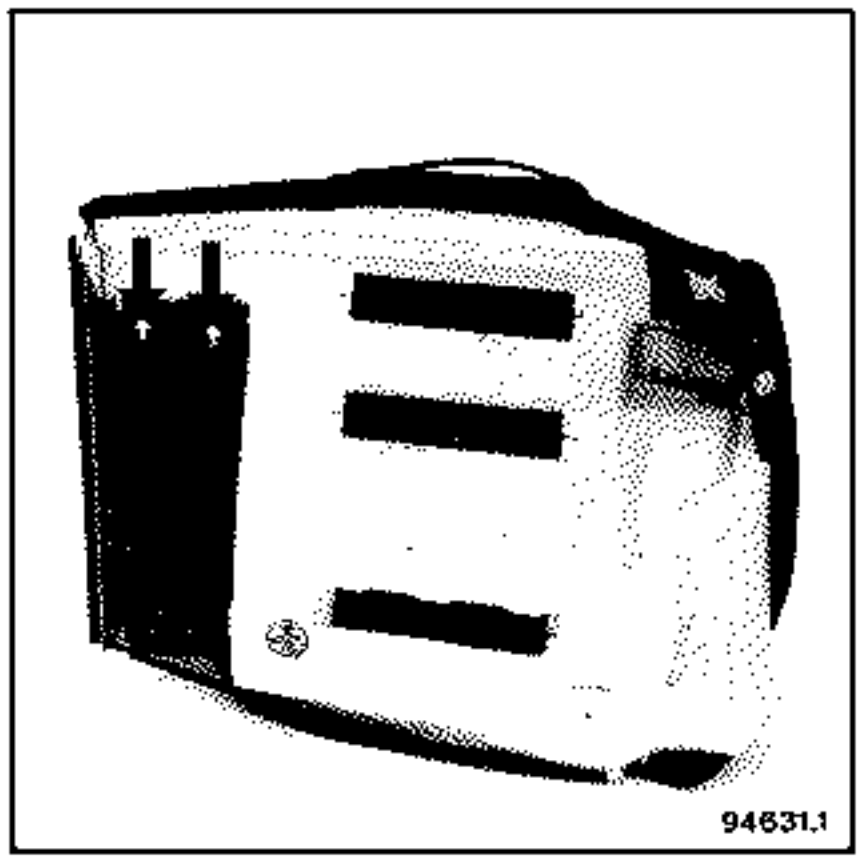




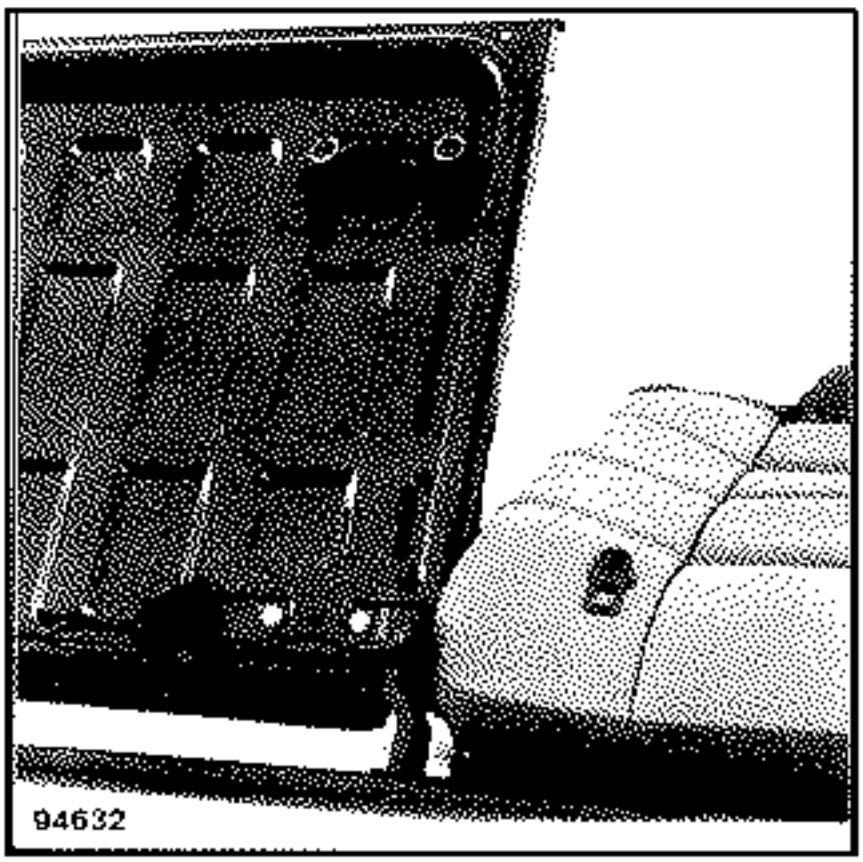
Carefully remove the edges of the trim (C).

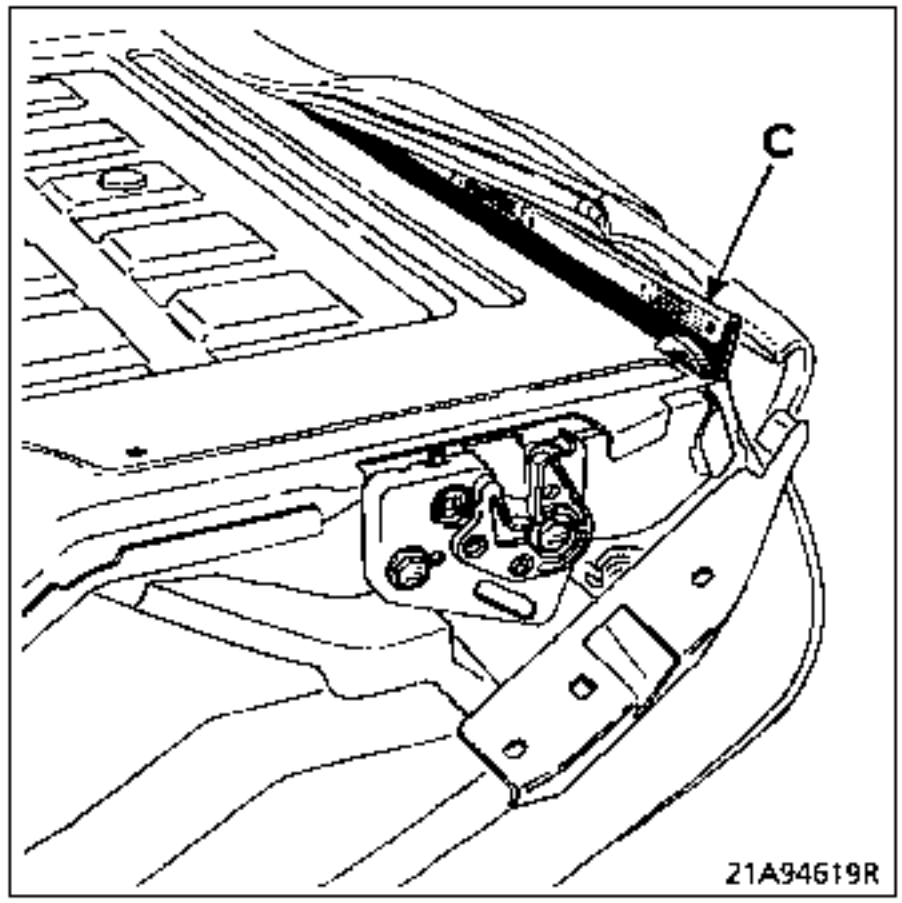


Remove the clip.



Unclip the two clips under the trim.

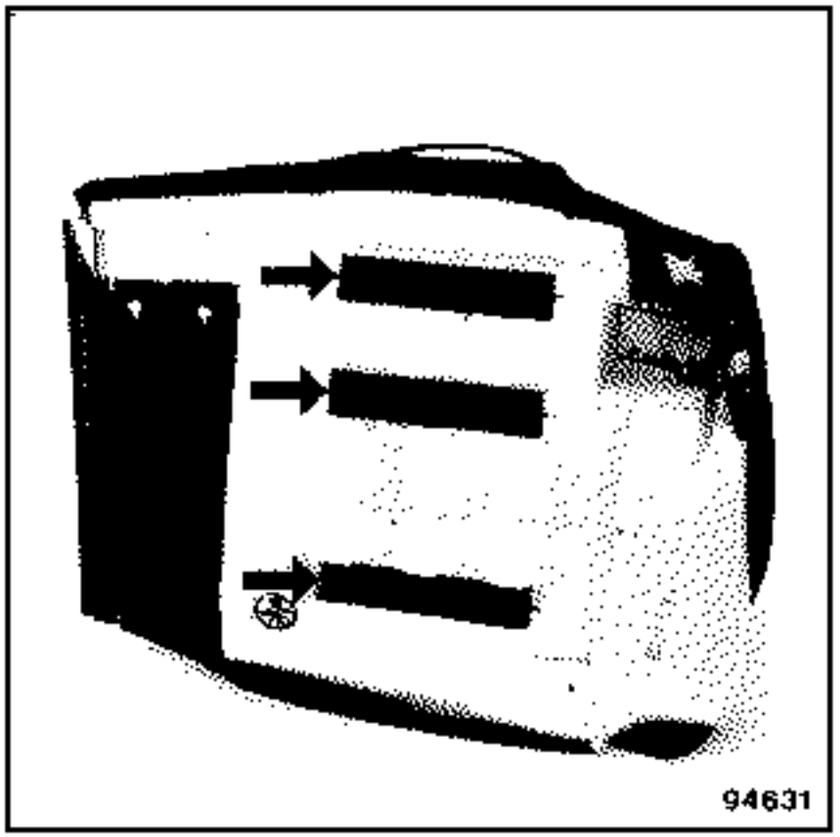




Pass the belt through the trim.

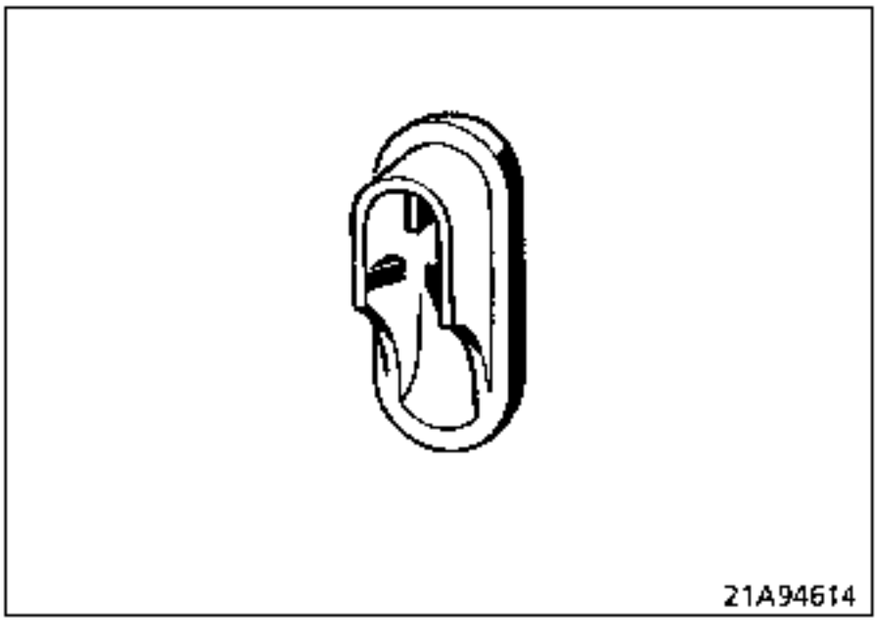
Unclip the upper edge (C).

Remove the foam trim assembly.



Remove the circular clip.

Separate the trim by passing the cardboard through the foam.



NOTE :

When refitting, refit the end pieces onto the seat frame before fitting the trim.

There is nothing particularly noteworthy about removing and refitting the battery.

However, the following checks and precautions are to be carried out to ensure that it operates efficiently.

A - CHECKS

Check that :

- the battery casing and cover are neither cracked nor broken,
- that the top of the battery is clean,
- the battery posts are in good condition,

  It is essential to :

  - ensure that no salts (sulphating) have formed on the posts or the terminal clamps,
  - clean and grease these parts if necessary,
  - check that the terminal clamps are fully tightened on the posts. Poor contact can give rise to starting or charging defects or sparking that could cause the battery to explode.
- Electrolyte level.

On batteries equipped with removable cover plates :

- remove the plate either by hand or with an appropriate tool (rigid spatula),
- check that the electrolyte level in all the cells is well above the plates,
- if necessary, top up the levels with distilled water.

***NOTE** : certain types of battery have translucent casings through which the electrolyte level can be seen.*

Never add already mixed electrolyte or any other form of product.

B - PRECAUTIONS

We should like to remind you that a battery :

- contains sulphuric acid which is a dangerous product,
- gives off, during charging, oxygen and hydrogen. These two gases form an explosive mixture, hence the risk of explosion.

1) - DANGER = ACID

A sulphuric acid solution is a very aggressive, toxic and corrosive substance. It attacks the skin, clothing and concrete and corrodes most metals.

It is therefore very important, when handling a battery, to take the following precautions :

- wear goggles to protect the eyes,
- wear gloves and acid-proof clothing.

> If the acid does splash onto the skin or clothing, rinse off the contaminated area with copious quantities of water and if it splashes in the eyes, consult a doctor.

2) - DANGER = RISK OF EXPLOSION

When a battery is being charged (whether on a vehicle of off it) oxygen and hydrogen are formed. The formation of this gas is at its maximum when the battery is fully charged and the quantity of gas produced is proportional to the strength of the charging current.

Oxygen and hydrogen when mixed in a free space, on the surfaces of the plates, form a highly explosive mixture.

The slightest spark, a cigarette, or a match which is not quite extinguished, is enough to cause an explosion. The explosion is so powerful that the battery can disintegrate into fragments and the acid can be dispersed into the surrounding atmosphere. Anybody near such an explosion is in danger from flying fragments and splashed acid. This splashed acid is very dangerous to the eyes, face and hands and it also attacks clothing.

> This warning of the danger of a badly treated battery exploding must therefore be taken very seriously. Avoid any risks of sparking.

- Ensure that the current consuming accessories are switched off before disconnecting or reconnecting a battery.
- When charging a battery within a confined space, switch off the charger before connecting or disconnecting the battery.
- Never lay a metal object on the battery as this could cause a short circuit across the battery posts.
- Never bring a battery near a naked flame, a welding torch or a lighted cigarette or match.

REMOVING

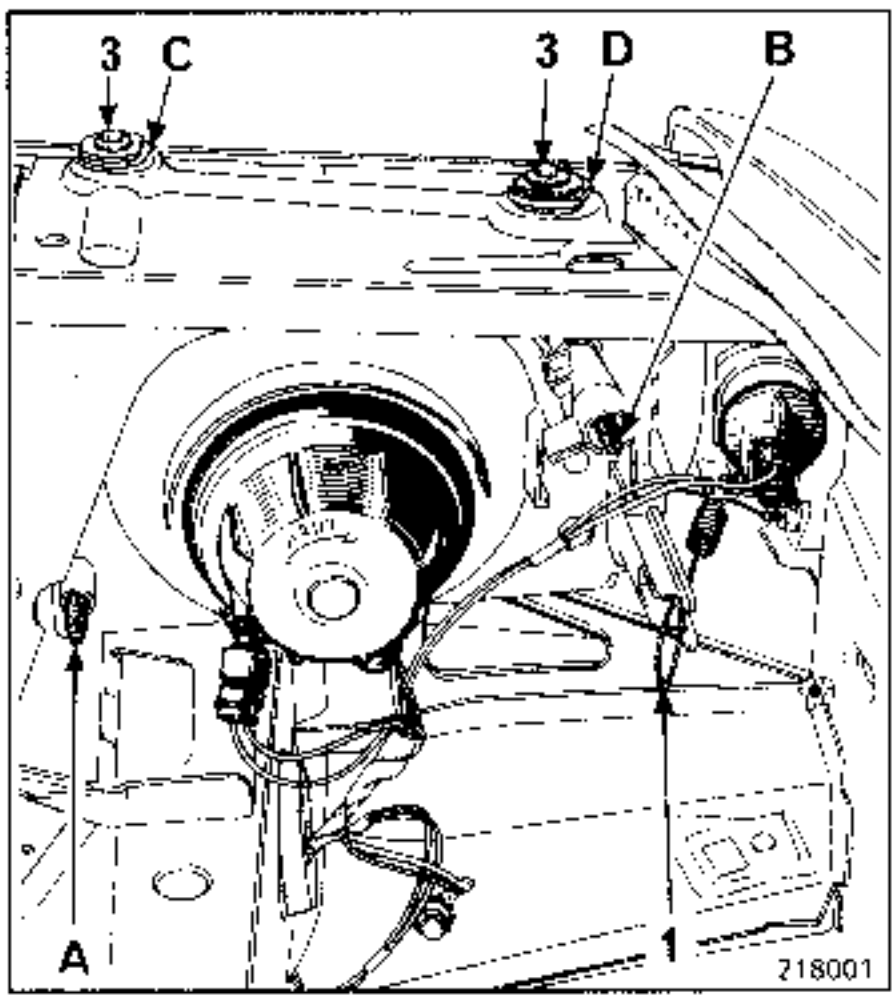
Disconnect :
- the battery,
- the direction indicator connector.

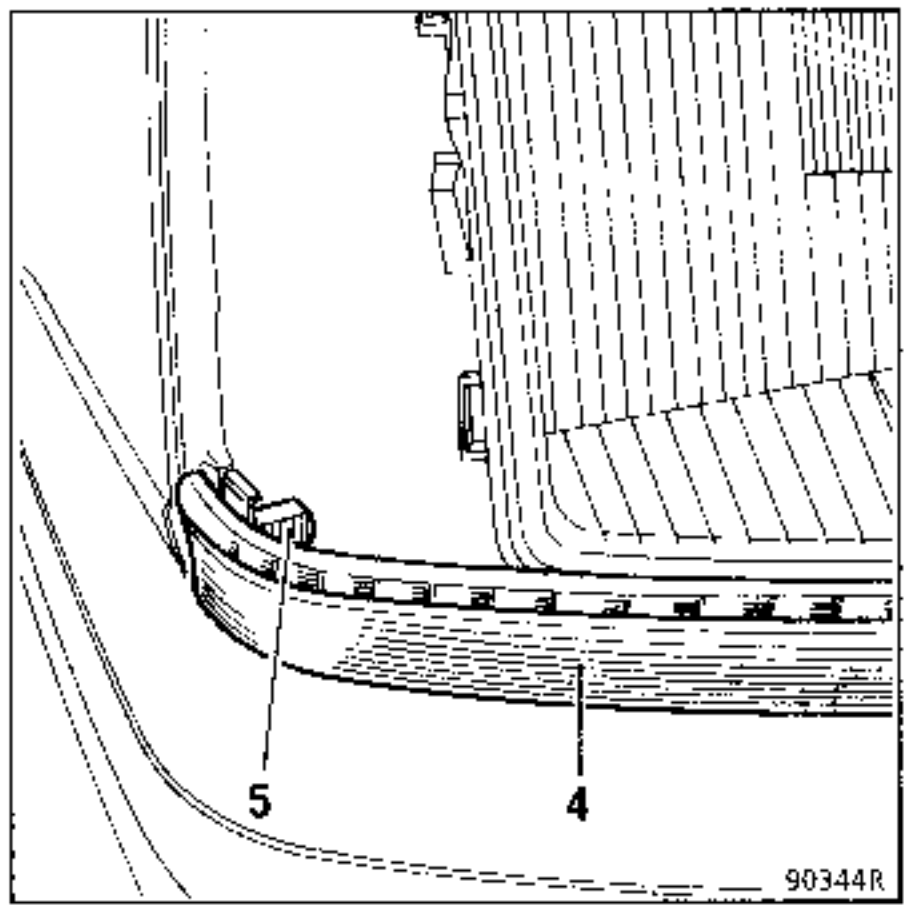
Remove :
- the direction indicator by releasing spring (1),
- the radiator grille lower bar (4) by releasing screw (5).

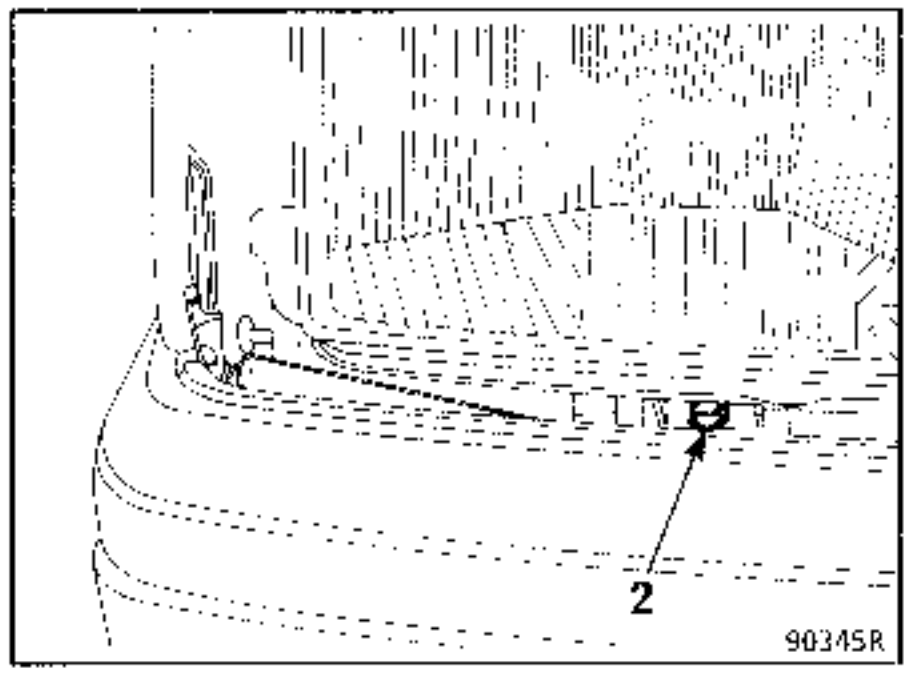
Disconnect the beam unit connectors.

Remove the lower screw (2) and the two upper screws (3).

Remove the headlight from the front.







REFITTING (Special points)

After refitting, adjust the headlight at screws (A) and (B).

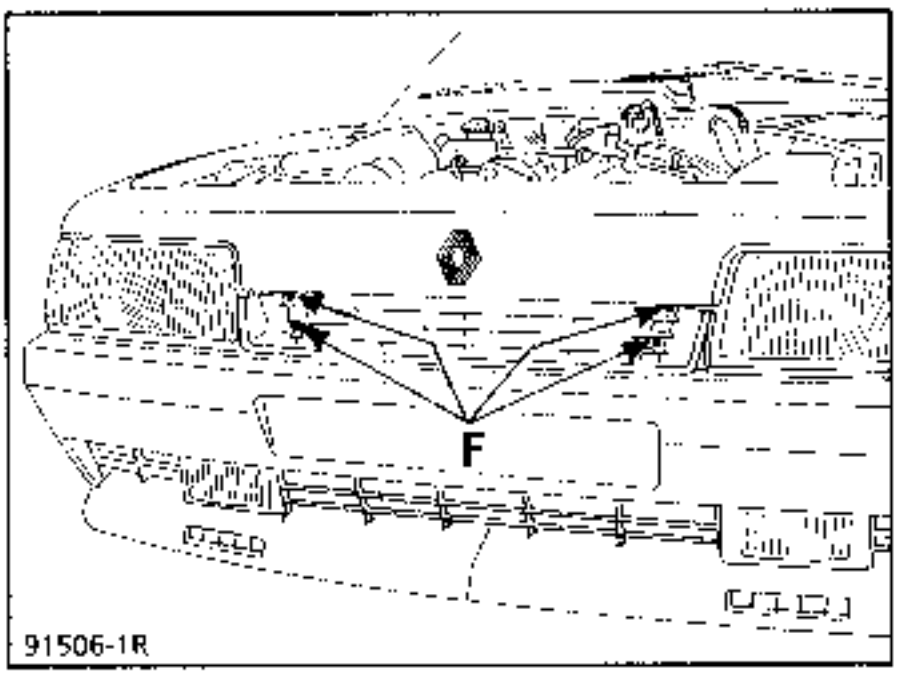
NOTE : Screws (C) and (D) are used to adjust the clearance between the bonnet and the radiator grille lower bar.

WARNING: These screws are pre-adjusted. If their adjustment has to be altered, consult section 42 of the Bodywork Workshop Manual.

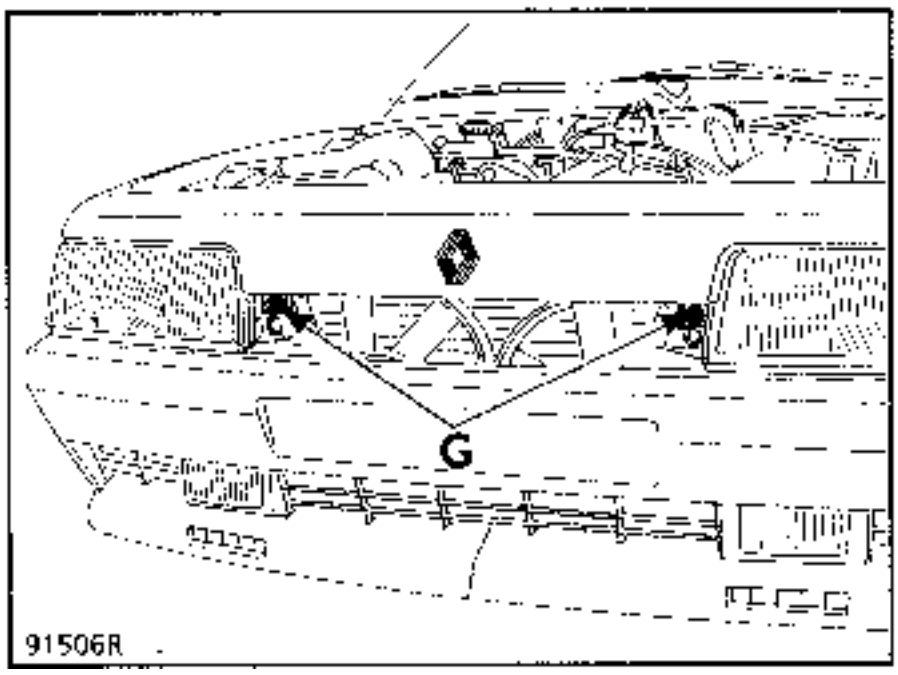
REMOVING

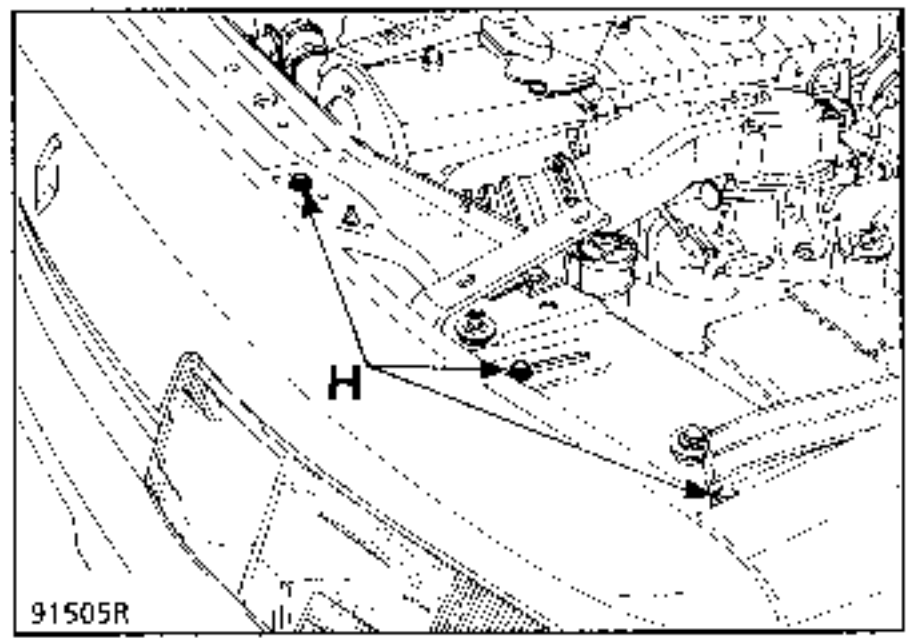
Disconnect the battery.

Remove :
– the radiator grill at 4 screws (F),



– the radiator grille upper panel at screws (G) and (H).

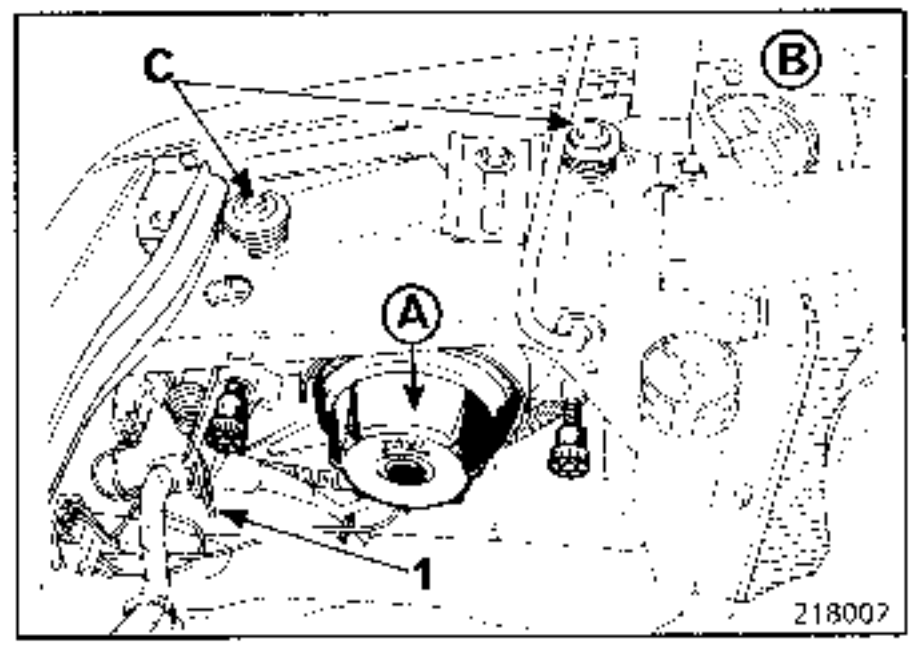




Disconnect the direction indicator connector.

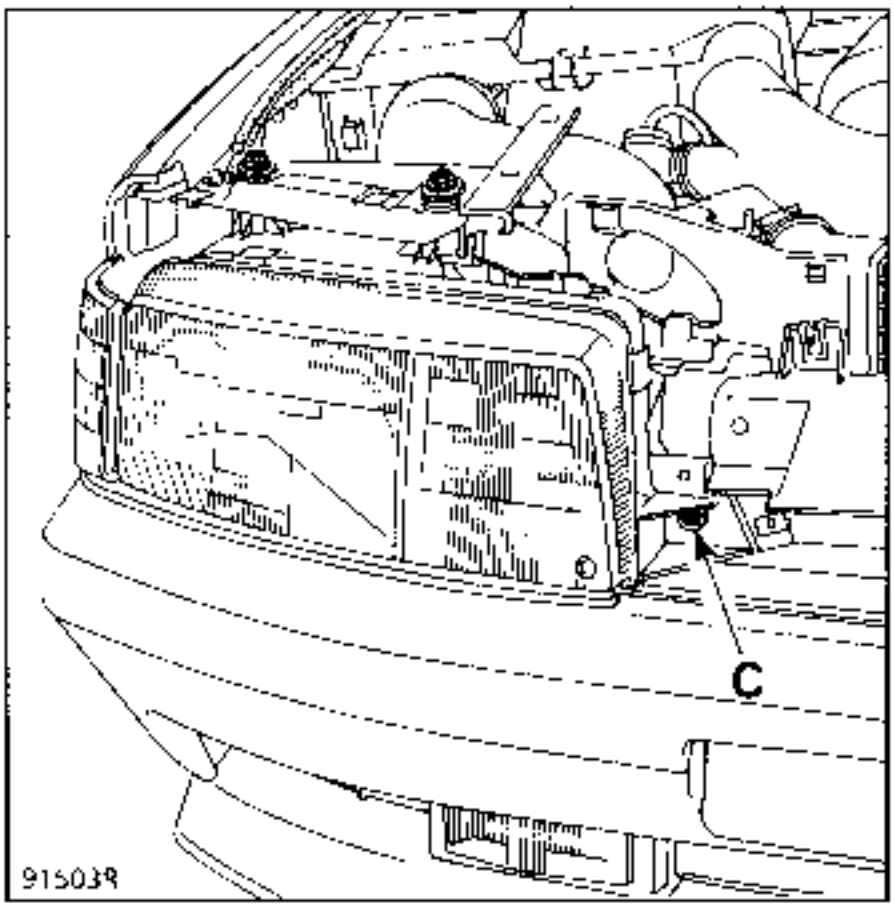
Remove :
– the direction indicator by releasing spring (1),
– the plastic covers by turning then through a quarter turn (A) (B).

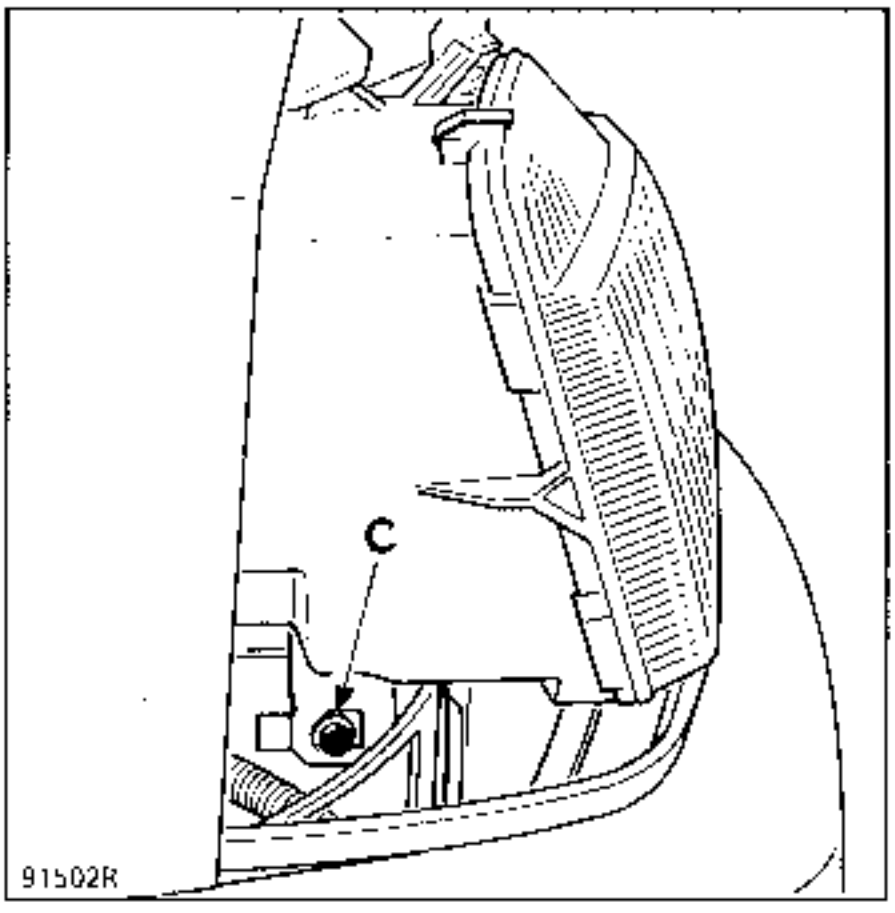
Disconnect the beam unit connectors.



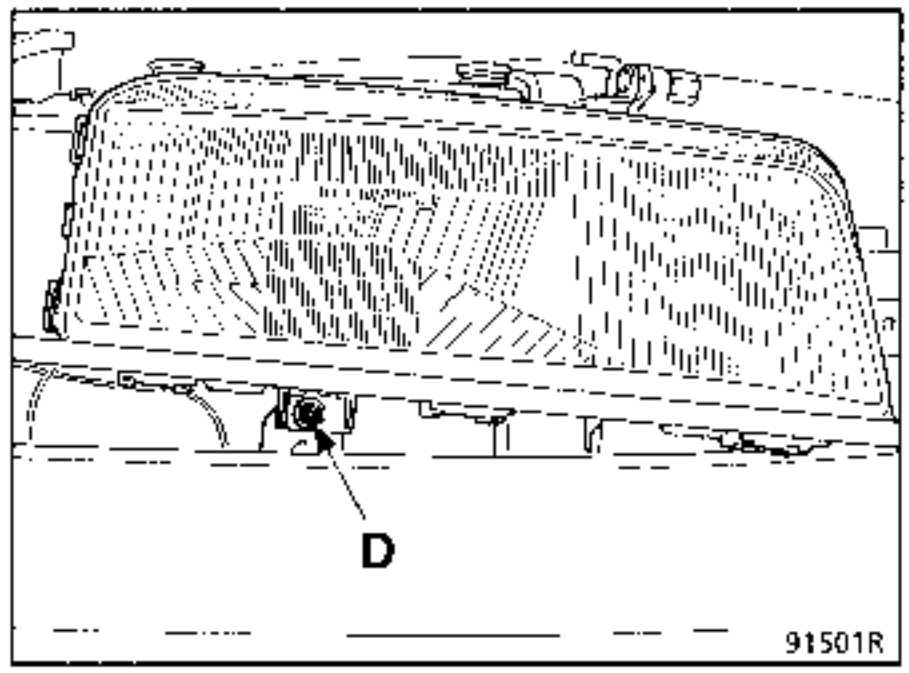
REMOVING (continued)

Remove the 4 screws (C).





Lift the headlight and remove screw (D).

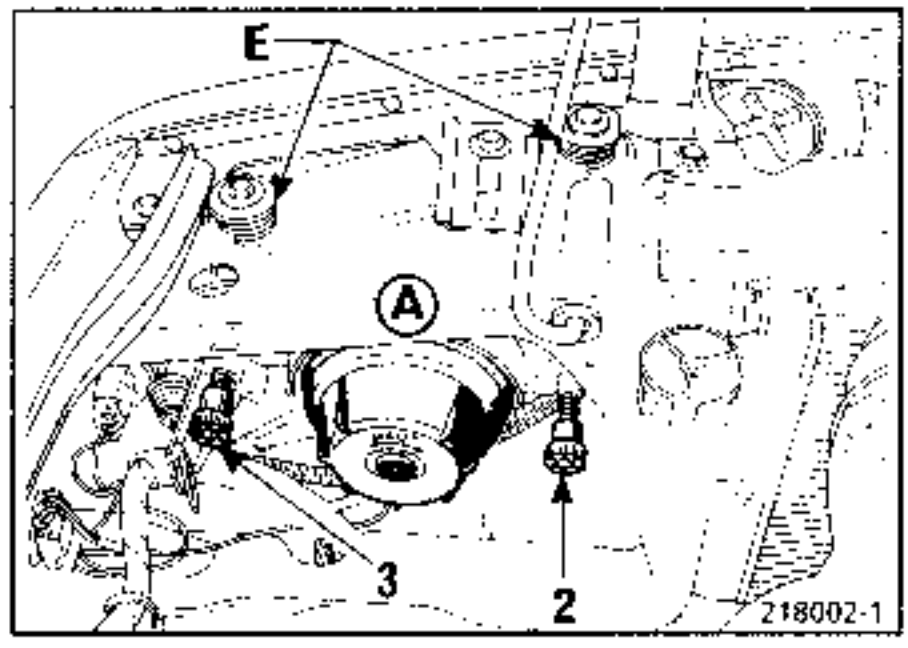


Remove the headlight from the front.

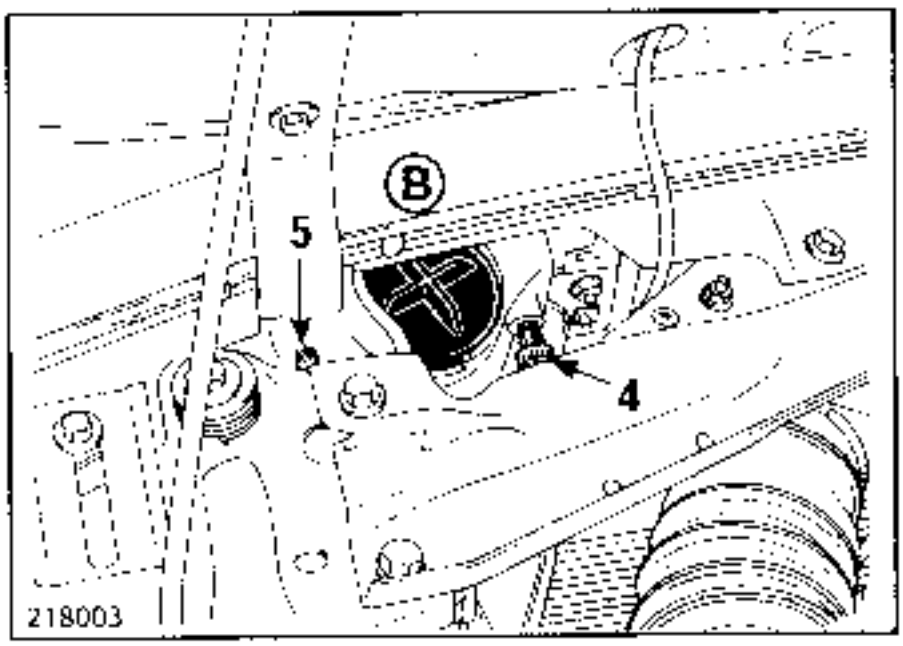
REFITTING (Special points)

Twin headlight radiator grille

After refitting, adjust the headlights at screws (2) and (3) in the case of the dipped/main beam light (A) and the screws (4) and (5) for the main beam only light (B).



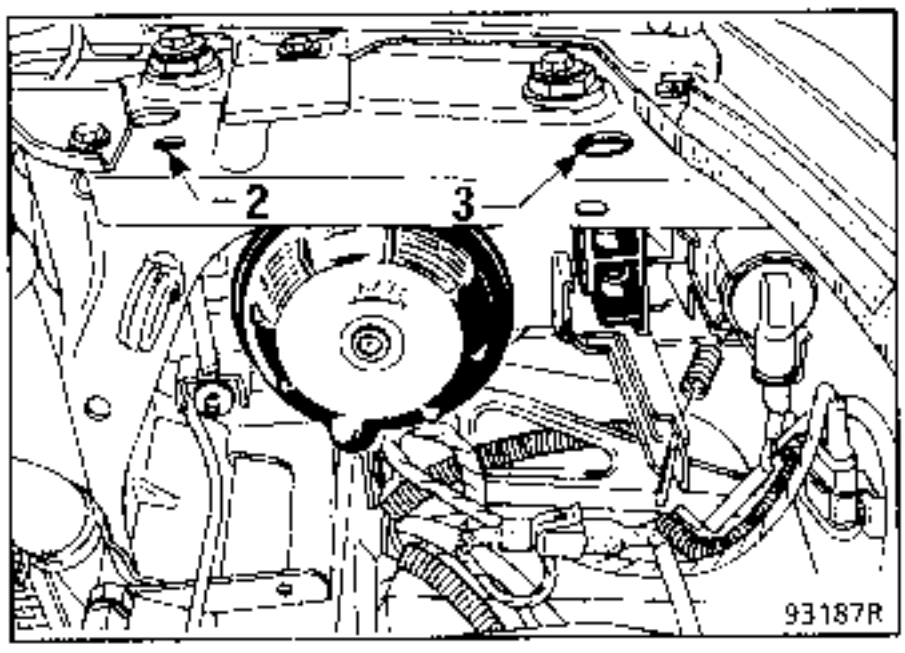
REFITTING (continued)



NOTE : Screws (E) are used to adjust the clearance between the upper part of the radiator grille and the front bumper.

WARNING : These screws are pre-adjusted. If their adjustment has to be altered, consult section 42 of the Bodywork Workshop Manual.

Special feature on single headlight type radiator grille
After refitting, adjust the headlight at screws (2) and (3).



NOTE : Screws (E) are used to adjust the clearance between the upper part of the radiator grille and the front bumper.

WARNING : These screws are pre-adjusted. If their adjustment has to be altered, consult section 42 of the Bodywork Workshop Manual.

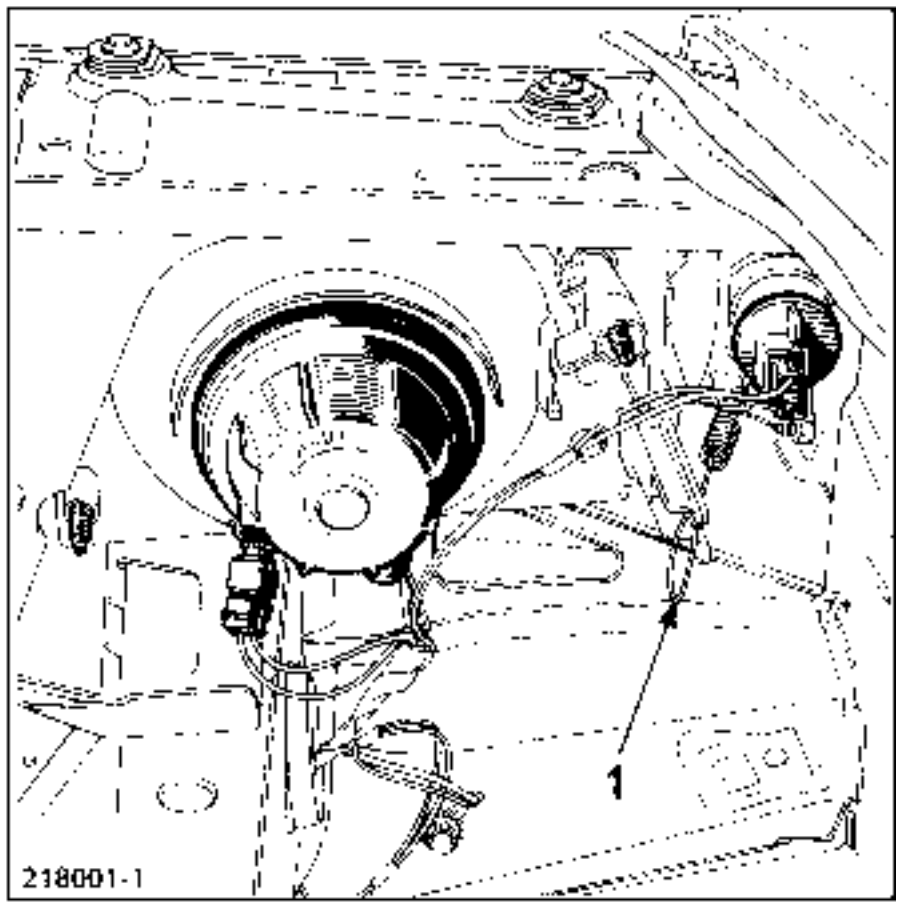
REMOVING

Disconnect the battery.

Unhook the spring (1).

Take out the bulb holder by twisting it.

Remove the light by pulling it towards the front.



REFITTING

Carry out these operations
in reverse.

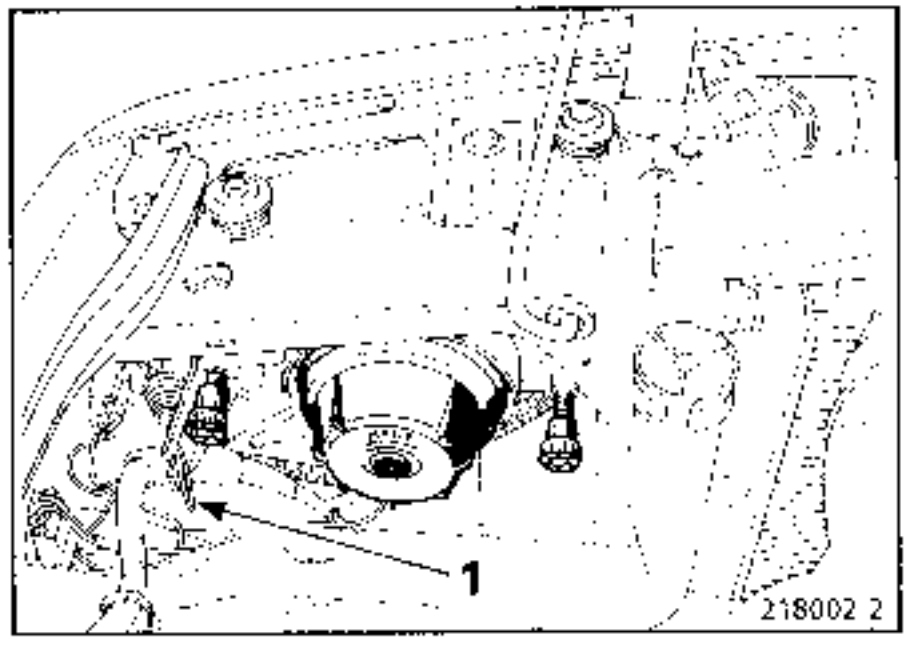
REMOVING

Disconnect the battery.

Unhook the spring (1).

Take out the bulb holder by twisting it.

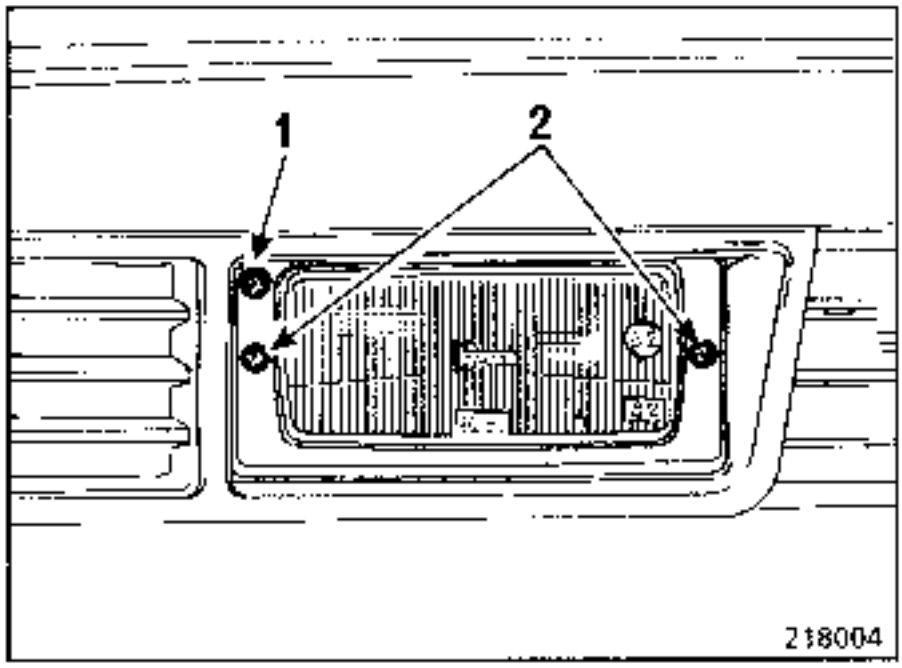
Remove the light by pulling it towards the front.

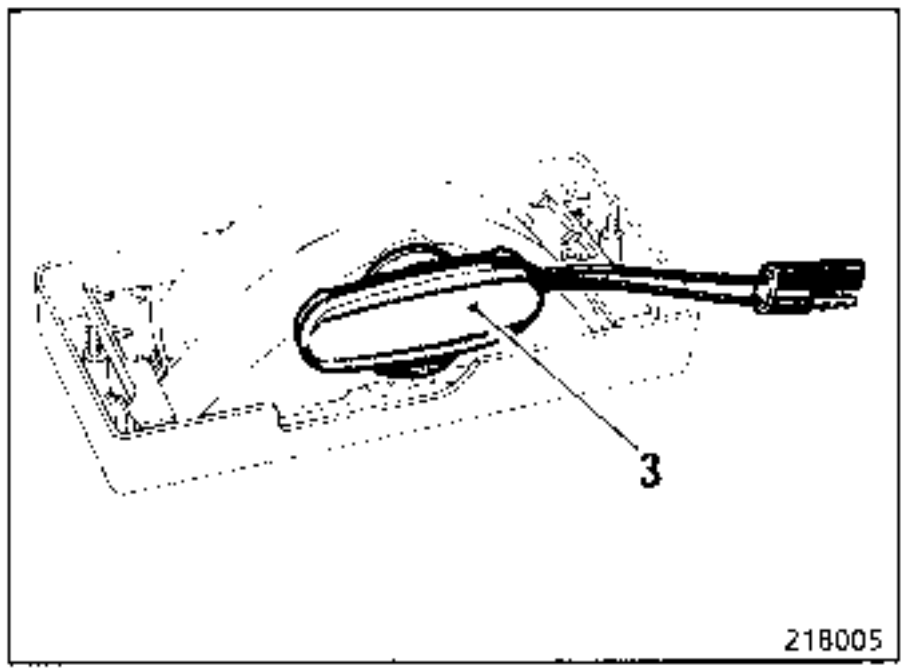


REFITTING

Carry out these operations in reverse.

For versions equipped with fog lights.





REMOVING

Unscrew securing screws (2).

Take out the beam unit in a forwards direction.

Disconnect the two wires.

REPLACING THE BULB
Turn the bulb holder through a quarter of a turn (3) and remove it.

Take out the bulb.

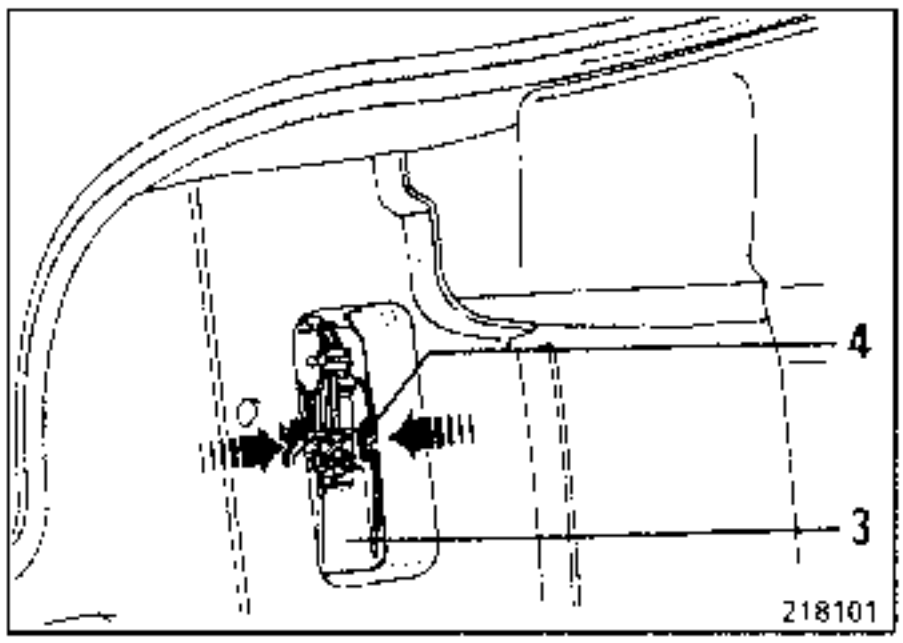
Hold the new bulb in a cloth or piece of paper and slide it into its support.

Adjust the height of the beam : screw (1).

REMOVING

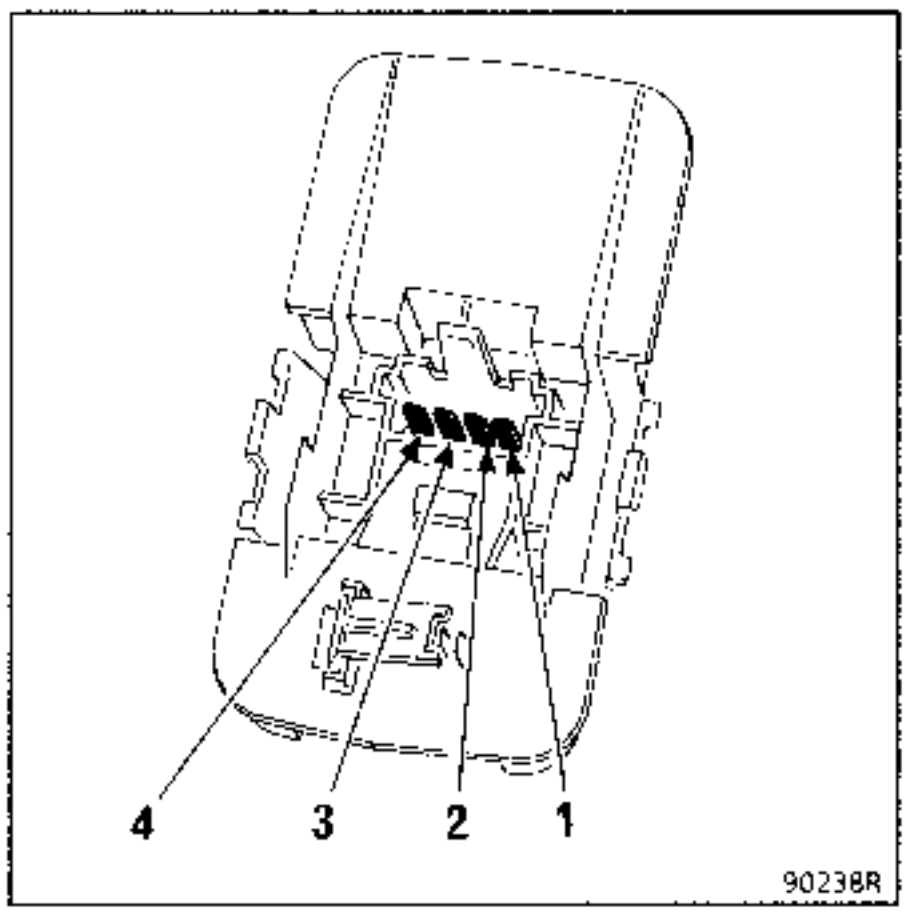
Disconnect :
- the battery,
- the connector.

To gain access to the bulbs, release the 2 lugs (4).



Remove:
- the trim (8 screws) from inside the boot,
- the rear lights (4 screws),
- the light, outwards.

CONNECTIONS

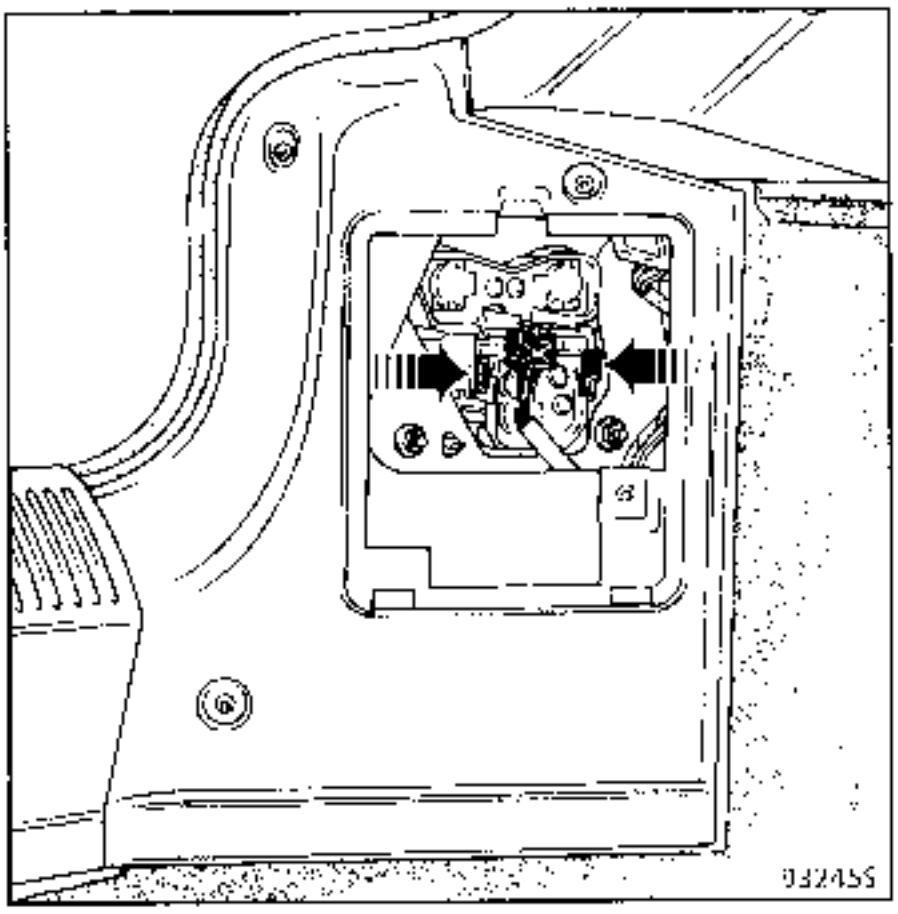


1 Direction indicator
2 Stop light
3 Rear sidelight
4 Earth

REMOVING

Disconnect:
- the battery,
- the connector.

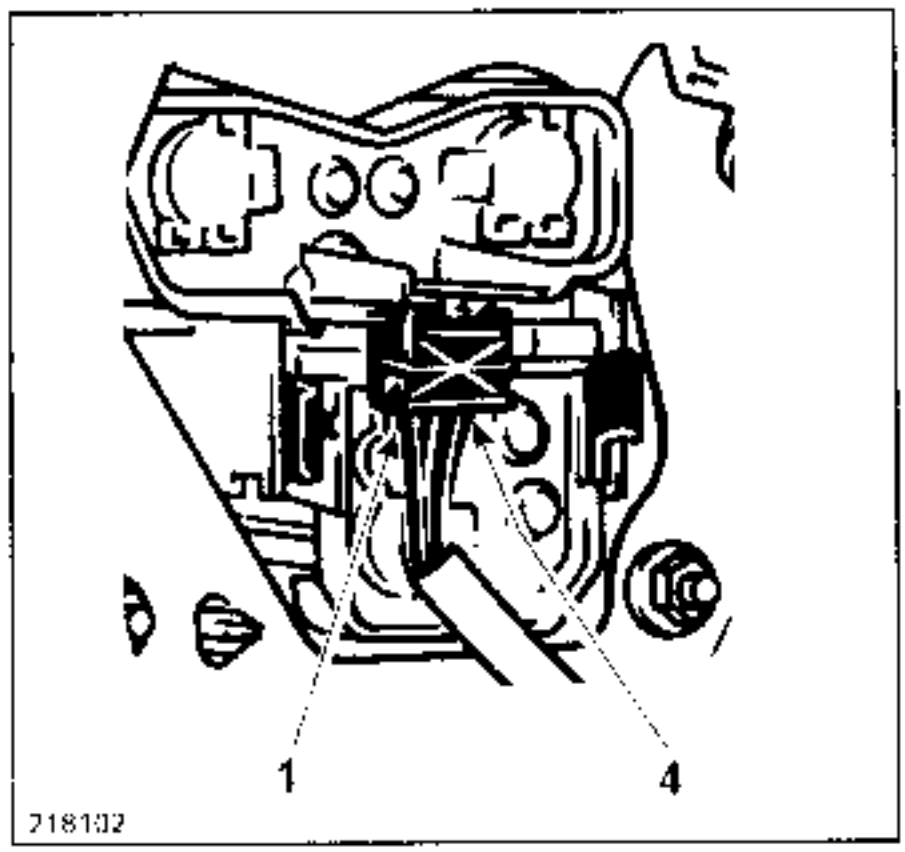
To gain access to the bulbs, free the retaining lugs.



Remove the 3 securing screws.

Pull the light outwards.

CONNECTIONS



1 Earth
2 Direction indicator
3 Stop light
4 Rear sidelight

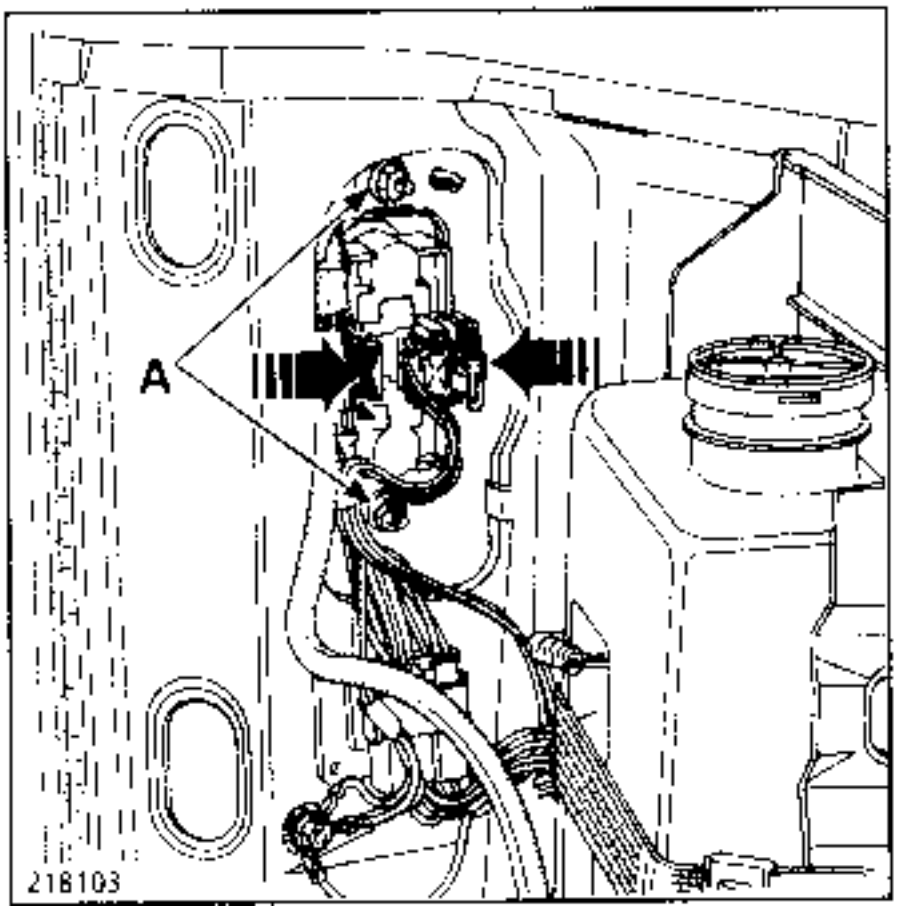
REMOVING

Remove the rear light access panel which is inside the wing.

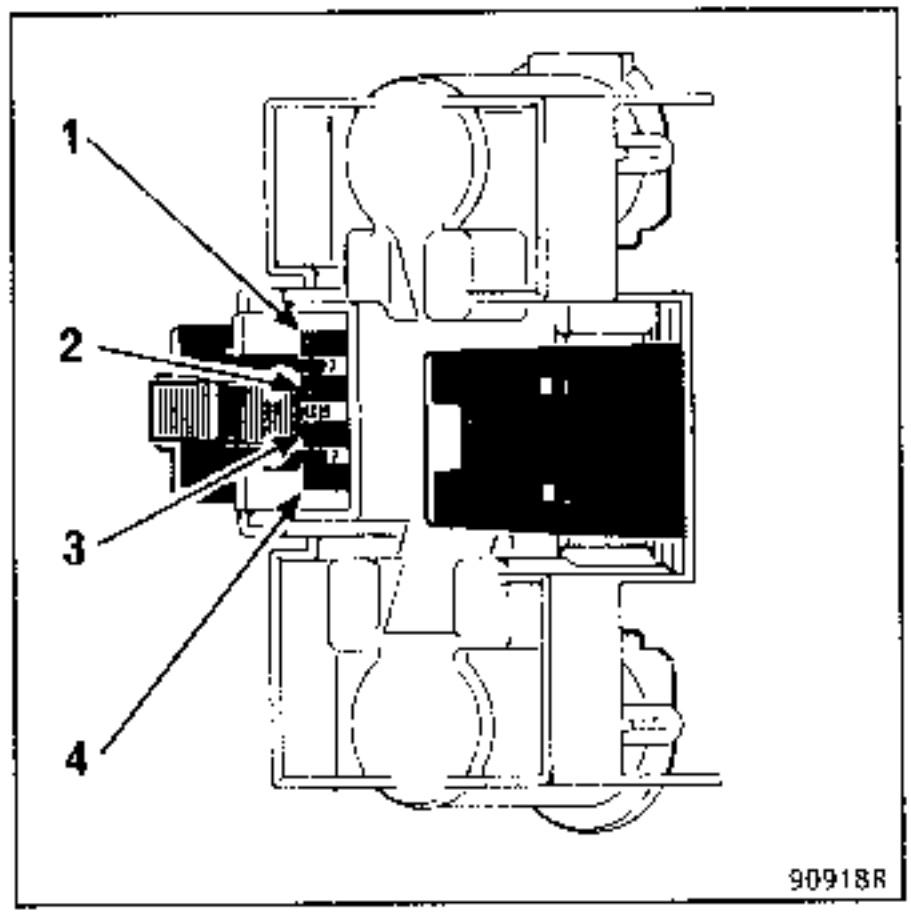
Disconnect :
- the battery,
- the connector.

Unscrew the 2 securing screws (A).

Take out the light.



CONNECTIONS

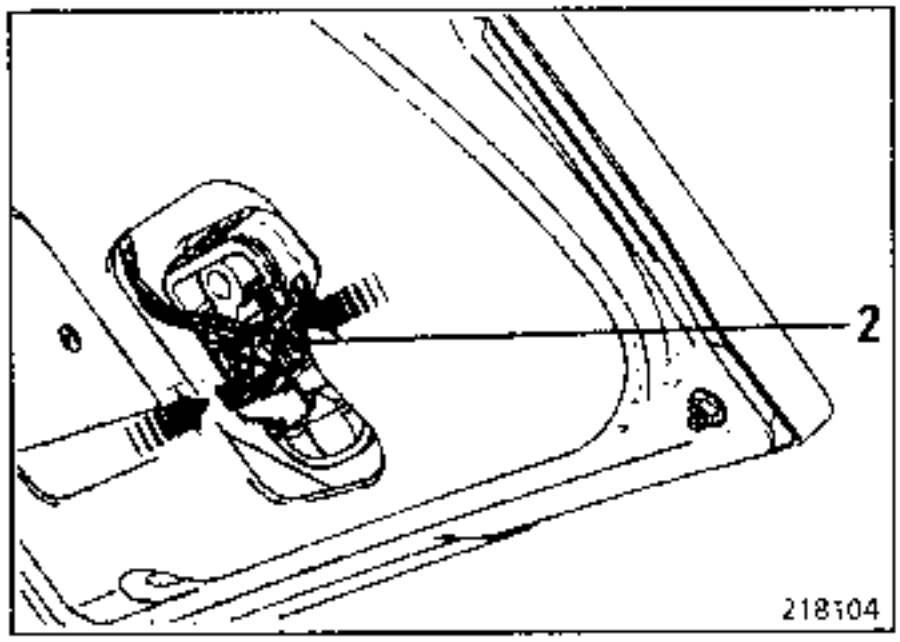


1 Earth
2 Direction indicator
3 Rear sidelight
4 Stop light

REMOVING

Disconnect:
- the battery,
- the connector.

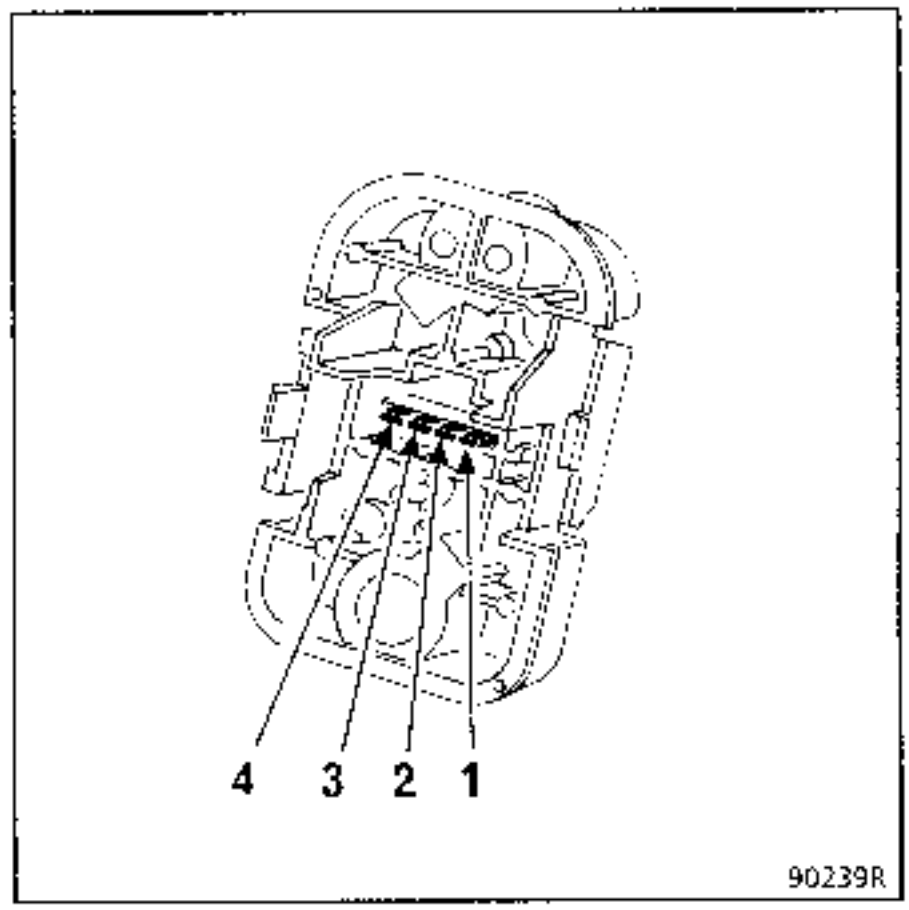
To gain access to the bulbs, free the 2 retaining lugs (2).



Remove:
- the trim piece that secures the number plate (6 screws and one nut behind the number plate on early vehicles).
- the rear light (4 screws).

Pull the rear light outwards.

CONNECTION



1 Rear fog light
2 Earth
3 Reversing light
4 Not used

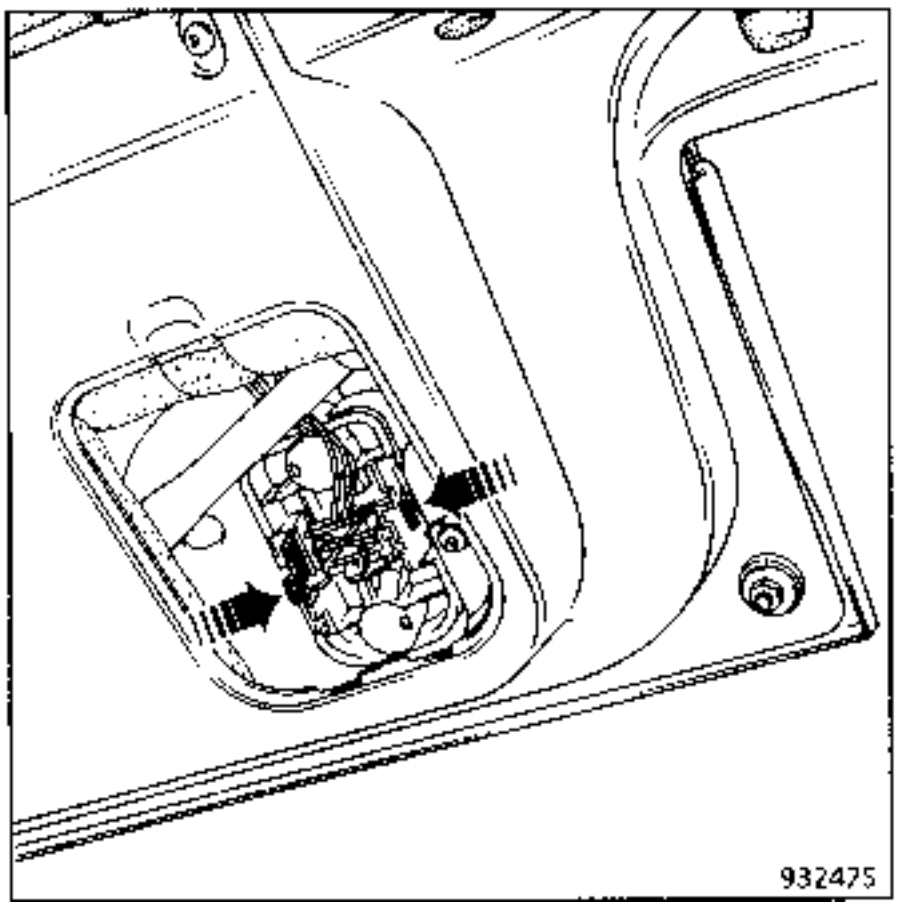
The rear lights mounted on the boot form one single assembly.

REMOVING

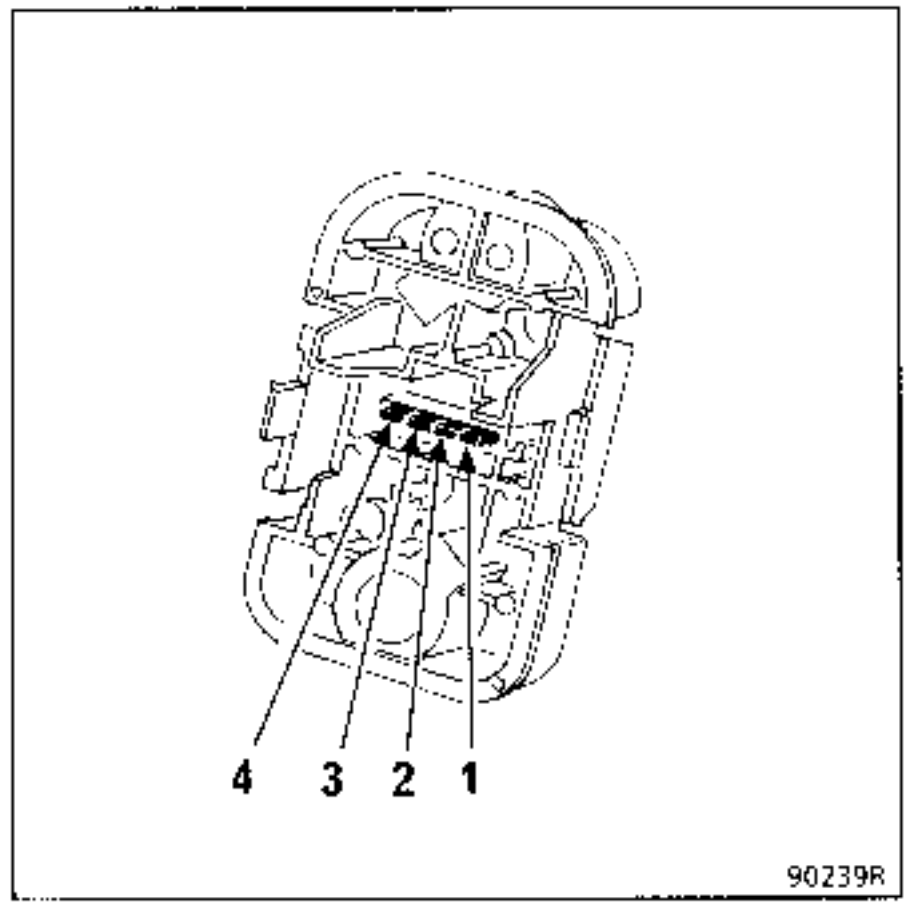
Disconnect the right and lefthand rear light connectors and the number plate light connectors.

Remove the 4 screws from the righthand rear light, the 4 screws from the lefthand rear light and the nut behind the number plate.

To gain access to the bulbs, free the 2 retaining lugs.



CONNECTION



1 Reversing light
2 Earth
3 Fog light
4 Not used

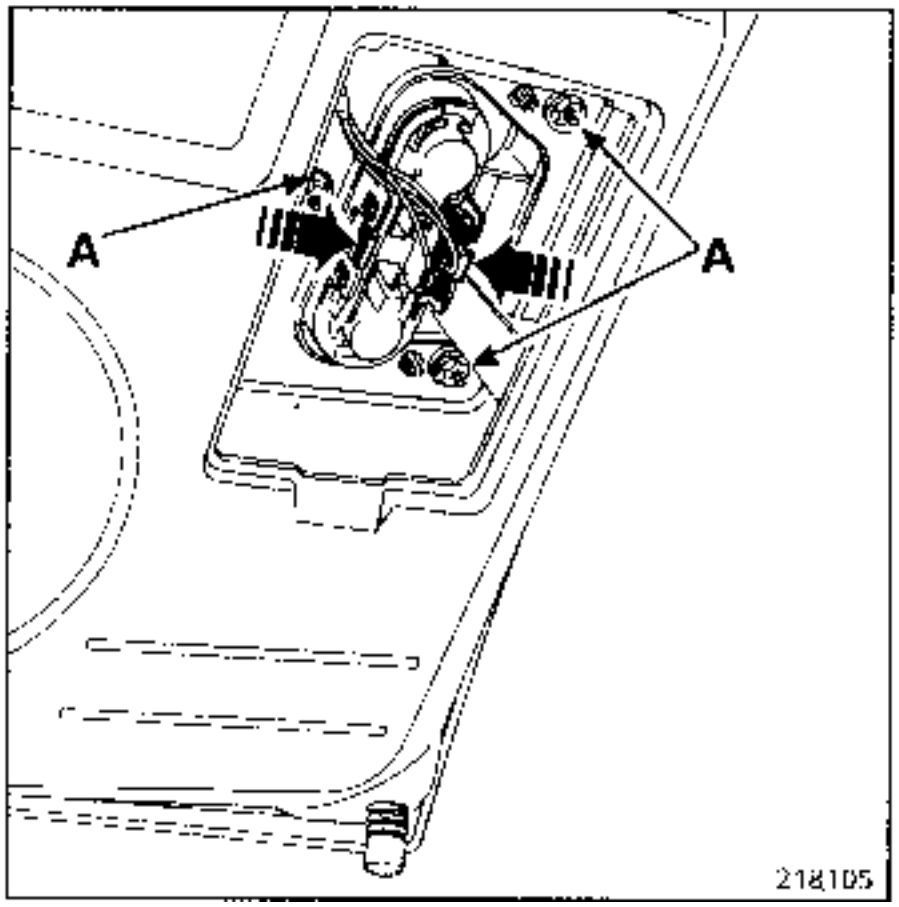
REMOVING

Remove the rear light access panel from the tailgate.

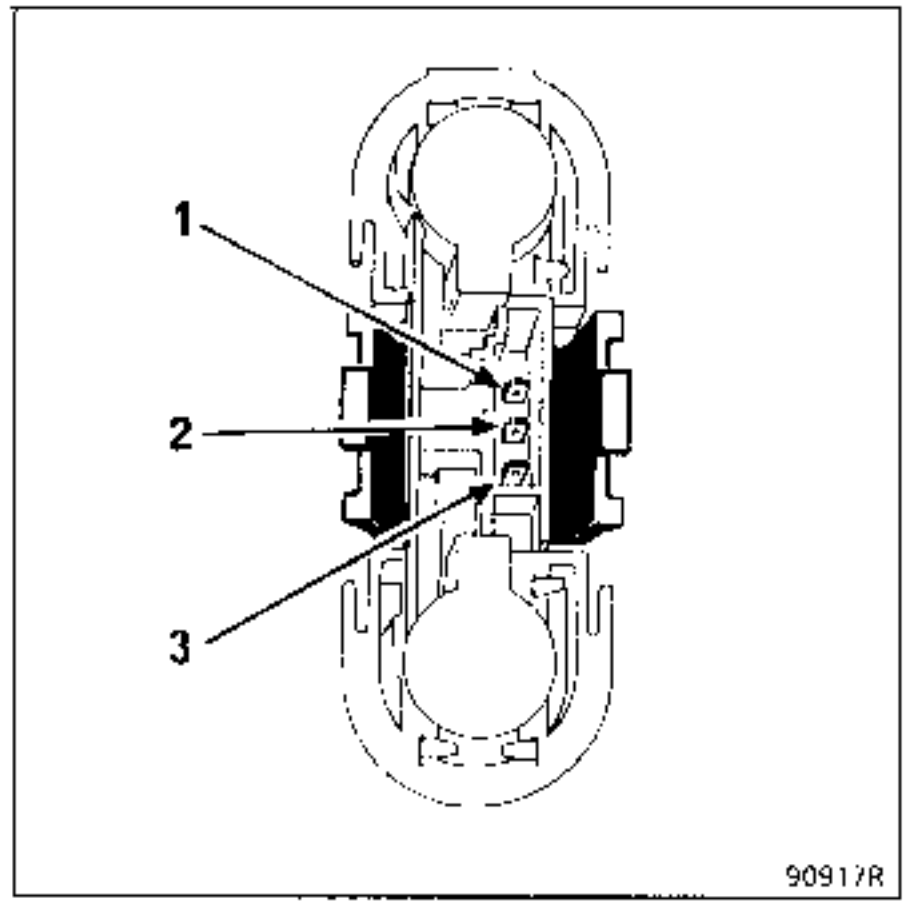
Disconnect :
- the battery,
- the connector.

Unscrew the 3 securing screws (A).

Remove the light.



CONNECTIONS



1 Rear fog light
2 Earth
3 Reversing light

SPECIAL POINT CONCERNING OPERATION

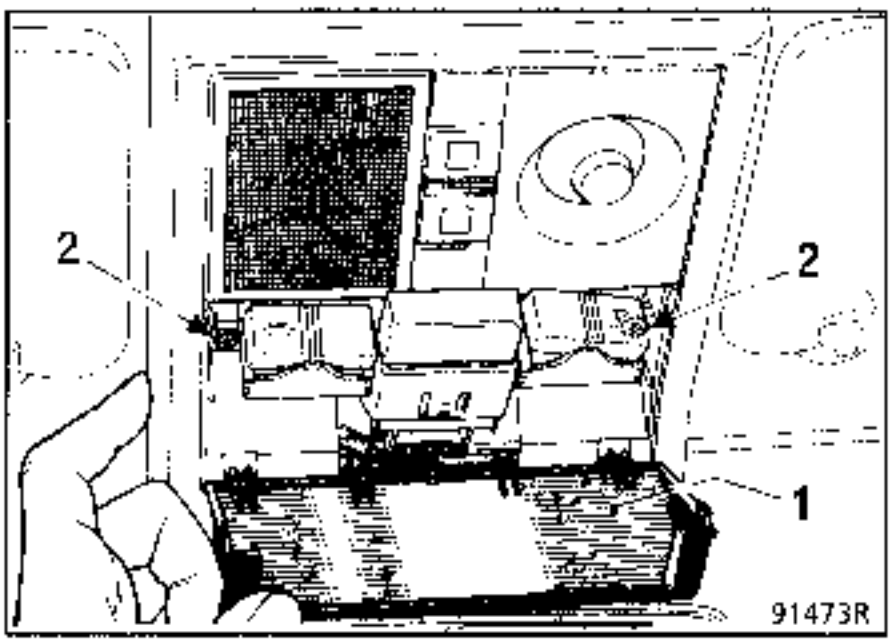
On some vehicles, the operation of the interior courtesy light is on a timer relating to the operation of unlocking the doors using the infra-red remote control (plip). (See pages 87-2 and 87-3).

To change the spot light and interior light bulbs, the interior light assembly must be removed first.

REMOVING

Remove:
- the plastic cover (1),
- the two securing screws (2).

Pull the assembly out towards the front of the vehicle.



REMOVING THE INTERIOR LIGHT OR SPOT LIGHT

In either case, the infra-red receiver unit must be removed first (if the vehicle is equipped with one).

Disconnect the connectors.

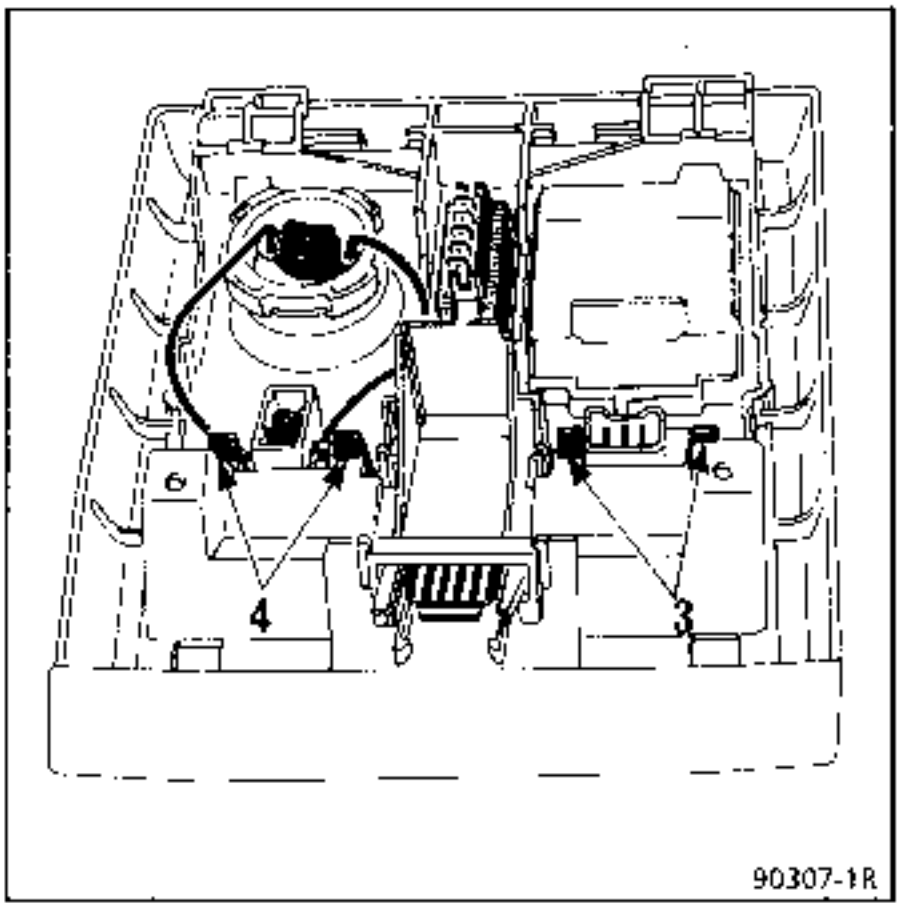
INTERIOR LIGHT

Carefully free the retaining lugs (3) and take out the switch and light assembly.

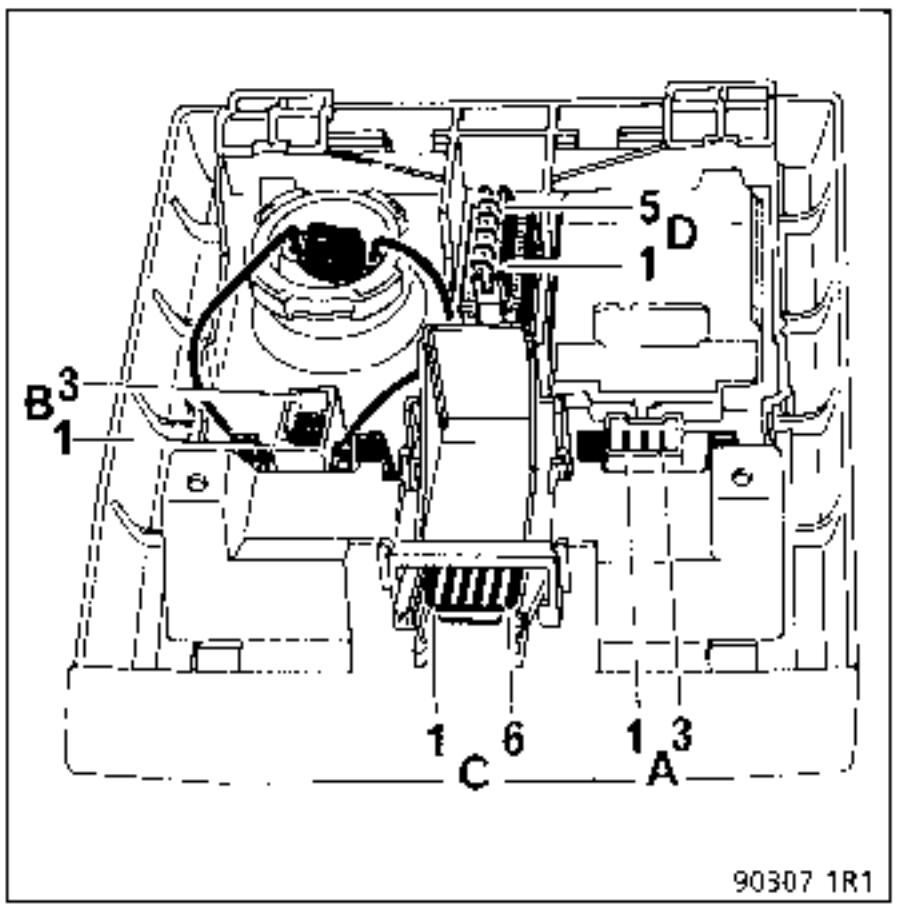
NOTE : The switch cannot be removed.

Carefully free the retaining lugs (4) and remove the spot light and switch assembly.

NOTE : The switch cannot be removed.



CONNECTIONS



CONNECTORS

INTERIOR LIGHTING (A)

1 + before ignition switch
2 Earth
3 Earth via door switch

MAP READING SPOT LIGHT (B)

1 + before ignition switch
2 Earth
3 Not used

INFRA-RED REMOTE CONTROL RECEIVER (C)
(vehicle without engine immobiliser)

1 Earth
2 Door unlock signal
3 Door unlock information
4 Door locking signal
5 Door locking information
6 + before ignition switch

INFRA-RED REMOTE CONTROL RECEIVER (C)
(vehicle with engine immobiliser)

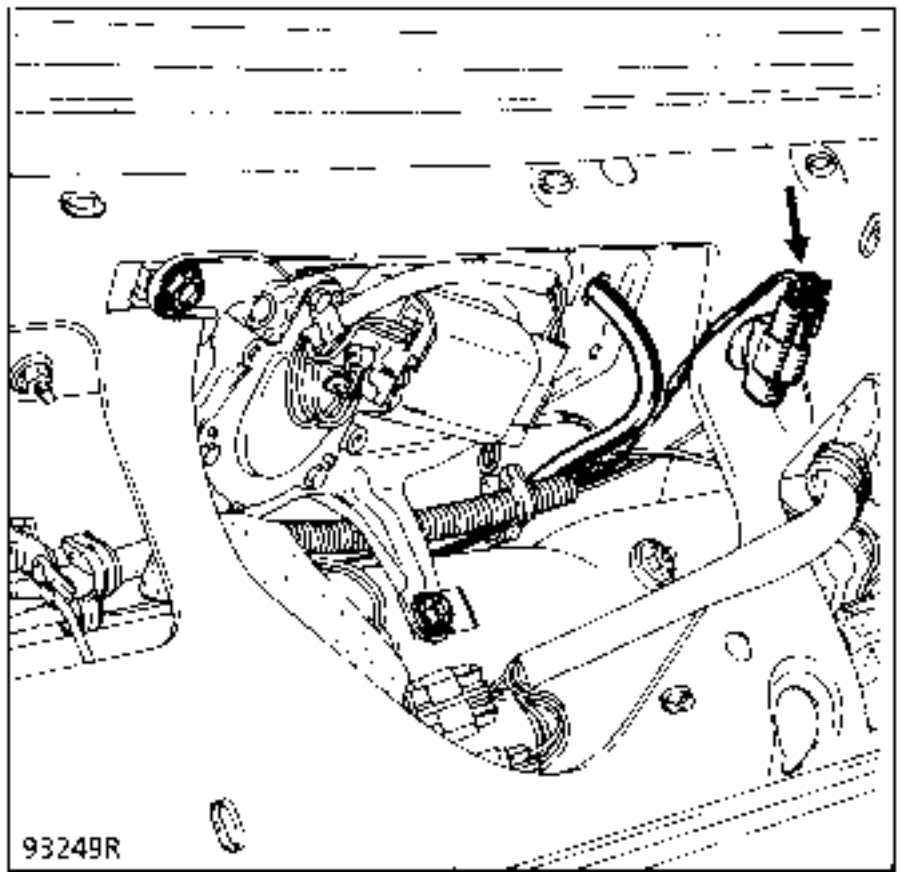
1 Earth
2 Not used
3 Infra-red receiver supply
4 Not used
5 Infra-red receiver outlet
6 Not used

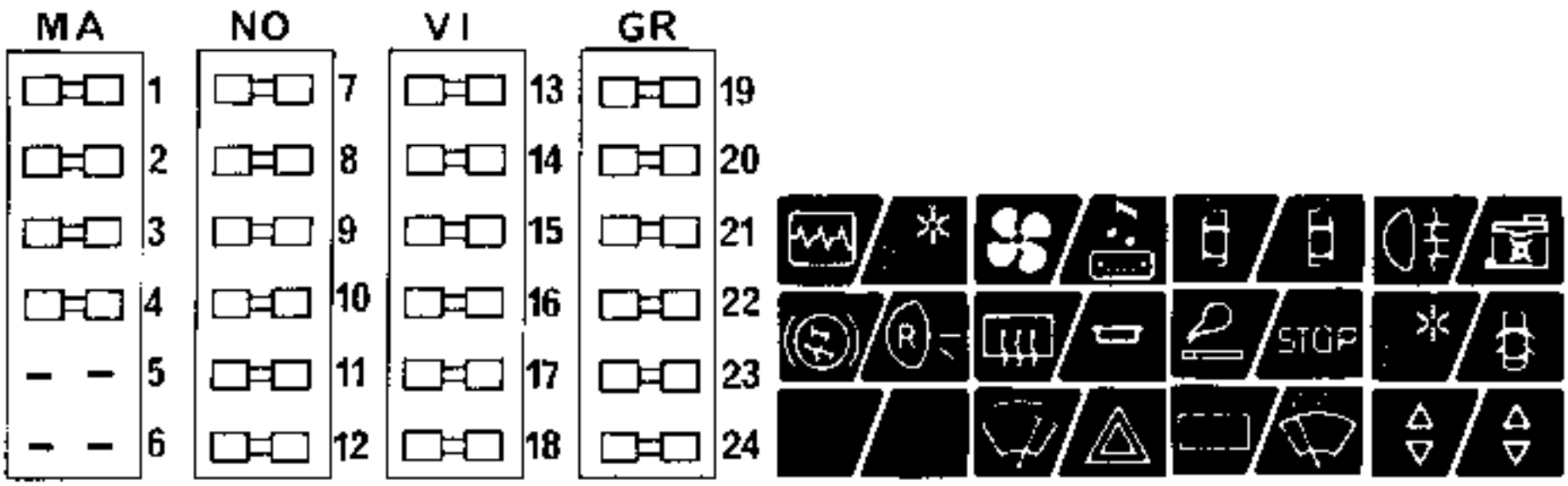
SUNROOF SWITCH (D)

1 Motor
2 Earth
3 + after ignition switch
4 Not used
5 Motor

BOOT LIGHT SWITCHES

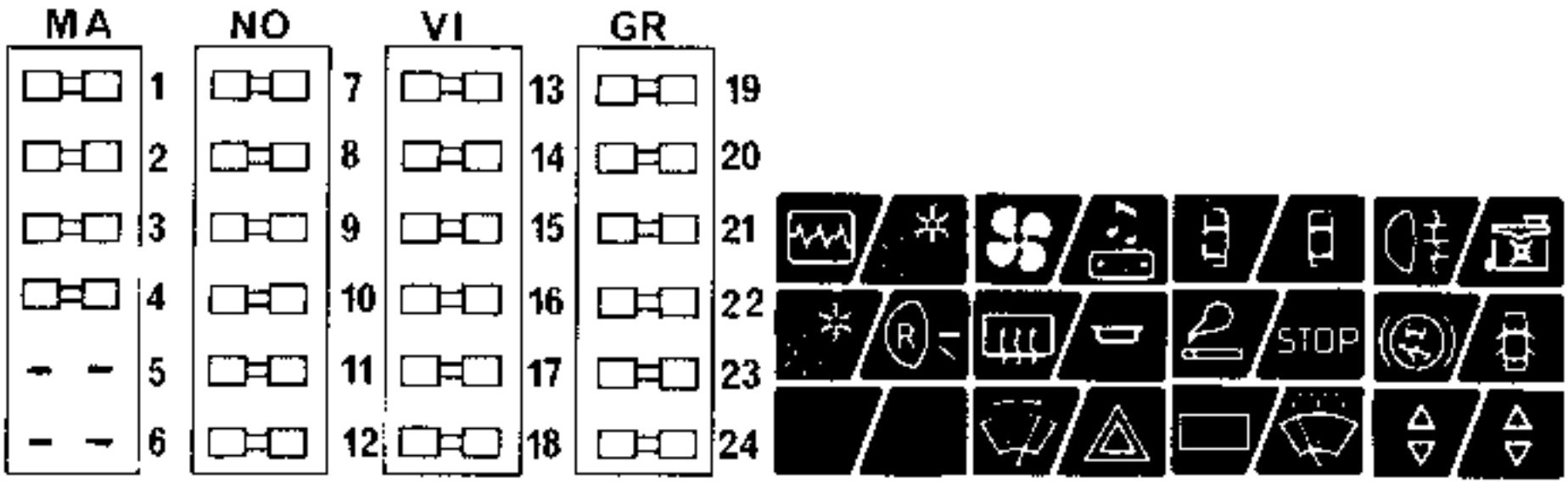
On type B48 vehicles, the boot light switch is a ball type switch mounted on the tailgate.





218106

N°	Amps	Allocation
1	5	Automatic transmission
2	30	Air conditioning
3	3	A.B.S.
4	5	Reversing light/Automatic transmission
5	-	Not used
6	-	Not used
7	20	Heater
8	10	Radio
9	20	Heated rear screen/rear wash/wipe
10	5	Clock/Interior lights Radio (before ignition)/Instrument panel (before ignition)
11	10	Windscreen wiper park/timer
12	10	Flasher unit Hazard warning lights
13	5	LH side/rear lights
14	5	RH side/rear lights
15	0	Cigar lighter
16	10	Stop lights
17	10	Inst. panel/Reversing lights
18	15	Windscreen wipers
19	7,5	Rear fog lights
20	20	Engine cooling fan
21	30	Air conditioning
22	25	Electric door locks/Electric rear view mirrors
23	30	LH window winder
24	30	RH window winder/ Sunroof



218107

N°	Amps	Allocation
1	5	Automatic transmission
2	30	Air conditioning
3	30	Air conditioning
4	-	Not used
5	-	Not used
6	-	Not used
7	20	Heater/Rear screen wash/wipe
8	10	Radio/Alarm (after ignition)
9	20	Heated rear screen
10	5	Clock/Interior lights Radio ((before ignition) / Instrument panel (before ignition)
11	10	Windscreen wiper park/timer
12	10	Flasher unit Hazard warning lights
13	5	LH side/rear lights Front fog lights
14	5	RH side/rear lights
15	10	Cigar lighter/Rear screen wash/wipe (park)
16	10	Stop lights/cruise control
17	10	Inst. panel/Reversing lights/Alarm
18	15	Windscreen wipers
19	7,5	Rear fog light
20	20	Engine cooling fan
21	3	A.B.S.
22	25	Electric door locks/Alarm (+ before ignition)/ Electric rear view mirrors
23	30	LH window winder
24	30	RH window winder/Sunroof

DESCRIPTION

The burglar alarm comprises:
- 1 alarm computer for processing and managing information,
- 1 volumetric detection unit (ultrasound), plus warning light,
- 1 self-fed siren (option) with on/off key switch,
- 1 alarm suppression key switch.

LOCATION OF THE COMPONENTS

Alarm computer

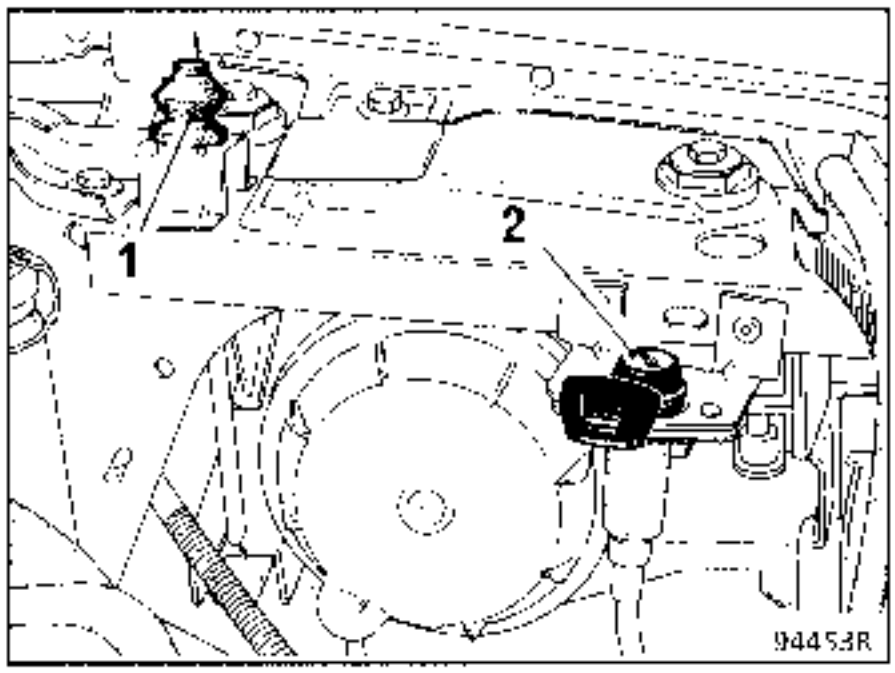
Strapped to a mounting on the floor, on the left hand side of the clutch pedal.

Volumetric detection unit

On the roof console with the PLIP receiver and the alarm standby warning light.

Self-fed siren

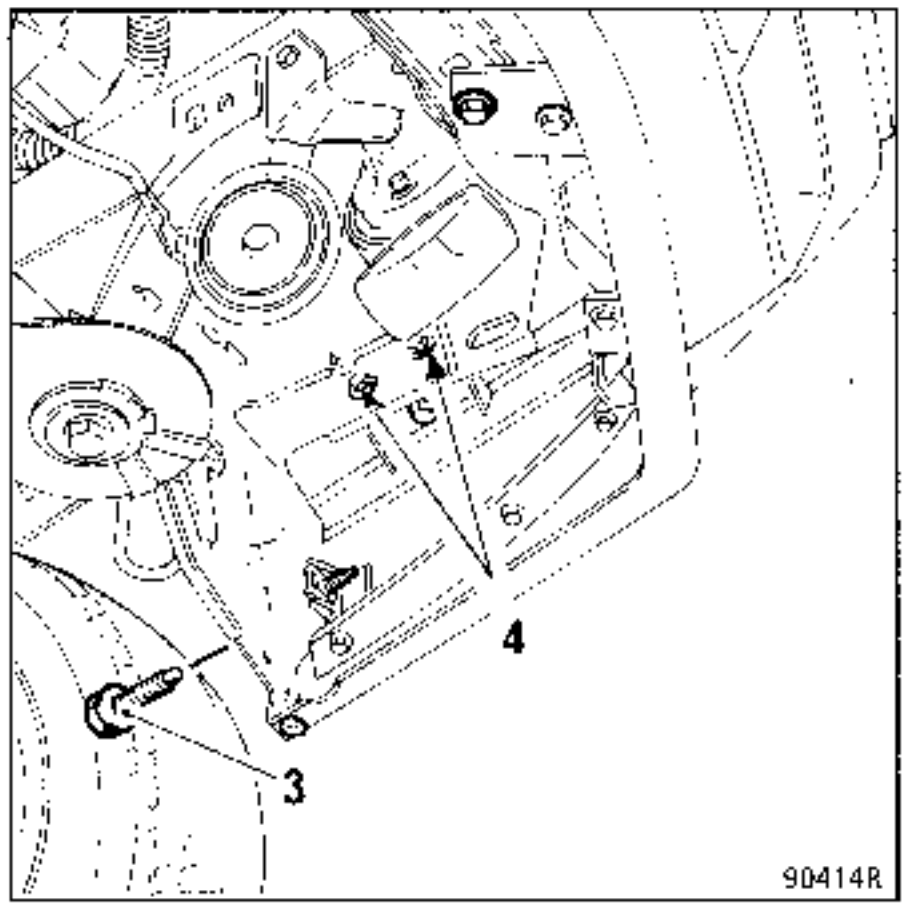
Located in the bumper, under the front right hand headlight unit, this is fitted with a remote key switch, mounted vertically on the front right hand headlight carrier panel. Check that the sealed cover is correctly refitted to prevent the ingress of water and dust.



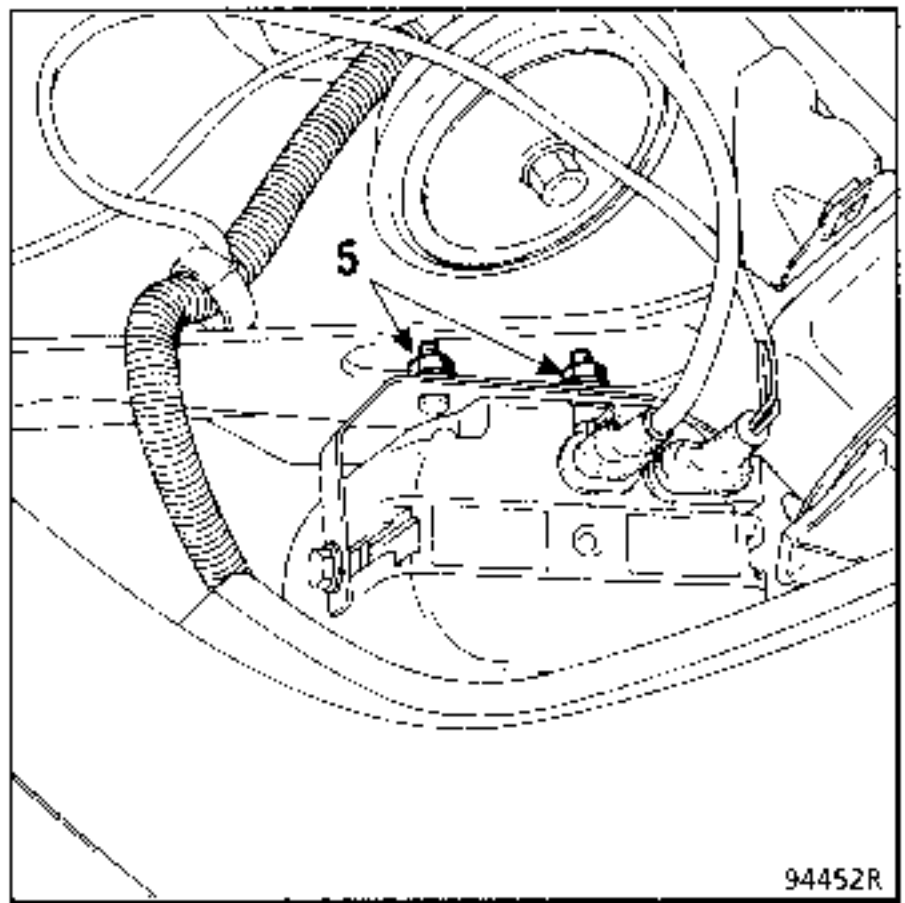
1 Bonnet switch
2 Key switch - remote from siren

REMOVING THE SIREN

Remove:
- the front right hand headlight unit (see method on page 81-),
- bolt (3) then the two bolts (4) via the engine compartment,



- passing your left arm under the washer fluid bottle, the lower siren mounting bolt (located vertically).
- the two siren mounting nuts (5) and their pressure bar.



Holding the bumper at the ends, pull it outwards to separate it from the wing and lift it, **while removing the siren with its mounting.**

Disconnect the two siren connectors.

Unclip the fog lights connector (depending on equipment).

Separate the siren from the mounting.

Alarm suppression key switch

This switch is located in the glovebox, at the top near to the light.

When working on the vehicle, it is advisable to have the key to turn the alarm off. Remember to switch the siren off too (if the vehicle has this option) using its special key. Remember to turn back on both the alarm and the siren (if fitted) after the operation.

NOTE : if the vehicle is fitted with the alarm and the self-fed siren as an option, the one key is used for both key switches.

ADVICE : ensure that the keys for the alarm and the siren are not separated from the vehicle keys.

OPERATION

This alarm ensures:

- volumetric protection of the passenger compartment by an ultrasound field. Any modification to the interior volume (disruption of the emission and receiving of the ultrasounds) will trigger the alarm,

- perimetric protection; the alarm unit is connected to all the vehicle opening elements (front and rear doors, bonnet, boot), so if one of them is opened, the alarm will be triggered immediately.

ALARM SIGNALS - VISIBLE AND AUDIBLE

In accordance with current legislation, once the alarm has been triggered, the dipped headlights*, hazard warning lights, original vehicle horn or the siren, if fitted, will operate alternately for 25 seconds (± 5 s) . After 25 seconds (± 5 s) of silence, the alarm will rearm itself automatically to monitor the vehicle once more.

NOTE : after being triggered 3 times in succession, the alarm will become inactive, but the warning light will continue to flash to simulate stand by.

(*) depending on country

SETTING THE ALARM

The alarm is set when the doors are locked by the remote control (using the key will not set the alarm).

"Close" information is sent on track 5 of the PLIP unit to track 6 of the alarm unit (MTIS 15 track black connector) (see diagram).

This pulse sets the perimetric and volumetric detection systems. This is shown by the hazard warning lights flashing twice and the roof console warning light illuminating. This warning light remains illuminated for about 20 seconds, then flashes. This period is used by the sensors to analyse the volume of the passenger compartment. They reset each time the alarm is set, to take into account any change in volume (luggage, packages , etc...)

Any change in the volume after the alarm has been set (examples : window broken or a foreign body enters the passenger compartment or any movement inside the passenger compartment) will disrupt the ultrasound field and immediately trigger the alarm.

The same applies to the vehicle's opening elements, which, when opened, send an earth to the alarm unit via the switches on the doors, bonnet and boot (see diagram).

The alarm may therefore only operate normally if all the doors, bonnet and boot, as well as the windows and sunroof (depending on equipment), are correctly closed.

IMPORTANT: an animal, if left in the vehicle, may trigger the alarm when it moves.

If the alarm is being triggered incorrectly, check that the user has not hung any **objects from the rear view mirror, which may swing about.**

When the system is set, ensure the hazard warning lights flash. If they do not, the boot, bonnet or one of the doors is still open. Perimetric protection will no longer be assured.

When the opening element is closed, the hazard warning lights will flash to show that protection is active once more.

TURNING THE ALARM OFF

The alarm is turned off when the PLIP is used to unlock the doors. "Open" information is sent on track 3 of the PLIP unit to track 5 on the alarm unit. This pulse turns off the perimetric and volumetric protection systems (this is also the case if the alarm has been triggered).

This is shown by the hazard warning lights flashing and the warning light on the roof console extinguishing.

IMPORTANT: opening the doors using the key will not turn the alarm off and will not stop it if it has been triggered. The key switch, hidden in the glovebox, may be used to allow or prevent the last status of the alarm system as set by the PLIP.

DURATION OF OPERATION

After 5 weeks on continuous standby the battery may not have enough power to ensure the vehicle operates correctly.

SIREN

When the siren is fitted, 2 1/2 hours driving is required to ensure the internal battery has enough power for the siren to operate correctly.

TESTING THE ALARM

Set the alarm using the PLIP.

Check that the hazard warning lights flash twice and the warning light illuminates; otherwise turn the key in the key switch in the glovebox.

TESTING PERIMETRIC PROTECTION

Set the alarm using the PLIP.

Unlock a door using the key and open it; the alarm should be triggered (dipped headlights*, hazard warning lights, original horn or siren operate alternately).

Stop the alarm using the PLIP.

(*) depending on country.

TESTING VOLUMETRIC PROTECTION

Half open a front or rear window.

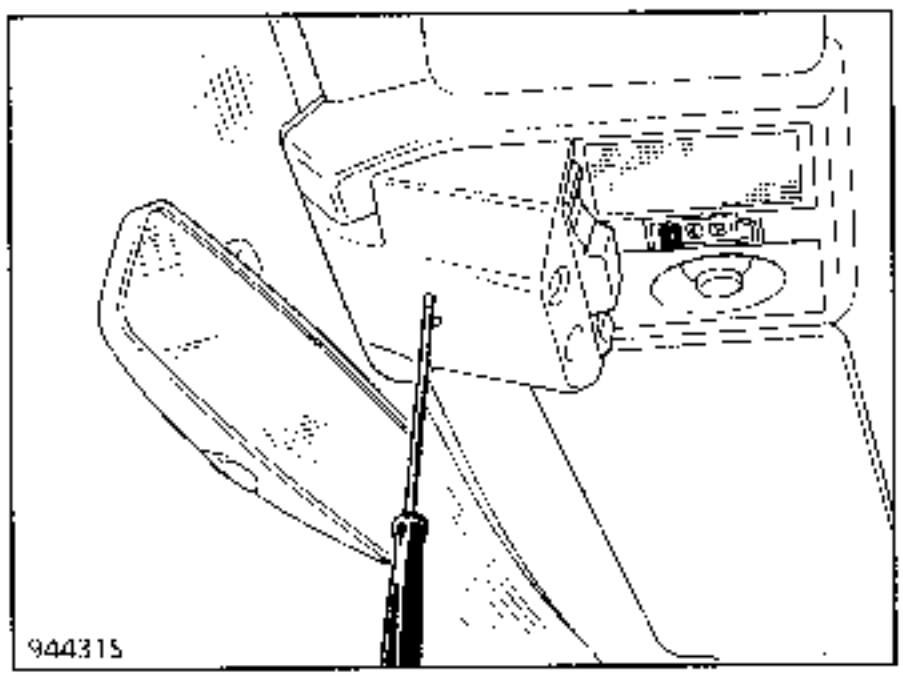
Set the alarm using the PLIP and wait for the warning light to flash.

Put your arm through the half open window and move it around in the passenger compartment; the alarm should be triggered, otherwise the sensitivity of the ultrasound module requires adjusting.

ADJUSTING THE ULTRASOUND SENSITIVITY

Put the ignition key in the accessories position (first notch) ; the warning light illuminates each time a movement is detected, but the alarm will not be triggered.

Remove the rubber plug from next to the warning light.
Using a small screwdriver, turn the potentiometer clockwise to increase the sensitivity or anti-clockwise to decrease the level.



SENSITIVITY ADJUSTMENT TABLE

Adjust using the potentiometer.

Reduce the value to reduce the sensitivity and vice versa.

The value is measured between tracks 2 and 4 on the detection unit electronic circuit.

TRIM		
Cloth	Leather	Baccara Leather
80 kΩ	60 kΩ	55 kΩ

CHECKING

Open a window, leave the vehicle and pass your arm through the open window; the warning light should illuminate when the arm is moved.

Continue to adjust until the required sensitivity is obtained.

Refit the plug.

IMPORTANT: do not set the ultrasound to too sensitive a level - the alarm may be triggered incorrectly.

ALLOCATION OF ALARM UNIT CONNECTOR TRACKS

(A) 15 tracks

1 Self-fed siren control
2 + 12 V after ignition
3 + 12 V accessories (1st notch ignition switch)
4 Earth
5 PLIP open information
6 PLIP close information
7 Front right hand door 1st notch switch
8 Front left hand door 1st notch switch
9 Rear right hand door 1st notch switch
10 Boot switch
11 Bonnet switch
12 Rear left hand door 1st notch switch
13 Ultrasound activation
14 Ultrasound detection
15 Warning light control

(B) 5 tracks

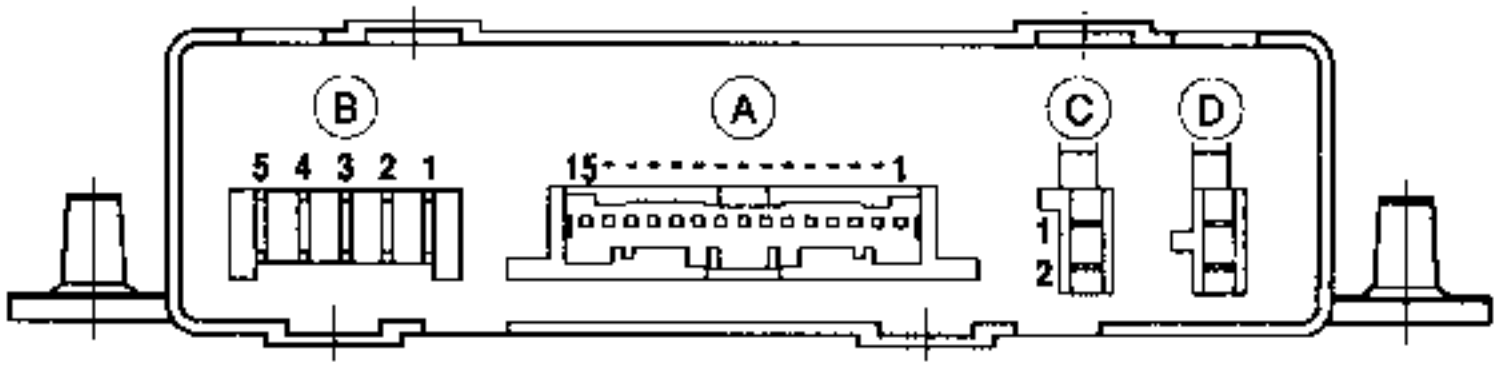
1 Right hand hazard warning lights
2 Left hand hazard warning lights
3 Dipped headlights*
4 Horn
5 + 12 V before ignition

(C) 2 tracks

1 Key switch (glovebox)
2 Key switch (glovebox)

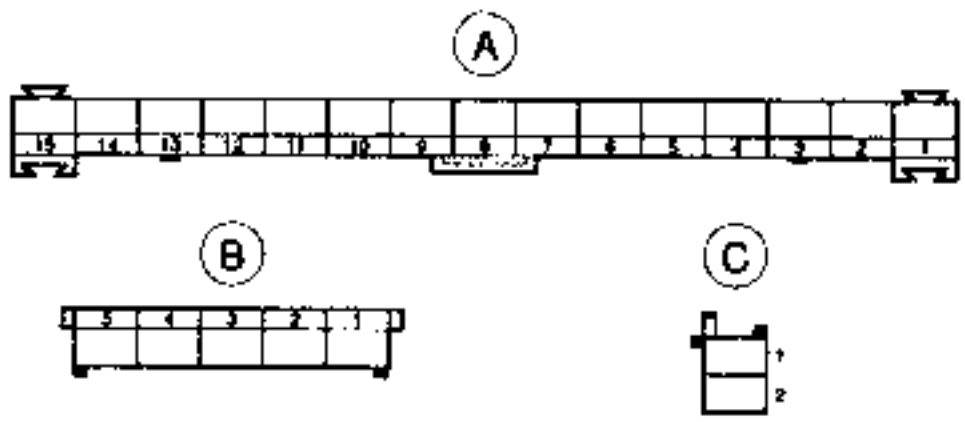
(D) Not used

(*) depending on country.



DG1004

Alarm unit

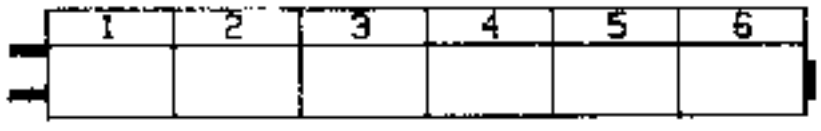


218201

Connectors at wiring end

NOTE : Connectors for the wiring are shown at wiring end.

ALLOCATION OF INFRARED RECEIVER CONNECTOR TRACKS (on roof console)

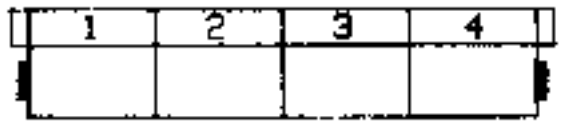


DG1005

1 PLIP earth
2 CPE* open command
3 Alarm open information
4 CPE* close command
5 Alarm close information
6 + before ignition PLIP

* CPE : central door locking

ALLOCATION OF DETECTION UNIT CONNECTOR TRACKS (on roof console)



DG1006

1 Ultrasound activation
2 Ultrasound detection
3 Alarm standby warning light
4 Detection unit earth

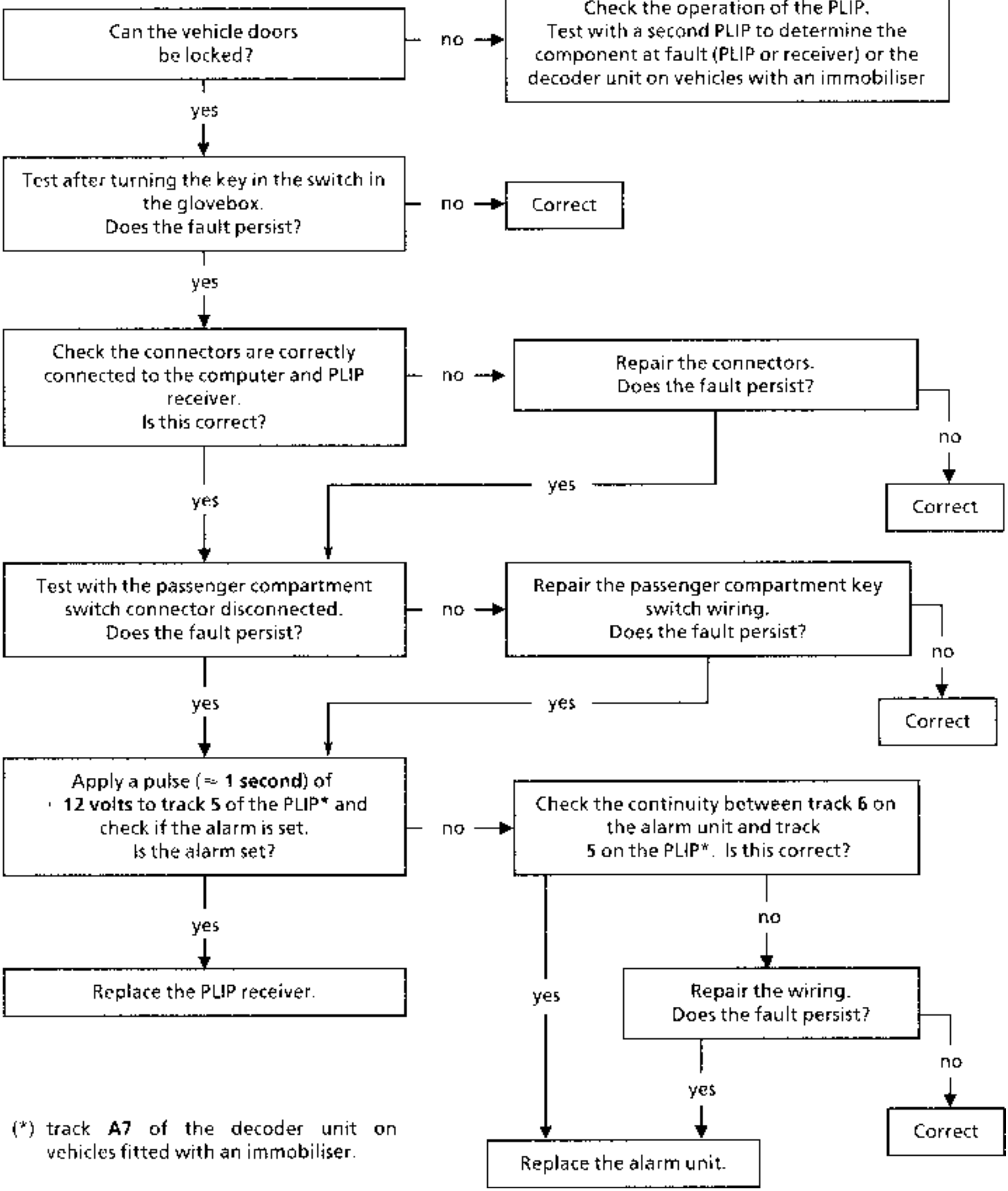
NOTE : Connectors for the wiring are shown at wiring end.

FAULT FINDING

CUSTOMER COMPLAINTS

- PLIP cannot be used to set alarm — **Chart 1**
- Alarm cannot be turned off
  - By the PLIP — **Chart 2**
  - By the passenger compartment key switch — **Chart 3**
- Alarm triggered incorrectly when on stand by — **Chart 4**
- Incorrect operation
  - Siren sounds when driving — **Chart 5**
  - Hazard warning lights do not flash when alarm is set — **Chart 6**
  - Dipped headlights do not illuminate when alarm triggered — **Chart 7**
  - Audible warning does not sound
    - with siren — **Chart 8**
    - without siren — **Chart 9**

Chart 1 : PLIP cannot be used to set alarm



(*) track **A7** of the decoder unit on vehicles fitted with an immobiliser.

Chart 2 : Alarm cannot be turned off by the PLIP

Can the vehicle doors be unlocked?

no → Check the operation of the PLIP. Test with a second PLIP to determine the component at fault (PLIP or receiver) or the decoder unit on vehicles with an immobiliser.

yes ↓

Check the connectors are correctly connected to the computer and PLIP receiver. Repair if necessary. Does the fault persist?

no → Correct

yes ↓

Set the alarm and apply a pulse = **1 second** of + **12 volts** to track **3** of the PLIP* and check that the alarm is turned off. Is the alarm turned off?

no → Check the continuity between track **5** on the alarm unit and track **3** of the PLIP* Repair if necessary. Does the fault persist?

no → Correct

yes ↓

Replace the PLIP receiver unit.

yes ↓

Replace the alarm unit

(*) track **A6** on the decoder unit for vehicles fitted with an immobiliser

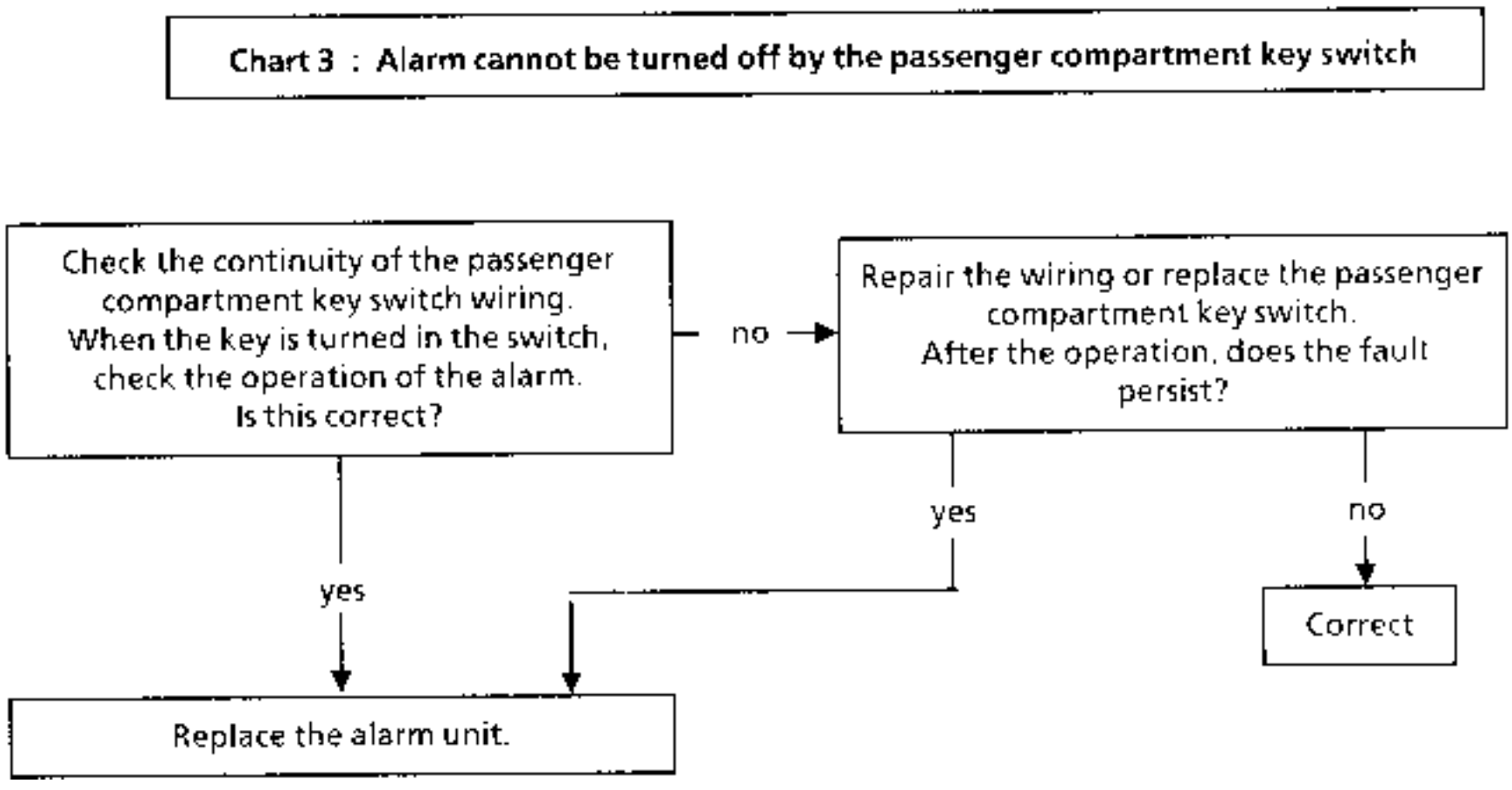

Chart 3 : Alarm cannot be turned off by the passenger compartment key switch
Check the continuity of the passenger compartment key switch wiring.
When the key is turned in the switch, check the operation of the alarm.
Is this correct?
no
Repair the wiring or replace the passenger compartment key switch.
After the operation, does the fault persist?
yes
no
yes
Correct
Replace the alarm unit.

Chart 4 : Alarm triggered incorrectly when on stand by

Set the alarm then check by pressing on the opening elements (doors, bonnet, boot) that the alarm is not triggered.
Is the alarm triggered?

yes → Check the adjustment and condition of the switch or the opening element at fault. Adjust or repair.
Does the fault persist?

yes → Leave the bonnet open to cancel perimetric protection and reset the alarm.
NOTE : the hazard warning lights will not flash - this is normal.
Tap sharply on one of the vehicle windows using the flat of your hand.
Is the alarm triggered?

no → See Chart 5 siren sounds when driving.

no → Correct

no

yes

Check the ultrasound sensitivity setting at terminals 4 (earth) and 2 on the detection unit (see adjustment values table p. 82-).
Is the setting correct?

no → Adjust to suit the interior trim.
Does the fault persist?

yes → Check the continuity of the wires between the detection unit and the alarm unit.

Detection unit	1	and 13	Alarm unit
	2	and 14	
	3	and 15	
	4	and vehicle earth	

Between track 4 on the alarm unit and vehicle earth.
Repair if necessary.
Does the fault persist?

no → Correct

yes

Replace the detection unit.
Does the fault persist?

no → Correct

yes

Replace the alarm unit.

no

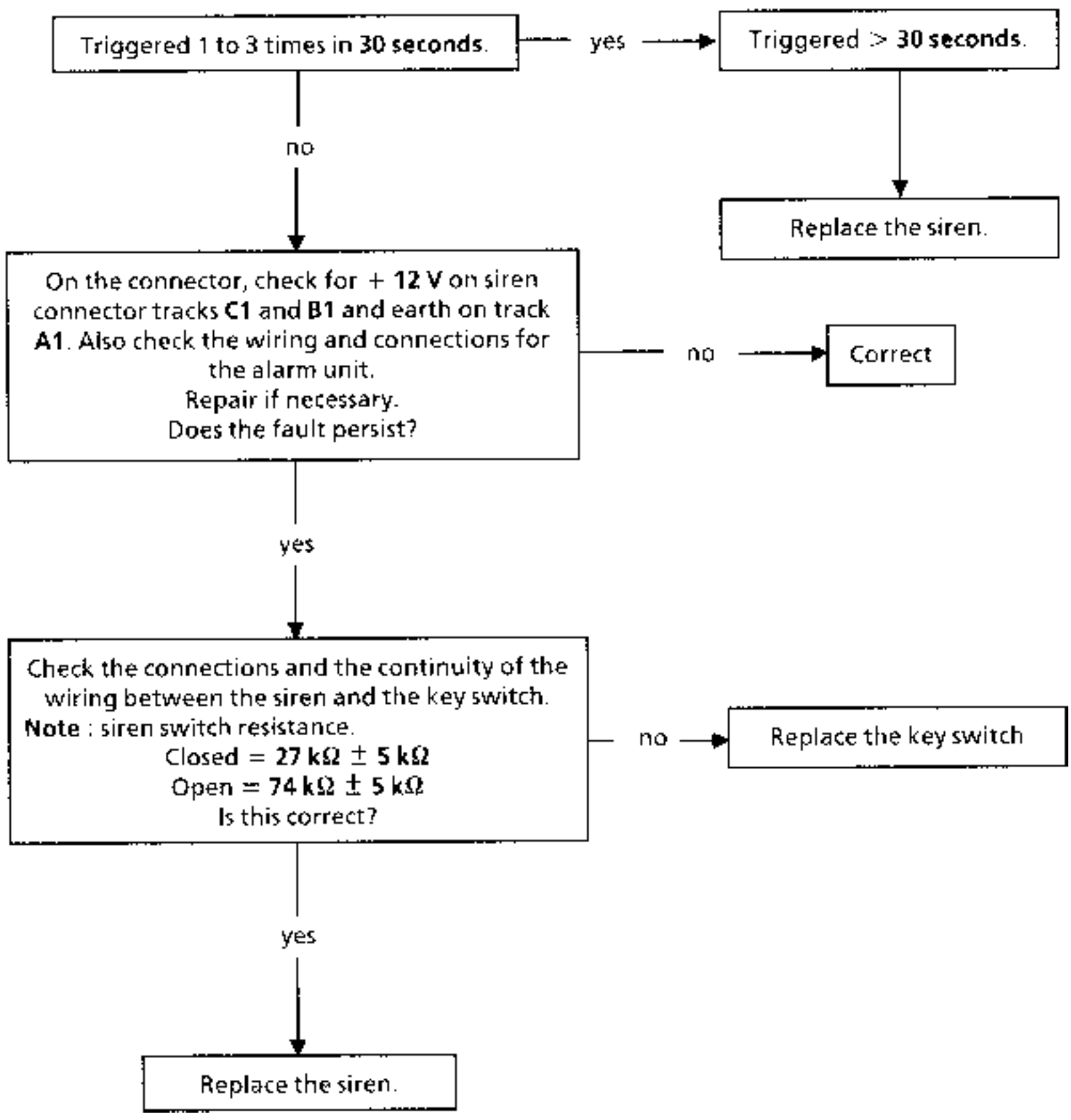
Correct

no

Correct

INCORRECT OPERATION

Chart 5 : Siren sounds when driving



INCORRECT OPERATION

Chart 6 : Hazard warning lights do not flash when alarm is set

Check by pressing the hazard warning lights switch that the lights operate correctly. Do they operate correctly?
- no → Check the hazard warning lights
- yes ↓

Check the feed fuse on track **5** (**5** track connector on the alarm unit). Repair if necessary. Does the fault persist?
- no → Correct
- yes ↓

Test after turning the key in the switch in the glovebox. Does the fault persist?
- yes → Stop
- no ↓

Check that the opening elements (doors - bonnet - boot) close correctly. Adjust if necessary. Does the fault persist?
- no → Correct
- yes ↓

On the **15** track alarm unit connector, check if the continuity is infinity on the wires corresponding to the opening elements: tracks 7 to 12. Is this correct?
- no → Note the opening element at fault, check the wiring for the faulty switch. After repair, does the fault persist?
  - no → Correct
  - yes → Replace the faulty lock.
- yes ↓

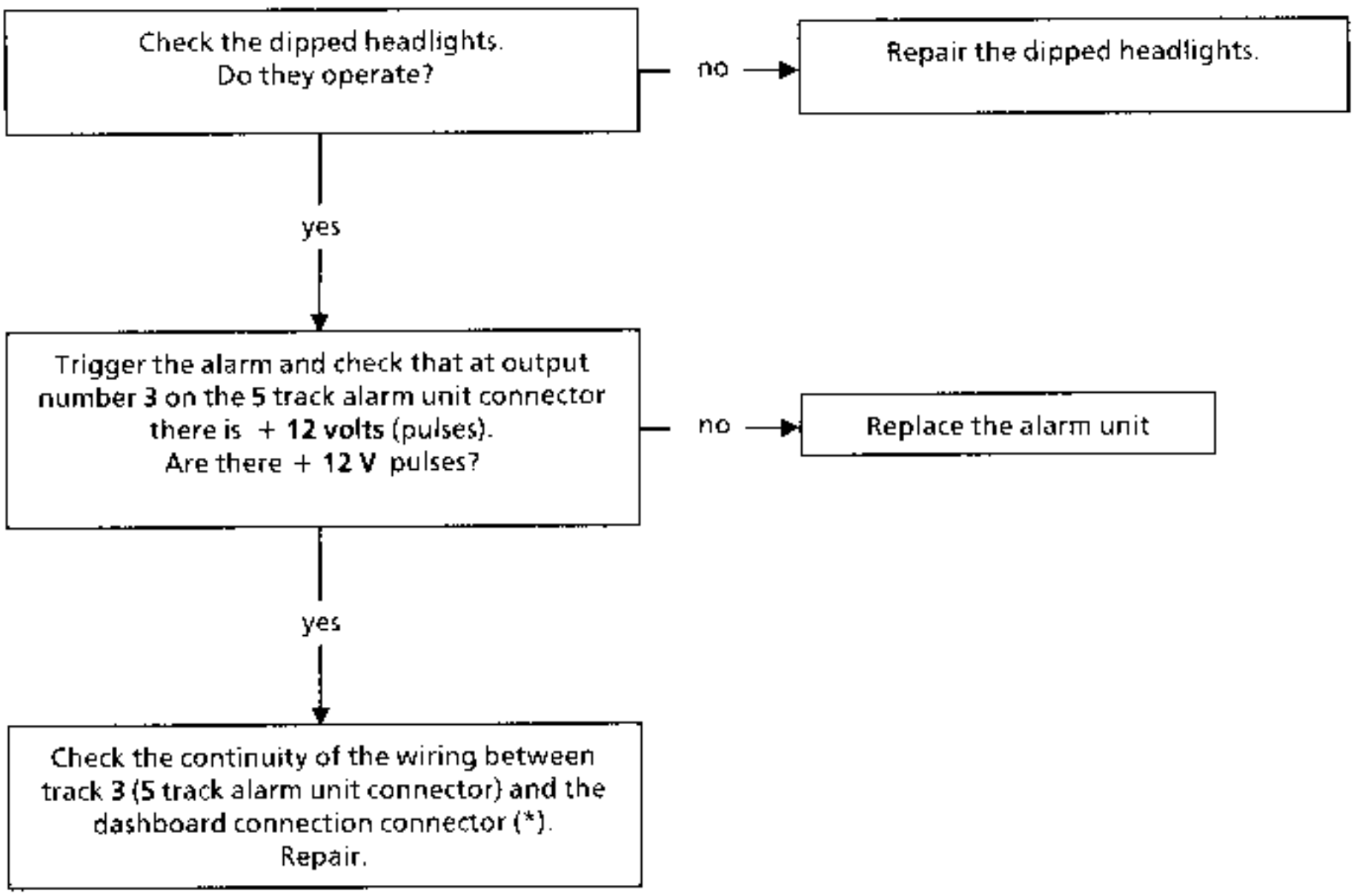
Sit in the vehicle, close the opening elements and check that when the alarm is set, there is + 12 volts (2 pulses) on track **1** of the alarm unit, reset the alarm and repeat the operation on track **2** (black **5** track connector). Is this correct?
- no → Replace the alarm unit
- yes ↓

Check the continuity of the wiring on tracks **1** and **2** (**5** track connector on the alarm unit) and the dashboard connection connector (*). Repair.

(*) see vehicle wiring diagram

INCORRECT OPERATION

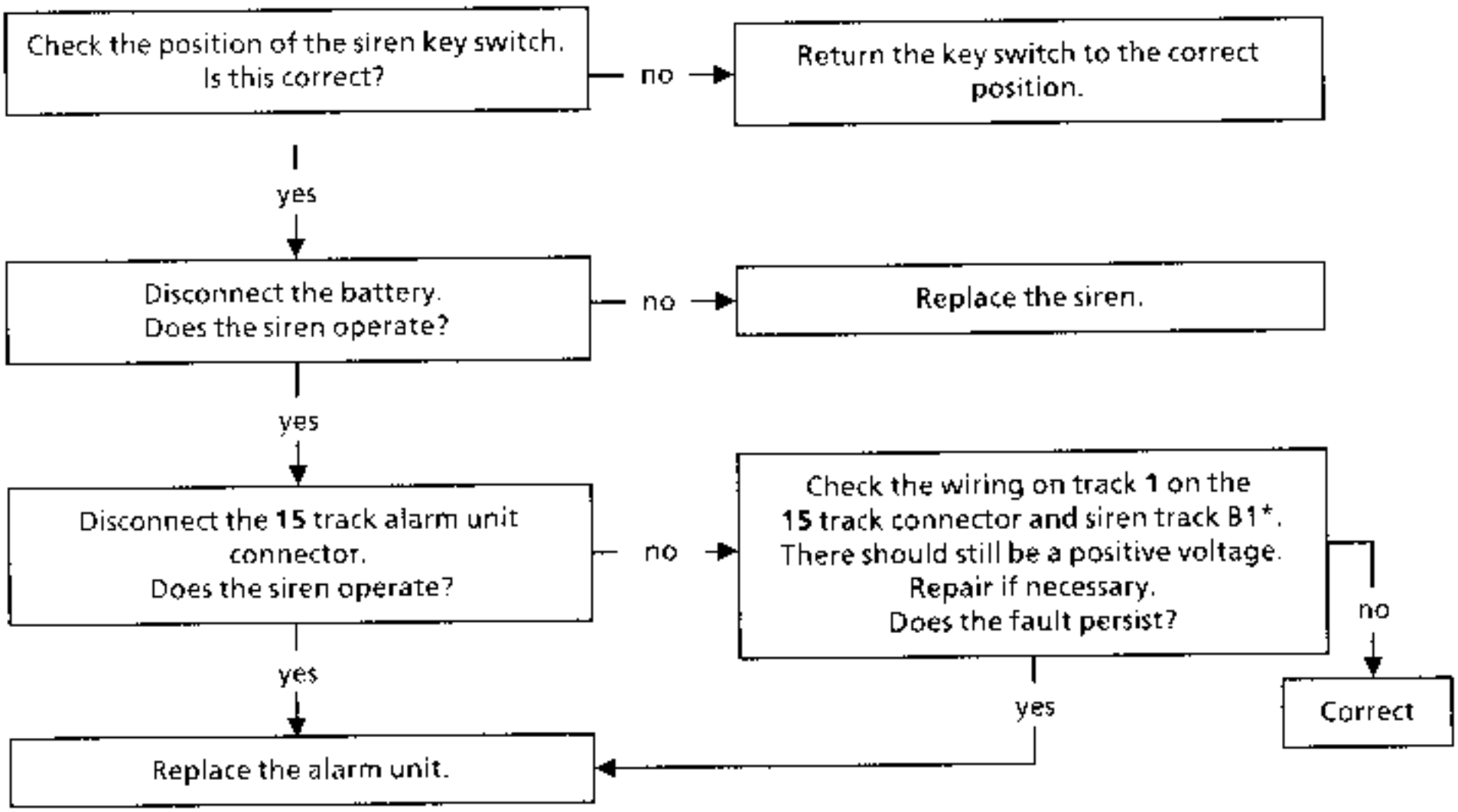
Chart 7 : Dipped headlights do not illuminate when alarm triggered



(*) see vehicle wiring diagram

INCORRECT OPERATION

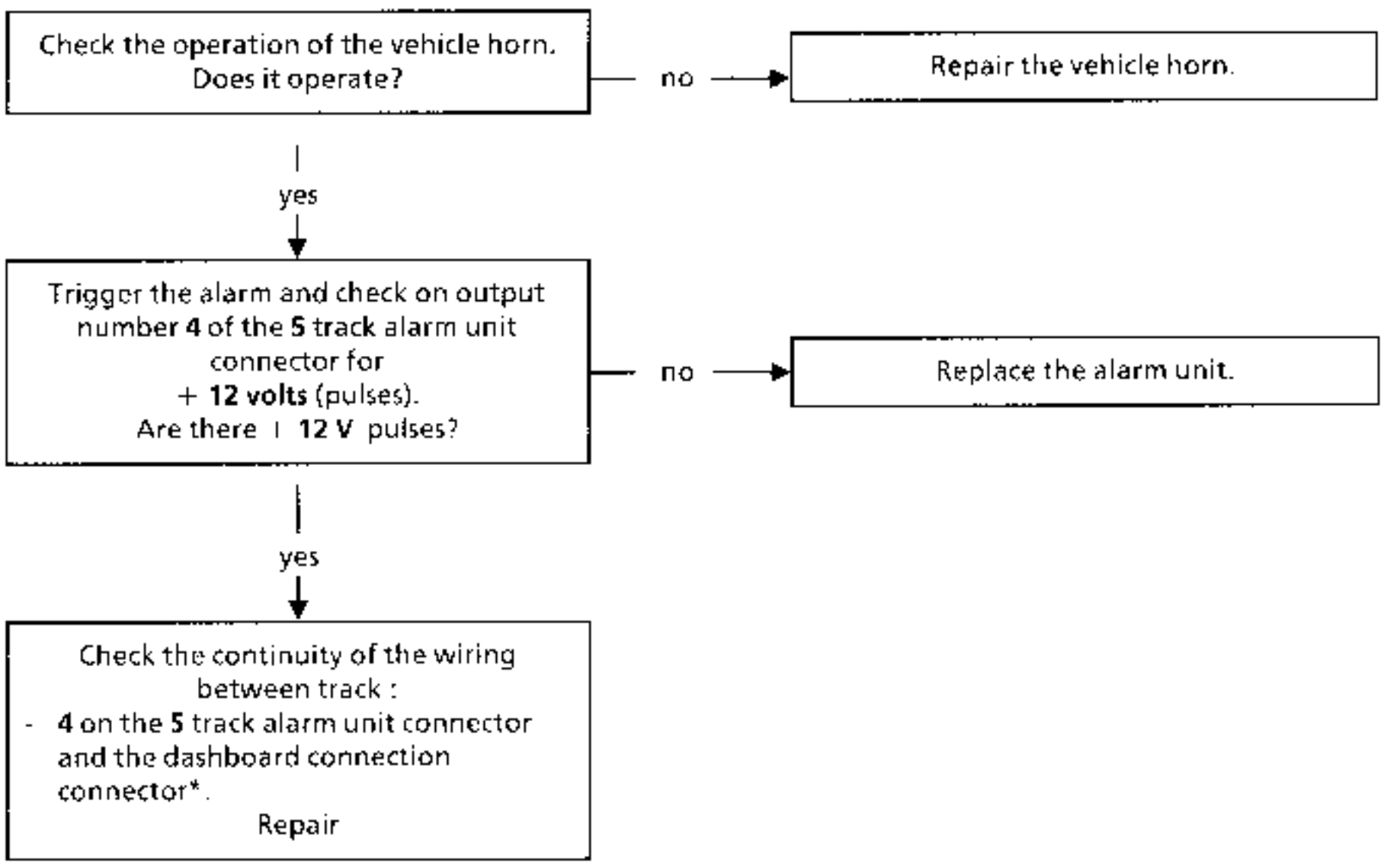
Chart 8 : Audible warning does not sound (with siren)



(*) see vehicle wiring diagram

INCORRECT OPERATION

Chart 9 : Audible warning does not sound (without siren)



(*) see vehicle wiring diagram

DESCRIPTION

The immobiliser system is linked to the alarm system.

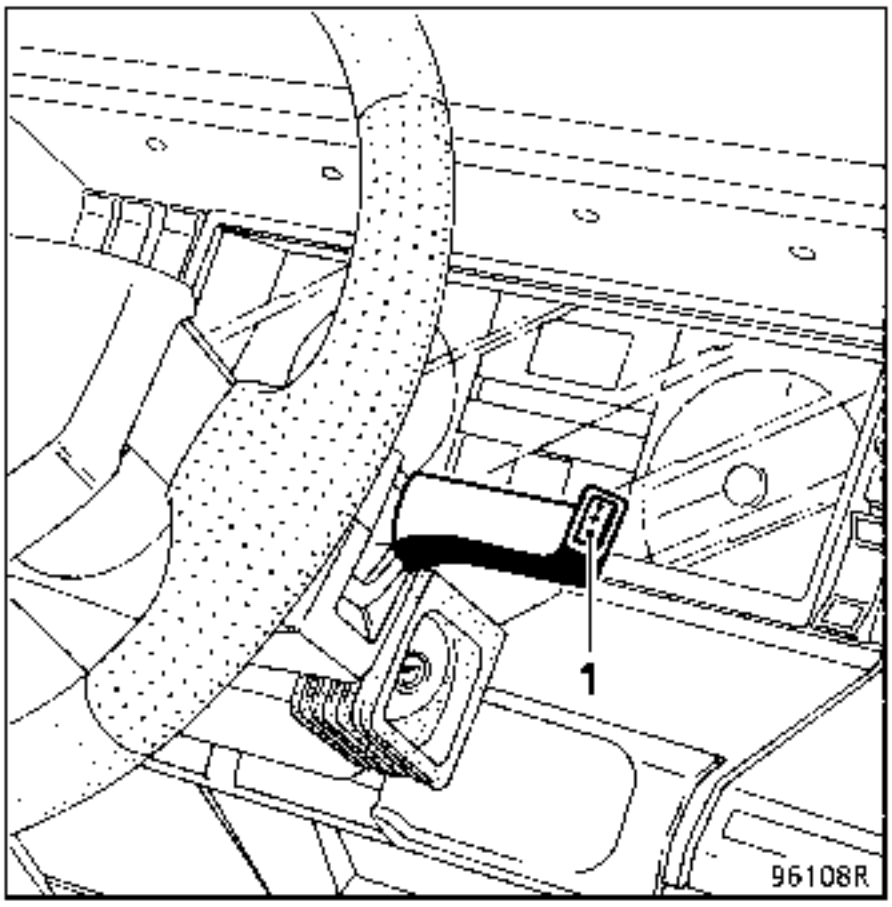
It is controlled by the PLIP.

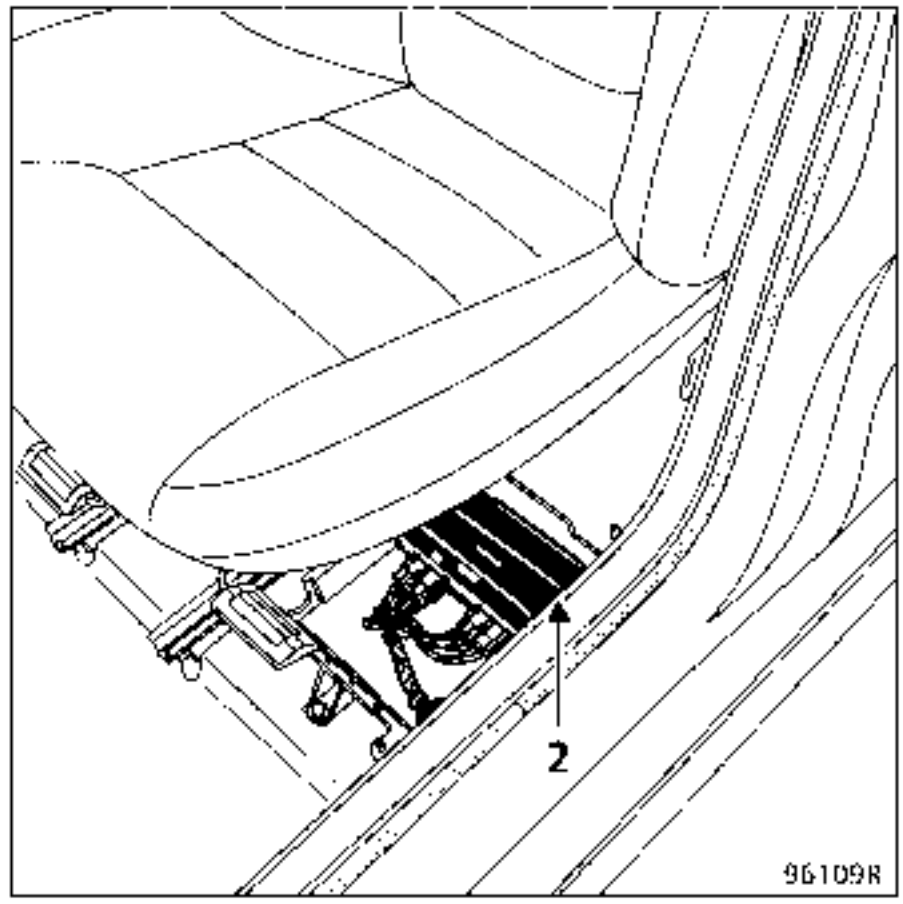
Unlocking the doors using the PLIP **turns the alarm off and permits the vehicle to be started**.

Locking the doors using the PLIP **turns the alarm on and prevents the vehicle from being started**.

The system comprises:

- the conventional alarm system,
- a special injection computer,
- an ADAC sequence display(1),
- a decoder unit (2).





This has the following functions:

- decoding of the infrared signal from the PLIP,
- the immobiliser function :
  In the presence of + after ignition feed, this generates a code on the coded line to the injection computer to authorise the vehicle to be started,
- locking / unlocking of the opening elements (doors, bonnet, etc.),
- setting / turning off of the alarm,
- management of the courtesy light which controls:
  - illumination of the courtesy light when one of the doors is opened (with or without the presence of + after ignition feed),
  - illumination of the courtesy light after the doors have been unlocked using the PLIP for a timed period of 15 seconds which starts again each time the PLIP is used (lock/open),
  - extinguishing of the courtesy light when + after ignition feed appears, when all doors are closed, even if a timed period has not yet expired.

OPERATION

When the doors are unlocked using the PLIP, a code is sent to the decoder unit via the infrared receiver unit.

If the decoder unit recognises the code, it turns the alarm off and after the ignition has been turned on, it sends a code to the injection computer on the coded line.

At this precise moment, one of several situations may arise:

- The injection computer has no reference code in its memory :
  - the code sent to it is stored in its memory
- The injection computer has a reference code in its memory :
  - the code sent to it is compared with the code in its memory.
  - if the two codes match, the injection computer unlocks the injection system, which allows the engine to be started.
    When the ignition is turned on, the injection warning light on the instrument panel flashes for a few seconds then remains illuminated, showing that the system is operating correctly.
    The injection warning light extinguishes when the engine is started, returning to its initial function (engine monitoring).
  - if the two codes do not match (different codes), the computer leaves the injection system locked to prevent the engine from being started (in this case the injection warning lights continues to flash).

When the doors are locked using the PLIP, the decoder unit sets the alarm and prevents a code being sent to the injection computer.

In this case, if the ignition is turned on, the injection warning light will remain flashing and the vehicle will not be able to be started.

NOTE : all actions on the PLIP will remain without effect if + after ignition feed is present.

EMERGENCY PROCEDURE

If the PLIP is faulty (example : batteries dead) the customer has two options:

- Use the second PLIP.
- Render the immobiliser function temporarily inoperational.

The method consists of entering a 4 figure code by hand using the ADAC sequence display key.

This code is on the card given to the customer when the vehicle was delivered and is covered by a protective film.

NOTE : when the customer takes delivery of his vehicle, the handover agent should ask him to take note of the code (by scratching off the protective film) and to test the procedure by entering the code himself, using the Driver's Handbook.

IMPORTANT: only the customer should carry out this operation. If the system is worked on in the workshop, the customer should enter the code himself (confidentiality).

PROCEDURE FOR ENTERING THE CODE

The PLIP does not work:

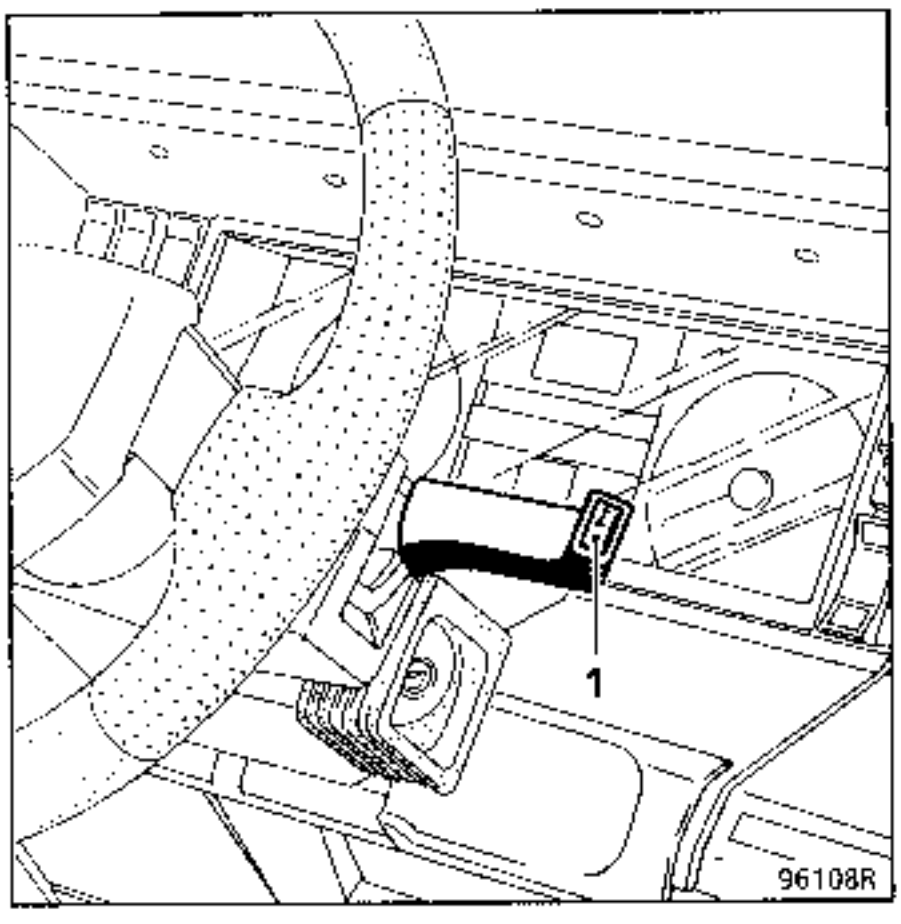
- Unlock the vehicle doors using the key, the alarm will be triggered.
  Turn the alarm off using the key switch in the glovebox.

- Turn the ignition on, the injection warning light will flash on the instrument panel.

  After taking note of the code number:

  1. Press the accelerator pedal down fully and hold it down. The injection warning light will extinguish.

  2. Press the ADAC sequence display key (1) the same number of times as the first figure of the code, checking that the injection warning light illuminates each time the key is pressed.



  3. Release the accelerator pedal - the injection warning light will flash.

Repeat operations 1, 2 and 3 to enter the three other figures of the code in turn.

After the code has been entered, the injection warning light should be permanently illuminated.If it is still flashing, the code is incorrect. Turn the ignition off then repeat the procedure for entering the code.

IMPORTANT: three attempts may be made to enter the code. If, after the third attempt, the code remains invalid, the battery must be disconnected for a few seconds.

When the injection computer memory has been erased, the code may be entered by hand once more.

Once the code has been validated (injection warning light is permanently illuminated) the vehicle is no longer protected by the immobiliser function and is used as a conventional vehicle.

RESETTING THE IMMOBILISER SYSTEM

The vehicle will only be protected again once the following operations have been carried out:

- Unlock the doors using the PLIP.

- Turn the ignition on for a few seconds to allow the injection computer to be programmed with the code once more.

- Lock then unlock the doors using the PLIP.

- Turn the ignition on, the injection warning light will flash for a few seconds then remain permanently illuminated.

The immobiliser function is now operational again.

Remember to turn the alarm back on using the key switch (in the glovebox).

IMPORTANT

Always check that the immobiliser has been reset correctly.

Turn the ignition off.

Lock the doors using the PLIP (from inside the vehicle).

Turn the ignition back on.

The injection warning light should flash to show that the engine cannot be started.

Also check that the alarm function has been activated by checking the warning light on the roof console.

NOTE : if the injection computer notes a fault in the system, when the engine is running, the injection warning light will flash during deceleration and at idle speed. In this case, after repair, erase the memory in the injection computer before resetting the immobiliser system using the PLIP.

REPLACING THE DECODER UNIT

Replace the complete kit (decoder unit, PLIP, card with new code number).

In this case the code memorised in the injection computer must be erased (code of the decoder unit to be replaced).

After removing the faulty decoder unit, use the customer emergency code (enter the 4 figure code number for the decoder unit to be replaced), then fit the new unit.

To programme the new code in the injection computer:

- Lock and unlock the doors using the PLIP.
- Turn the ignition on then off again.
- Lock and unlock the doors using the PLIP.
- Turn the ignition on, the injection warning light flashes for a few seconds then remains permanently illuminated.

The immobiliser function is operational again.

IMPORTANT

Always check that the immobiliser has been reset correctly.

Turn the ignition off.

Lock the doors using the PLIP (from inside the vehicle).

Turn the ignition back on.

The injection warning light should flash to show that the engine cannot be started.

Also check that the alarm function has been activated by checking the warning light on the roof console.

REPLACING THE INJECTION COMPUTER

The injection computer is supplied uncoded. The immobiliser code must therefore be programmed in when the injection computer is fitted.

Carry out the following operations:

Unlock the doors using the PLIP.

Turn the ignition on for a few seconds.

Lock and unlock the doors using the PLIP.

Turn the ignition on, the injection warning light should flash for a few seconds then remain permanently illuminated.

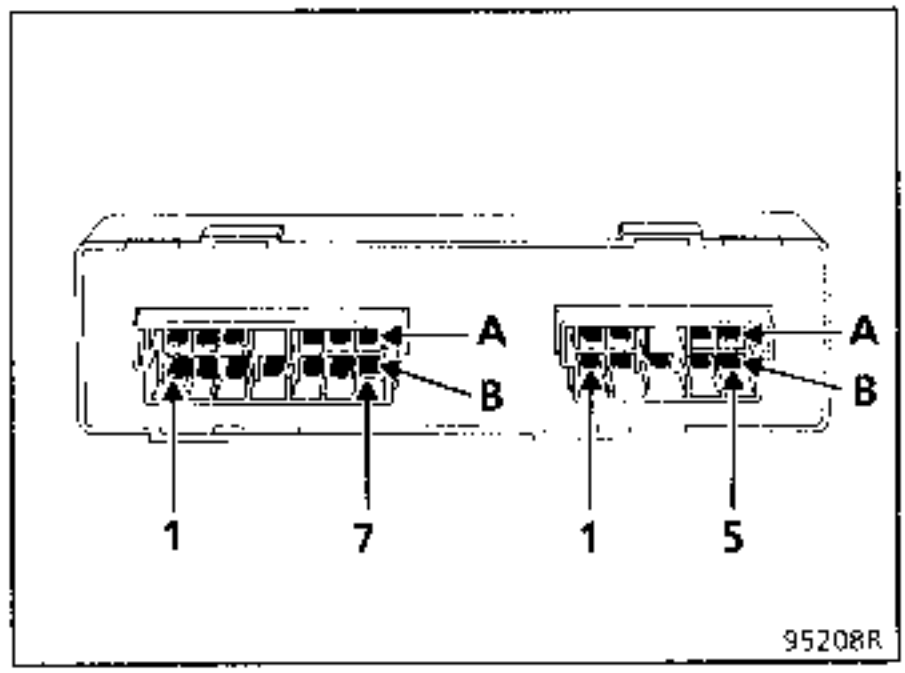
The immobiliser function is operational again.

IMPORTANT: if an uncoded injection computer from stock or from another vehicle (test part) is being tested, the doors MUST be locked by the PLIP when the part is fitted (do not use the PLIP during the test).

If the doors are unlocked, turning the ignition on sends a coded signal from the decoder unit to the injection computer (which will then be coded).

To prevent a code being memorised which could render the injection computer unusable after the test, the doors must be locked by the PLIP. The coded signal is then not sent when the ignition is turned on (the computer remains uncoded).

DECODER UNIT CONNECTIONS



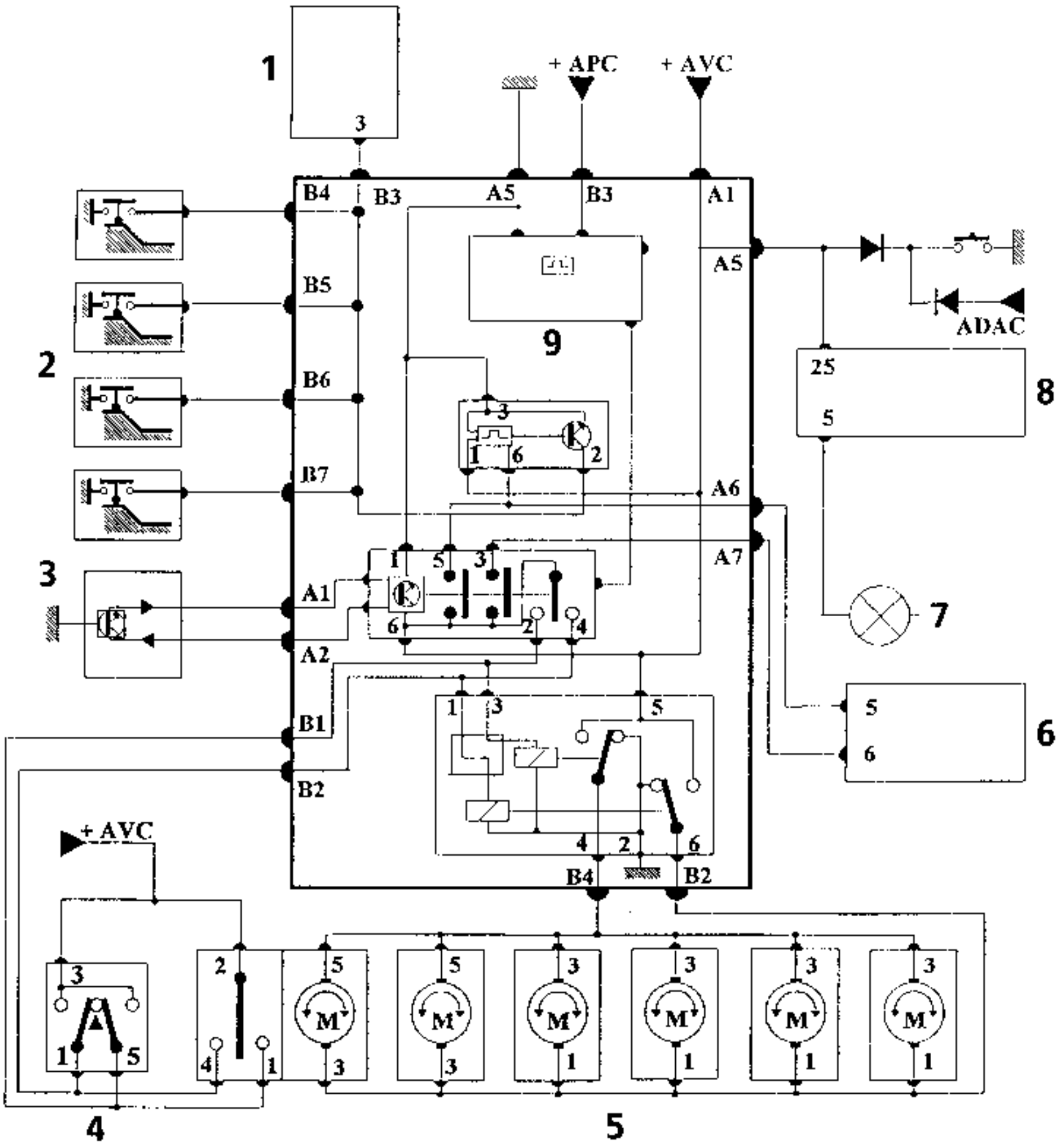
13 track connector

Track	Allocation
A1	Infrared input
A2	Infrared receiver feed
A3	Not used
A5	Coded information to injection computer
A6	Open information to alarm
A7	Close information to alarm
B1	Door open information
B2	Door close information
B3	+ after ignition
B4	Front left hand door switch
B5	Front right hand door switch
B6	Rear left hand door switch
B7	Rear right hand door switch

9 track connector

Track	Allocation
A1	- before ignition
A2	Diagnostic line K (not used)
A4	Diagnostic line L (not used)
A5	Earth
B1	Not used
B2	Doors close
B3	Courtesy light timer
B4	Doors open
B5	+ after ignition

DECODER UNIT DIAGRAM



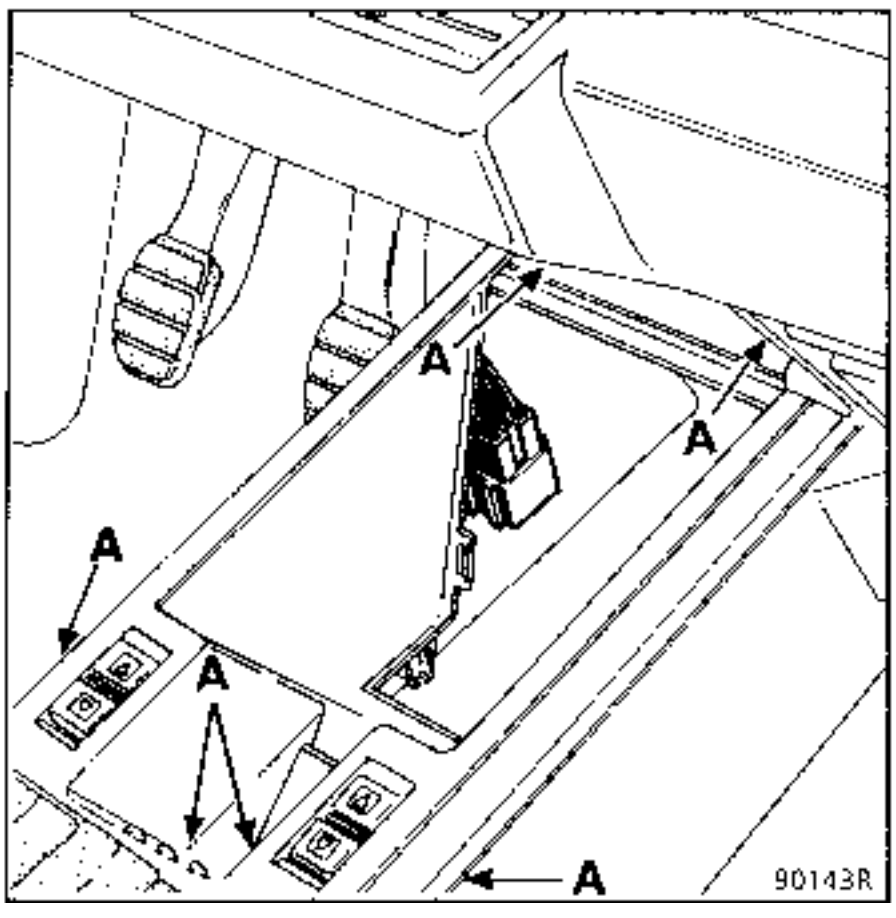
PRJ82003

1 Courtesy light
2 Door switches
3 Infrared receiver
4 Door locking switch
5 Door locking motors
6 Alarm unit
7 Injection warning light
8 Injection computer
9 Injection coding

Disconnect :
- the connectors in the front and lefthand door pillars and the earth wires,
- the choke connector,
- the connectors from the steering column mounted controls and the anti-theft switch,
- the connectors on the console, the heater assembly and its controls,
- the speedometer drive cable.

Remove :
- the steering column,
- the heater controls (see section 6),
- the choke control (apply soft soap to the cable to remove the anti-rattle sleeves),
- the instrument panel

Pull back the central console (screw A for equipment levels E1-E2) - (screw B for equipment level E3).



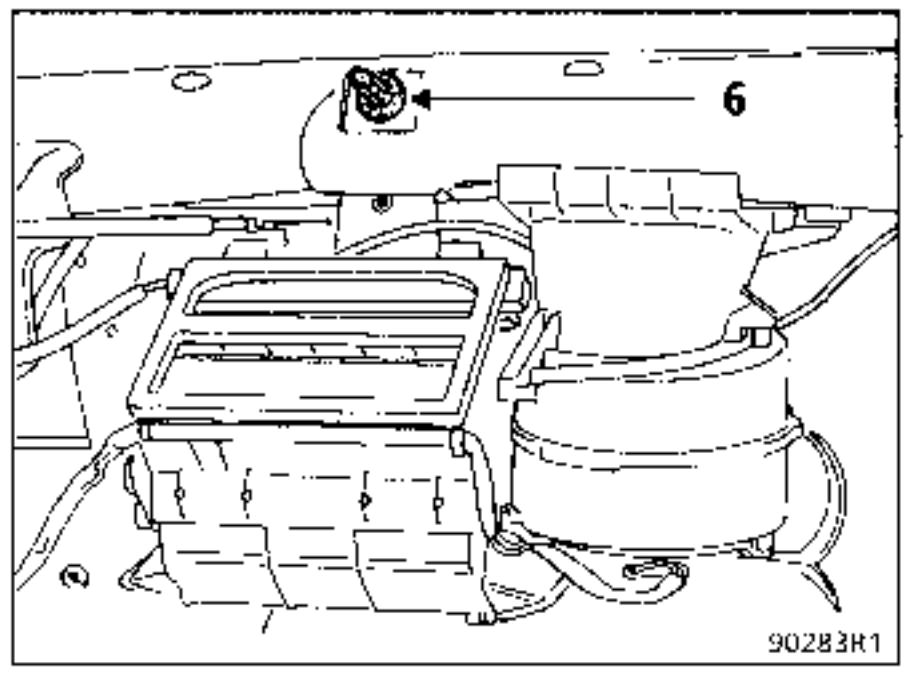
Remove :
- the two securing screws (2) from the heater assembly,
- the two securing screws (3) near the front left and righthand door pillars,
- the two nuts (4) in the speaker apertures (1).

Disconnect :
- the pedal assembly connector,
- the connector (5) between the fascia panel wiring harness and the windscreen wiper harness.

Remove the fascia panel.

REFITTING

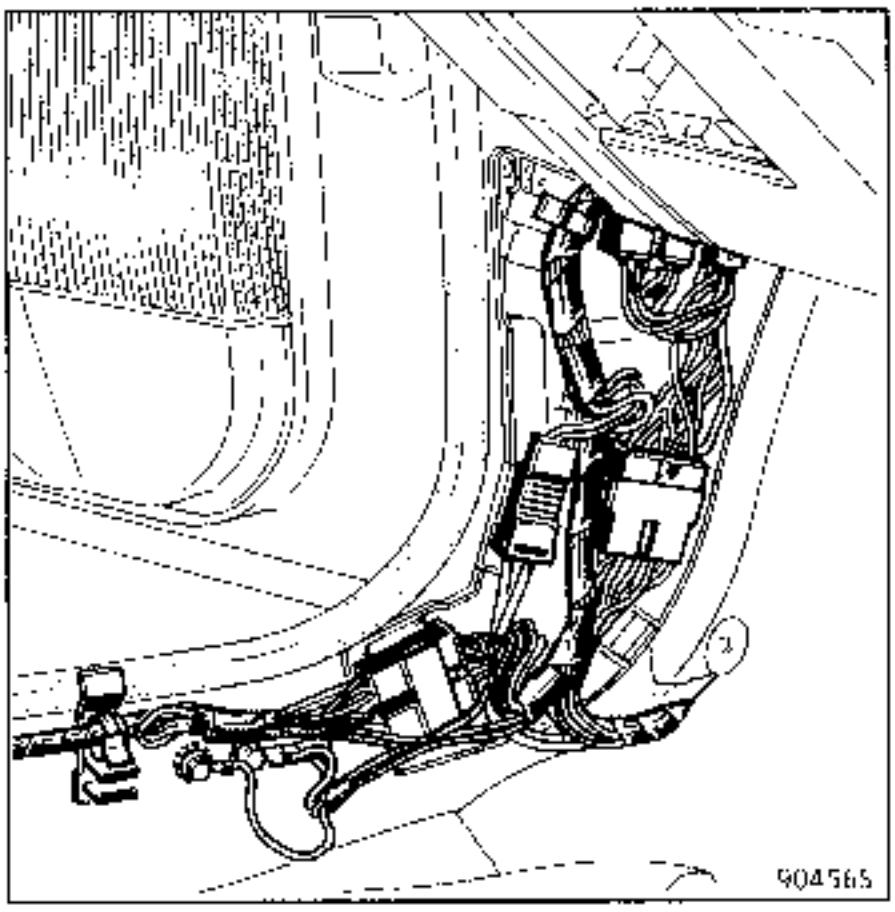
Check that the plastic locator (6) is in position.

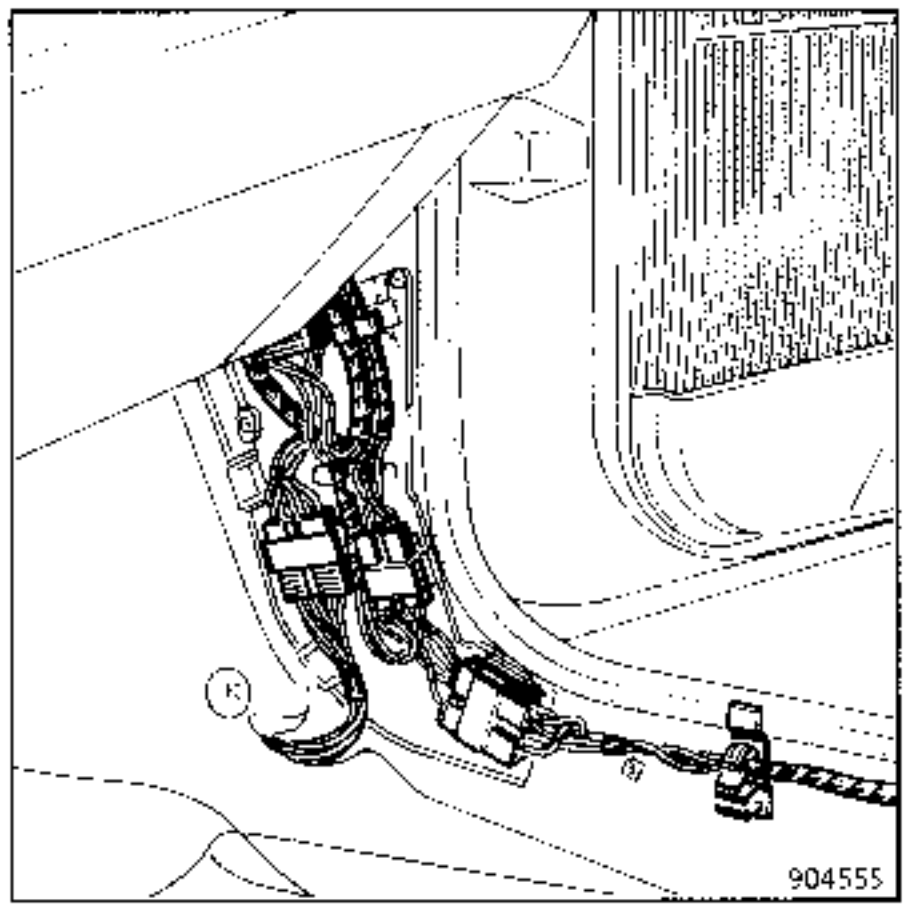


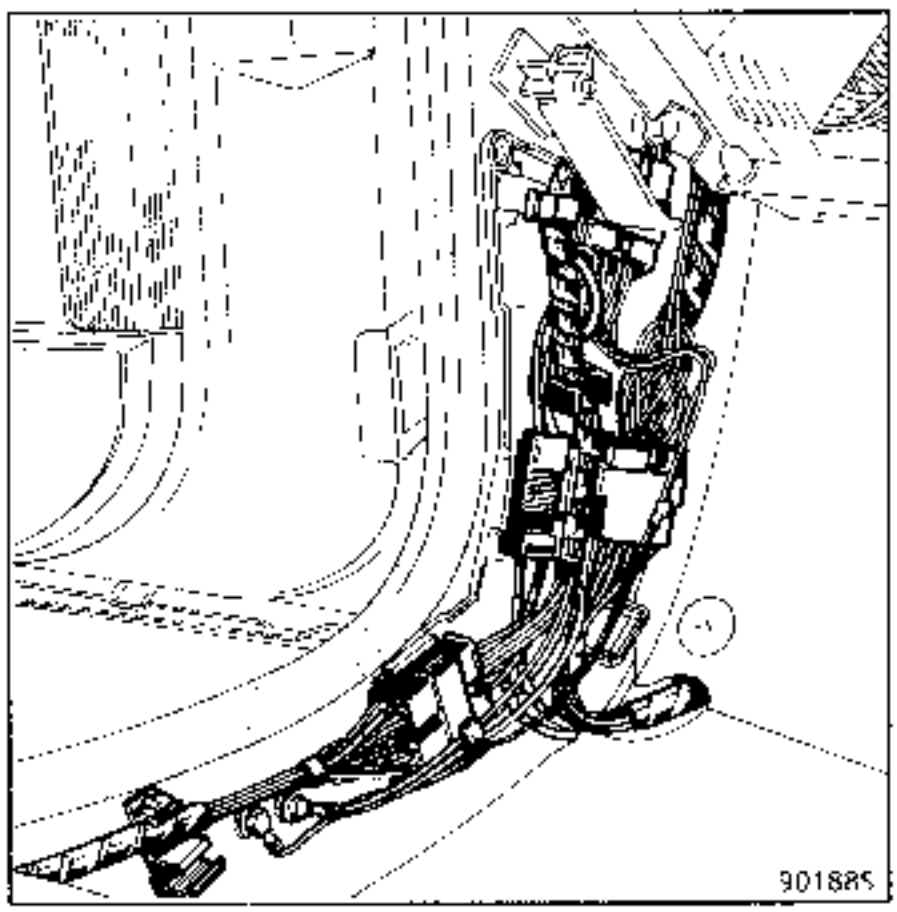
Place the fascia panel in position and fit it on to the locator (6) (take care not to trap the wiring) and secure the fascia panel in place.

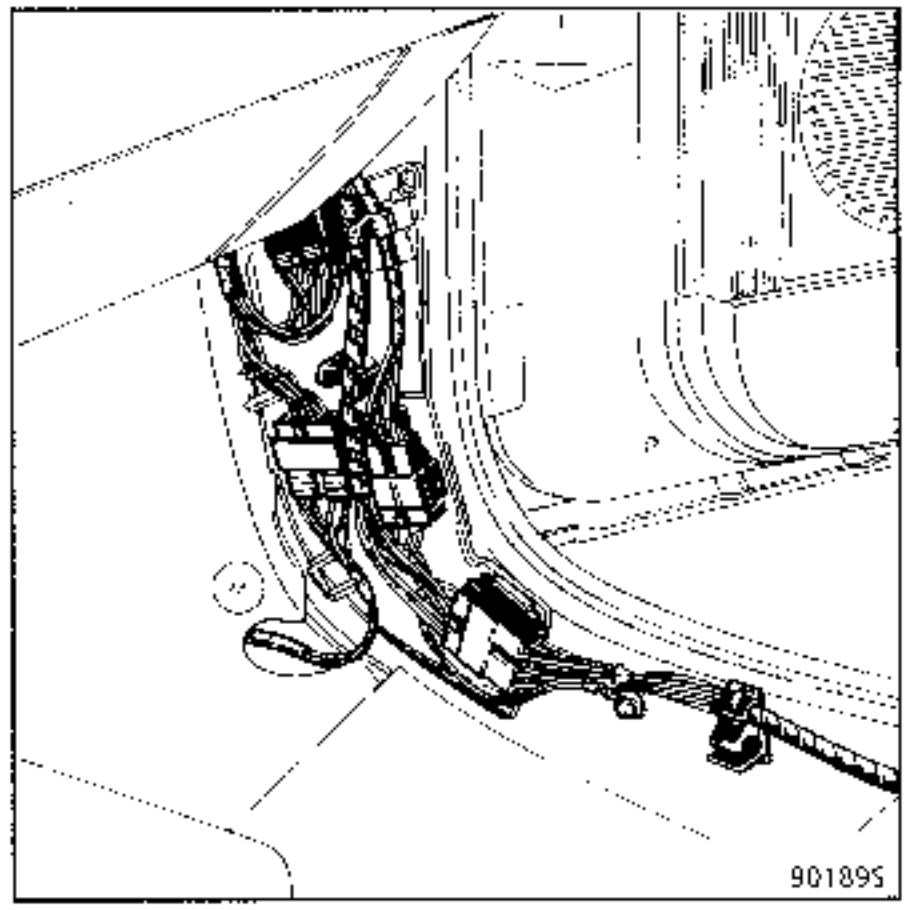
Special points for refitting

Ensure that the wiring is in its original positions.









Do not forget to reconnect the connector (5) on the fascia panel harness, the windscreen wiper harness and the pedal assembly connector.

Before refitting the lower cover, check that the rubber locating studs are in position and fit the cover over them.

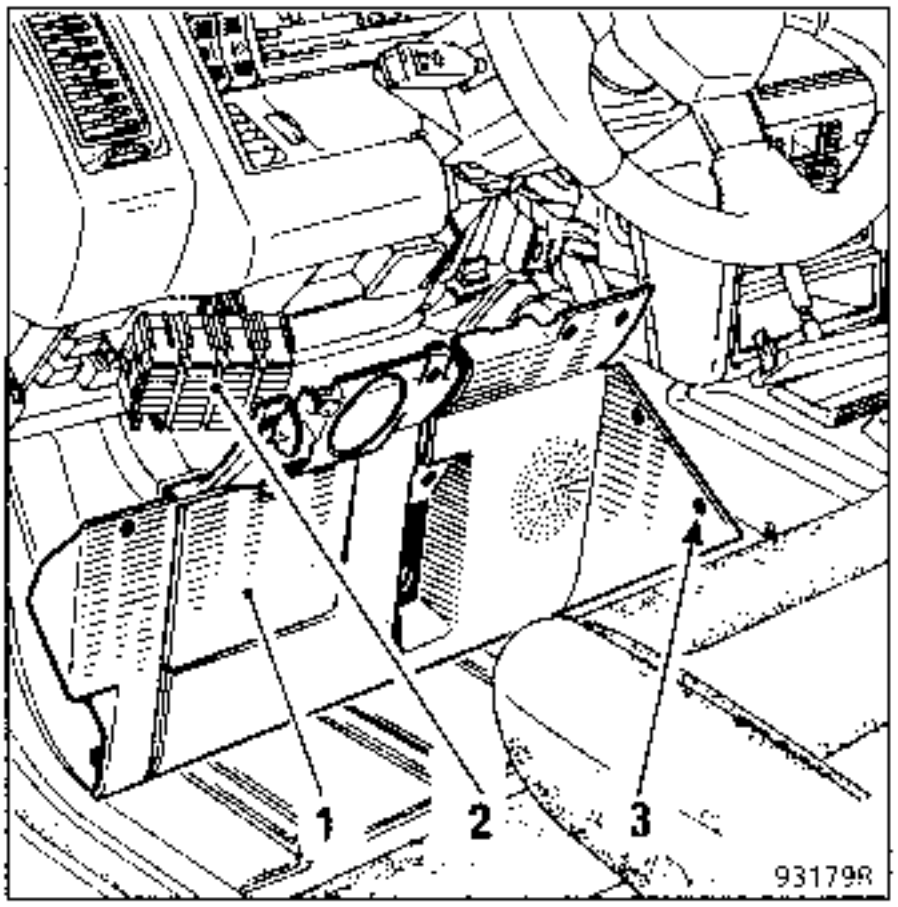
Reconnect the battery, with the ignition switched off and check that all the accessories are operating correctly.

NOTE : If the steering wheel is too near the steering wheel half casings, adjust the position of the steering column universal joint.

REMOVING

Disconnect the battery.

Remove :
- the central console,
  the left and righthand lower body side trims,
- the steering wheel after first marking its position,
  the lower and upper steering column half casings which are connected to one another by four screws,



Open the door (1).

Unclip the fuse holder casings (2).

Remove the steering column adjustment lever.

Remove :
- the 9 screws (3) that retain the trim under the steering wheel and remove the trim by tilting it,
- the trim on the lefthand side of the glove box.

CHOKE CONTROL (depending on version)

REMOVING

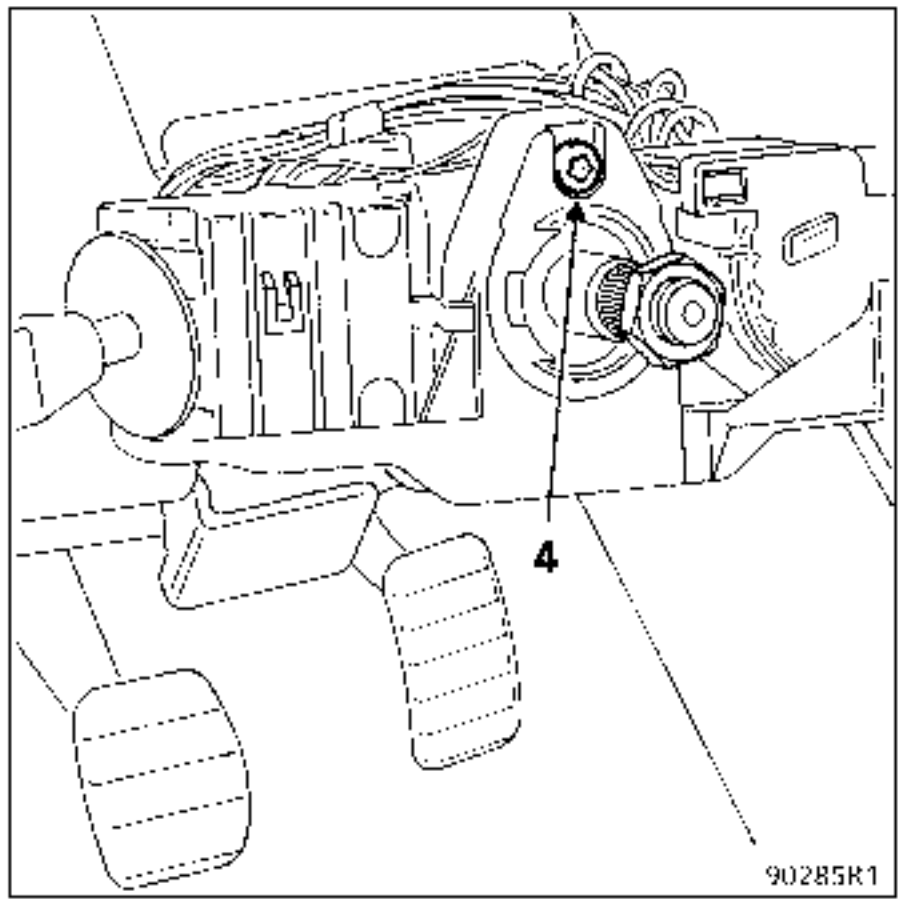
Unclip the cable at the carburettor end.

Remove the 2 foam anti-noise pads which are on the cable sleeve.

Unclip :
- the warning light connector,
- the knob assembly at the fascia panel end and remove the complete control, together with its cable sleeve and cable.

STEERING COLUMN

REMOVING



Unscrew screw (4) without removing it, then push it back to free the clamping taper.

Disconnect the connectors and remove the control assembly.

STEERING COLUMN (continued)

Disconnect the starter switch.

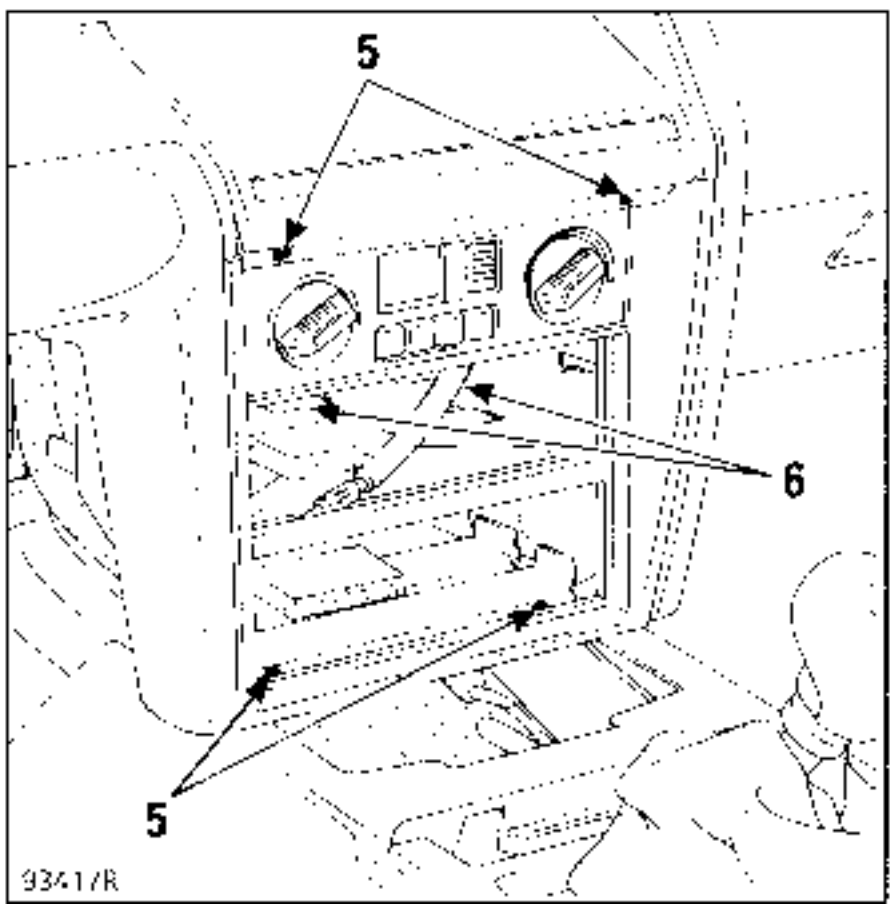
Place the steering wheel in position and turn it to gain access to the universal joint clamping bolt.

Remove the universal joint clamping bolt.

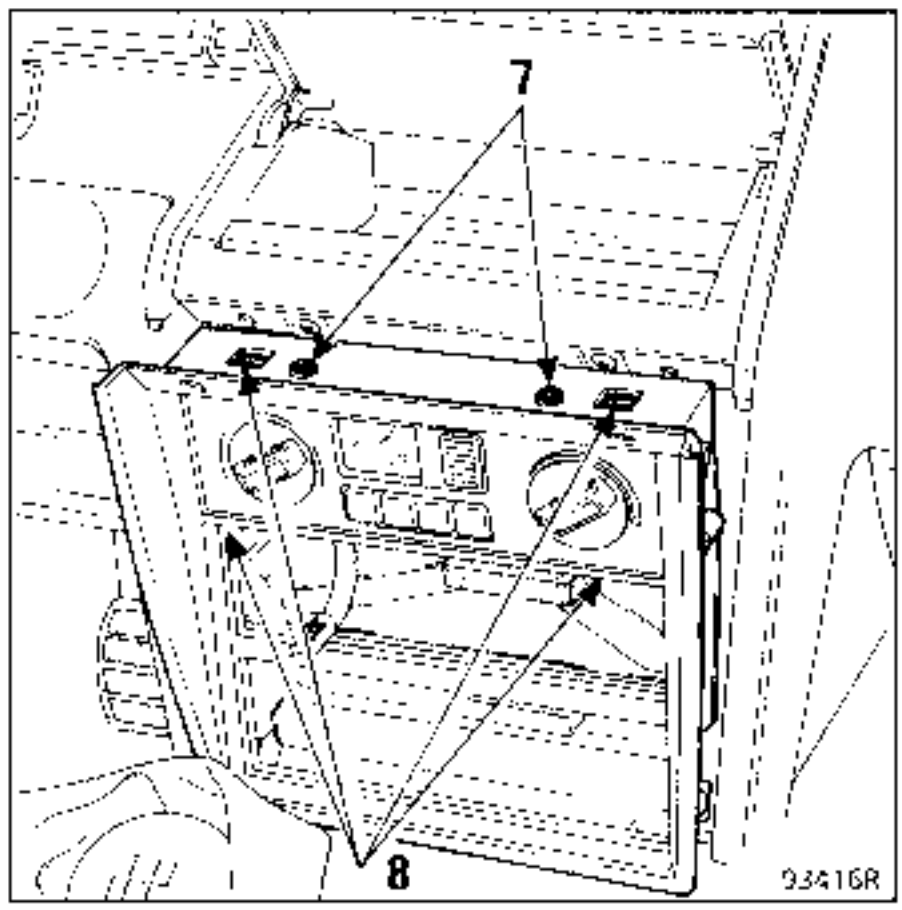
Remove the five fastenings to secure the column in place (2 screws, 1 bolt, 1 nut and 1 Torx screw).

Tilt the column downwards and pull it to remove it.

HEATER CONTROL PANEL AND RADIO MOUNTING



Remove :
- the radio or the radio compartment trim,
- the lower compartment casing,
- the four screws (5) that hold the control panel in place,
  the two nuts (6) at the back of the radio mounting bracket.

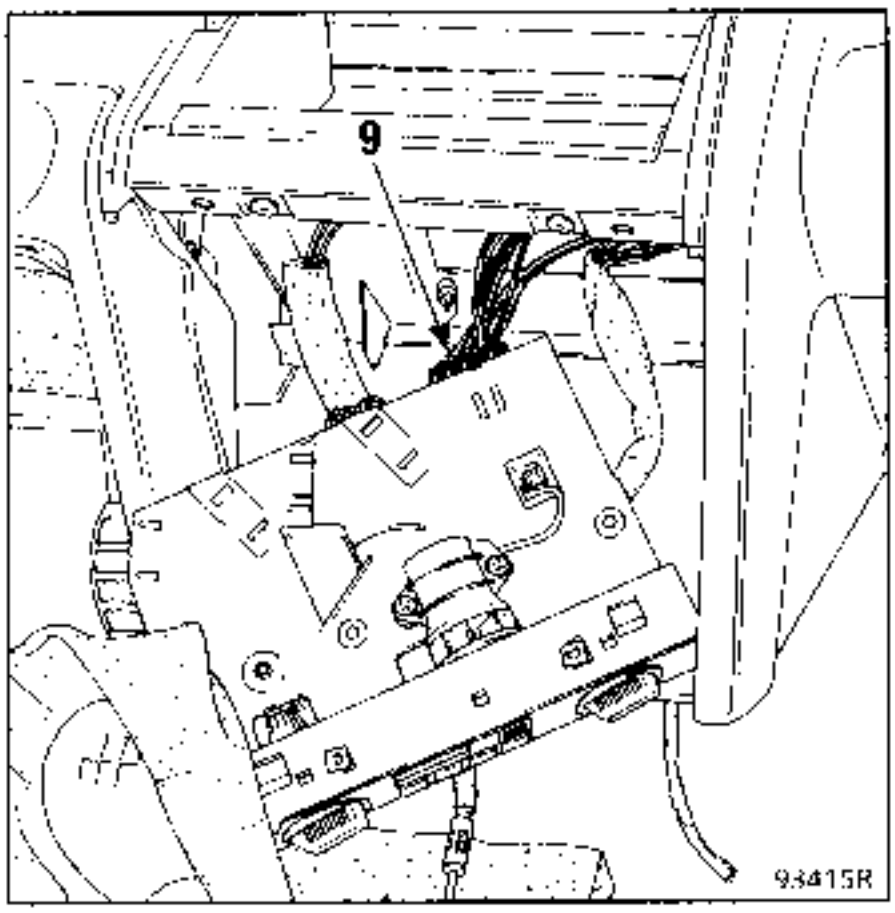


Pull out the mounting, slightly, from the fascia panel.

Remove the two screws (7) that secure the control panel to the mounting.

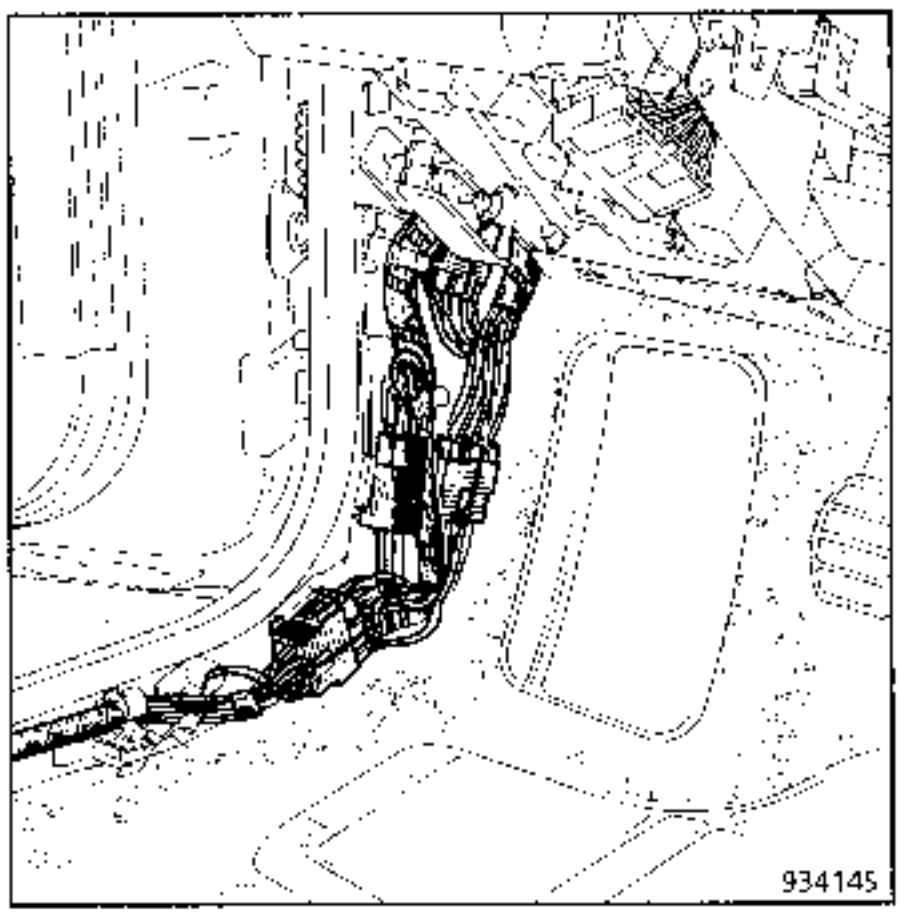
Unclip the four studs (8) that retain the control panel and push the panel inwards.

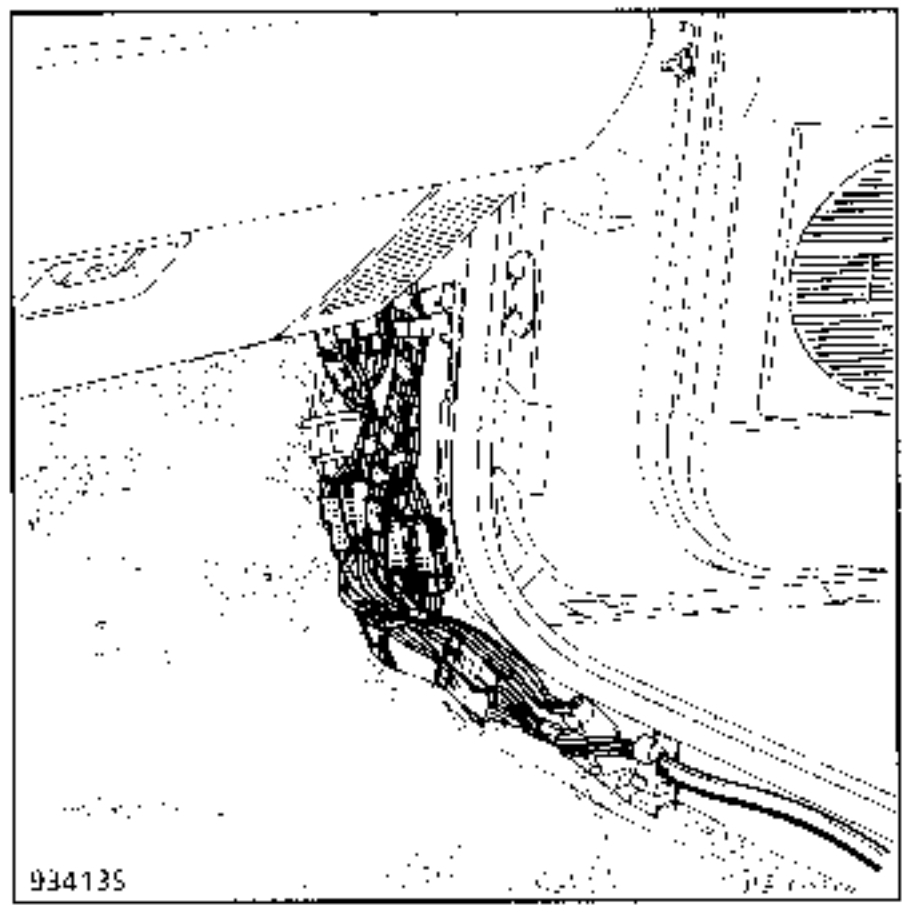
Remove the mounting by tilting it downwards.



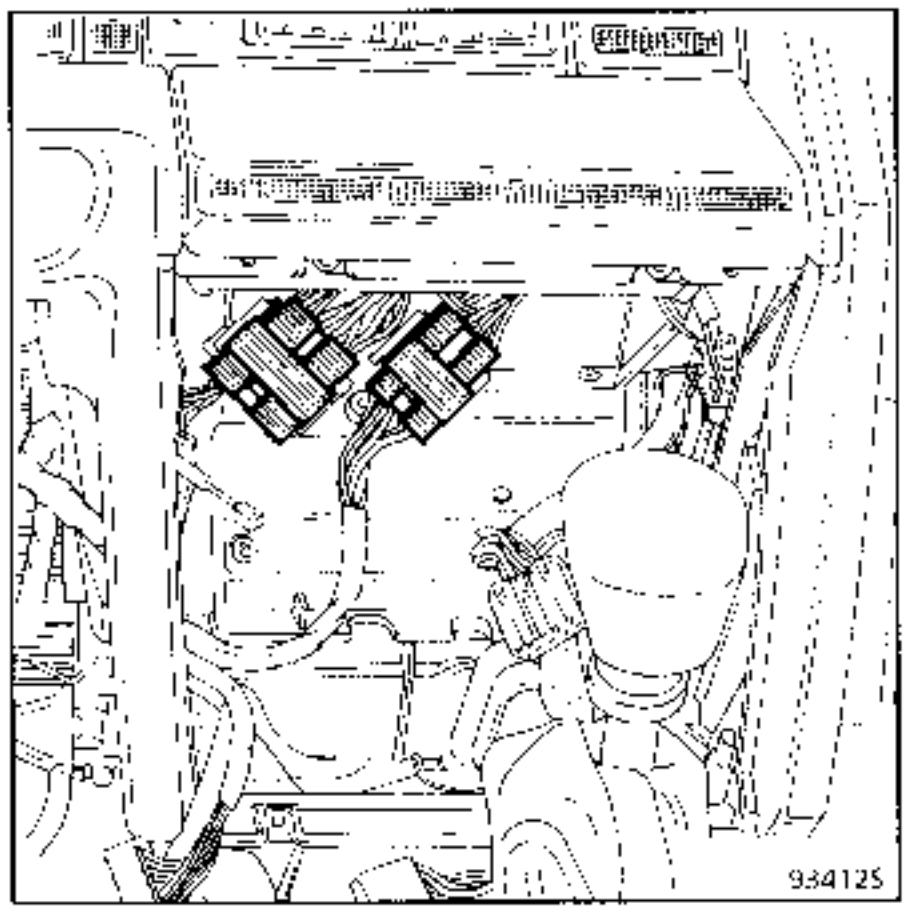
Disconnect :

- the brown connector (9) that provides the electrical supply to the panel, without removing it.

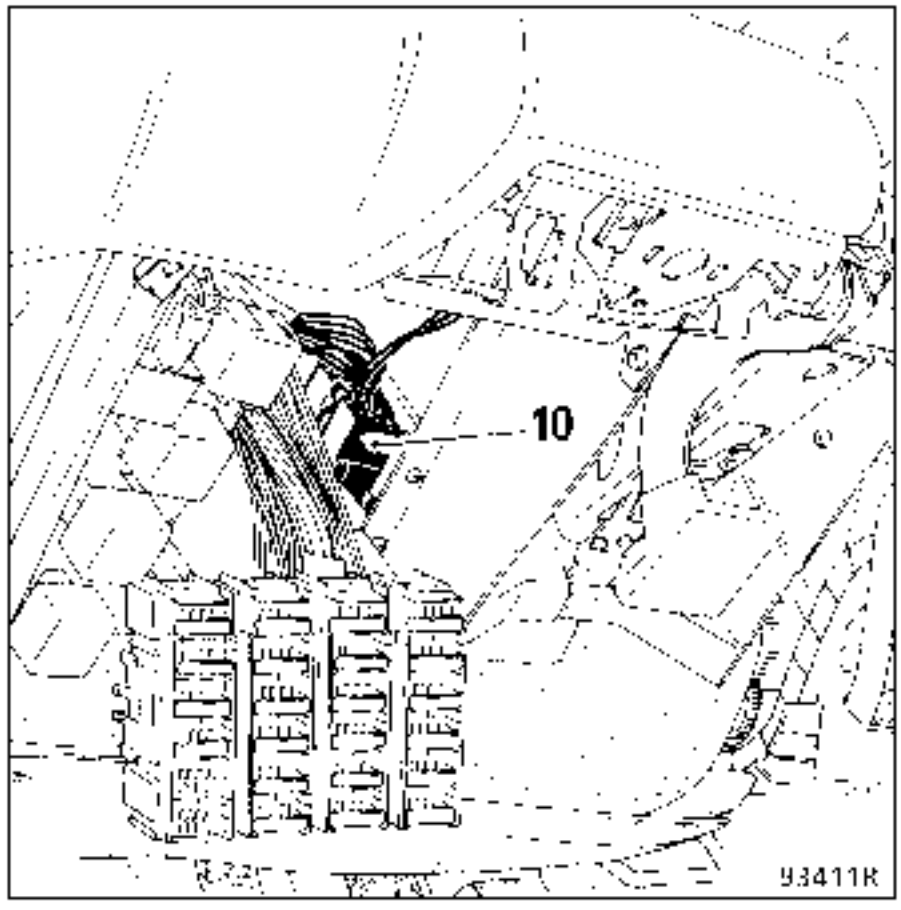




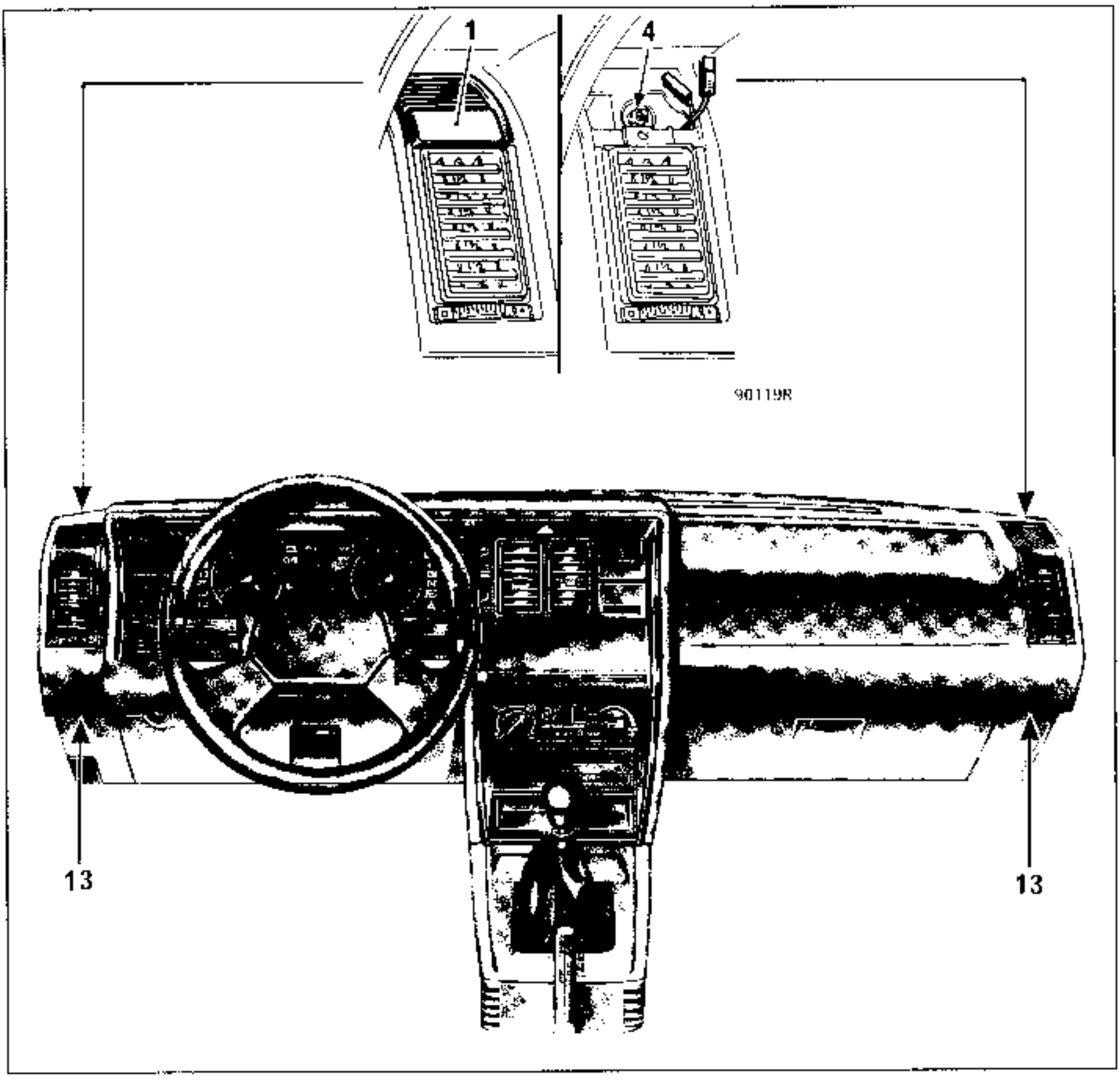
- Disconnect the connectors on the front lefthand and righthand door pillars and remove the screws that retain the earth terminals.



- Disconnect the two connectors located on the air distribution casing,
- Disconnect the speedometer drive cable,
- Disconnect the pulse generator connector on the speedometer drive cable (depending on version).



- Disconnector connector (10) on the scuttle wiring harness.

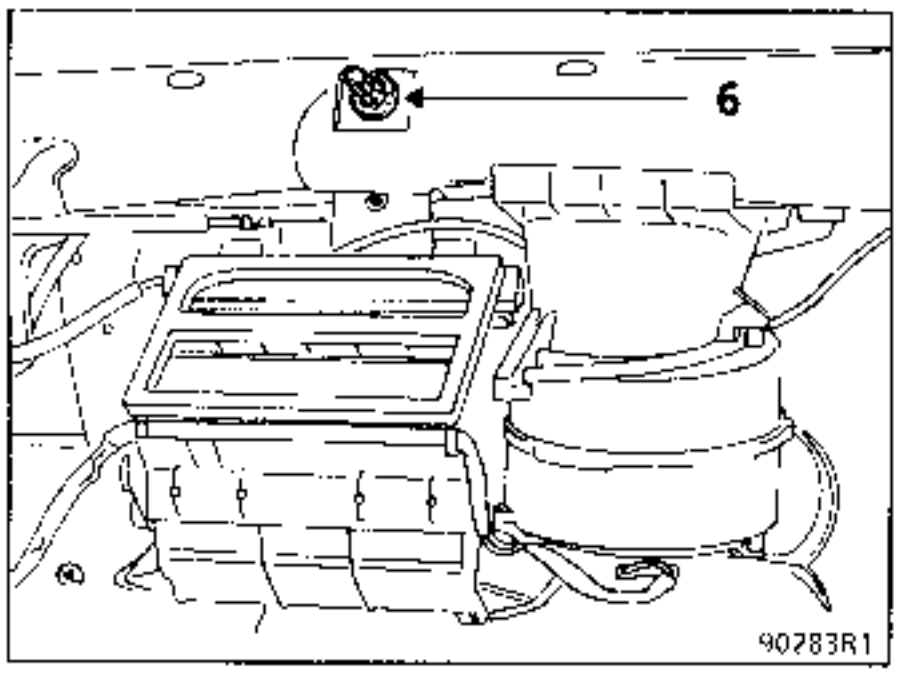


On both left and righthand sides :

Unclip the trim (11),

Remove :
- the speaker grille,
- the two lower securing screws (13),
- the 2 upper securing screws (12),
- the fascia panel.

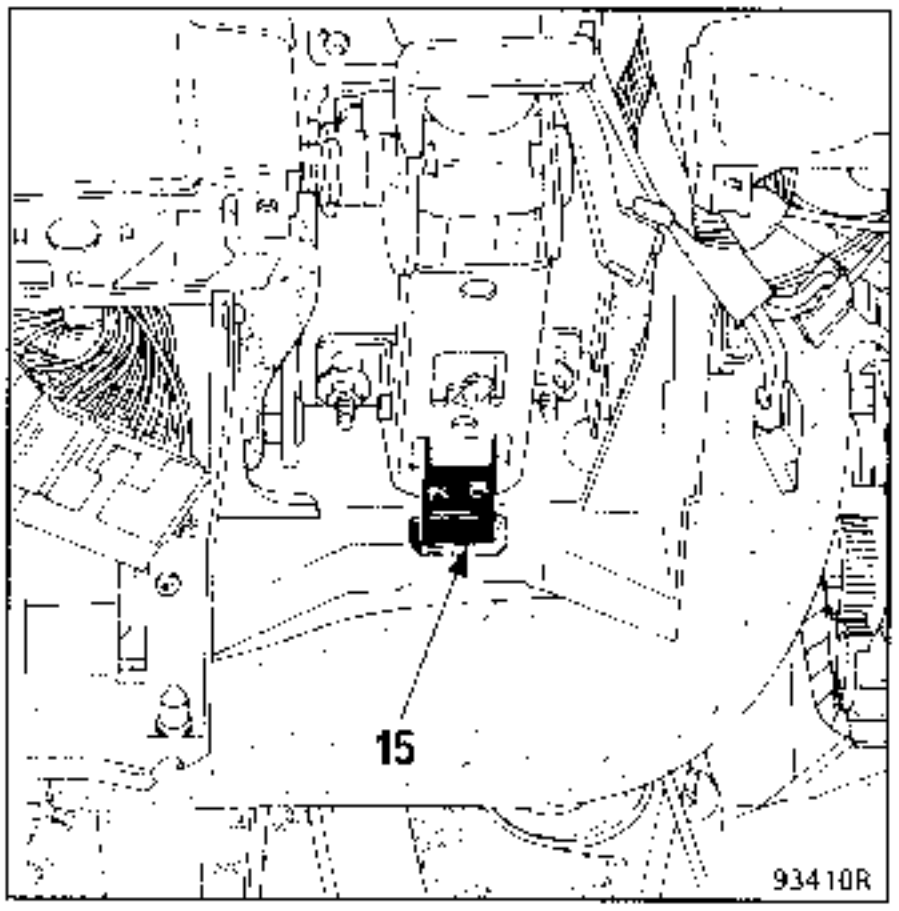
REFITTING



Check that the plastic locator (14) is in position.

Place the panel on the locator and on its four securing points (take care that it does not trap the wiring harnesses or foul the steering column intermediate shaft).

Secure the fascia panel in place.



Place the steering column in position, engaging the tab (15) into its location and the steering column shaft in its universal joint.

Secure the steering column in place.

Fit the universal joint clamping bolt without tightening it. When the steering wheel is fitted, adjust the lengthwise position of the steering column shaft and clamp the universal joint bolt.

Refit the radio mounting and the heater control panel.

Reconnect the speedometer drive cable, all the connectors and earth wires.

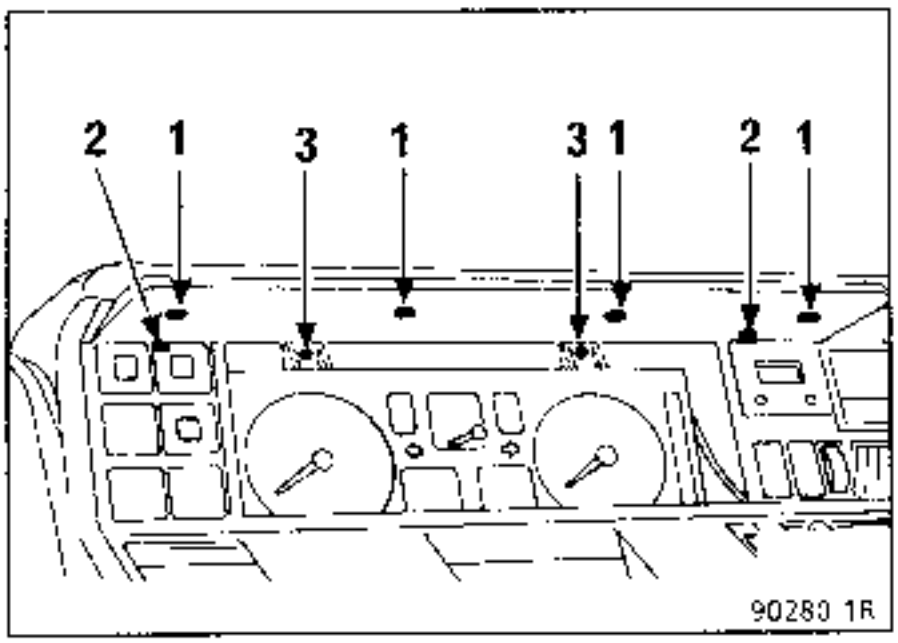
Connect the battery, with the ignition switched off and then check the operation of all the accessories before refitting all the trim.

REMOVING

Disconnect the battery.

Remove the fours screws (1) with a stub screwdriver.

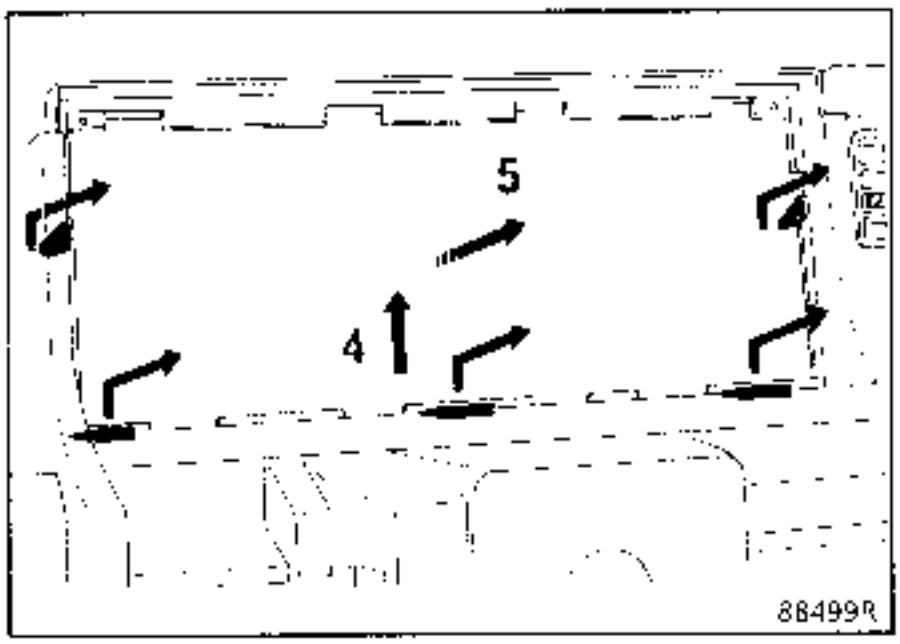
Push in the two studs (2) on the panel visor and swing it to remove it.



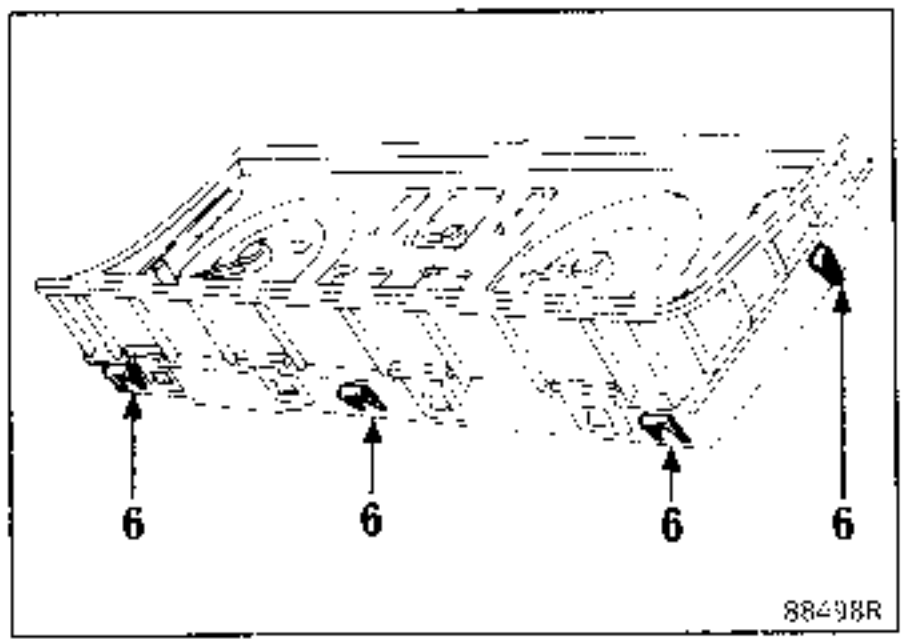
Disconnect the speedometer drive cable through the fuse box access panel.

Remove the two screws from the instrument panel (3).

Lift the panel (4) as far as it will go.



Remove the instrument panel (5) whilst holding it up to free the lugs (6).



REFITTING (Special points)

Before reconnecting them, check that the connectors and their wires are all in good condition.

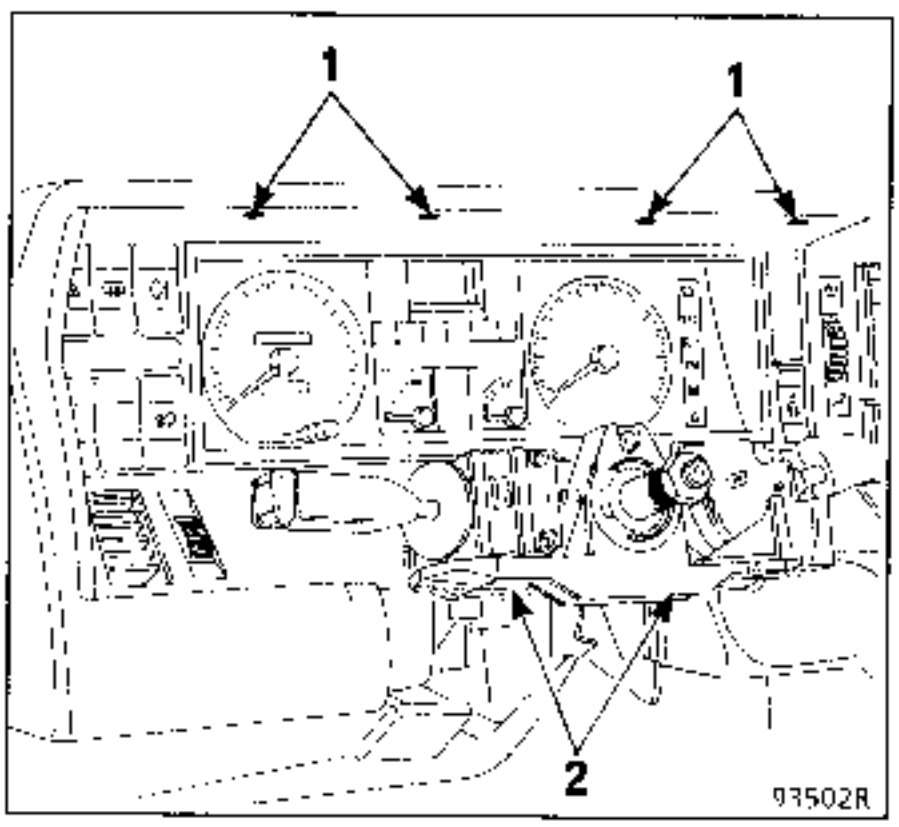
Ensure that the connectors are fully clipped in place.

Check the operation of all the instrument panel functions.

REMOVING

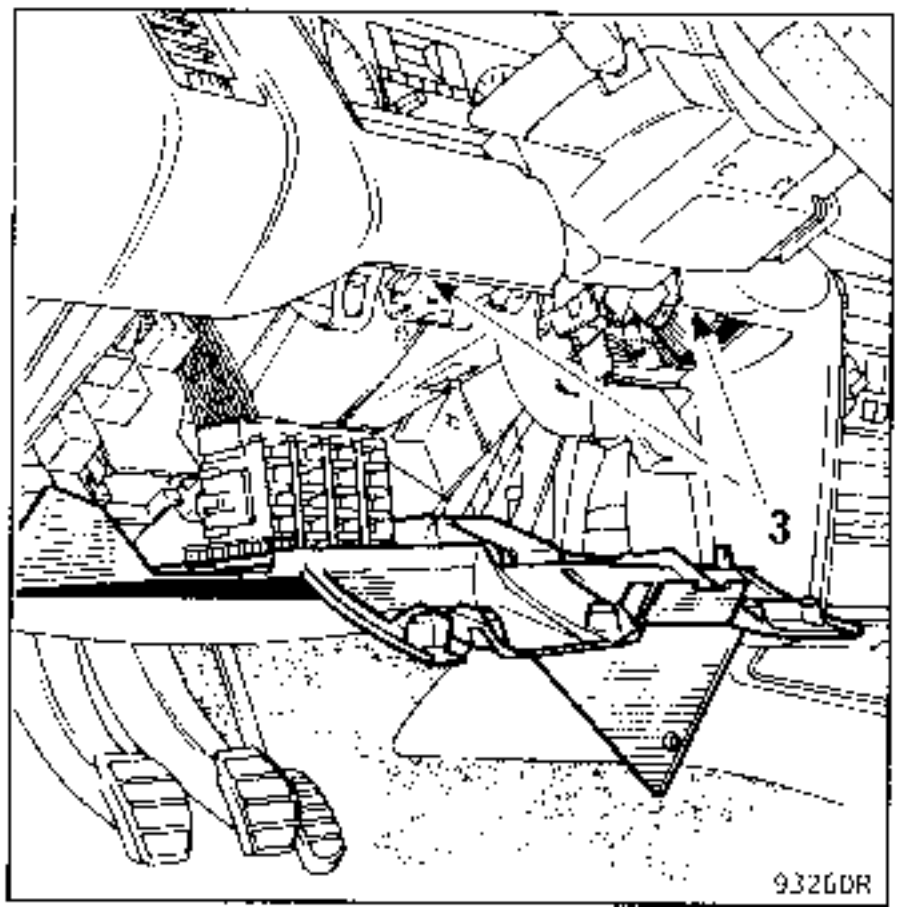
Disconnect the battery.

Remove :
- the lower cover under the fascia panel (9 screws),
- the 2 screws that retain the visor (2).

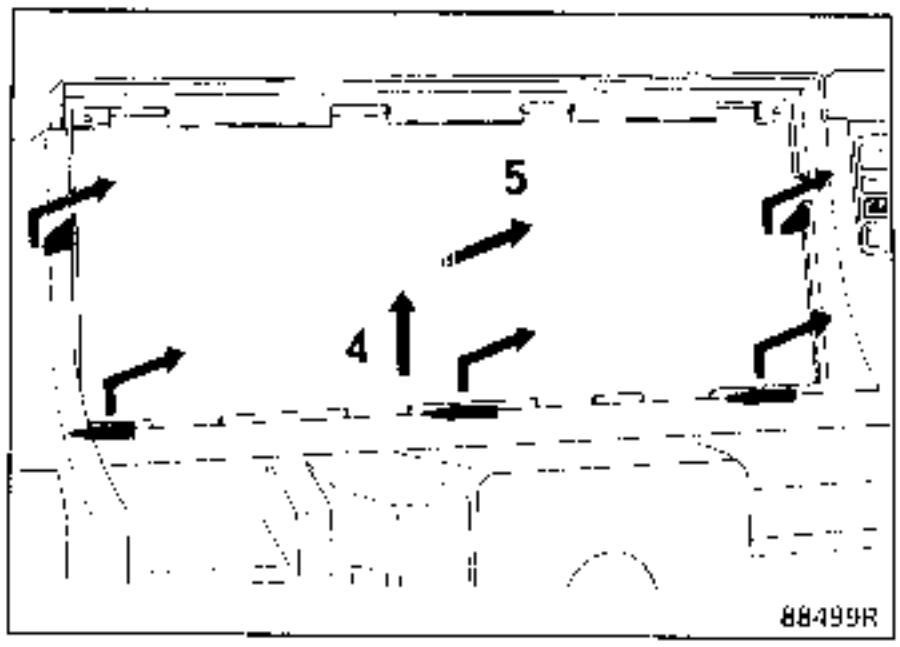


Disconnect the speedometer drive cable.

Remove :
- the 4 screws from the visor (1) and swing it to remove it,
- the 2 screws from the panel (3).



Lift the instrument panel fully up and remove it, whilst holding it raised.



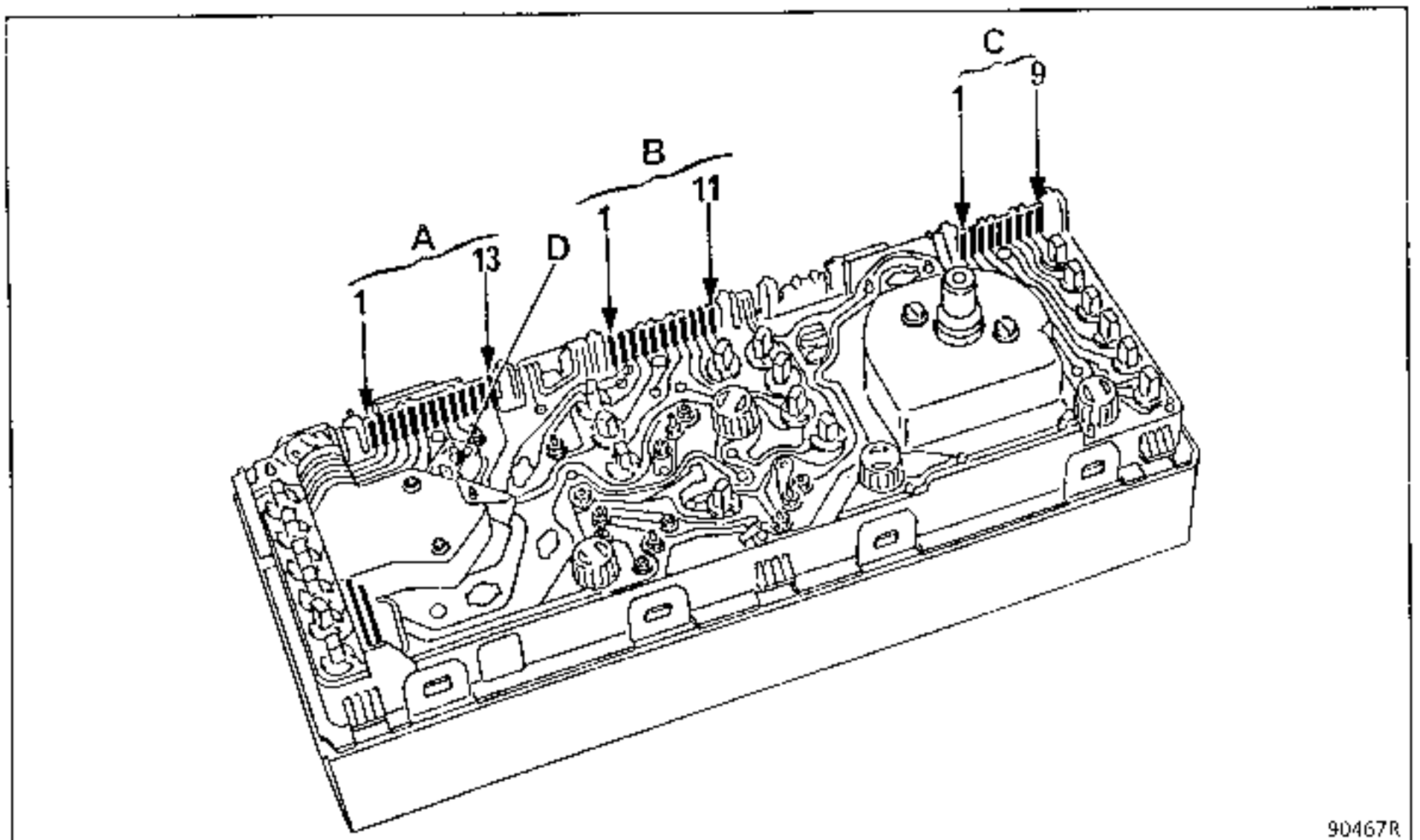
REFITTING (Special points)

Before reconnecting them, check that the connectors and their wires are all in good condition.

Ensure that the connectors are fully clipped in place.

Check the operation of all the instrument panel functions.

CONNECTIONS



Connector A (13-track)

1 Hazard warning light repeater
2 Brake wear warning light
3 Transmission engagement or transmission selection warning light (Automatic transmission)
4 Minimum washer bottle level or ABS or excessive speed warning light*
5 Choke or seat belts "on" warning light*
6 Automatic transmission and injection warning light
7 Not used
8 Tachometer
9 Oil pressure indicator or warning light (2 bars)**
10 Not used
11 Not used
12 Not used
13 Fuel gauge

Connector B (11-track)

1 Minimum fuel level warning light
2 Oil pressure warning light 0.3 bar
3 – after ignition
4 Pre-heater or catalytic convertor defect warning light*
5 LH direction indicator repeater
6 Coolant temperature indicator*
7 RH direction indicator repeater
8 Coolant temperature warning light
9 Brake (Nivocode) and handbrake warning light
10 Not used
11 Charge/discharge warning light

Connector C (9-track)

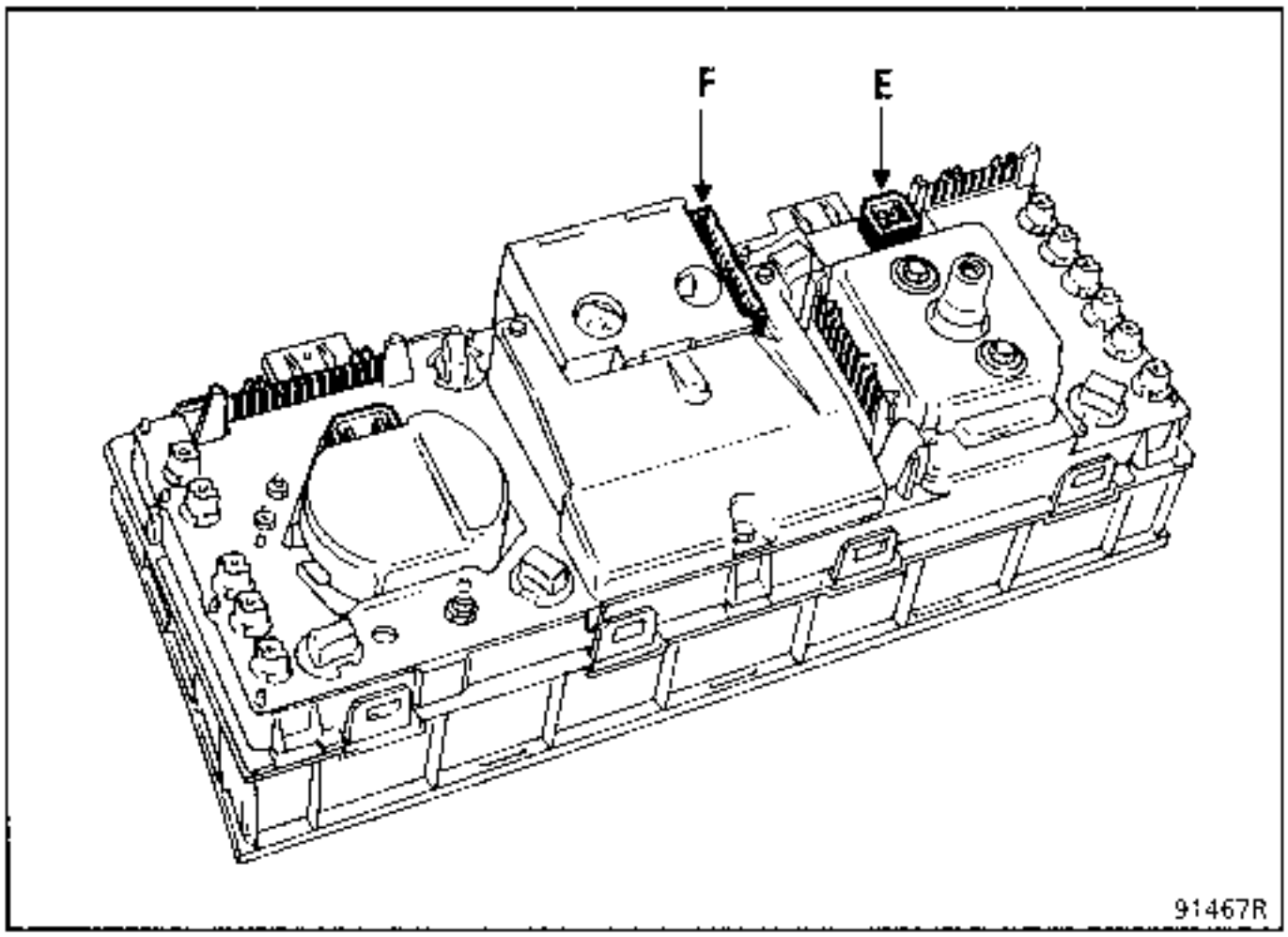
1 Coolant temperature indicator
2 Instrument panel lighting
3 Main beam warning light
4 Dipped beam warning light
5 Side light warning light
6 Front fog lights warning light
7 Rear fog light warning light
8 Heated rear screen warning light
9 Earth

Connector D

1 Oil level sensor
3 Oil level sensor

* depending on country
** depending on version

CONNECTIONS



Connector E (2-track)

1 On-board computer reset button
2 Earth

Connector F (15-track)

1 On-board computer earth
2 + before ignition
3 − after ignition
4 Speed signal
5 Flow sensor signal
6 Fuel gauge signal
7 Outside temperature signal
8 Lighting rheostat
9 Instrument panel lighting
10 Outside temperature electronic earth
11 Fuel gauge electronic earth
12 Fuel gauge warning light
13 On-board computer reset button
14 On-board computer display
15 Not used

SPEED SIGNAL INFORMATION

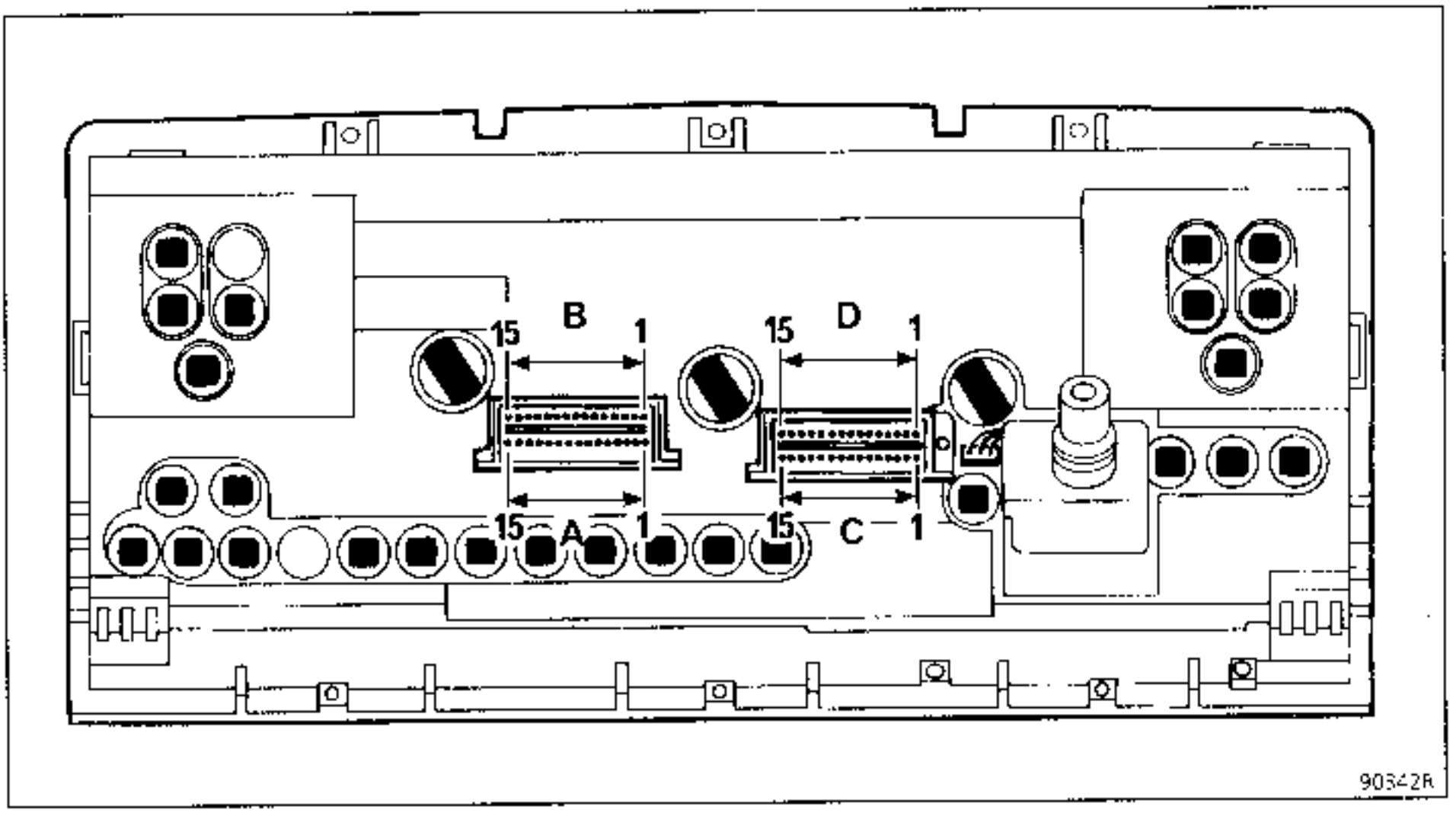
The speedometer cable is fitted with a speed sensor. Vehicle speed information is sent to the on board computer.

Connection via the black 3-way connector

1 + 12 V after ignition
2 Vehicle speed information
3 Earth

NOTE : Connection of the other 3 connectors is identical to that on a conventional type instrument panel (see previous pages).

CONNECTIONS



Connector A (red)

1 Hazard warning light repeater
2 Not used
3 RH direction indicator repeater
4 + after ignition (instrument panel fuse)
5 Choke warning light
6 Pre-heater warning light
7 Front fog lights warning light
8 Rear fog light warning light
9 Heated rear screen warning light
10 ABS warning light
11 AR4 automatic transmission warning light
12 Seat belts "on" warning light (depending on equipment level)
13 Handbrake warning light
14 Not used
15 Not used

Connector B (black)

1 Not used
2 LH direction indicator repeater
3 Not used
4 On-board computer display (by earthing circuit)
5 Not used
6 Windscreen washer level warning light
7 Brake pad wear warning light
8 Instrument panel lighting (instrument panel fuses)
9 Not used
10 Injection/Automatic transmission warning light
11 Oil pressure drop indicator to voice synthesiser
12 Voice synthesiser speaker
13 Voice synthesiser speaker
14 Electronic earth
15 + before ignition (interior light fuse)

CONNECTIONS (continued)

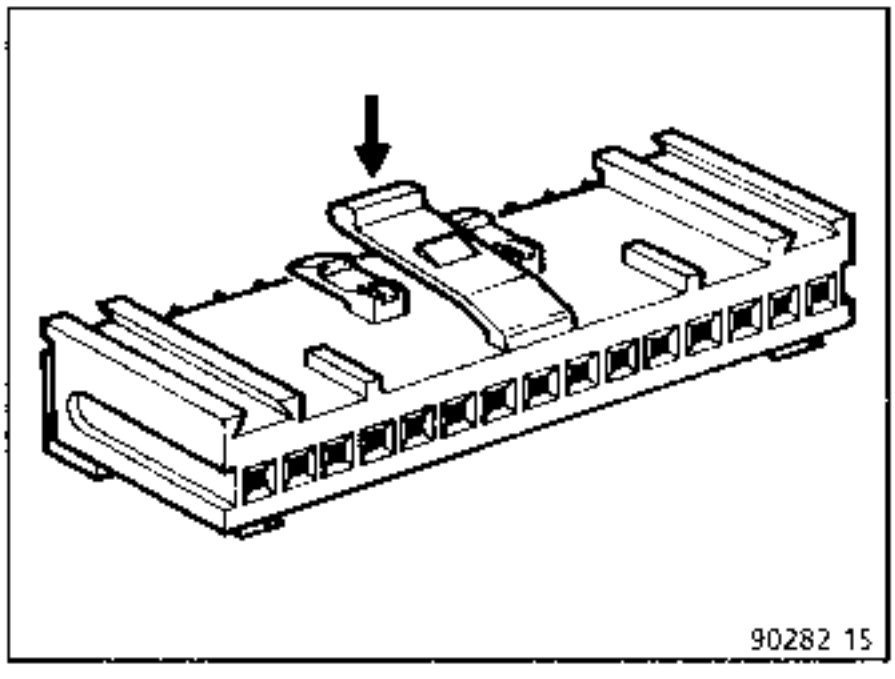
Connector C (blue with retaining lock)

1 Not used *
2 Not used*
3 Not used
4 Coolant temperature warning light via temperature switch
5 Charge/discharge warning light
6 Oil pressure warning light (0.35 bar pressure switch)
7 Brake warning light (Nivocode)
8 Dipped beam warning light
9 Warning lights earth
10 Main beam warning light
11 Side lights warning light
12 Diesel tachometer
13 Petrol tachometer
14 Voice synthesiser demonstration and repeat **
15 Oil pressure warning light (2 bar pressure switch)

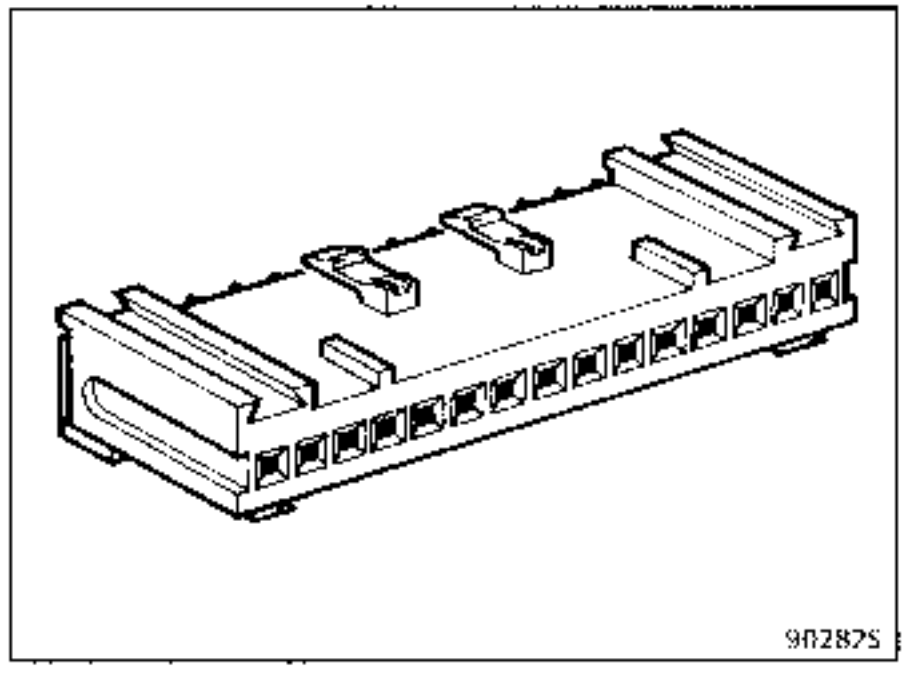
Connector D (blue)

1 Flow sensor signal
2 Not used
3 Coolant temperature via temperature switch
4 External temperature sensor return (in rear view mirror)
5 To external temperature sensor (in rear view mirror)
6 Fuel gauge return
7 Radio shut-off**
8 To fuel gauge
9 To oil level sensor
10 Oil level sensor return
11 Rear LH door signal**
12 Rear RH door signal**
13 Warning lights earth
14 Driver's door signal**
15 Passenger door signal**

Connector with retaining lock



Connector without retaining lock



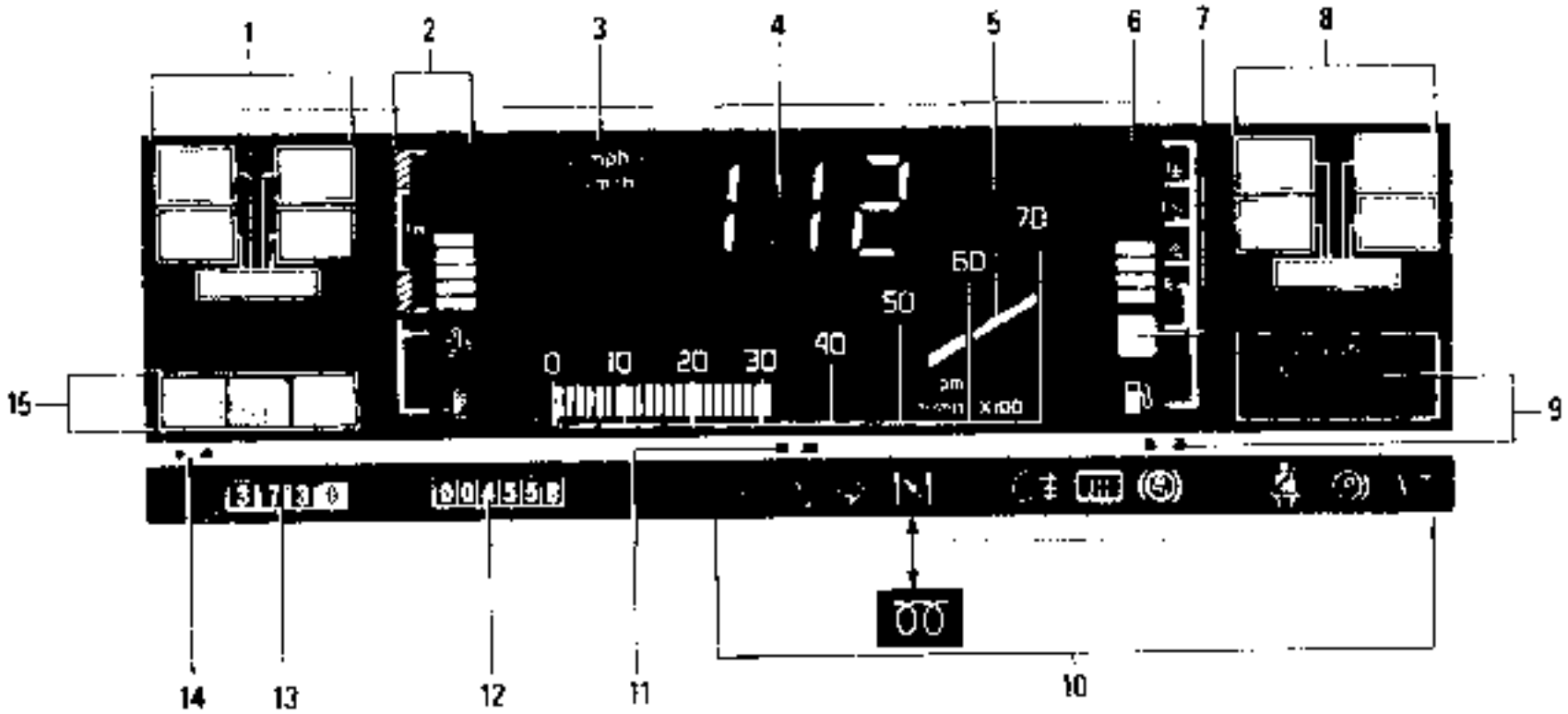
* Speed signal output to be used for special applications
** Vehicle equipped with voice synthesiser

DESCRIPTION

The electronic instrument panel consists of several distinctly separate units contained in a single casing :

- a liquid crystal display assembly,
- a warning light assembly.

In addition, the instrument panel checks that certain sensors and detectors are operating correctly and, if they are not, displays an error code in place of the speed display.



NOTE : The lighting rheostat controls the brightness of the display.

1/ WARNING LIGHTS

- Braking system defect warning light (Nivocode).
  This warning light is tested when the ignition is switched on, before the engine starts but should switch off as soon as the engine is running.

- Battery charge/discharge warning light.
  This warning light switches on when the ignition is switched on but should switch off when the engine starts.

- Coolant temperature warning light.
  This warning light should be off when the ignition is switched on.
  It illuminates **when the 115 °C temperature switch* opens.**

- Engine oil pressure warning light.
  This should switch on when the ignition is switched on and switch off when the engine starts.

Special features of the J type petrol engine

There are two pressure switches*.

One set at **0.35 bars** which maintains a permanent check on the oil pressure. Its warning light illuminates if the oil pressure falls below **0.35 bars**.

The second pressure switch (2 bars) checks the oil pressure at speeds above **2 500 rpm**. Its warning light illuminates if the oil pressure falls below **2 bars** at engine speeds of more than **2 500 rpm**.

(*) Sensors, detectors or wiring, whose condition is monitored by the instrument panel.

DESCRIPTION

2/ OIL LEVEL OR COOLANT TEMPERATURE BARGRAPH

A - Oil level *

The engine oil level is displayed only after the ignition has been switched off for at least two minutes with the vehicle stationary.

When the ignition is switched on, the bargraph segments will illuminate after approximately two seconds.

The coolant temperature bargraph will replace the above display when the ignition switch is operated a second time or when the engine is running or the vehicle is in motion.

B - **Engine coolant temperature**

A thermistor controls the operation of some of the segments on the bargraph.

If the engine overheats, the the opening of the **115 °C*** temperature switch switches on the complete bargraph **(10 segments)**, with the engine running.

NOTE : When the engine coolant temperature is lower than **52 °C**, one of the bargraph segments should be illuminated.

At a coolant temperature of 52 °C, two segments should switch on, etc.

3/ SPEED DISPLAY UNITS

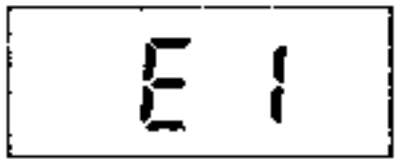
km/h or mph.

4/ DIGITAL SPEED DISPLAY AND DIAGNOSTIC CODE

The speed signal is provided by the speedometer drive cable that drives the mileometer drums. A sensor built in to this mechanism provides the speed signal to the instrument panel and the on-board computer **(5 pulses per metre)**.

Diagnostic code display

Example :



This display will appear in place of the speed display under the following conditions :

after the ignition has been switched off for at least two minutes,

if one of the sensors or detectors or their wiring monitored by the instrument panel is defective (See fault-finding on pages 83-24 and 83-39).

NOTE : The codes range from E1 to E9.

- the vehicle is stationary.

5/ TACHOMETER

The engine speed is displayed by means of a 50 segment bargraph **(7 segments per 1 000 rpm)**.

Petrol engine
Scale : 0 to 7 000 rpm.
At speeds of more than 6 000 rpm, the complete bargraph will flash.

6/ FUEL LEVEL BARGRAPH*

Each segment of the bargraph represents 1/10 of the fuel tank capacity.

WARNING : When filling the tank, the vehicle must have been stationary for at least **15 seconds** for the fuel contents level to be correct with the ignition switched off.

7/ MINIMUM FUEL LEVEL WARNING LIGHT

When the quantity of fuel in the tanks falls to below **5 litres**, the minimum fuel level warning light will flash.

(*) Sensors, detectors or wiring, whose condition is monitored by the instrument panel.

8/ SERVICE WARNING LIGHTS

- Screen washer fluid minimum level warning light.
- Front brake pad wear warning light.
- Electronic defect warning light.
  It illuminates as soon as the ignition is switched on and should go extinguish when the engine is running (injection test warning light).

9/ ON-BOARD COMPUTER

9/ RESET BUTTON

10/ OTHER WARNING LIGHTS

11/ BUTTON TO CHANGE UNITS

km/h or mph (for righthand drive vehicles).

12/ TOTAL MILEAGE RECORDER

13/ TRIP MILEAGE RECORDER

14/ TRIP MILEAGE RECORDER RESET BUTTON

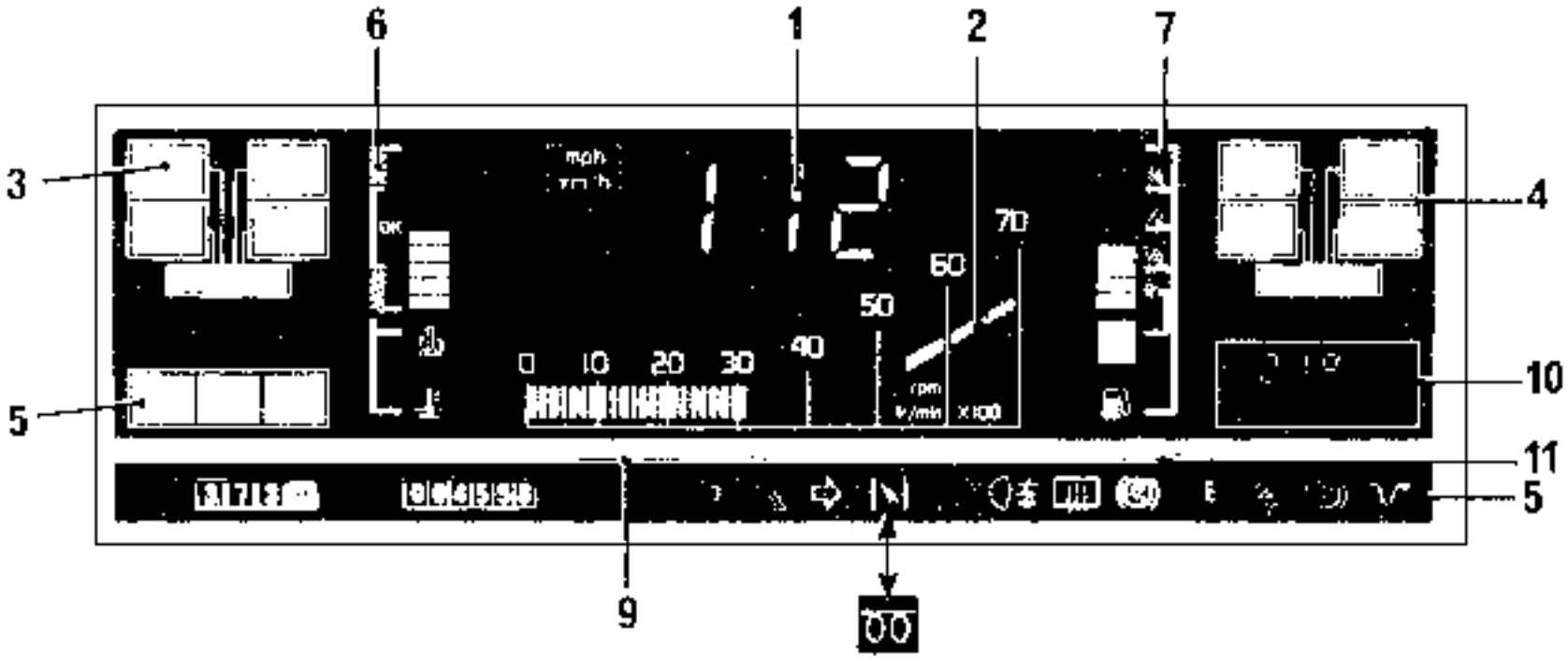
15/ LIGHTING WARNING LIGHTS

DESCRIPTION

The electronic instrument panel consists of several distinctly separate units contained in a single casing :

- a liquid crystal display assembly,
- a warning light assembly,
- a voice synthesiser unit (depending on equipment level).

In addition, the instrument panel checks that certain sensors and detectors are operating correctly and, if they are not, displays an error code in place of the speed display.



NOTE : The lighting rheostat controls the brightness of the display.

1/ VEHICLE SPEED

The digital speedometer consists of three figures that can indicate a maximum speed of 255 km/h.

The speed data is provided by a sensor built-in to the mechanical mileometer assembly.

2/ ENGINE SPEED

The engine speed is displayed by means of a 50 segment bargraph (7 segments per **1 000 rpm**). The first three segments are illuminated as soon as the ignition is switched on, before the engine starts).

A - Petrol engines

The engine speed displayed on the bargraph ranges from **0 to 7 000 rpm**. At speeds of more than **6 000 rpm**, the bargraph will flash.

B - Diesel engines

The engine speed displayed on the bargraph ranges from **0 to 5 500 rpm**. At speeds of more than **4 800 rpm**, the bargraph will flash.

3/ DANGER WARNING LIGHT

If one of the following defects is detected, the warning light that corresponds to the actual defect will switch on together with the "STOP" warning light. There will also be a spoken message.

- **BATTERY CHARGING SYSTEM DEFECT**

  This warning light will illuminate when the ignition is switched on and should extinguish when the engine starts.

  If the warning light illuminates whilst the engine is running, it is an indication of a defect in the charging system.

DESCRIPTION (continued)

The voice synthesiser will generate the spoken message "electrical system defect" if :

- the charging defect lasts for more than **10 seconds**,
- the oil pressure has been correct for at least **60 seconds**.

- **BRAKING SYSTEM DEFECT**

This warning light is tested when the ignition is switched on and should extinguish as soon as the engine starts.

If the warning light remains illuminated with the engine running, it is an indication that there is a defect in the braking system (brake fluid level, pressure drop in the braking system).

The spoken message "braking system defect" is generated when the + circuit, after the ignition switch is closed and there is an indication of a defect in the braking system.

As soon as it is detected, this defect is memorised and the warning light will remain illuminated until the ignition is switched off.

- **OIL PRESSURE DROP**

This warning light should illuminate when the ignition is switched on and extinguish as soon as the engine starts.

If the warning light remains on with the engine running, it is an indication of low pressure in the lubrication system (**0.35 bar** minimum pressure switch and **2 bar** pressure switch for speeds of more than **2 500 rpm**).

The spoken message "low oil pressure" is generated if :

- the + circuit after ignition is closed,
- the engine has been running for at least 10 seconds,
- the defect has been detected for more than 2 seconds.

- **ENGINE COOLANT TEMPERATURE**

This warning light should extinguish when the ignition is on and the engine is running. If the warning light illuminates, it is an indication that the engine coolant temperature is too high (higher than **115 °C**).

The spoken message "engine overheating" is generated when :

- the ignition is on,
- an overheating condition has been detected for more than one second,
- the oil pressure has been correct for more than **10 seconds**.

4/ SERVICE WARNING LIGHTS

When one of the following defects is detected, the corresponding warning light will illuminate together with the "SERVICE" warning light.

A spoken message is generated for certain defects under the following conditions.

- **BRAKE PAD WEAR**

If this warning light illuminates it is an indication that the brake pads require replacing.

The spoken message "BRAKE PADS WORN" is generated with the ignition on, when the defect has been detected for a total of **30 seconds** since the ignition was switched on. The defect is held in the memory until the ignition is switched off.

DESCRIPTION (continued)

- **AUTOMATIC TRANSMISSION - INJECTION WARNING LIGHT**

  This warning light indicates a defect in the fuel injection system or the automatic transmission. It illuminates when the ignition is switched on and extinguishes when the engine is started

  There is no spoken message for these defects.

- **SCREEN WASHER BOTTLE LEVEL**

  This warning light indicates that the screen washer bottle is empty.

  There is no spoken message for this defect.

- **ANTI-LOCK BRAKING SYSTEM (ABS) DEFECT**

  This warning light illuminates when the ignition is switched on and extinguishes when the engine starts.

  It indicates that there is a defect in the anti-lock braking system.

  There is no spoken message for this defect.

5/ OTHER WARNING LIGHTS

6/ OIL AND WATER BARGRAPH

This displays the following two readings in succession :

- oil level,
- coolant temperature.

When the ignition is switched on, before the engine is started, the oil level reading is automatically selected if the ignition has been off for more than two minutes.

There will be no display on the bargraph before a maximum of 2.5 seconds after switching on the ignition.

Once the "engine running" signal is received, or if the vehicle is moving, the bargraph will provide a direct coolant temperature reading.

If an "engine overheating" signal is received from the temperature switch, all the bargraph segments will illuminate. (One bargraph segment corresponds to approximately 10°C. The bargraph indicates temperatures higher than 50°C).

7/ FUEL LEVEL BARGRAPH

The level of fuel in the tank is shown by ten segments and by a "minimum fuel level" warning light.

Each of the bargraph segments corresponds to 1/10 of the fuel tank capacity.

8/ VOICE SYNTHESISER

Functions covered :

- handbrake,
- side doors not closed properly,
- lights not switched off,
- minimum fuel level,
- brake pads worn,
- drop in oil pressure,
  engine overheating,
- braking system defects,
- electrical charging system defect,
- no defect,
- fault diagnosis.

FUNCTIONS

- handbrake on,
- doors not closed properly,
- lights left on

The message "HANDBRAKE ON" is generated when :

- the handbrake is applied,
  the ignition is on,
- the vehicle is moving at a speed of more than **10 mph** (15 km/h).

A message such as "**FRONT** RIGHTHAND DOOR NOT PROPERLY CLOSED" is generated when :

- the door in question is not closed properly,
- the ignition is on,
  the vehicle is moving at a speed of more than **10 mph** (15 km/h).

The message "LIGHTS ON" is generated when :

- the side lights are on,
- the ignition is switched off,
- the driver's door is opened.

MINIMUM FUEL LEVEL MESSAGE

A spoken message of the type "**FUEL** LEVEL LOW" is generated when the fuel reaches the minimum level (less than **5 litres).**

BRAKE PAD WEAR

The spoken message "BRAKE PADS WORN" is generated when :

the ignition is switched on,
- the defect has been detected for a total of more than **30 seconds** since the ignition was switched on.

OIL PRESSURE DROP

The defect "DROP IN OIL PRESSURE" is detected either by the first minimum oil pressure switch or by the second pressure switch (when the engine speed is higher than **2 500 rpm**).

The spoken message "DROP IN OIL PRESSURE" is generated when :

- the ignition is on,
- the engine has been running for at least **10 seconds,**
- the defect has been detected for at least **2 seconds.**

ENGINE OVERHEATING

Excessive temperatures are detected by a temperature switch (**115 °C**).

The spoken message "ENGINE OVERHEATING" is generated when :

- the ignition is switched on,
- the overheating condition has been detected for more than **1 second,**
- the oil pressure has been correct for more than **10 seconds,**

The message is not transmitted if the temperature switch is defective.

BRAKING SYSTEM DEFECT

The message "BRAKING SYSTEM DEFECT" is generated when :

- the ignition is switched on.,
- the defect is detected in the braking system.

The defect is memorised until the ignition is switched off (the warning light remains illuminated).

CHARGING SYSTEM DEFECT

The spoken message "ELECTRICAL SYSTEM CIRCUIT DEFECT" is generated when :

- the charging defect has been detected for more than **10 seconds,**
- the oil pressure has been correct for more **than 60 seconds**.

The message will not be transmitted if the first pressure switch (0.35 bars) is defective.

Musical "self-test" signal

The musical self-test signal is generated under the following conditions :

- if there is a defect in one of the sensors or detectors,
- if the ignition has been switched on for for more than **1 second,**
  if the engine is stopped.

VOICE SYNTHESISER

Conditions under which the messages are generated

Types of spoken message	Conditions under which message is generated	Fault detected by :	Held in memory until ignition switched off
Oil pressure drop	Ignition on Engine running for more than 10 **seconds** Fault detected for **2 seconds**	Oil pressure switch (Circuit earthed)	
Engine overheating	Ignition on Fault detected for **1 second** Oil pressure correct for more than **10 seconds**	Temperature switch (Circuit earthed)	
Battery charging system defect	Oil pressure correct for more than **60 seconds** Fault detected for **10 seconds**	Voltage regulator (warning light circuit earthed)	
Braking system defect	Ignition on Braking system defect	Sensor on brake fluid reservoir (Circuit earthed)	X
Minimum fuel level	Ignition on Fault detected for 30 **seconds** Less than **5 litres**	Fuel tank unit (Circuit earthed)	X
Brake pads	Ignition on Fault detected for more than a total of **30 seconds** since ignition switched on	Brake pads (Circuit earthed)	X
Rear lefthand door Rear righthand door Front righthand door Front lefthand door	Ignition on Vehicle speed more than **10 ± 5 mph (15 ± 5 km/h)** Doors not fully closed	Door switches (Circuit earthed)	
Handbrake on	Ignition on Vehicle speed more than **10 ± 5 mph (15 ± 5 km/h)** Handbrake applied	Switch (Circuit earthed)	
Lights on	Ignition off Side lights on Driver's door open	Circuit earthed via the door switch + side lights	

DESCRIPTION (continued)

A fault detected by one of the sensors switches off the message "MONITORED FUNCTIONS CORRECT".

The musical signal replaces the "lights still on" message when all the voice synthesiser messages have been obliterated.

NOTE : Any of the warning messages will interrupt any of the messages currently being transmitted unless the message in question is already a warning message. The interrupted message will be re-transmitted if the conditions giving rise to it still exist.

9/ "OBLITERATION" SWITCH

This cuts out all the voice synthesiser messages when the switch operated by its button earths the circuit.

NOTE : The obliteration does not apply to the defect summary messages :

- the musical signal can be obliterated,
- if the obliteration system is operating, the "lights still on" message is replaced by the musical signal.

DEMONSTRATION RE-RUN SWITCH

When this switch earths its circuit, with the ignition on, the system can be used either to re-transmit the messages, re-run the defect summary or carry out a demonstration run (this switch is mounted with the other switches on the fascia panel).

Operating the re-run switch when one or more consecutive messages are being transmitted or re-transmitted, interrupts the message currently being broadcast and causes the message to be re-transmitted.

During the demonstration run, if no defect is present, all the bargraphs on the instrument panel will switch on.

10/ ON-BOARD COMPUTER

11/ RESET BUTTON

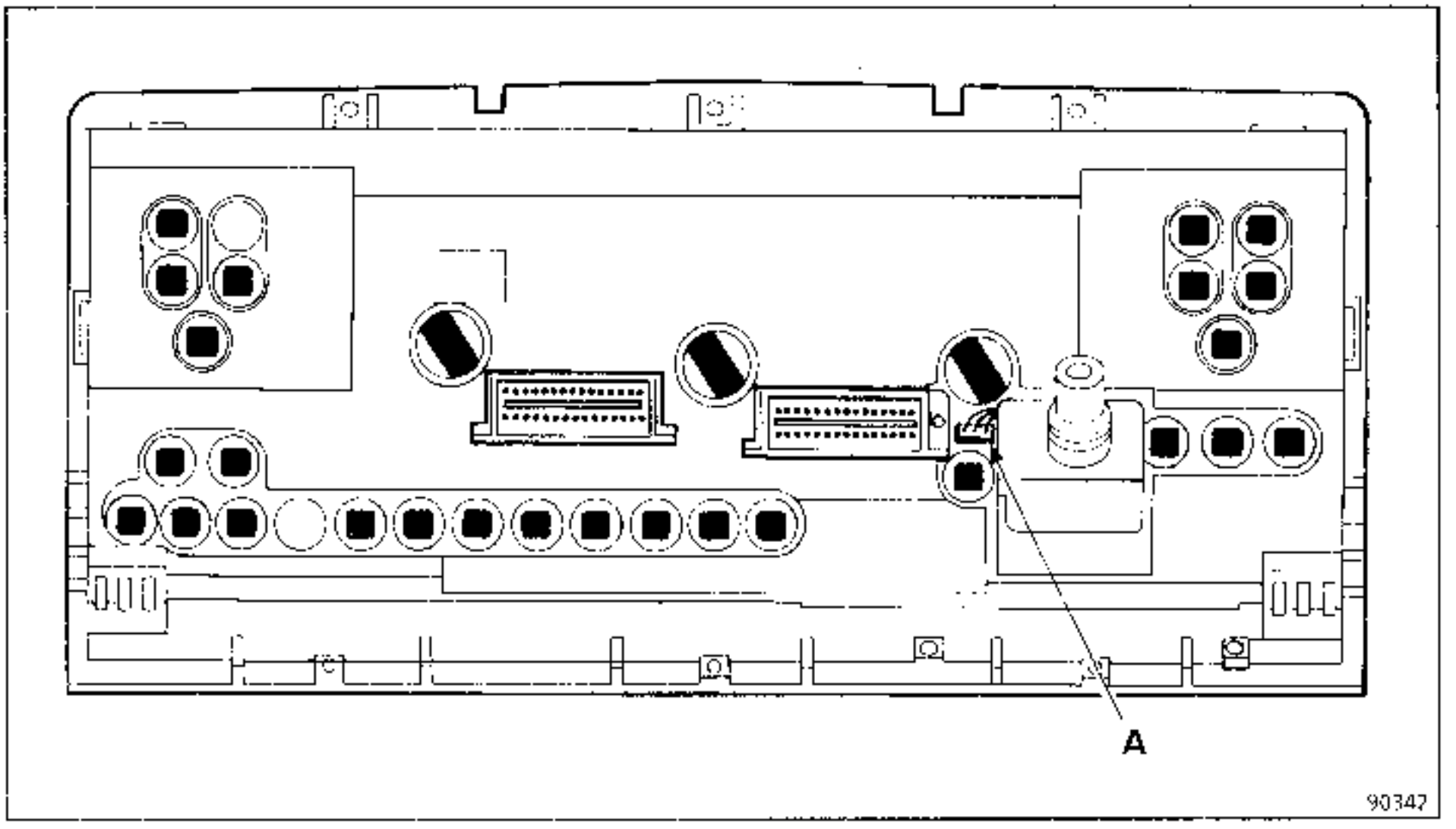
SERVICING

THE ELECTRONIC INSTRUMENT PANEL CANNOT BE REPAIRED. THE ONLY SERVICING OPERATIONS THAT CAN BE CARRIED OUT ON IT ARE REPLACING THE BULBS AND TESTING THE SPEEDOMETER CONNECTOR (A).

Carry out a careful fault finding operation and, if necessary, replace the instrument panel with a standard service exchange unit.

Return the faulty instrument panel in the packing in which the service exchange unit was delivered. The returned instrument panel must be in perfect condition (with no traces of internal dismantling) and accompanied by the fault record card, **duly filled in**. If it is not, the panel will not be accepted for service exchange.

Removing the bulbs.

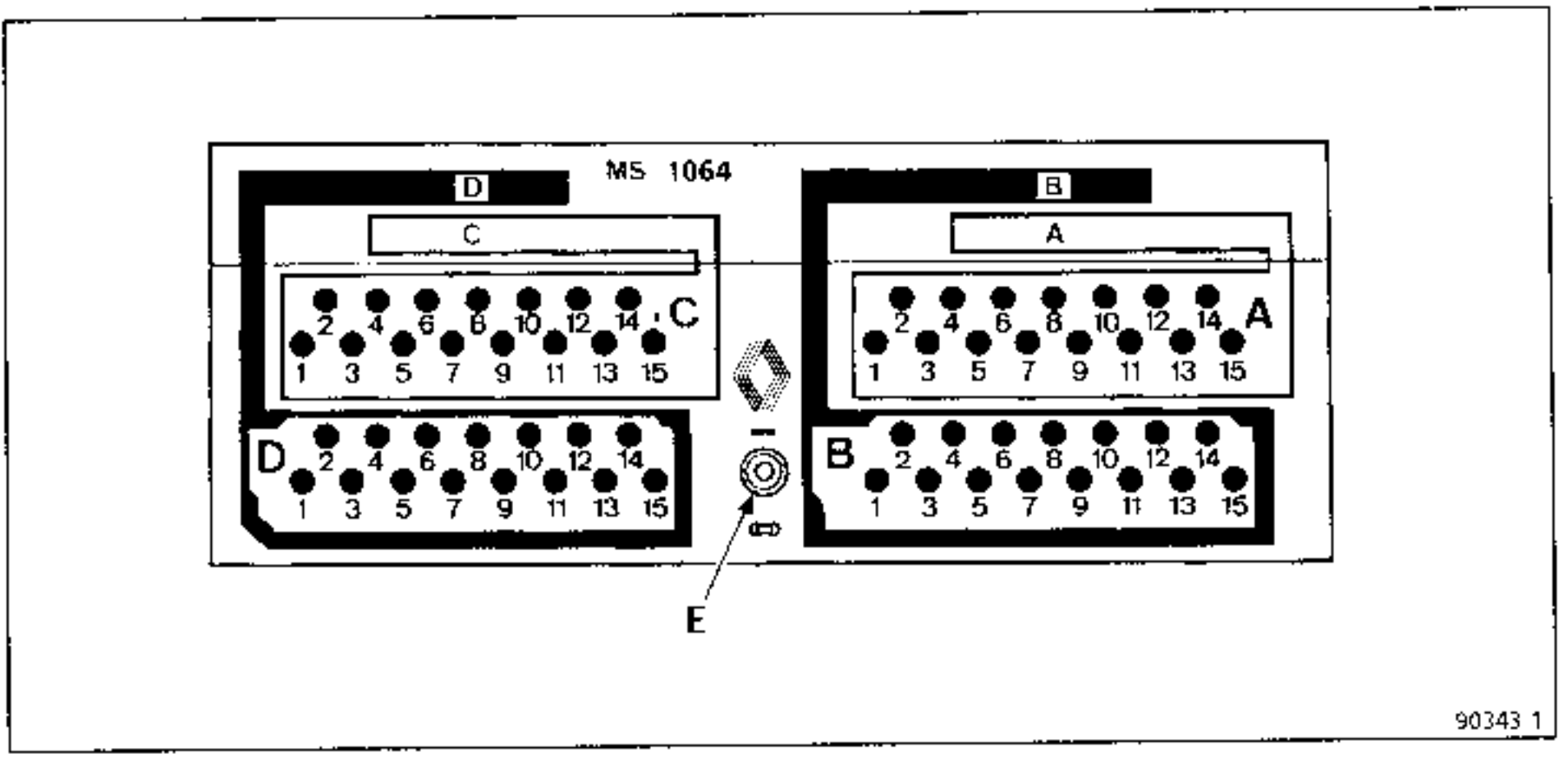


Do not remove the white plastic cover. Take out the bulbs with flat jawed pliers.

FAULT-FINDING AND PRECAUTIONS TO BE TAKEN ON THE ELECTRONIC INSTRUMENT PANEL

ESSENTIAL SPECIAL TOOLING	
MS. 1064	Junction block for testing the wiring using the XR 25 or a multimeter

The use of a junction block is essential for testing the wiring and the sensors or detectors when confirming general fault-finding procedures on the instrument panel itself (whether coded or not).



A : Red connector **A**
B : Black connector **B**
C : Blue connector **C**, with lock retaining system
D : Blue connector **D**, without lock retaining system
E : Chassis earth (reference)

CONNECTING

Connect the junction block into the system in place of the instrument panel.
Connect the free wire on the junction block to a chassis component (the earth connection must be absolutely perfect). This wire is used to check the continuity of the earth circuits.

PRINCIPLE OF TEST METHOD

Place the probes of the **XR 25** or the multimeter on the contacts identified by the numbers on the junction block which correspond to the fault-finding sequence or connection described in this manual.

PRECAUTIONS

- Never wrongly connect the earth at the instrument panel connectrons or on the sensors, as this could irreparably damage the instrument panel.

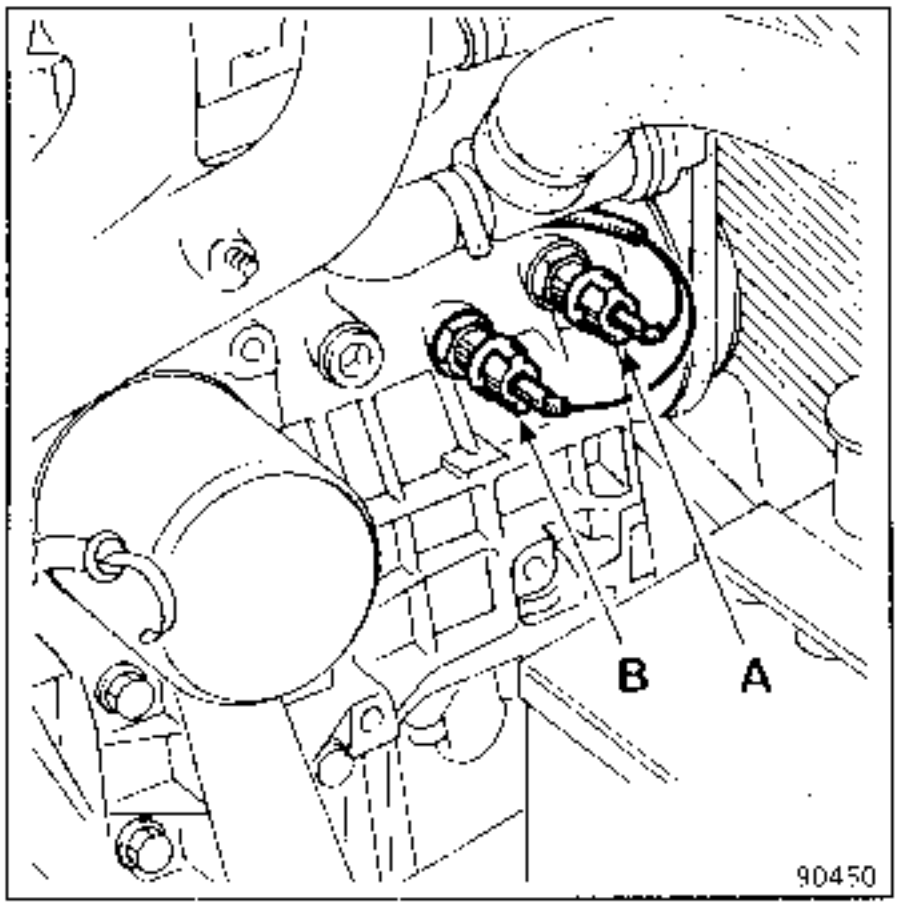
Example :
Cross-connection of the rear view mirror de-icing system earth and the external temperature sensor return wire.

- Do not use a test lamp.
- **Never disconnect the battery or remove the instrument panel supply wire when the ignition is switched on.**

SPECIAL POINTS (J type petrol engine)

Defect : If the oil pressure warning light remains switched on with the engine running at idling speed, but switches off when the speed reaches **2500 rpm**.

Cause : Wires cross-connected on the pressure switch connectors

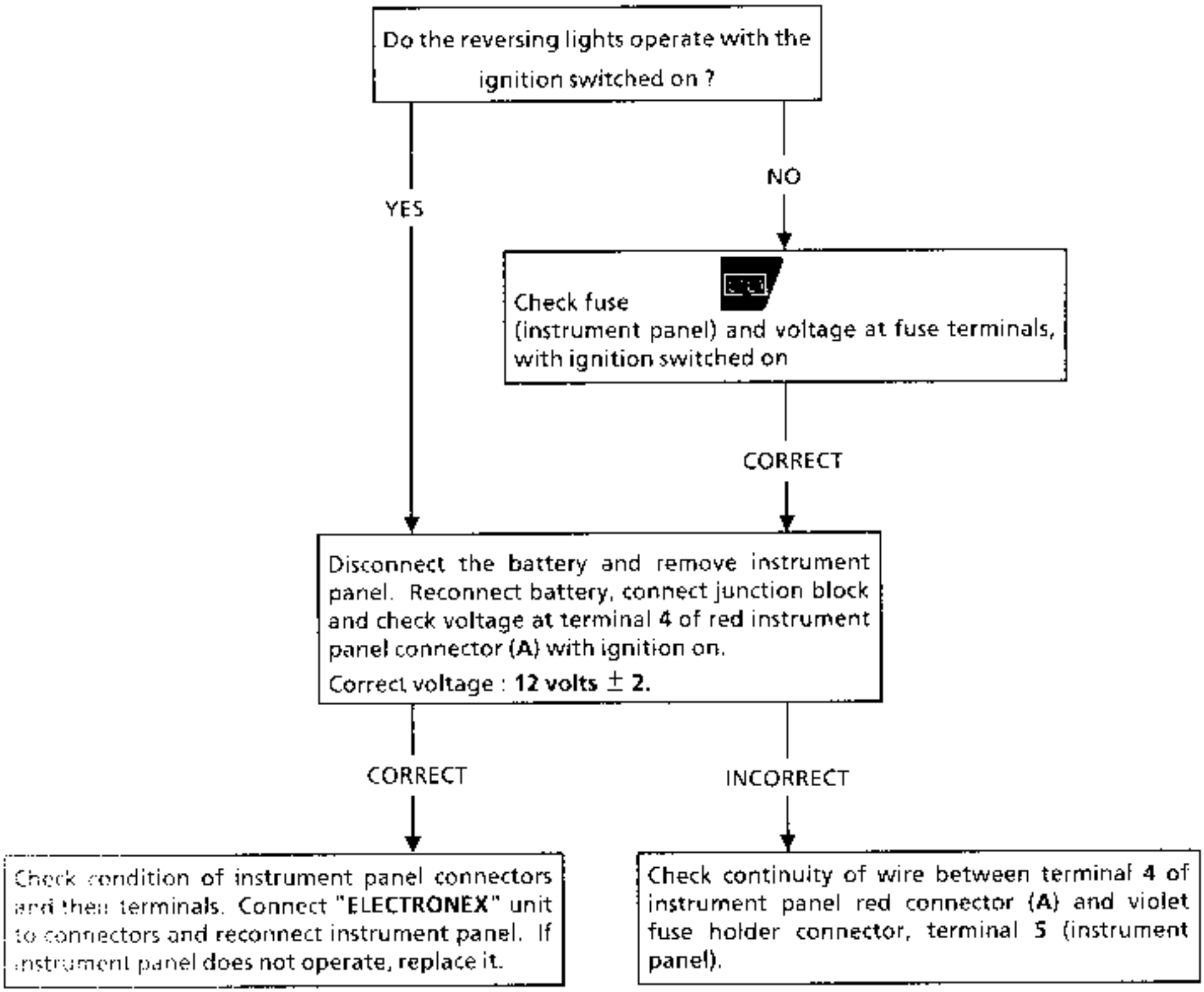


A = 2 bars

B = 0.35 bar

FAULT-FINDING

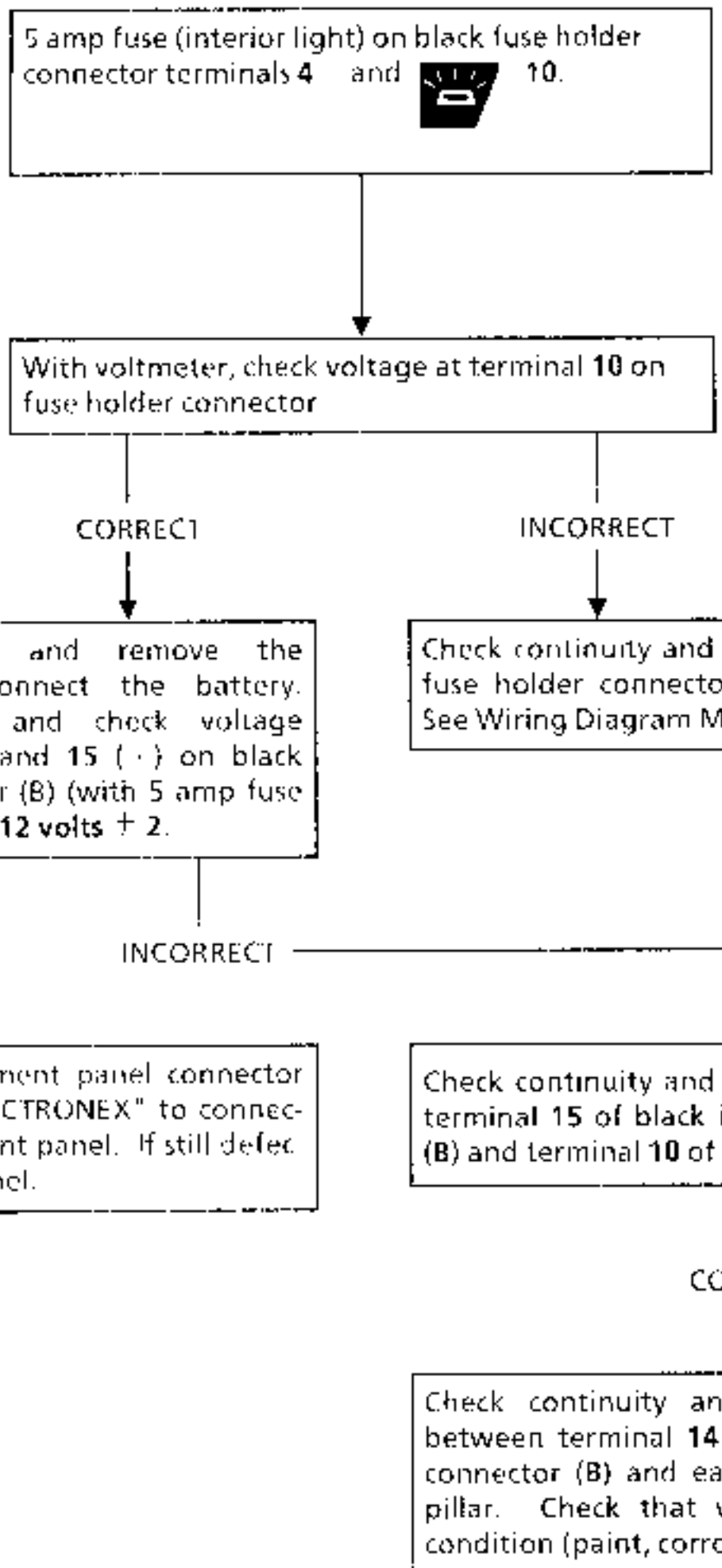
Defect : Instrument panel not operating (no panel lighting or, when applicable, no clock, no stop and service warning light with ignition on, no liquid crystal display).



NOTE : See Wiring Diagram Manual

FAULT-FINDING

Defect : With ignition on or engine running, no liquid crystal display on the instrument panel and, when applicable, no clock, operate lighting rheostat (variation in brightness of lighting, but no display), check :



FAULT-FINDING

Defect : With ignition on and rheostat operating, there is very little variation in the brightness of the side light and headlight warning lights and direction indicator repeater operating when not selected. The danger warning lights (STOP) operate normally. When the vehicle is being driven, the instrument panel displays incorrect readings.

Disconnect the battery **after switching off the ignition.**

Remove the instrument **panel** and check that the earth wire on the blue instrument panel connector (D) that has no retaining lock, terminal 13, has not come out of its contact on the connector. If it is OK, connect up the junction block and check :

Continuity between terminal 13 on blue connector (D) without a lock and the (-) terminal on the junction block. Correct reading : **0** to **2 Ω** - Incorrect : greater than **2 Ω**.

CORRECT

With ignition on and **heater blower on maximum**, measure with a voltmeter in position "mV" the voltage between blue instrument **panel** connector **(D)** without a lock, terminal **13, and** (-) on junction block. Correct reading : **5** to **20** mV (pointer should move). Incorrect : **0**.

CORRECT

Check condition of instrument **panel** connector and its pins. Connect "ELECTRONEX" to connector and reconnect instrument panel. If still defective, replace **instrument** panel.

INCORRECT

Check continuity between terminal **13** on blue connector **(D)** without lock and earth wire on red radio connector, twice, **7** tracks on terminal **B5**.

CORRECT

Check fastening of earth on front LH **door** pillar and condition of wires **(2 black wires)** (corrosion, paint, loose).

CORRECT

Check earth bar (black) which is in 2nd position to right of fascia **panel** harness. Continuity **between** chassis earth wire and wire on radio connector at **B5**

INCORRECT

Wire broken or terminal loose.

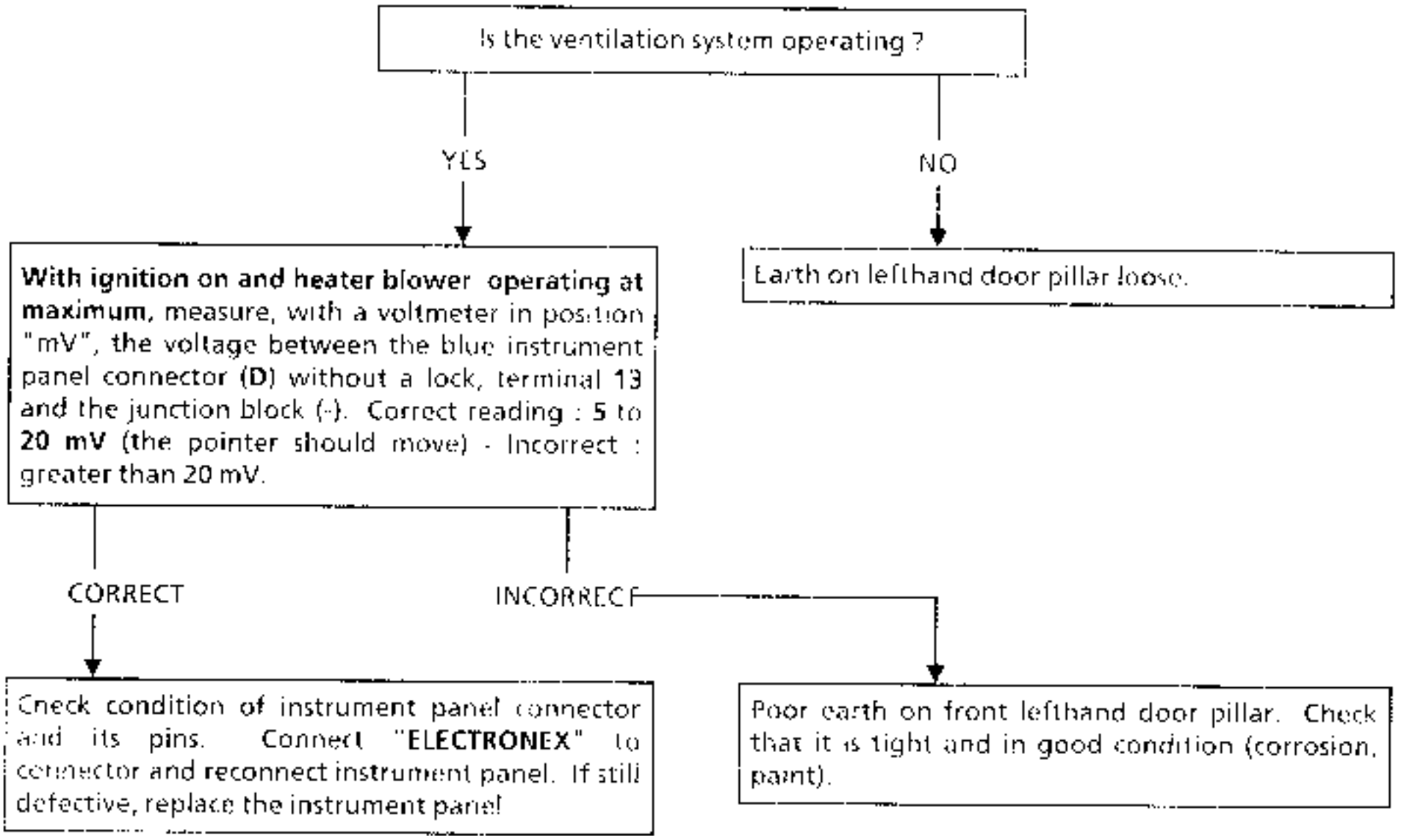
INCORRECT

FAULT-FINDING

Defect : When the vehicle is being driven, the instrument panel displays incorrect readings and the instrument panel lighting may vary in brightness, with the warning light switching on for no apparent reason.

Disconnect the battery **after switching off the ignition**.

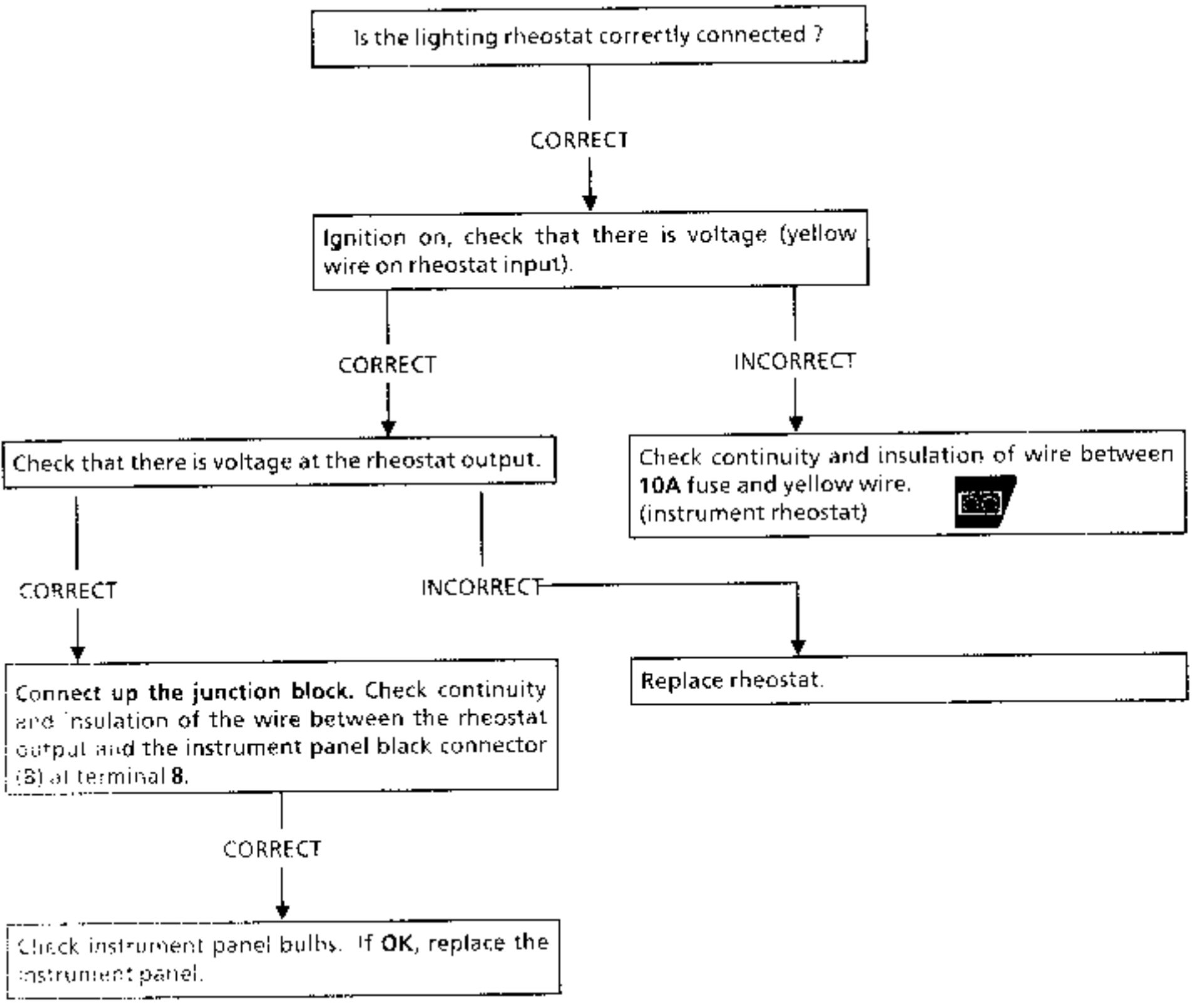
Remove the instrument panel, connect up the junction block and the battery and check :



FAULT-FINDING

Defect : With the ignition on, the instrument panel does not operate (no change when the instrument panel lighting rheostat is operating). The STOP and SERVICE warning lights operate, but the display is very dim.

Check :



See **Wiring Diagram Manual**.

FAULT-FINDING

Defect : no speed display

Mileometer and trip mileage operating, but no speed display.

↓

Check connection of connector (A) and condition of wires (red wire speedometer end)

↓

CORRECT

↓

Replace instrument panel.

No mileometer display and no speed display.

↓

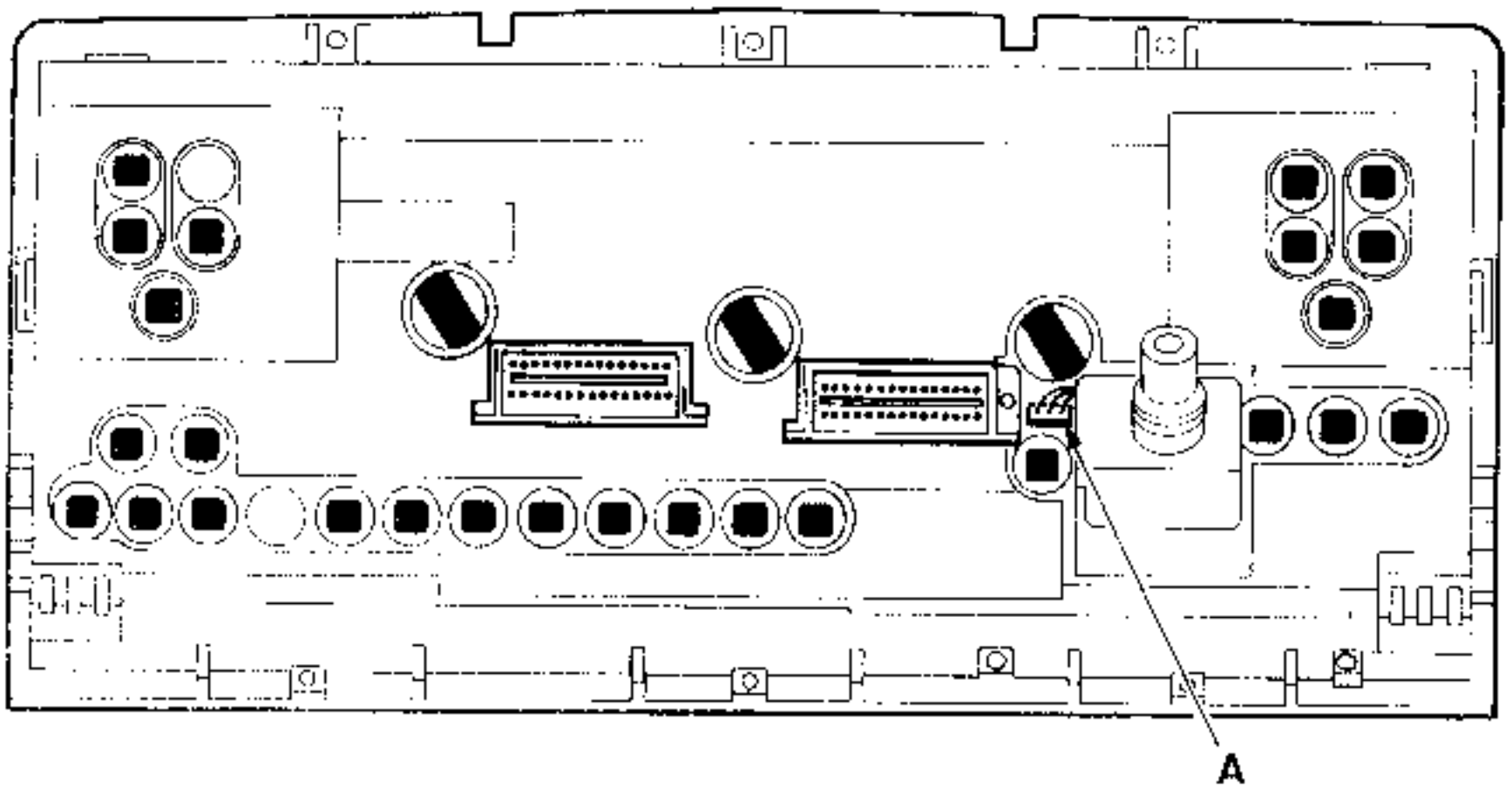
Check condition and operation of speedometer drive cable.

↓

CORRECT

↓

Replace instrument panel.



FAULT-FINDING

Defect : no tachometer display.

Petrol engine with electronic ignition module (AEI) or power module.

Disconnect the **AEI** or power module and check resistance at **AEI** or power module between contacts **A** and **C**.
Correct reading : **1000 Ω ± 500**.

CORRECT

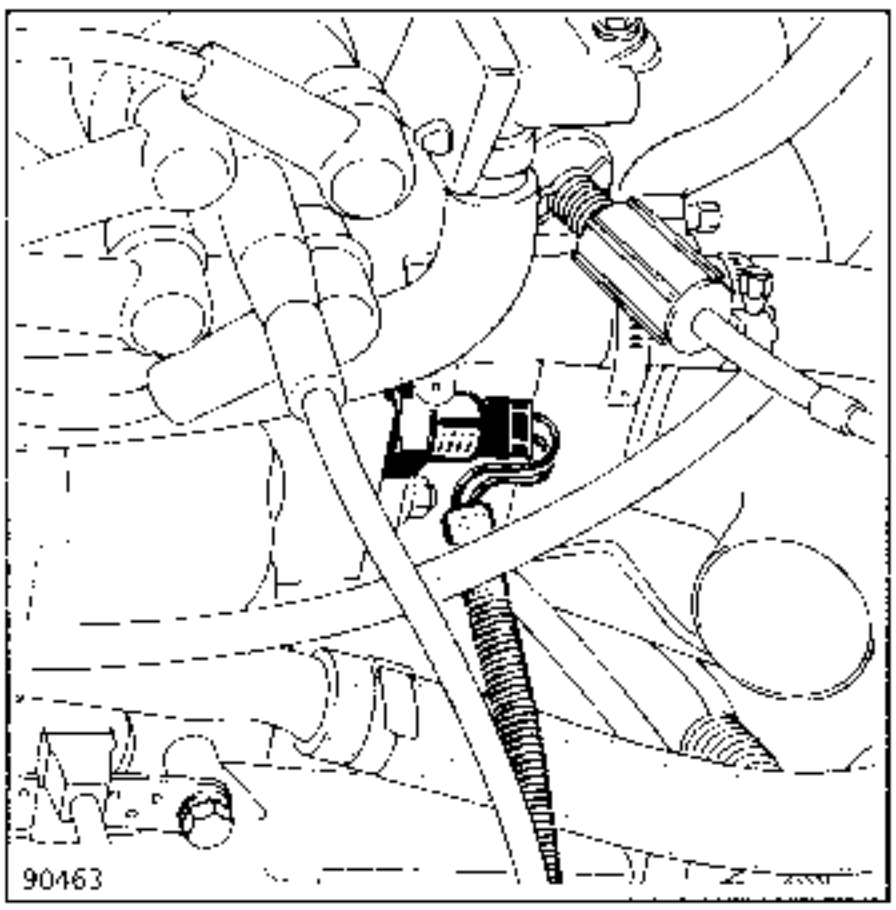
Connect junction block. Check continuity and insulation of tachometer wire between terminal **C** on **AEI** connection and terminal **13** of blue instrument panel connector (**C**) with lock.

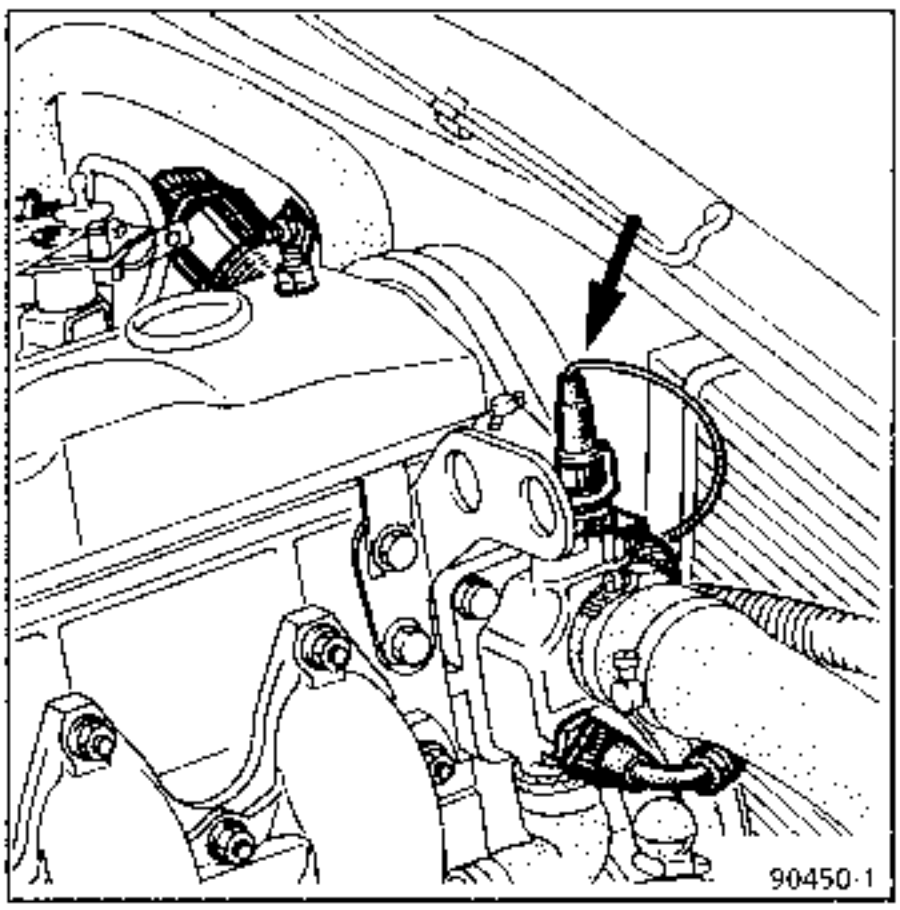
CORRECT

Check condition of instrument panel connector and its pins. Connect the "ELECTRONEX" to the connector and reconnect the instrument panel. If still defective, replace the instrument panel.

FAULT-FINDING

Defect : no engine coolant temperature display.





Check that the sensor is correctly connected and the condition of the terminals and wires.

CORRECT

Check the voltage. with the ignition on, at the sensor connector (J type petrol engine), terminal **2** (**F** type petrol engine).
Correct voltage : **4 to 6 volts.**

CORRECT

INCORRECT

Check the sensor with the ohmmeter

R (Ω)	Coolant temperature
90 ± 10	115°C ± 5
140 ± 10	100°C ± 5
760 ± 50	50°C ± 5
3 000 ± 200	20°C ± 5

Connect junction block. Check the continuity and insulation of the wire between sensor connector (J type petrol engine), terminal **2** (F type petrol engine) and terminal **3** on blue instrument panel connector **(D)** without lock.

CORRECT

CORRECT

Check condition of the instrument panel connector and its pins. Connect the "ELECTRONEX" to the connector and reconnect the instrument panel. If still defective, replace the instrument panel

FAULT-FINDING

WARNING LIGHTS

The fault-finding test sequence is identical to that for the other tests.

a) Warning lights which are earthed via the instrument panel and the supply (+) for which comes via their control switches :

- side lights	blue connector (C) with lock	terminal 11
headlights	blue connector (C) with lock	terminal 10
- rear fog light	red connector (A)	terminal 8
- front fog lights	red connector (A)	terminal 7
- direction indicator light	red connector (A)	terminal 3 (righthand)
- direction indicator light	black connector (B)	terminal 2 (lefthand)
- heated rear screen	red connector (A)	terminal 9
- hazard warning lights	red connector (A)	terminal 1

b) Warning lights whose supply (+) comes via the instrument panel and the earths for which are via switches :

- handbrake	red connector (A)	terminal 13
- choke	red connector (A)	terminal 5
- pre-heater	red connector (A)	terminal 6
- brake pads	black connector (B)	terminal 7
- automatic transmission/ injection	black connector (B)	terminal 10
- screen washer bottle level	black connector (B)	terminal 6
- charge/discharge	blue connector (C) with lock	terminal 5
- oil pressure (0.35 bar)	blue connector (C) with lock	terminal 6
- coolant temperature	blue connector (C) with lock	terminal 4
- oil pressure (2 bars)	blue connector (C) with lock	terminal 15
- brake fluid level (nivocode)	blue connector (C) with lock	terminal 7

NOTE : The full supply for the dipped headlights comes through the switch (+) **terminal 8** - (-) **terminal 9** blue connector **(C)** with a locking system.

FAULT-FINDING

FOR ANY OTHER DEFECT, CHECK, USING THE JUNCTION BLOCK :

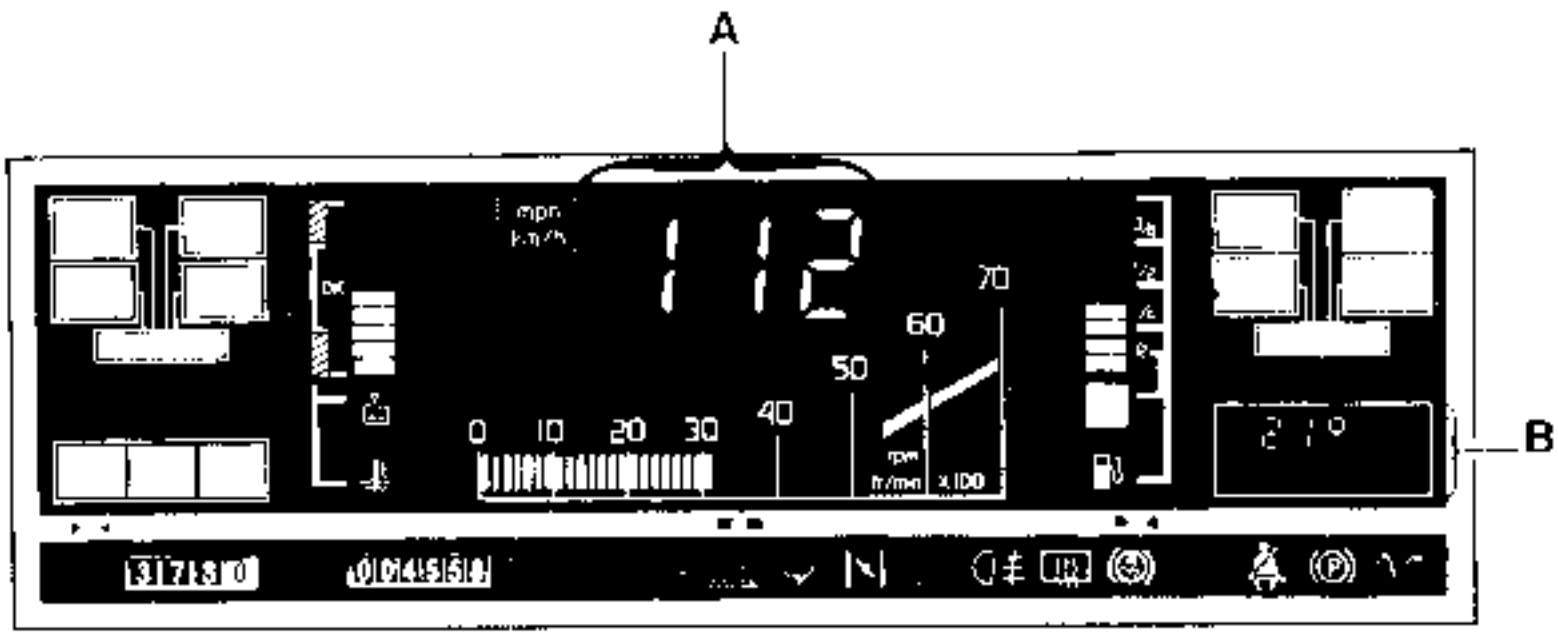
THE INSTRUMENT PANEL EARTH CIRCUITS :

- electronic earth — black connector **(B)** — terminal **14**
- warning light earth : see pages **83-31** and **83-32**.

INSTRUMENT PANEL CURRENT SUPPLY :

- + before ignition switch : — black connector **(B)** — terminal **15**
- + after ignition switch : — red connector **(A)** — terminal **4**
- + instrument panel lighting : — black connector **(B)** — terminal **8**

FAULT-FINDING



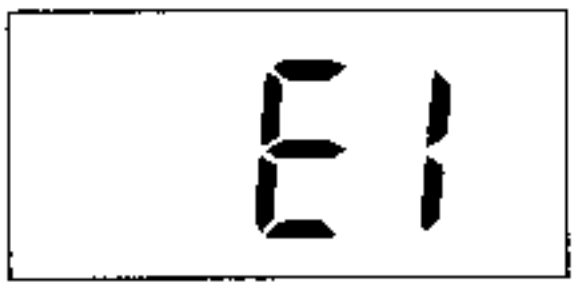
I - ZONE A

The instrument panel displays defects on the following sensors and their wiring :

- fuel gauge,
- instrument panel resistance,
- engine oil pressure switch,
- engine oil level indicator,
- external temperature sensor,
- engine coolant temperature switch,

by messages which are displayed in place of the vehicle speed.

Example :



If a defect occurs on more than one sensor, these codes will be displayed one after the other.

CONDITIONS UNDER WHICH THE CODED MESSAGE APPEARS

The ignition must have been switched off for at least **2 minutes**.

Ignition switch to be in "ignition on" position.

WARNING:
If the starter is operated or if the ignition switch is switched off and then on again, the fault-finding codes are eliminated. You will have to wait for a period of 2 minutes before they reappear.

NOTE : The fault-finding mode can be selected without waiting for 2 minutes by switching off the ignition and disconnecting the battery.

The code will be erased as soon as the defect is rectified.

FAULT-FINDING

DEFECT DISPLAY (ZONE A)

Code	Defective sensor or wiring	Defect	For rectification, see page :
E1	Instrument panel resistance	Short-circuit	83-42
E2	Fuel gauge	Disconnected or wire broken	83-43
E3	Not used	Not used	
E4*	**2 bar** oil pressure switch	Disconnected or wire broken or open contact	83-44
E5	Engine oil level sensor	Disconnected or wire broken or short-circuit	83-45
E6	External temperature sensor (in rear view mirror)	Broken or disconnected	83-46 83-47
E7		Short-circuit	
E8	Engine coolant temperature switch	Disconnected or broken	83-48
E9*	**0.35 bar** oil pressure switch	Disconnected or wire broken or short-circuit	83-49

* For the **F type** engine there is only one oil pressure switch **(0.35 bar)**. If a defect occurs on this, both codes **(E4-E9)** will be displayed one after the other.

FAULT-FINDING

DEFECT DISPLAY (ZONE A)

Code	Defective sensor or wiring	Defect	Voice synthesiser	Page
E1	Not used	-	-	-
E2	Fuel gauge	Disconnected or wire broken	musical	83-43
E3	Not used	Not used		-
E4*	**2 bar** oil pressure switch	Disconnected or wire broken or short-circuit	musical	83 44
E5	Engine oil level sensor	Disconnected or wire broken or short-circuit	musical	83-45
E6	External temperature sensor (in rear view mirror)	Broken or disconnected	musical	83-46
E7		Short-circuit		83 47
E8	Engine coolant temperature switch	Disconnected or circuit broken	musical	83-48
E9*	**0.35 bar** oil pressure switch	Disconnected or wire broken or short-circuit	musical	83-49

* For the **F type** engine there is only one oil pressure switch **(0.35 bar)**. If a defect occurs on this, both codes **(E4-E9)** will be displayed one after the other.

FAULT-FINDING

1 - Code E1 "instrument panel resistance"

When code **E1** is displayed, none of the segments of the fuel gauge bargraph on the instrument panel should be illuminated.

NOTE : The instrument panel is fitted with a resistance (which cannot be removed) to adapt the electronic instrument panel to the capacity of the fuel tank fitted to the X48 type vehicle.

FAULT-FINDING

Instrument panel resistance short-circuiting.
Replace instrument panel.

FAULT-FINDING

2 - Code E2 "fuel gauge"

Code **E2** is displayed. None of the segments of the fuel gauge bargraph on the instrument panel should be illuminated.

Check, in the following order :

That the gauge tank unit is correctly connected and that the wires and terminals on the connector are in good condition.

CORRECT

With the ignition on and code **E2** displayed, earth the fuel gauge connector wire, on terminal **1**. All the fuel gauge bargraph segments should illuminate and code **E2** should disappear (after **4 seconds**).

YES

With the ignition on and **E2** displayed, connect wires 1 and **4** on the fuel gauge connector. All the fuel gauge bargraph segments should illuminate and code **E2** should disappear (after **4 seconds**).

YES

Check fuel gauge.

NO

Connect the junction block. Check the continuity and insulation of the wire from terminal 1 of the fuel gauge connector to the blue instrument panel connector (D), without a lock, terminal **8**.

CORRECT

Check the condition of the instrument panel connector and its terminals. Connect the "ELECTRONEX" to the connector and reconnect the instrument panel. If still defective, change the instrument panel.

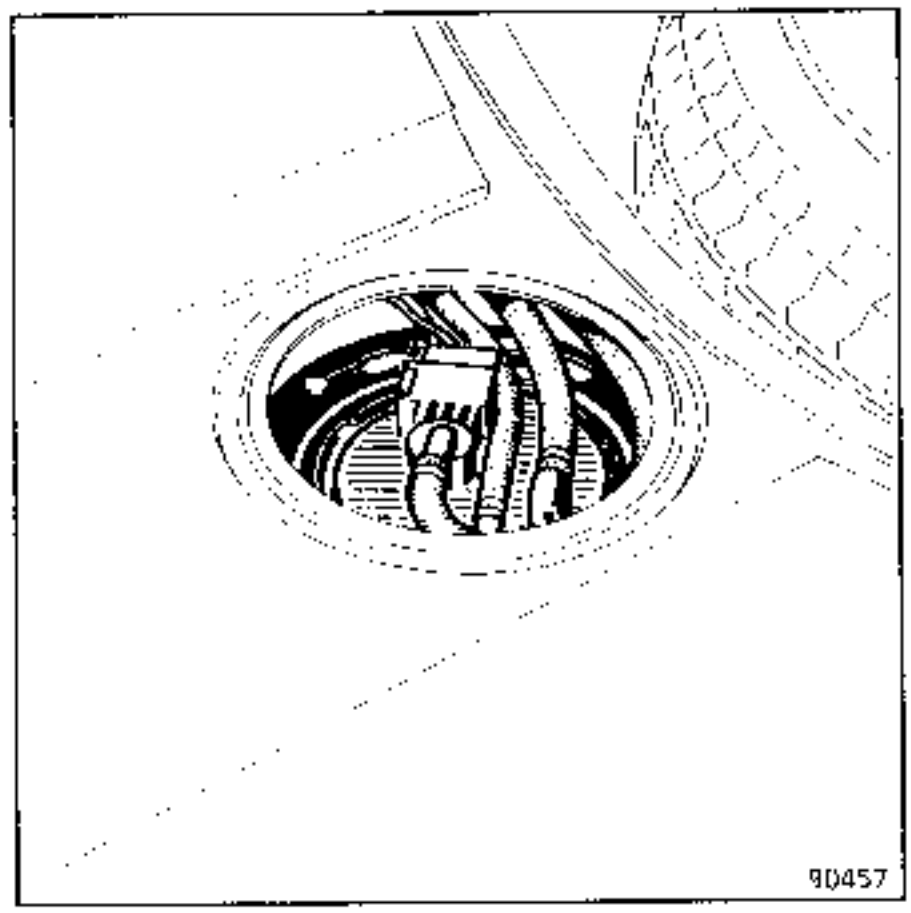
NO

Check the continuity between terminal **4** on the fuel gauge connector and earth.

Correct value : **0** to **5 Ω**.

INCORRECT

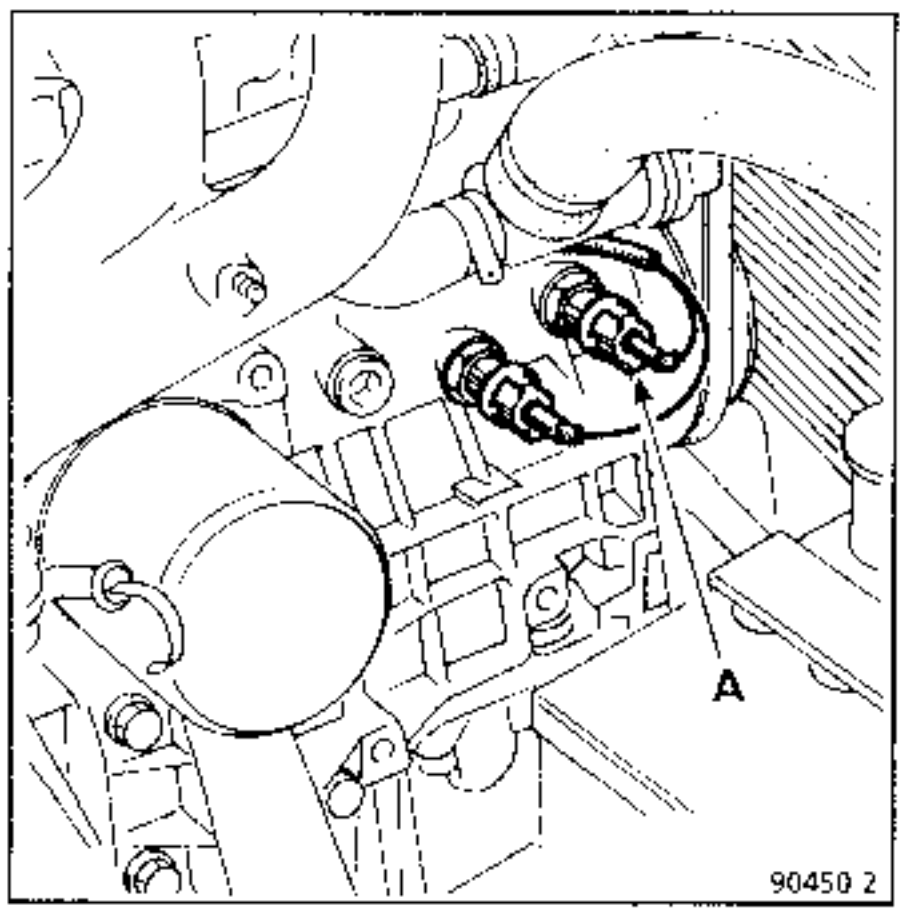
Connect the junction block. Check the continuity and insulation of the wire from terminal **4** of the fuel gauge connector and terminal **6** of the blue instrument panel connector **(D)**, without a lock.



FAULT-FINDING

3 - Code E4 "2 bar oil pressure switch (A)"

Only fitted to J type petrol engines.



If code **E4** is displayed, check :

That the pressure switch is correctly connected and the condition of the terminal and the wire.

CORRECT

With the ignition on, code **E4** displayed, earth the pressure switch wire. Code **E4** should disappear **(4 seconds)**.

YES

Replace the pressure switch **(A)** (switch jammed).

NO

Check the voltage between the pressure switch wire and earth with the ignition on.
Correct voltage : **11 volts ± 2.**

CORRECT

Check the condition of the instrument panel connector and its pins. Connect the "ELECTRONEX" to the connector and reconnect the instrument panel. If still defective, change the instrument panel.

INCORRECT

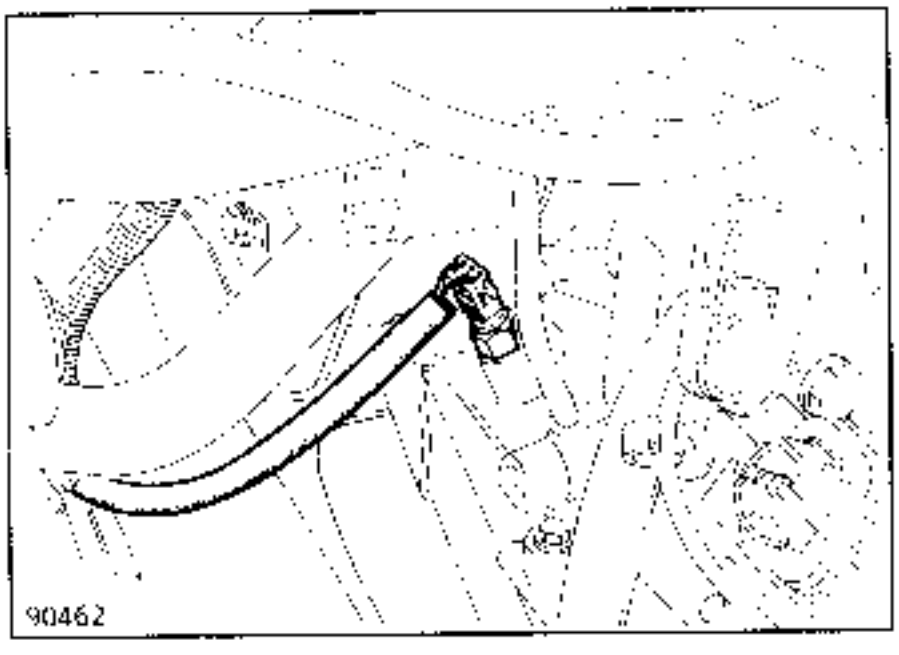
Connect the junction block. Check continuity and insulation of wire between pressure switch and connector and blue instrument panel connector **(C)** with lock, terminal **15.**

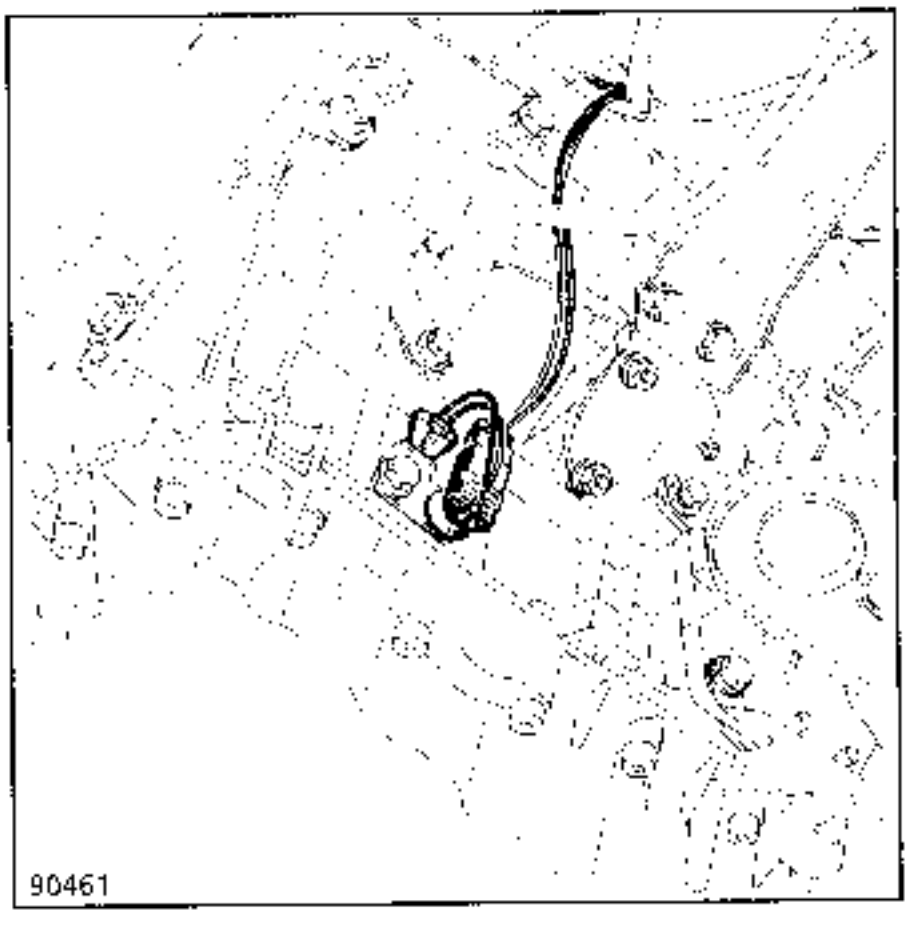
CORRECT

FAULT-FINDING

4 - Code E5 "Engine oil level sensor"

If code **E5** is displayed and none of the oil level indicator bargraph segments is illuminated.





Check:

That the sensor is correctly connected and the condition of its terminals and wires.

CORRECT

Measure the continuity of the sensor with an ohmmeter. Correct value : **5** to **30 Ω**.

CORRECT

Measure voltage between terminal **1 (F type petrol engine)** or **3 (J type petrol engine)** on the sensor connector, wiring end and earth with ignition on. Correct reading **0.5** to **8 volts**.

Measure continuity between terminal **3 (F type petrol engine)** or **1 (J type petrol engine)** on the sensor connector, wiring end and earth. Correct reading: **0** to **30 Ω**.

CORRECT

Connect the junction block. Check insulation and continuity of the wire from terminal **3 (F type petrol engine)** or **1 (J type petrol engine)** on the sensor connector to the blue instrument panel connector (D) without a lock, terminal 10.

CORRECT

Check the condition of the instrument panel connector and its pins. Connect the "ELECTRONEX" to the connector and reconnect the instrument panel. If still defective, change the instrument panel.

INCORRECT

Connect the junction block. Check insulation and continuity of the wire from terminal **1** (F **type petrol engine**) or **3** (J **type petrol engine**) on the sensor connector to the blue instrument panel connector (D) without a lock, terminal **9**.

CORRECT

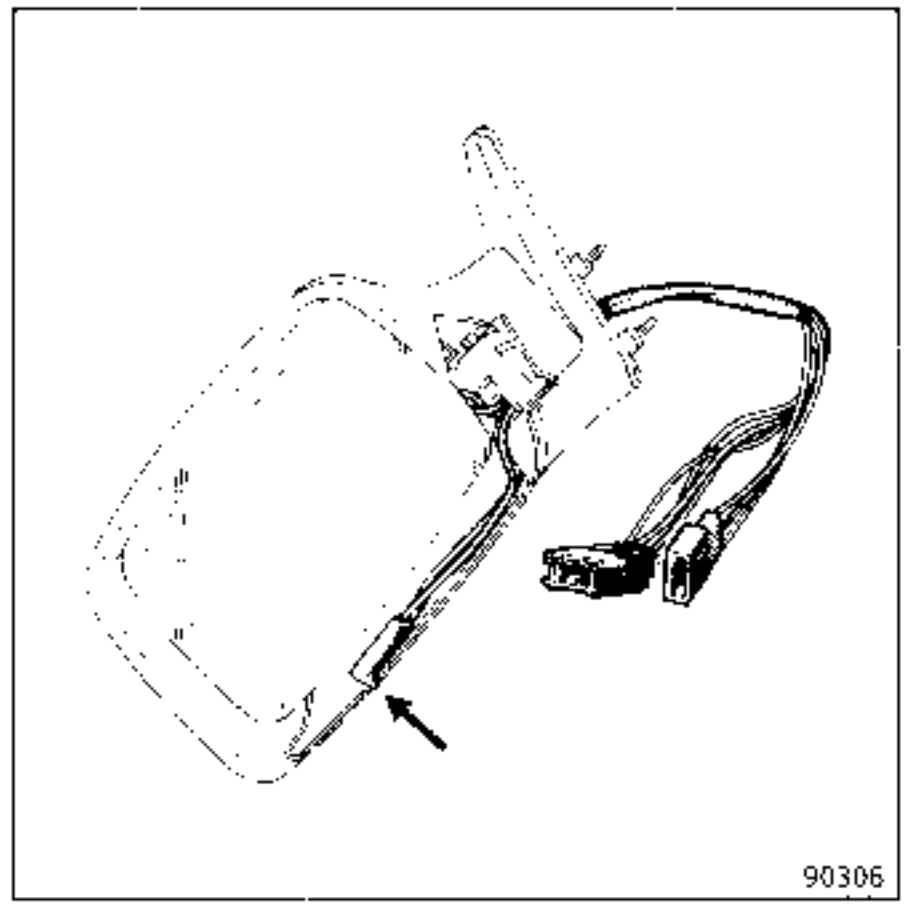
FAULT-FINDING

5 - Codes E6 - E7 "External temperature sensor"

This sensor is mounted in the lefthand rear view mirror and access can be gained to its connector by removing the speaker grille. **The sensor, however, cannot be removed.**

a) Code E6 with the external temperature display on the on-board computer flashing (sensor or wiring circuit broken or disconnected).

Check :


90306

That the sensor (white connector) is correctly connected and the condition of the terminals and wires

CORRECT ↓

Disconnect the white connector and check the sensor circuit, with an ohmmeter, between terminal **A3** and **B3** on the white connector. correct values are :

Temperature	Resistance
0°C	6 kΩ ± 500
20°C	3 kΩ ± 300
25°C	2.5 kΩ ± 300
30°C	2 kΩ ± 300

CORRECT →

Check the voltage between terminal **B3** on the white connector (harness end) and earth, with the ignition switched on. Correct voltage : **2 to 6 volts.**

Check, with an ohmmeter, continuity between terminal A3 on the white connector and earth, with the ignition off. Correct value : **0 to 5 Ω.**

CORRECT → INCORRECT ↓

Connect the junction block. Check insulation and continuity of the wire between the sensor white connector terminal **A3** and the instrument panel blue connector **(D)** without lock, at terminal **4.**

CORRECT ↓

Check the condition of the instrument panel connector and its pins. Connect the "ELECTRONEX" to the connector and reconnect the instrument panel. If still defective, change the instrument panel.

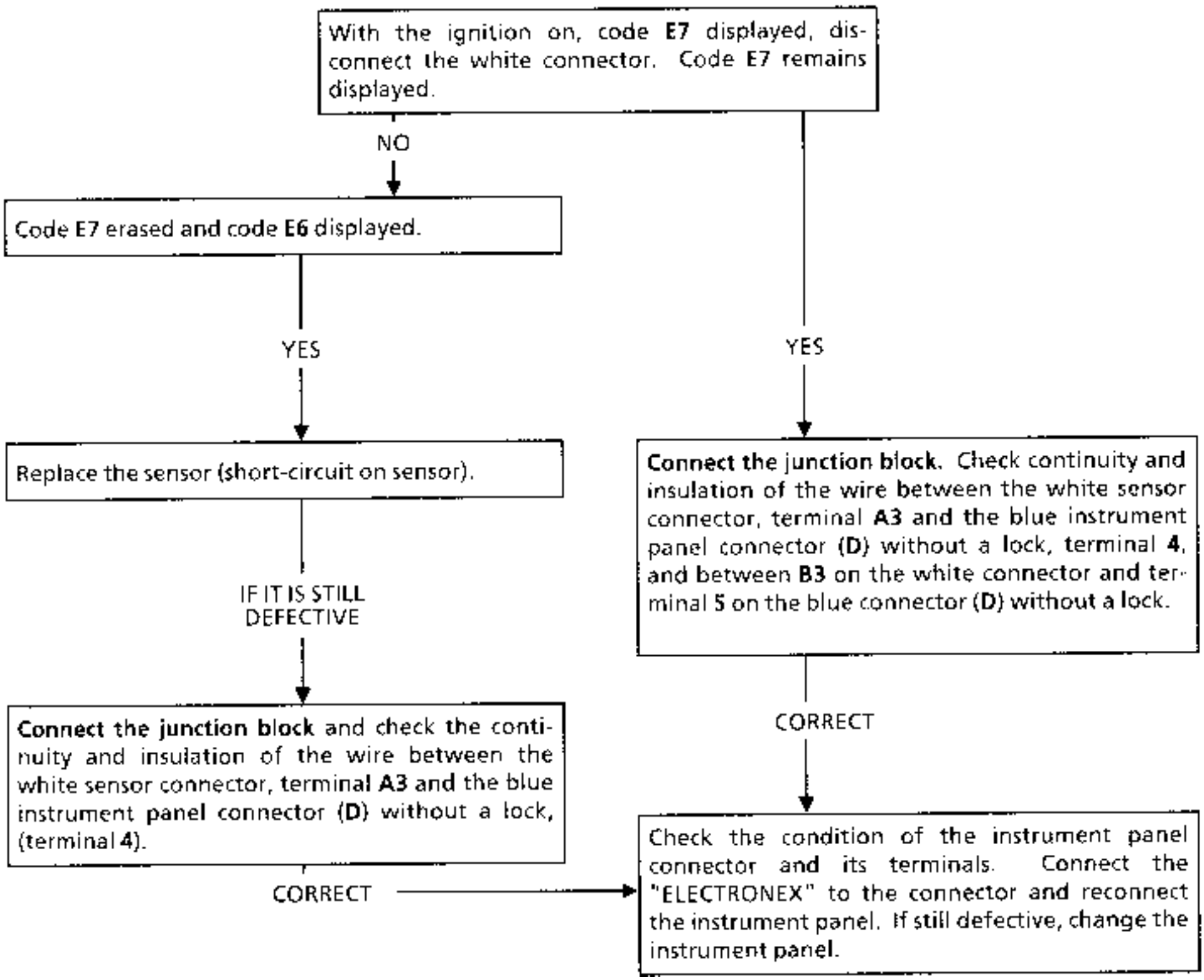
Connect the junction block. Check insulation and continuity of the wire between the sensor white connector terminal **B3** and the instrument panel blue connector **(D)** without lock, at terminal **5.**

CORRECT →

NOTE : After carrying out the repair, the battery must be disconnected to stop the on-board computer display from flashing.

FAULT-FINDING

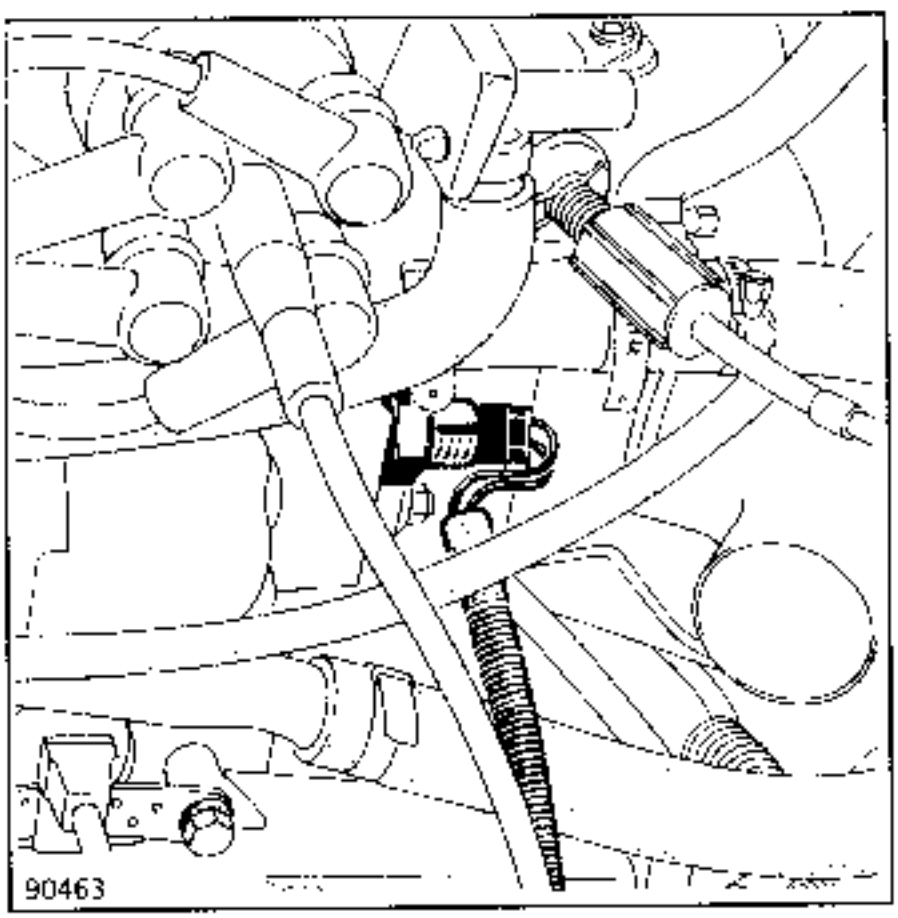
b) Code E7 with a display of 50°C on the on-board computer, which is not flashing (ambient temperature lower than 50°C; sensor or its wiring short-circuited).

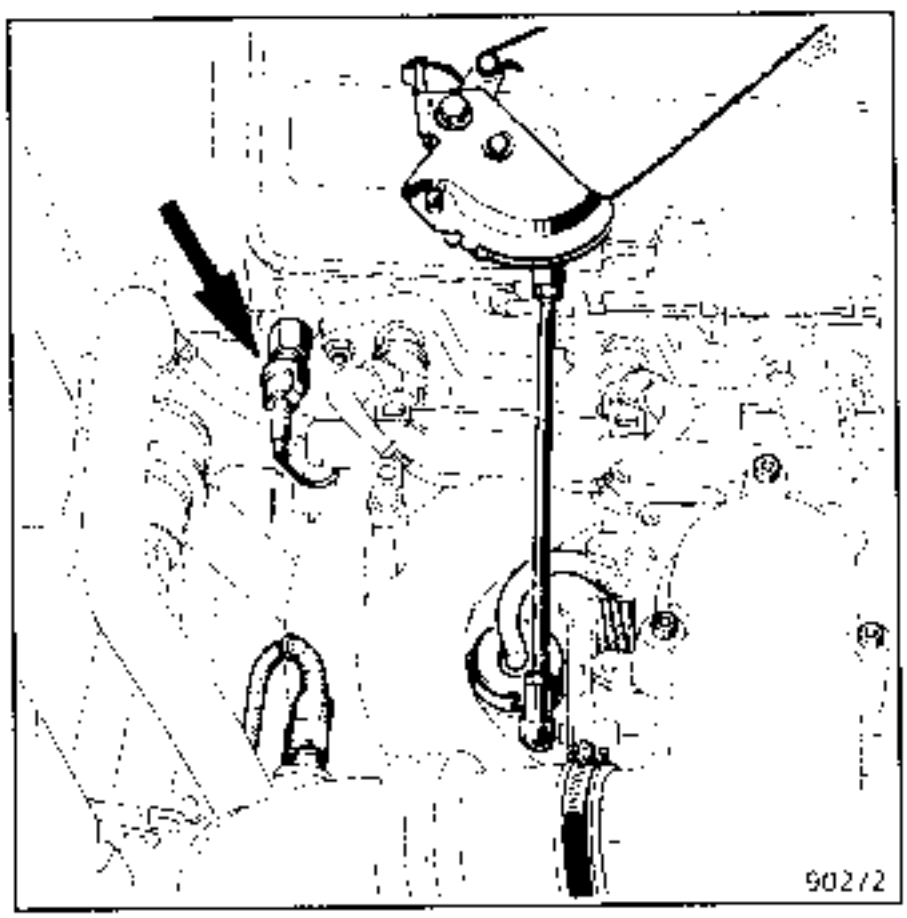


FAULT-FINDING

6 - Code E8 "Engine coolant temperature switch"

Code **E8** is displayed and the coolant temperature switch is on (if the coolant temperature is greater than **80°C**, no diagnostic code will be displayed).





Check:

That the temperature switch is correctly connected and its terminals and wires are in good condition.

CORRECT

Ignition on, code **E8** displayed. Earth the wire on the temperature switch connector (**J type petrol engine**), terminal **1** (**F type petrol engine**). Code **E8** should disappear and the coolant temperature warning light should extinguish.

YES

Change the temperature switch (temperature switch remaining open).

NO

Check, with an ohmmeter, the voltage at the temperature switch connector (**J type petrol engine**) terminal **1** (**F type petrol engine**) and earth. Correct voltage : **2** to **12 volts**.

CORRECT

Check the condition of the instrument panel connector and its pins. Connect the "ELECTRONEX" to the connector and reconnect the instrument panel. If still defective, change the instrument panel.

INCORRECT

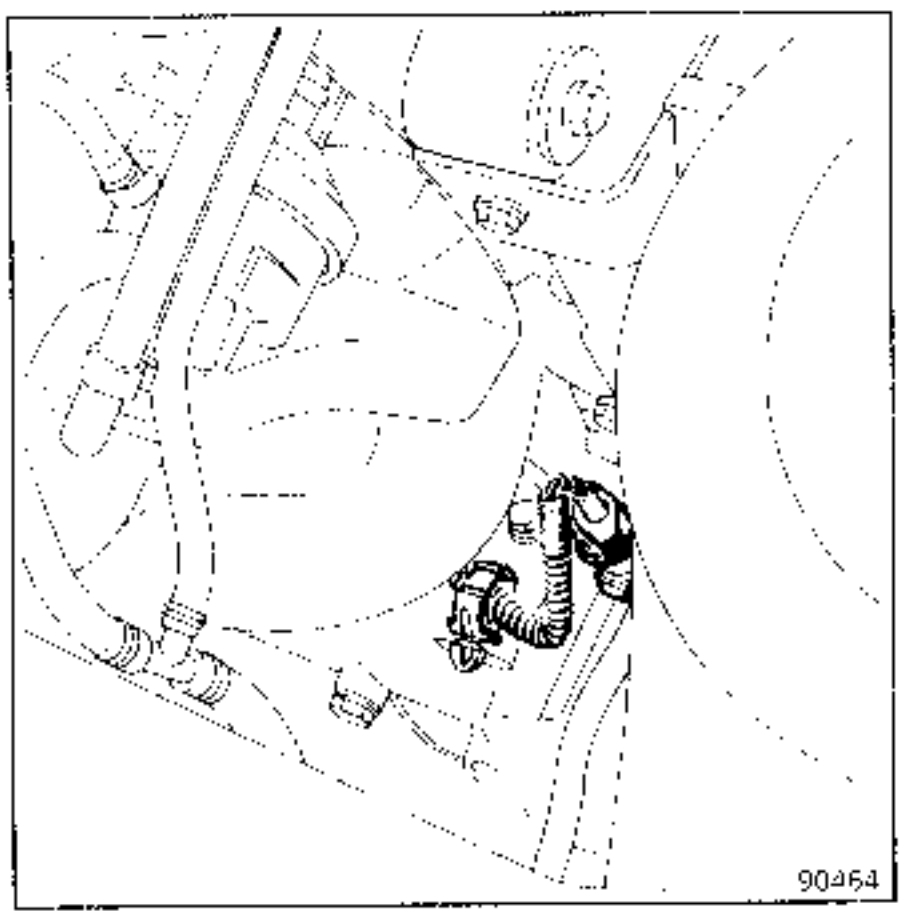
Connect the junction block. Check the continuity and insulation of the wire between the temperature switch connector (**J type petrol engine**), terminal **1** (**F type petrol engine**) and the blue instrument panel connector (**C**), with lock, terminal **4**.

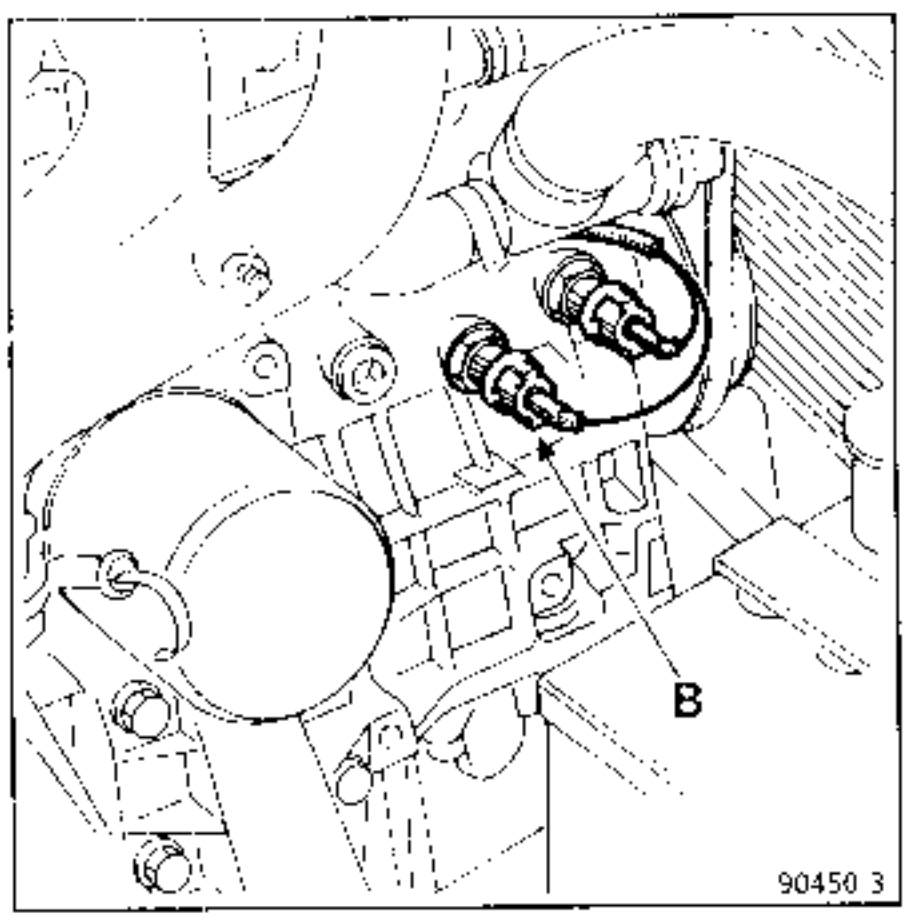
INCORRECT

FAULT-FINDING

7 - Code E9 "0.35 bar oil pressure switch (B)"

Code **E9** is displayed and the oil pressure warning light is off.





Check:

That the sensor is correctly connected and the condition of its terminal and wire.

CORRECT

Ignition on, code **E9** displayed, earth the temperature switch wire. Code **E9** should disappear and the oil pressure warning light should illuminate.

YES

Change pressure switch **(B)** (pressure switch jammed).

NO

Check the voltage between the oil pressure switch wire and earth, with the ignition on.
Correct voltage : **11 volts ± 2**.

CORRECT

Check the condition of the instrument panel connector and its pins. Connect the "ELECTRONEX" to the connector and reconnect the instrument panel. If still defective, change the instrument panel.

INCORRECT

Connect the junction block. Check the continuity and insulation of wire from pressure switch connector to the blue instrument panel connector **(C)**, with lock, terminal **6**.

CORRECT

FAULT-FINDING

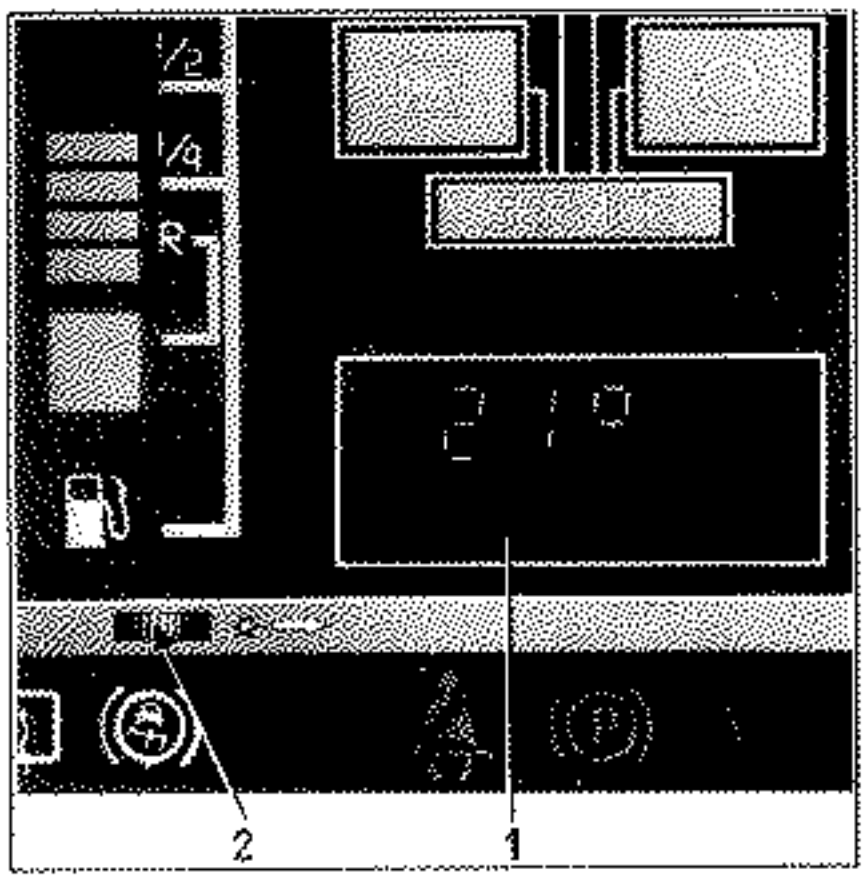
VOICE SYNTHESISER

Should a defect arise on the voice synthesiser, check the sensors and detectors by selecting the fault-finding sequence on the on-board computer and checking the coded messages or which warning lights illuminate. Only the door sensors cannot be tested via the instrument panel.

The voice synthesiser unit cannot be removed from the instrument panel and therefore, if the synthesiser is defective, the instrument panel assembly must be replaced.

ON-BOARD COMPUTER

DESCRIPTION



The electronics of this instrument panel are centralised in a circuit comprising a microprocessor, which controls the mileage indicator liquid crystal display and the on-board computer displays (this screen will be referred to as the display module).

Display logic

The display module comprises a loop made up of 7 screen displays.

Changeover from one type of screen to the next is carried out by button 3.

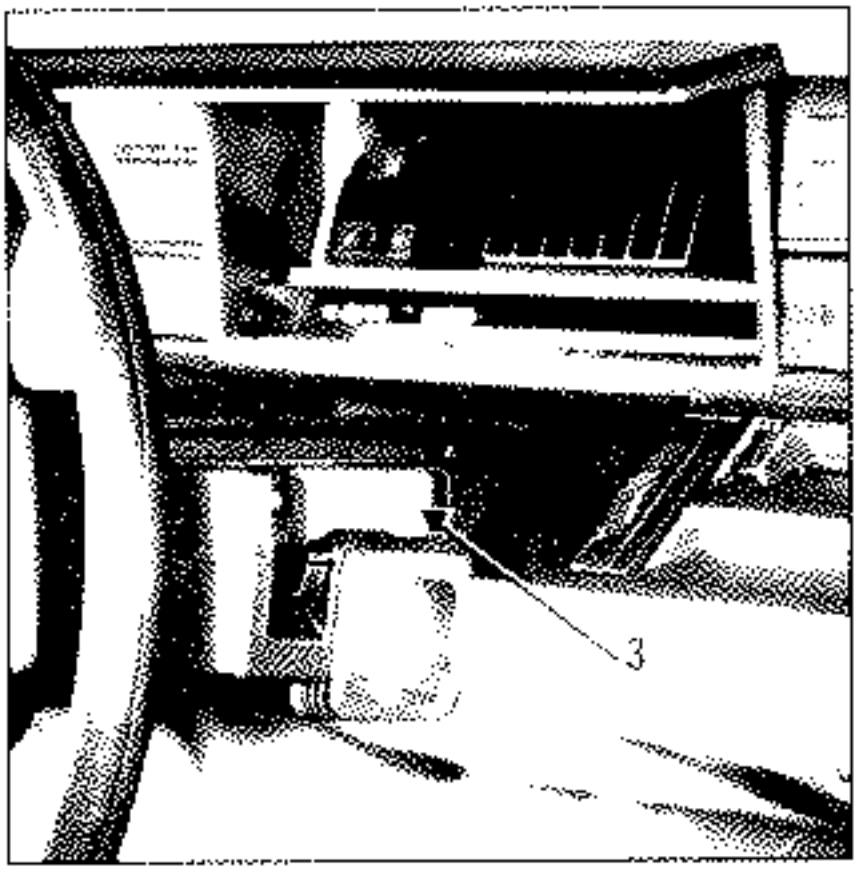
When the ignition is switched on, the amount of fuel in the tank will be displayed.

ON-BOARD COMPUTER

1 Display

2 "Start" key
zeros the memories
zeros the trip mileage indicator

3 Display selection key (at the end of the windscreen wiper switch stalk).



THE ON-BOARD COMPUTER LOOP

The on-board computer display is selected by means of key 3.

This operation runs through 7 types of display one after the other.

- **The amount of fuel remaining in the tank**
  There is no display below **5 litres**.

- **Range (in km)**
  This is obtained by dividing the quantity of fuel remaining in the tank by the average consumption since the Start key was pressed.

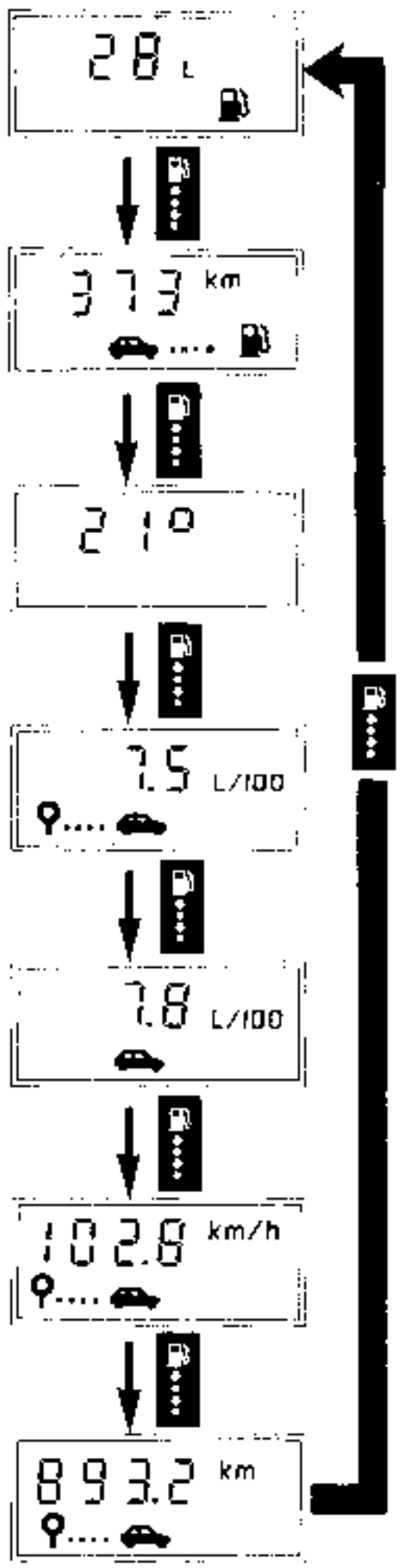
- **External temperature in degrees Celsius**
  Capacity - **30** to **+ 50**.

- **Average fuel consumption (in l/100 km)**
  Obtained by dividing the fuel consumed by the distance covered since the last time the Start key was pressed.
  Minimum distance required to obtain display : **400 m**.
  Maximum capacity for fuel consumed: **2 500 litres**.

- **Consumption at any given point (in l/100 km)**
  Minimum distance required to obtain display: **400 m**.
  Minimum speed required to obtain display : **40 km/h**.
  The figure displayed is limited to three times the average fuel consumption.

- **Average speed (in km/h)**
  Obtained by dividing the distance covered by the time elapsed since the last time the Start key was pressed. Minimum distance required to obtain display: **400 m**.
  Capacity : **250 hours** since the last time the ignition was switched on (stops deducted).

- **Distance travelled (in km)**
  Since the last time the Start key was pressed.
  Displayed in hundreds of metres up to **1 000 km**.
  Maximum capacity : **9 999 km**.



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ON-BOARD COMPUTER

DESCRIPTION (continued)

NOTE : If any of the maximum capacities of the indicators are exceeded, the system returns to zero (as with Start key). After the current is switched off (battery disconnected), press key **2** to stop the display flashing and to restart the function.

WARNING : if one of the displays flashes with the the current having been cut off, see fault-finding sequence on the following page.

The displays are calculated from the following data :

- the injection computer which sends one pulse every **160 mm³** of fuel consumed or a flow sensor delivering one pulse every **80 mm³**,

- a thermistor mounted in the external rear view mirror,

- a fuel gauge tank unit providing information for the fuel consumption unit (**5 Ω per** litre),

- the speed information is given by the instrument **panel** or by a speed sensor (**5 pulses per metre**).

OPERATING

The on-board computer is zeroed by pressing key (2)

FAULT DETECTION

The on-board computer has been designed so that it detects and informs the driver of any defect which might affect the fuel content display.

If { the amount of fuel in the tank / the range / the average consumption / the given point consumption }

displays flash, it is an indication that there has been a fuel signal defect for more than **10 km.**

If only { the amount of fuel in the tank / the range }

displays flash, it is an indication that there has been a fuel signal defect for more **than 2 minutes**.

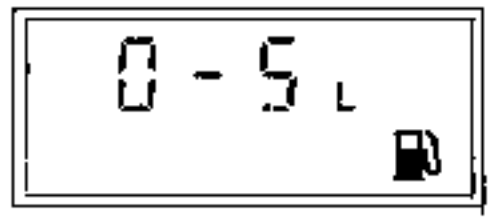
NOTE : When the ignition is first switched off **and** then switched on again, the display will show **99 L** and will flash.

If only the external temperature display flashes, it is an indication that the temperature signal has been defective for more than **2 minutes**.

NOTE : after disconnecting the battery, the display module will show **50°C** and will flash.

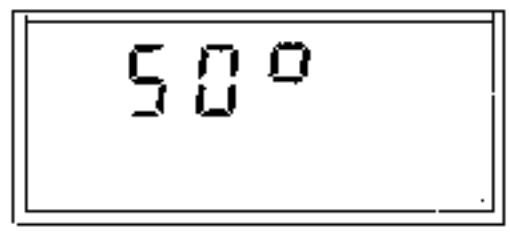
Other cases (when the display does not flash).

If the display module shows that less than **5 litres** of fuel remain in the tank.



But the tank is not empty, there is a short-circuit on the tank unit or its wiring.

If the display module shows a temperature of **50°C**.



But the temperature is not **50°C**, it is an indication of a short-circuit on the **thermistor** or its wiring.

Before carrying out any rectification work, start the on board computer fault-finding sequence.

FAULT-FINDING SEQUENCE

The instrument panel microprocessor incorporates a test programme for the :

- receiver (display module),

  sensors which are connected to it (fuel gauge unit, fuel flow signal, speed signal, temperature signal).

ACCESS TO THE FAULT-FINDING SEQUENCE

WITH THE ENGINE STOPPED

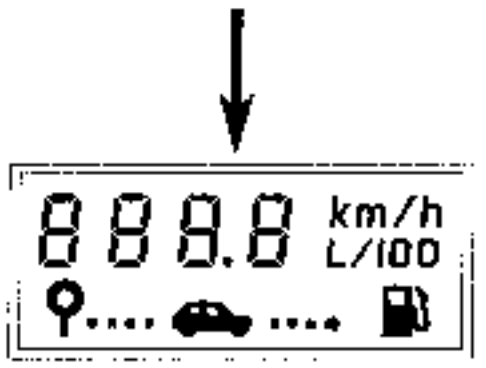
- Switch on the ignition.
- Disconnect and reconnect the battery negative ( ) terminal.

ON-BOARD COMPUTER

FAULT-FINDING

TESTING THE DISPLAY

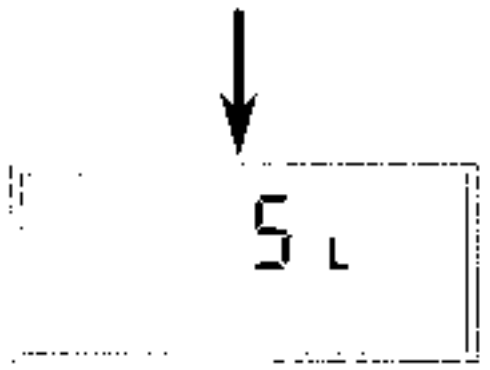
If all the display segments are illuminated and flashing



Check that no section of the segments is missing.

TESTING THE FLOW SENSOR

Press key **3** (run-through key) and start the engine.

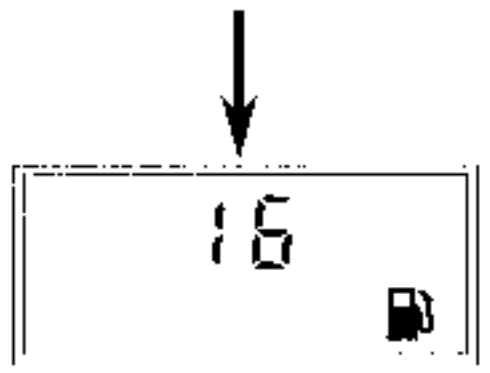


The display module will show the pulse frequency in Hertz.

The display should be other than zero (engine running).
Example : **5 Hz**.

CHECKING THE FUEL GAUGE TANK UNIT

Press key **3** (run-through key).

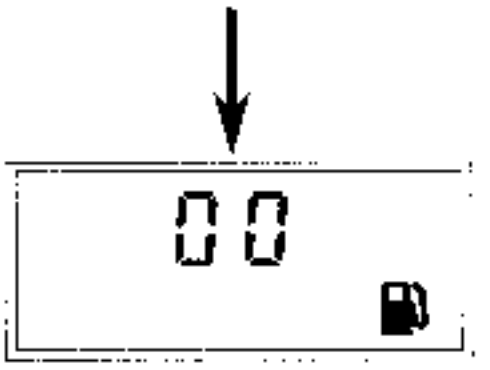


The display module should show the quantity of fuel remaining in the tank.
Example : **16 litres.**

NOTE : under fault-finding conditions, the display module will show the true figure even if there is less than **5** litres in the tank.

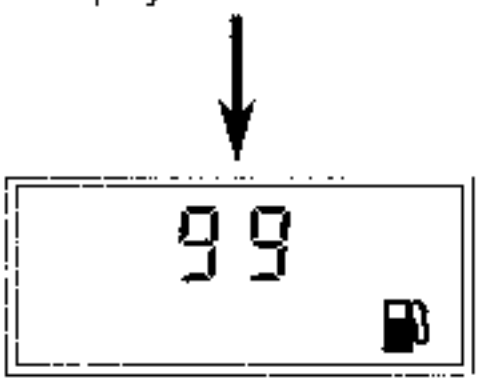
OTHER FAULT-FINDING DISPLAYS FOLLOWING THE FAULT-FINDING SEQUENCE (testing the fuel gauge tank unit)

1st ARRANGEMENT
If the module displays zeros.



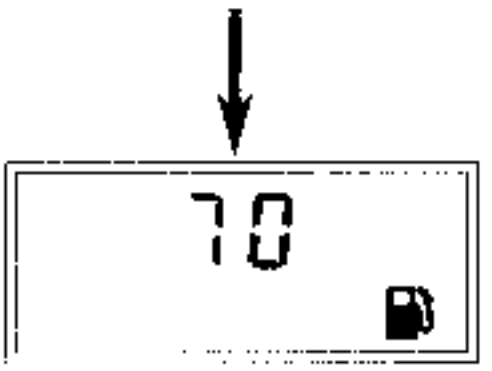
It is an indication that there is a short-circuit on the tank unit or its wiring.

If the module displays **99**.



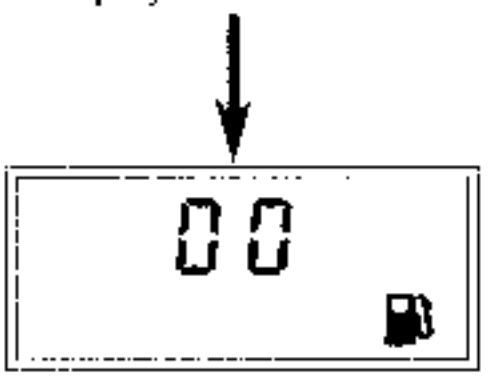
It is an indication of a broken circuit on the tank unit or its wiring.

2nd ARRANGEMENT (model year 1990)
If the module displays **70**.



It is an indication that there is a short-circuit on the tank unit or its wiring.

If the module displays zeros.



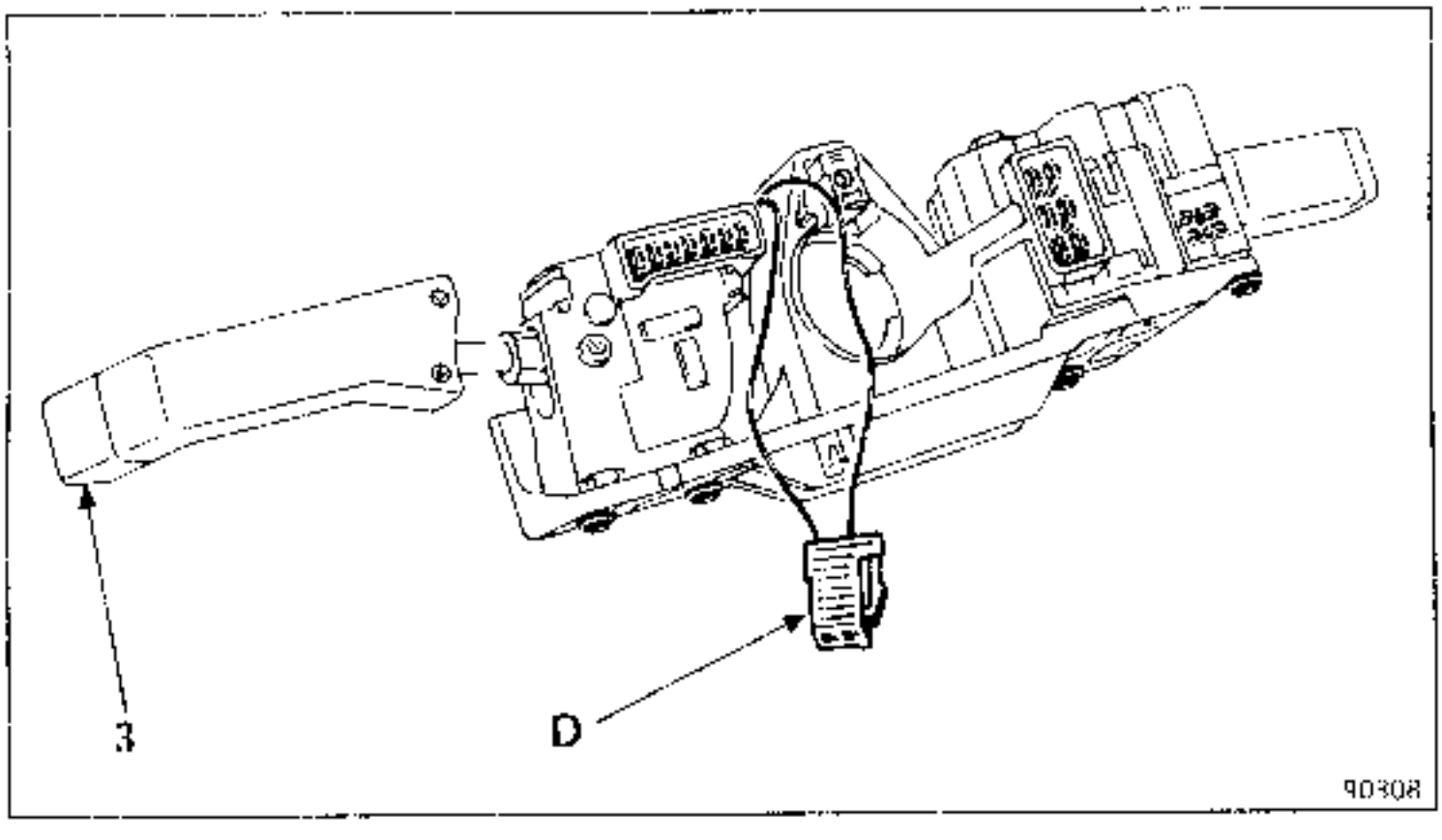
It is an indication that there is a broken circuit on the tank unit or its wiring.

END OF FAULT-FINDING SEQUENCE
To exit the fault-finding sequence, just press key **2** (Start key).

ON-BOARD COMPUTER

OTHER FAULT-FINDING

Defect : if the display selector key (3) (at the end of the windscreen wiper stalk) does not cause the various displays to run through.



Check:

That connector (D) is correctly connected and check its wires are in good condition

OK

Switch on the ignition, cross connect the two wires on the wiring side of the connector (D). Does the display run through?

YES

Replace the control.

NO

Connect the junction block and check the continuity of the wire between the black connector (B), terminal **4** and the junction block (-).
Switch (3) operating : R = **0.2** to 1 Ω
Switch (3) released : R = ∞

CORRECT

Check the condition of the instrument panel connector and its pins. Connect the "ELECTRONEX" to the connector and reconnect the instrument panel. If still defective, replace the instrument panel.

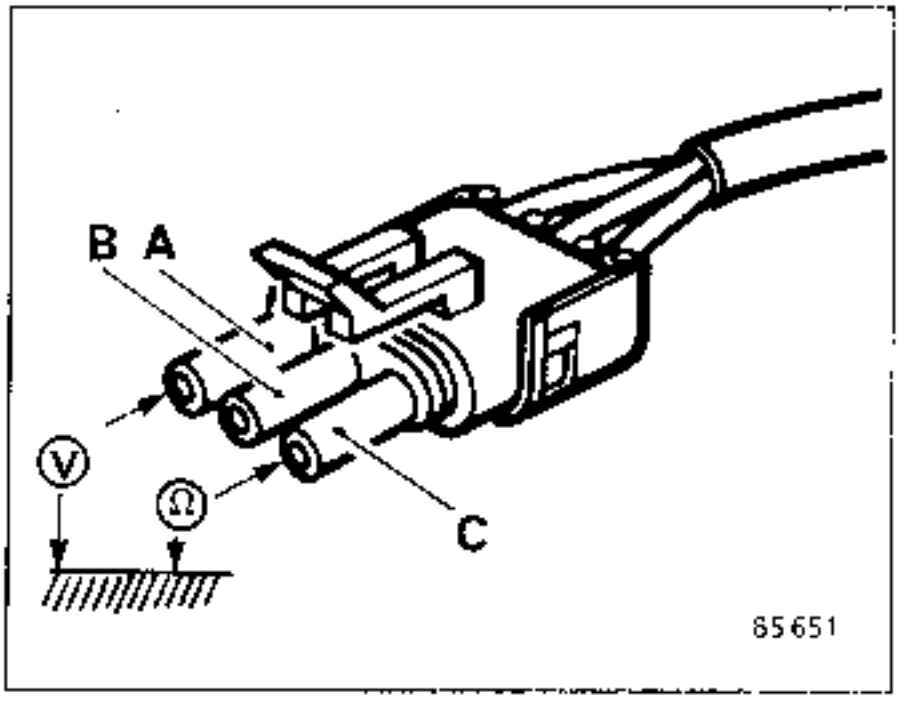
INCORRECT

Check the continuity of the wire between the black connector (B), terminal **4**, and the earth wire on the front LH door pillar with switch (3) operating

INCORRECT

Broken wire between instrument panel connector and earth on LH door pillar (this wire passes via a terminal bar in the centre of the fascia panel harness).

TESTING THE FLOW SENSOR (F TYPE PETROL ENGINES)



Disconnect the flow sensor and check :

- the voltage (**A**) "+ after ignition" and the continuity (**C**),
- connect the junction block and test the continuity between terminals (**B**) and **1** on the blue instrument panel connector (**D**), without lock system.

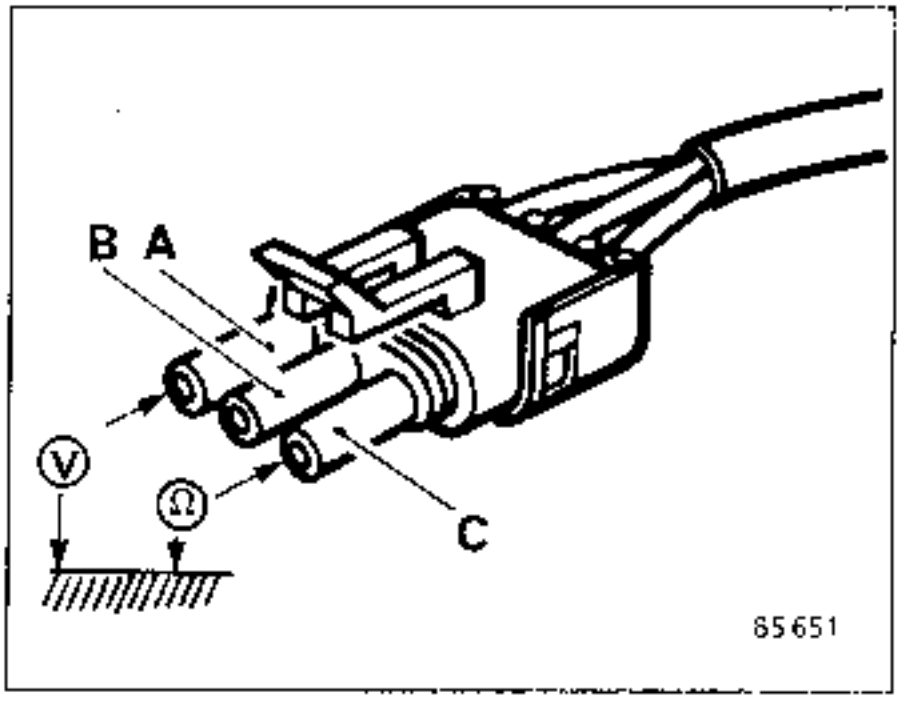
If it is incorrect, check the continuity and insulation of the wires.

NOTE : Fuel injection engines use the flow sensor signal from the electronic injection system.

TESTING THE AIR TEMPERATURE SENSOR

T° Farenheit	T° Celsius	RESISTANCE			
- 22	- 30	approx.	13350	Ohms	± 200
- 13	- 25	approx.	12250	Ohms	± 200
- 4	- 20	approx.	11050	Ohms	± 200
5	- 15	approx.	9800	Ohms	± 200
14	- 10	approx.	8600	Ohms	± 200
23	- 5	approx.	7400	Ohms	± 200
32	0	approx.	6300	Ohms	± 200
41	5	approx.	5300	Ohms	± 200
50	10	approx.	4400	Ohms	± 200
59	15	approx.	3700	Ohms	± 200
68	20	approx.	3100	Ohms	± 200
77	25	approx.	2500	Ohms	± 200
86	30	approx.	2100	Ohms	± 200
95	35	approx.	1750	Ohms	± 200
104	40	approx.	1450	Ohms	± 200
113	45	approx.	1250	Ohms	± 200
122	50	approx.	1000	Ohms	± 200
131	55	approx.	850	Ohms	± 200

TESTING THE FLOW SENSOR (F TYPE PETROL ENGINES)



Disconnect the flow sensor and check :

- the voltage (**A**) "+ after ignition" and the continuity (**C**),
- connect the junction block and test the continuity between terminals (**B**) and **1** on the blue instrument panel connector (**D**), without lock system.

If it is incorrect, check the continuity and insulation of the wires.

NOTE : Fuel injection engines use the flow sensor signal from the electronic injection system.

TESTING THE AIR TEMPERATURE SENSOR

T° Farenheit	T° Celsius	RESISTANCE			
- 22	- 30	approx.	13350	Ohms	± 200
- 13	- 25	approx.	12250	Ohms	± 200
- 4	- 20	approx.	11050	Ohms	± 200
5	- 15	approx.	9800	Ohms	± 200
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23	- 5	approx.	7400	Ohms	± 200
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41	5	approx.	5300	Ohms	± 200
50	10	approx.	4400	Ohms	± 200
59	15	approx.	3700	Ohms	± 200
68	20	approx.	3100	Ohms	± 200
77	25	approx.	2500	Ohms	± 200
86	30	approx.	2100	Ohms	± 200
95	35	approx.	1750	Ohms	± 200
104	40	approx.	1450	Ohms	± 200
113	45	approx.	1250	Ohms	± 200
122	50	approx.	1000	Ohms	± 200
131	55	approx.	850	Ohms	± 200

CONNECTOR CONNECTIONS (continued)

15-pin connector (D) (type MTIS)

1 On-board computer earth
2 + APV (before ignition)
3 + APC (after ignition)
4 On-board computer speed signal
5 Flow sensor signal
6 Fuel gauge tank unit signal
7 External temperature signal
8 Rheostat
9 On-board computer lighting
10 External temperature electronic earth
11 Fuel gauge tank unit electronic earth
12 Fuel gauge warning light
13 On-board computer zeroing
14 On-board computer run-through
15 Not used

2-pin connector (E)

1 On-board computer zeroing
2 Earth

3-pin connector (F)

Oil level sensor

SPEED SIGNAL

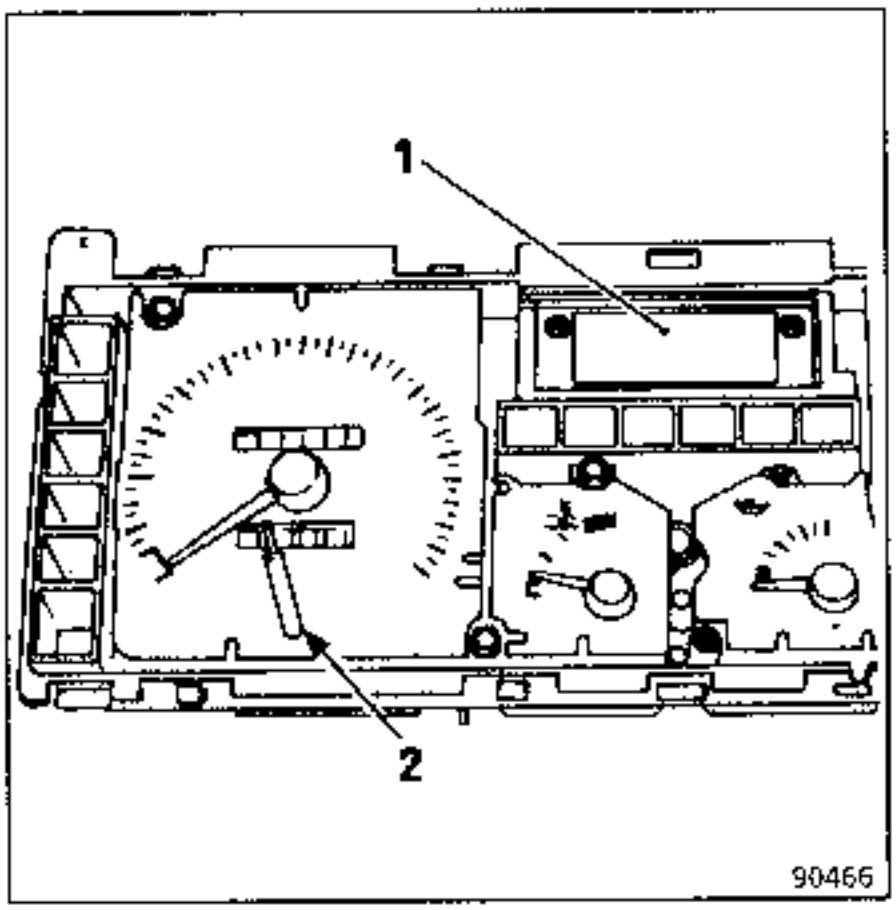
The speedometer drive cable has a speed sensor on it. The vehicle speed signal is used by the on-board computer and the injection system computer.

Connection via black 3-pin connector

1 + 12 V after ignition
2 Vehicle speed signal
3 Earth

ON-BOARD COMPUTER

DESCRIPTION



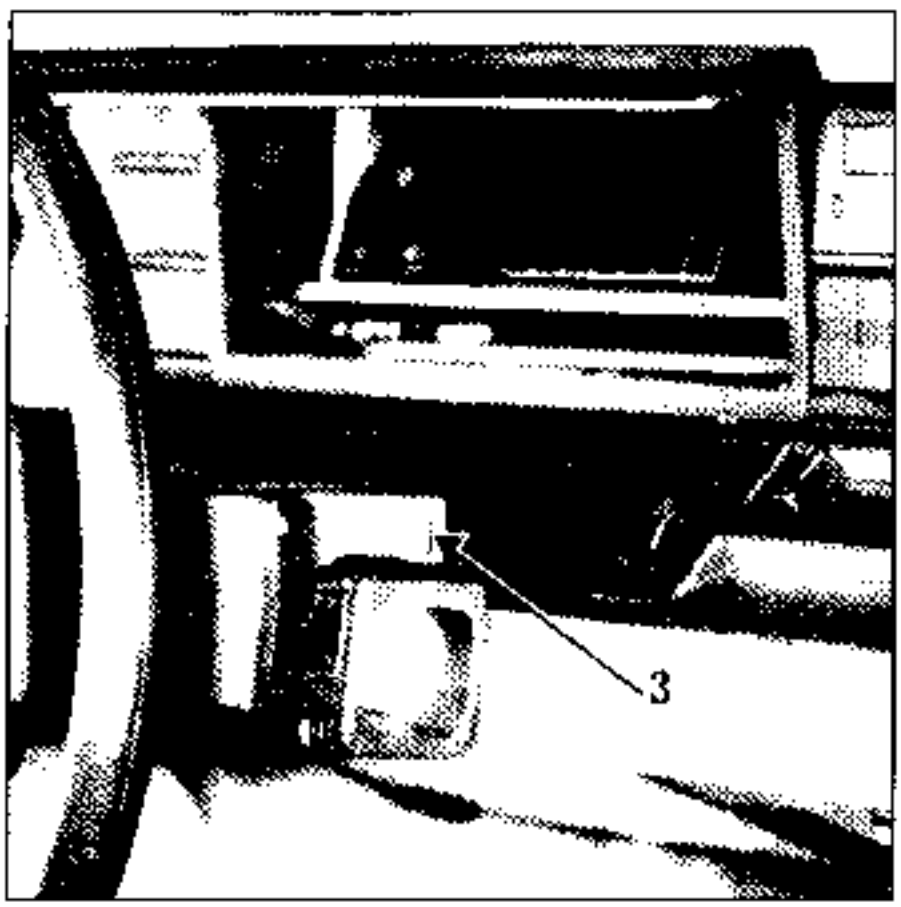
ON-BOARD COMPUTER

ON-BOARD COMPUTER

1 Display

2 Start key
Zeros the memories
Zeros the trip mileage indicator

3 Display selection key (at the end of the windscreen wiper stalk).



The electronics of this instrument panel are centralised in a circuit comprising a microprocessor, which controls the mileage indicator liquid crystal display and the on-board computer displays (this screen will be referred to as the display module).

Display logic

The display module comprises a loop made up of 7 screen displays.

Changeover from one type of screen to the next is carried out by button 3.

When the ignition is switched on, the amount of fuel in the tank will be displayed.

THE ON-BOARD COMPUTER LOOP

The on-board computer display is selected by means of key 3.

This operation runs through 7 types of display one after the other.

- **The amount of fuel remaining in the tank**
  There is no display below **5 litres**.

- **Range (in km)**
  This is obtained by dividing the quantity of fuel remaining in the tank by the average consumption since the Start key was pressed.

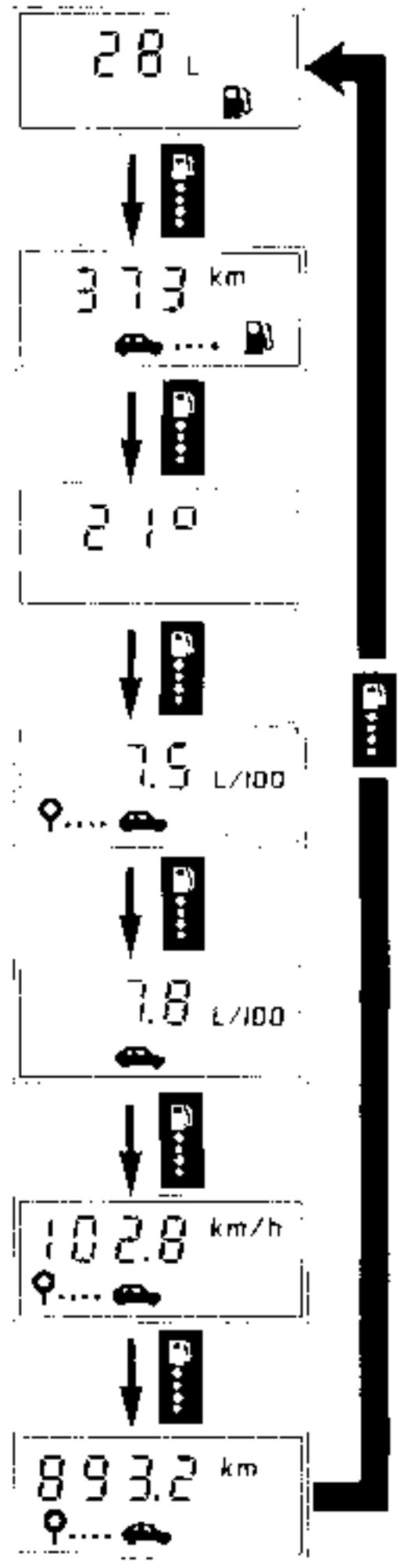
- **External temperature in degrees Celsius**
  Capacity - **30** to **+ 50**.

- **Average fuel consumption (in l/100 km)**
  Obtained by dividing the fuel consumed by the distance covered since the last time the Start key was pressed.
  Minimum distance required to obtain display : **400 m**.
  Maximum capacity for fuel consumed : **2 500 litres**.

- **Consumption at any given point (in l/100 km)**
  Minimum distance required to obtain display: **400 m**.
  Minimum speed required to obtain display : **40 km/h**.
  The figure displayed is limited to three times the average fuel consumption.

- **Average speed (in km/h)**
  Obtained by dividing the distance covered by the time elapsed since the last time the Start key was pressed. Minimum distance required to obtain display: **400 m**.
  Capacity : **250 hours** since the last time the ignition was switched on (stops deducted).

- **Distance travelled (in km)**
  Since the last time the Start key was pressed.
  Displayed in hundreds of metres up to **1 000 km**.
  Maximum capacity : **9 999 km**.



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ON-BOARD COMPUTER

DESCRIPTION (continued)

NOTE : If any of the maximum capacities of the indicators are exceeded, the system returns to zero (as with Start key). After the current is switched off (battery disconnected), press key **2** to stop the display flashing and to restart the function.

WARNING : If one of the displays flashes with the the current having been cut off, see fault-finding sequence on the following page.

The displays are calculated from the following data :

- the injection computer which sends one pulse every **160 mm³** of fuel consumed or a flow sensor delivering one pulse every **80 mm³**,
- a thermistor mounted in the external rear view mirror,
- a fuel gauge tank unit providing information for the fuel consumption unit (**5 Ω** per litre),
- the speed information is given by the instrument panel or by a speed sensor (**5 pulses per metre**).

OPERATING

The on-board computer is zeroed by pressing key (2).

FAULT DETECTION

The on-board computer has been designed so that it detects and informs the driver of any defect which might affect the fuel content display.

the amount of fuel in the tank
the range
the average consumption
the given point consumption

displays flash, it is an indication that there has been a fuel signal defect for more than **10 km**.

the amount of fuel in the tank
the range

displays flash, it is an indication that there has been a fuel signal defect for more than **2 minutes**.

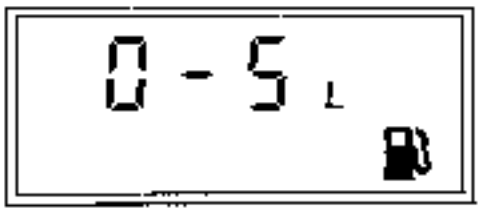
NOTE : When the ignition is first switched off and then switched on again, the display will show **99 L** and will flash.

If only the external temperature display flashes, it is an indication that the temperature signal has been defective for more than **2 minutes**.

NOTE : after disconnecting the battery, the display module will show **50°C** and will flash.

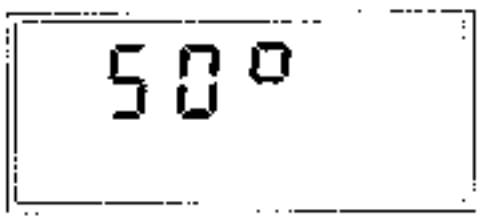
Other cases (when the display does not flash).

If the display module shows that less than **5 litres** of fuel remain in the tank.



But the tank is not empty, there is a short-circuit on the tank unit or its wiring.

If the display module shows a temperature of **50°C**.



But the temperature is not **50°C**, it is an indication of a short-circuit on the thermistor or its wiring.

Before carrying out any rectification work, start the on-board computer fault-finding sequence.

ON-BOARD COMPUTER

FAULT-FINDING SEQUENCE

The instrument panel microprocessor incorporates a test programme for the :

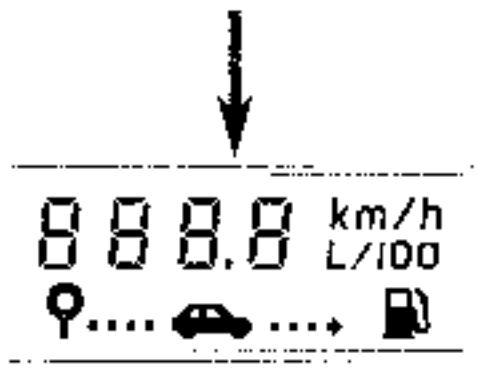
- receiver (display module),
- sensors which are connected to it (fuel gauge unit, fuel flow signal, speed signal, tempera ture signal).

ACCESS TO THE FAULT-FINDING SEQUENCE

WITH THE ENGINE STOPPED
- Switch on the ignition.
- Disconnect and reconnect the battery negative ( ) terminal.

TESTING THE DISPLAY

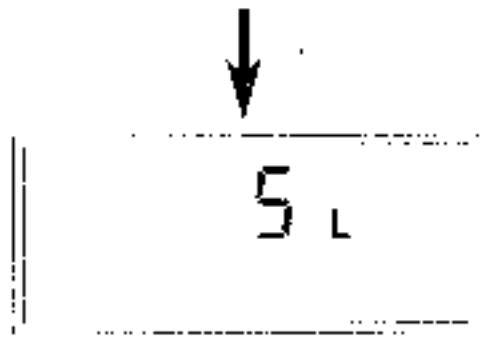
If all the segments of the display module are displayed and flashing.



Check that no section of the segments is missing.

TESTING THE FLOW SENSOR

Press key 3 (run-through key) and start the en gine.

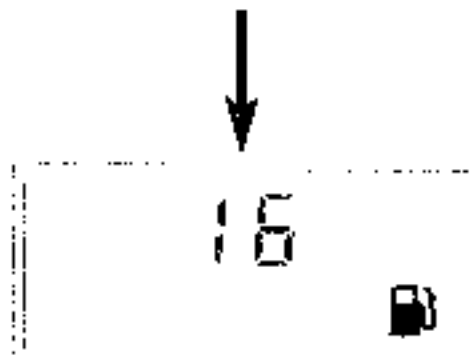


The display module will show the pulse frequency in Hertz.

The display should be other than zero (engine running).
Example : **5 Hz**.

TESTING THE FUEL GAUGE TANK UNIT

Press key 3 (run through key).

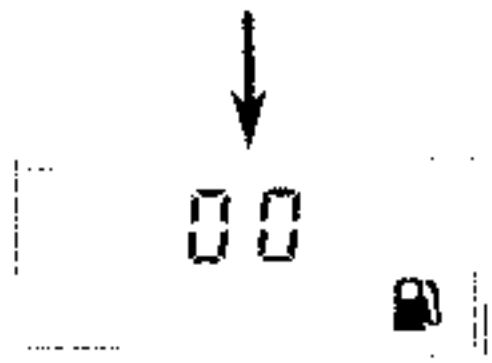


The display module should show the quantity of fuel remaining in the tank.
Example : **16 litres**.

NOTE : under fault finding conditions, the display module will show the true figure even if there is less than **5 litres** in the tank.

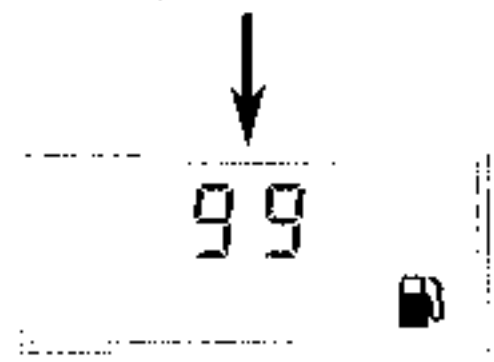
OTHER FAULT-FINDING DISPLAYS FOLLOWING THE FAULT-FINDING SEQUENCE (testing the fuel gauge tank unit)

1st ARRANGEMENT
If the module displays zeros.



It is an indication that there is a short-circuit on the tank unit or its wiring.

if the module displays **99**.



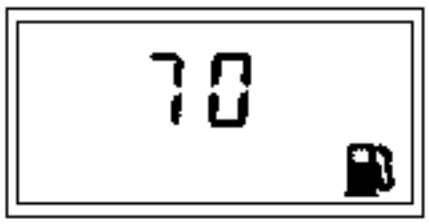
It is an indication of a broken circuit on the tank unit or its wiring.

ON-BOARD COMPUTER

OTHER FAULT-FINDING SEQUENCE FOR THE FUEL GAUGE TANK UNIT

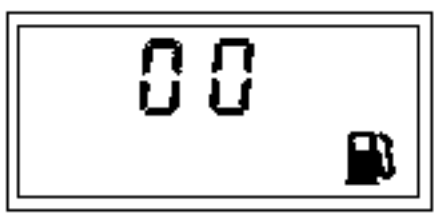
2nd ARRANGEMENT (model year 1990)

If the module displays 70.



It is an indication that there is a short-circuit on the tank unit or its wiring.

If the module displays zeros.

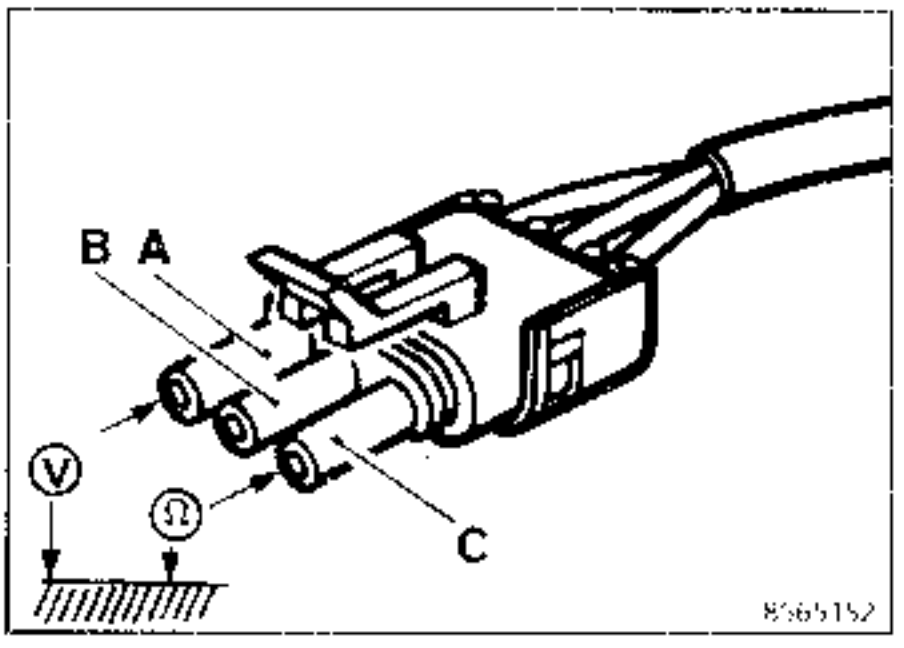


It is an indication that there is a broken circuit on the tank unit or its wiring.

END OF FAULT-FINDING SEQUENCE

To exit the fault-finding sequence, just turn button 2 (Start key) in a clockwise direction.

CHECKING THE FLOW SENSOR (F TYPE PETROL ENGINE)



Disconnect the flow sensor and check :

The voltage (A) "+ after ignition" and the continuity (C).

- connect the junction block and test the continuity between terminals (B) and 1 on the blue instrument panel connector (D), without lock system.

If it is incorrect, check the continuity and insulation of the wires.

NOTE : Fuel injection engines use the flow sensor signal from the electronic injection system.

CHECKING THE AIR TEMPERATURE SENSOR

T° Farenheit	T° Celsius	RESISTANCE			
- 22	- 30	approx.	13350	Ohms	± 200
- 13	- 25	approx.	12250	Ohms	± 200
- 4	- 20	approx.	11050	Ohms	± 200
5	- 15	approx.	9800	Ohms	± 200
14	- 10	approx.	8600	Ohms	± 200
23	- 5	approx.	7400	Ohms	± 200
32	0	approx.	6300	Ohms	± 200
41	5	approx.	5300	Ohms	± 200
50	10	approx	4400	Ohms	± 200
59	15	approx.	3700	Ohms	± 200
68	20	approx.	3100	Ohms	± 200
77	25	approx.	2500	Ohms	± 200
86	30	approx.	2100	Ohms	± 200
95	35	approx.	1750	Ohms	± 200
104	40	approx	1450	Ohms	± 200
113	45	approx.	1250	Ohms	± 200
122	50	approx.	1000	Ohms	± 200
131	55	approx.	850	Ohms	± 200

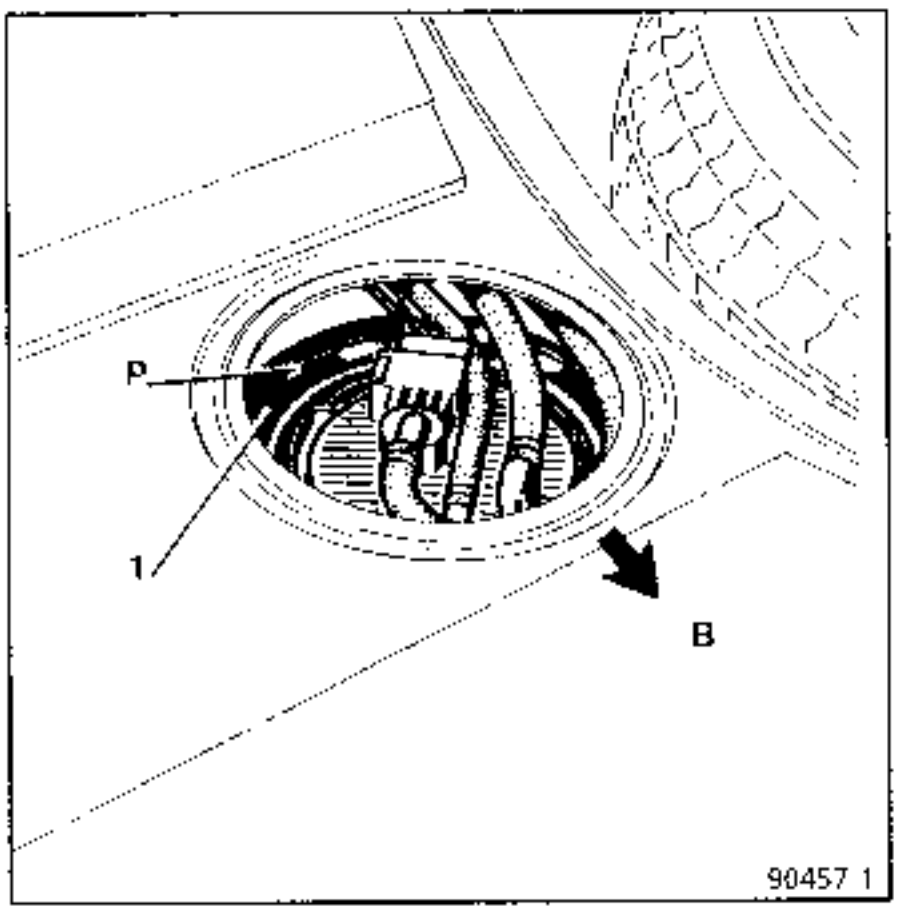
REMOVAL

Before removing the fuel level sensor, take note of the following precautions.

Do not smoke.

Do not bring a naked flame or carry out work involving red hot parts (welding, etc) near the working area.

After draining off the fuel, ensure that its container is properly closed.



On vehicles fitted with adjustable rear seats :

- tilt the rear seats forward,
- remove the floor covering from the boot.

On vehicles not fitted with adjustable rear seats :

- undo the rear seat clips,
- release the rear seat and pull it forward,
- remove the rear seat belts to free the rear seat-back,
- lift the boot floor covering.

Remove the tank unit plastic cover.

Disconnect :

- the electrical connector,
- the pipes.

Move the pipes and connector to one side out of the way and secure them to the side of the vehicle.

Turn the ring (1) to free the studs (P).

Try to free the ring, in a sideways direction, as shown by arrow (B).

WARNING : On certain vehicles the tank unit is too high in relation to the floor and the ring (1) cannot be freed in a sideways direction without slightly lowering the tank.

Proceed as follows :

- fully loosen the tank securing straps,
- free the ring (1). If there is still insufficient room, remove the tank,
- remove the tank unit.

IMPORTANT

When handling the tank unit, take care to ensure that the base (3) is correctly positioned in relation to the top (2).

REFITTING

SPECIAL POINTS

- Fit a new seal.
- Refit the tank unit into its slot.
- Refit the ring and if it has been removed, refit the tank.
- Connect up the pipes and fit the hose clips.
- Reconnect the connectors.

CONNECTIONS

With electronic instrument panel

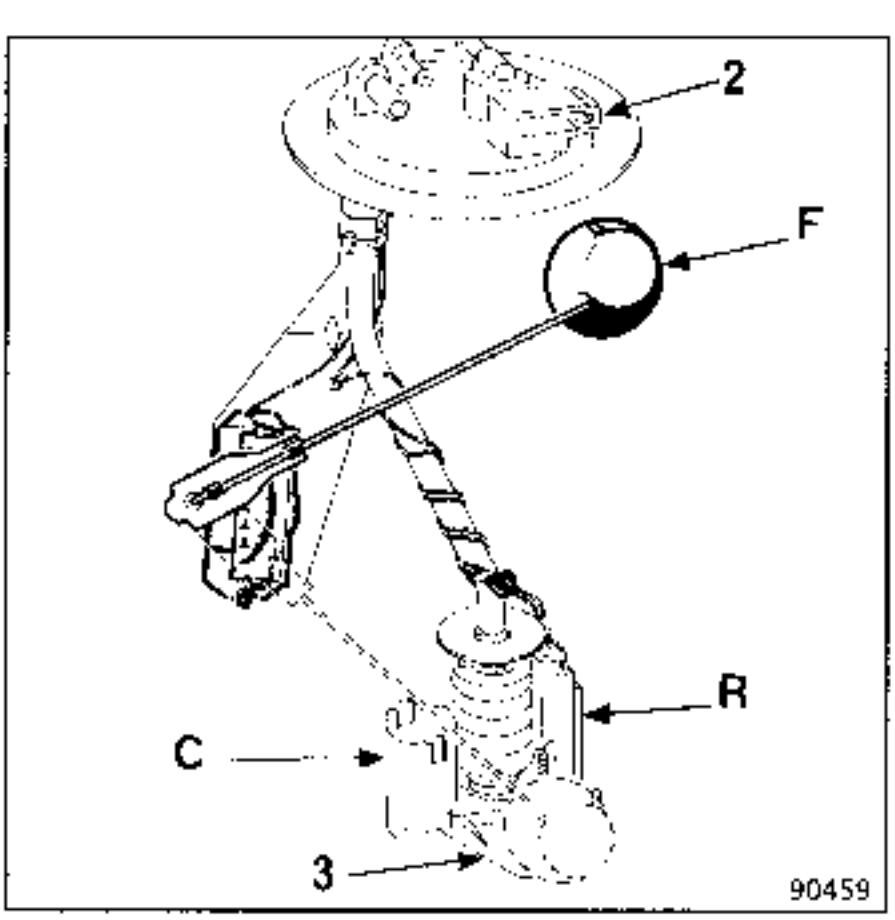
1 Indicator on instrument panel
2 Not used
3 Not used
4 Earth

With conventional instrument panel

1 Not used
2 Indicator on instrument panel
3 Minimum level
4 Earth

With on-board computer

1 Indicator on instrument panel
2 Not used
3 Not used
4 Earth



Special points and operations on vehicles fitted with an electronic instrument panel or an on-board computer.

This tank unit has **2** sections :

- a float mounted on an arm (F),
- a variable height strainer (C).

To improve the accuracy of the instrument panel reading, the tank unit is fitted with a strainer, the height of which is variable, which moves down or up to suit the distortion of the plastic tank. This strainer is fitted with sensors which move along a track on a variable resistance (R) which is added to the resistance in the float unit.

The strength of the resistance (R) varies from 0 to approximately 25Ω. This system cannot be removed.

TESTING

Vehicles with a conventional instrument panel.

Vehicles fitted with the 2nd type of on-board computer (1990 model).

INDICATOR

Display	Readings across terminals 2 and 4 (Ω)
4/4	7 MAXIMUM
3/4	51 ± 5
1/2	100 ± 10
1/4	150 ± 16
Reserve tank	300 + 200

TESTING (continued)

Vehicles fitted with the 1st type of on-board computer.

INDICATOR

Display	Readings across terminals 1 and 4 (Ω)
4/4	326 ± 10
3/4	289 ± 10
1/2	220 ± 10
1/4	148 ± 10
Reserve tank	78.4 ± 10
Lower stop	13.1 ± 10

2nd type (since June 1989)

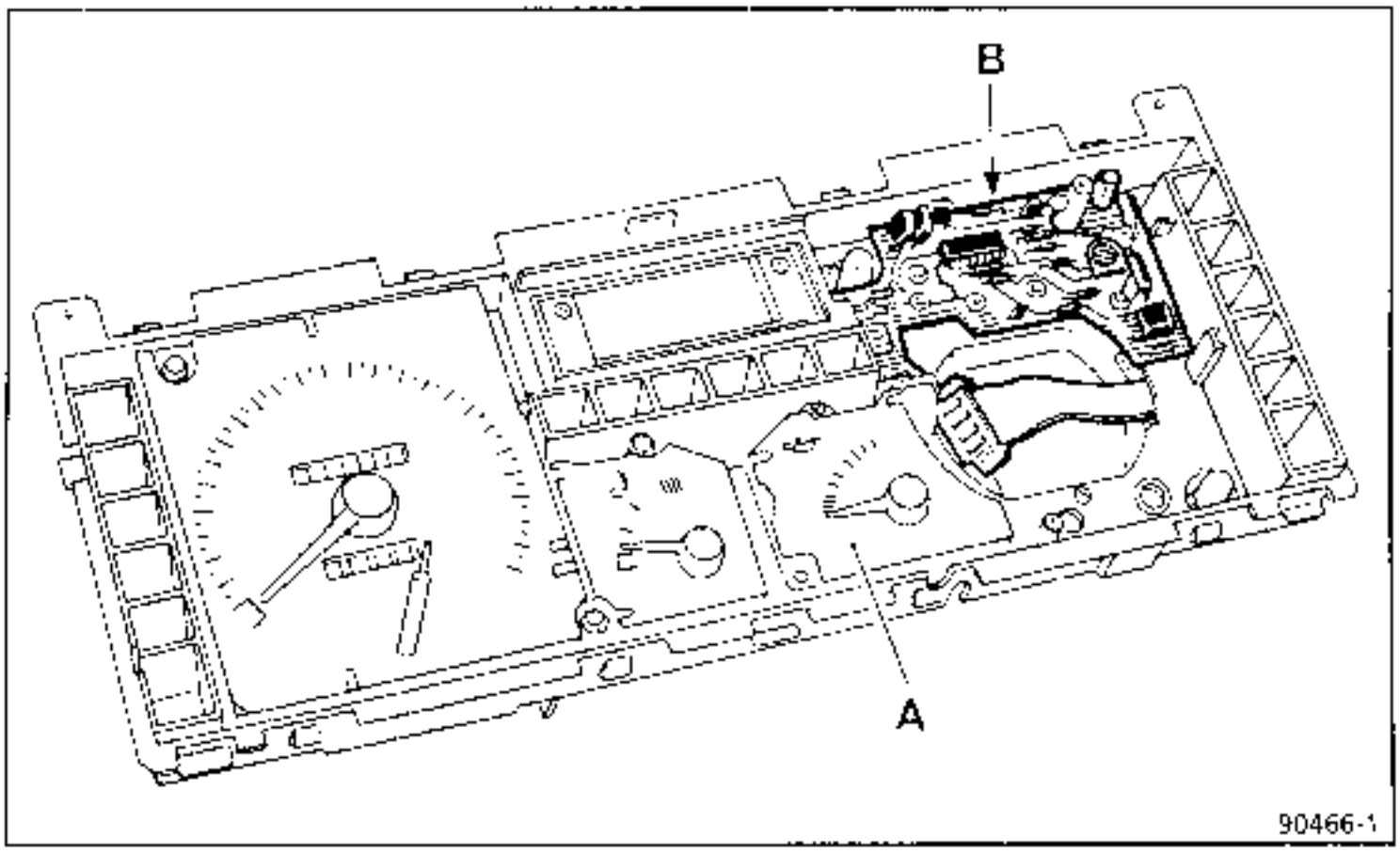
Display	Resistance at terminals 1 and 3 (Ω)
Lower stop	25 ± 5
4/4	60 ± 5
3/4	130 ± 5
1/2	200 ± 10
1/4	280 ± 16
Reserve tank	335 ± 20

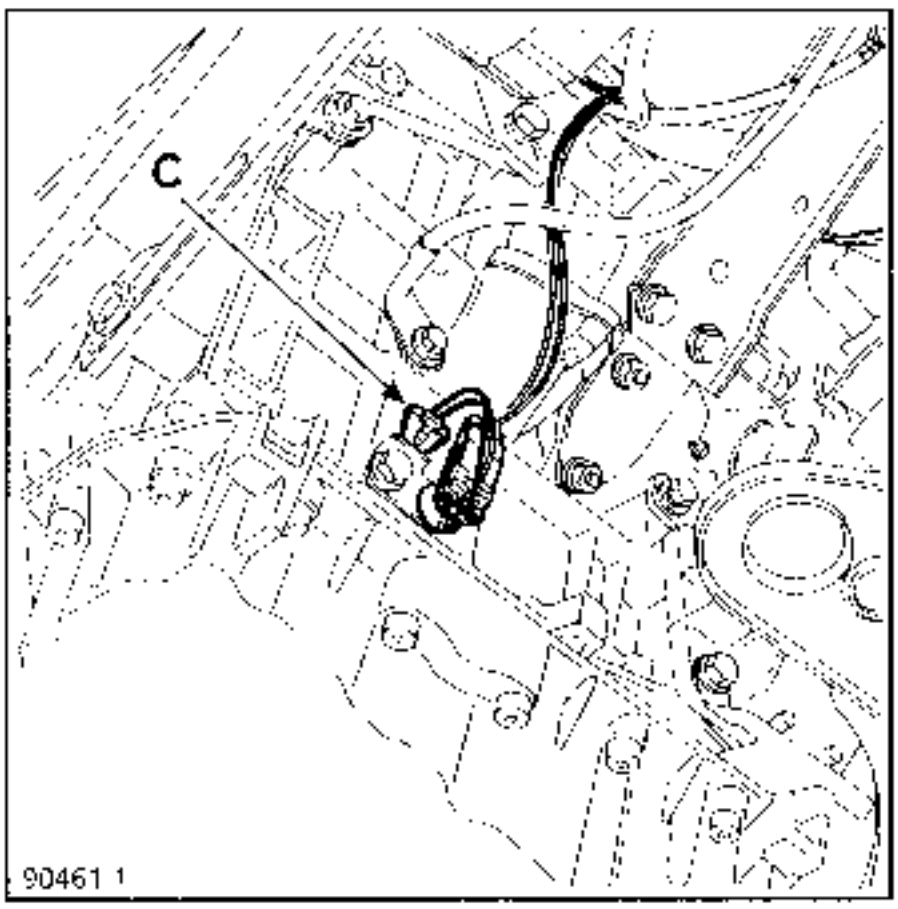
TESTING THE MOVING STRAINER

Secure the float in the upper position and gradually push down the strainer whilst reading on the ohmmeter, (terminals 1 and 4), the variation in the resistance.

The correct resistance variation is a lowering of **25 Ω ± 5 Ω**.

NOTE : All these figures are given for information only. Check that the resistance varies as the float is moved.





A Oil level indicator

B Electronic unit

C Oil level sensor

Operation

The oil level sensor consists of a wire with a high coefficient of resistivity. The thermal conductivity of this wire when a current is passed through it, is not the same immersed in fluid as it is when in the open air.

When the ignition is switched on, the oil pressure warning light switches on. An electronic unit (on the instrument panel) passes current to the terminals of the oil level sensor.

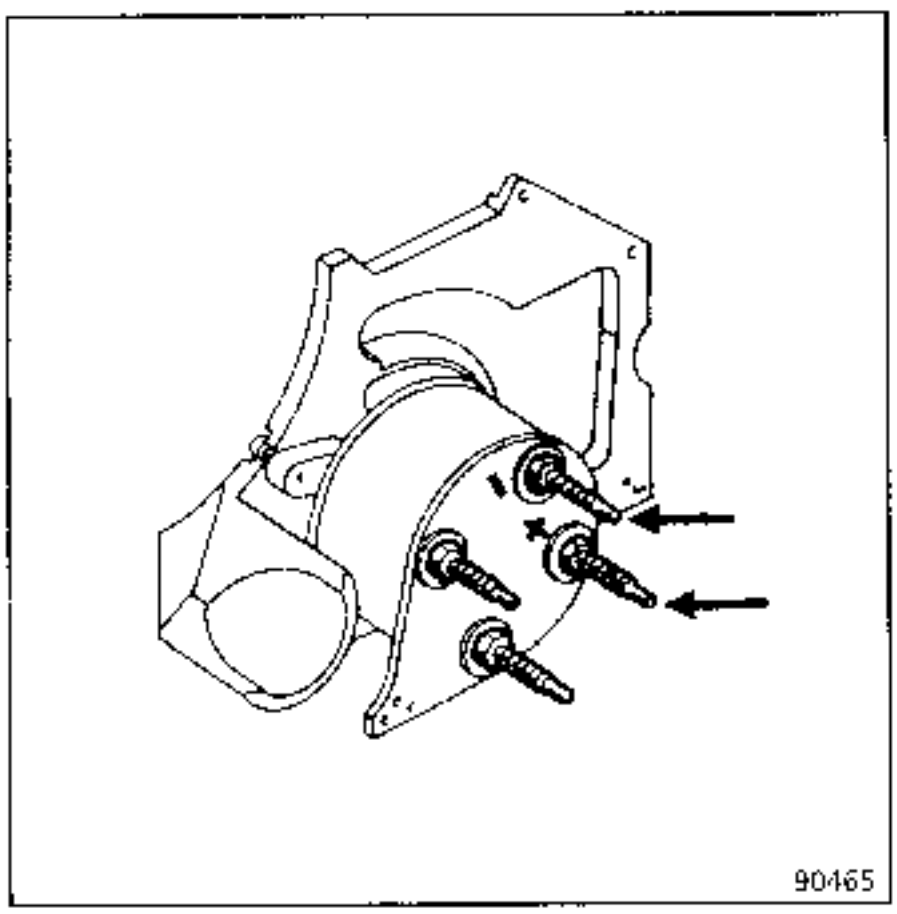
After a given fixed time, there will be a voltage variation across the terminals of the sensor, the strength of which will depend on the amount of wire which is immersed. This voltage variation is recorded by the electronic unit, which then sends the data to the level indicator.

When the engine is running, if the oil pressure is high enough, the pressure switch cuts off the warning light circuit. It also cuts out the electronic unit and therefore the oil level is no longer displayed.

TESTING

OIL LEVEL INDICATOR

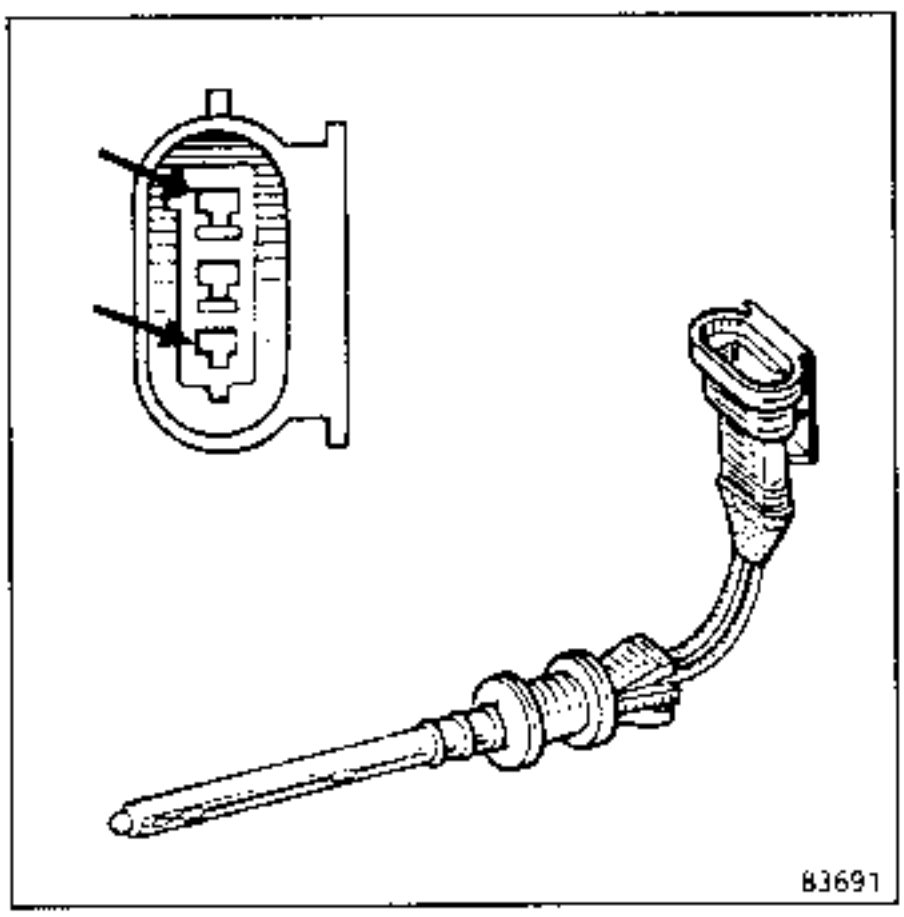
- Remove the indicator before carrying out the test.
- Connect an ohmmeter across the two terminals. The ohmmeter should register a resistance.



OIL LEVEL SENSOR

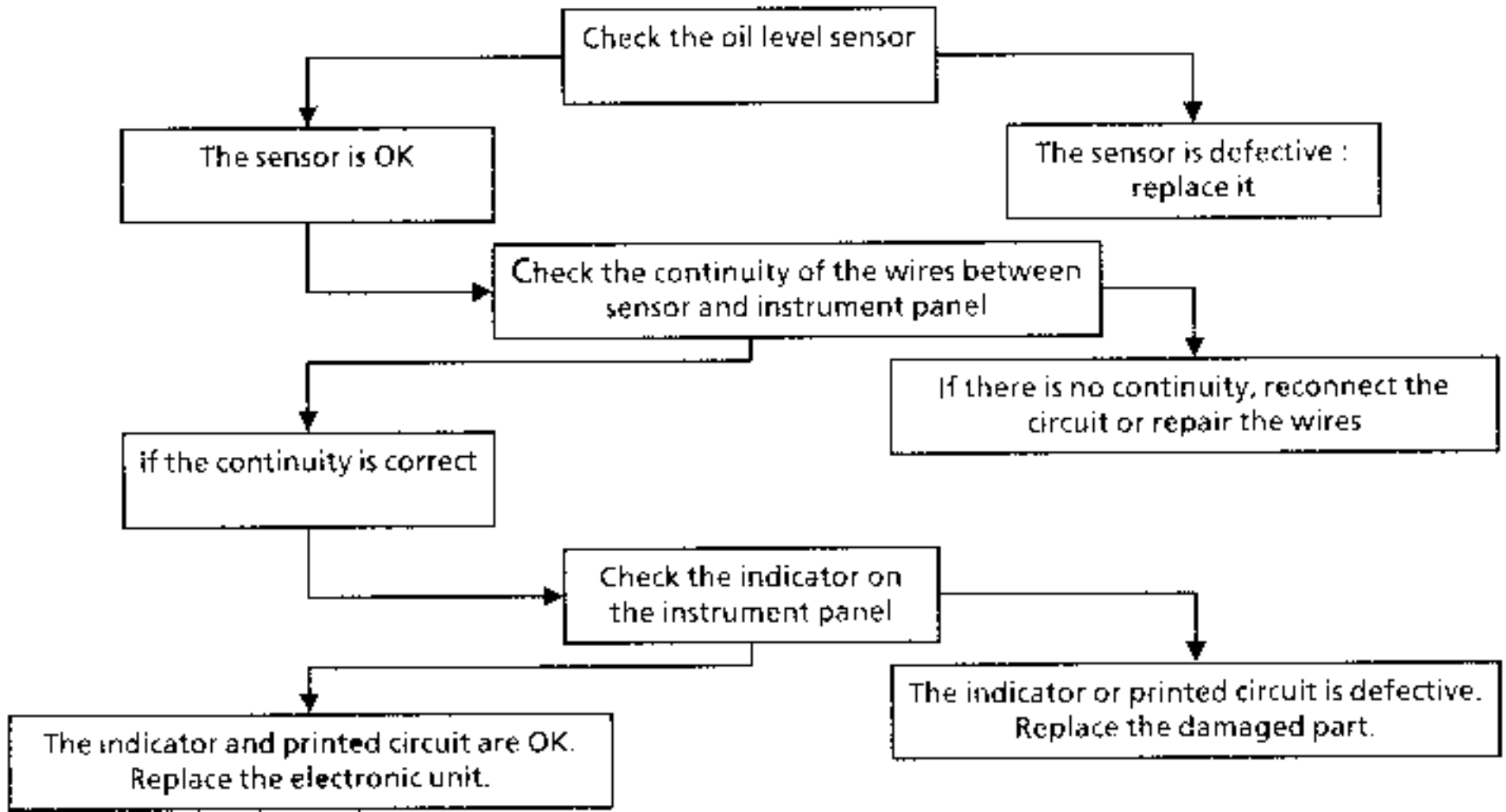
Connect an ohmmeter across the two terminals of the oil level sensor.

Correct reading : **5** to **30 Ω**.



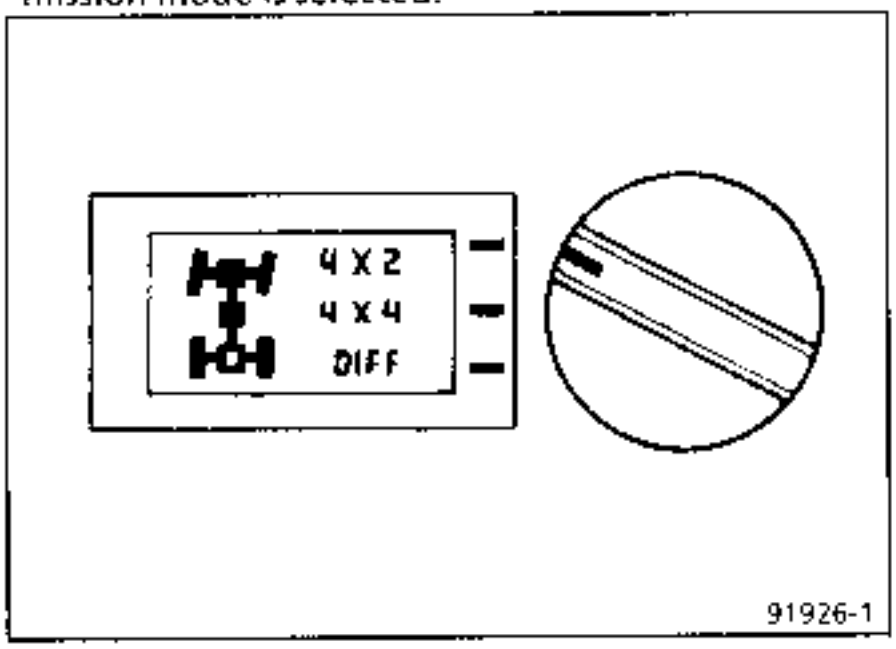
Fault-finding

If the oil level indicator does not operate when the ignition is switched on (the oil pressure warning light will illuminate.



TRANSMISSION ENGAGEMENT INDICATOR UNIT AND TRANSMISSION ENGAGEMENT WARNING LIGHT

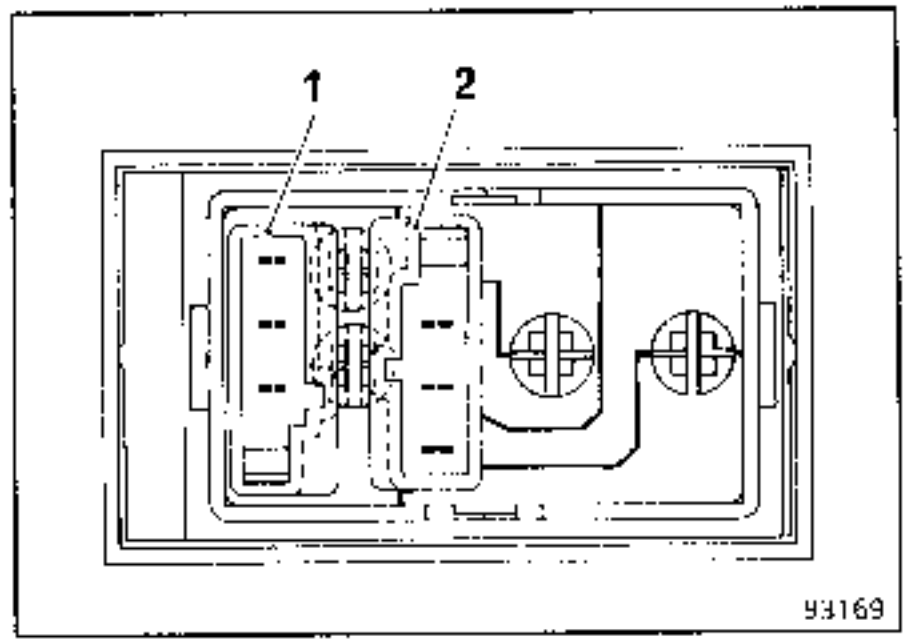
Vehicle types **K 48 4 x 4** are fitted with a detector unit and a warning light which show which transmission mode is selected.



At **B** : **4 x 4** : 4 wheel drive because the longitudinal transmission shaft is engaged. **4 x 4** warning light on central console switched on,

At **C** : **DIFF** : 4 wheel drive plus rear differential lock engaged.
4 x 4 and **DIFF** warning light on central console illuminated together with **DIFF** warning light on instrument panel.

CONNECTIONS



1 Black 3-pin connector

1 Not used
2 + after ignition
3 Transmission engagement warning light on differential lock switch panel

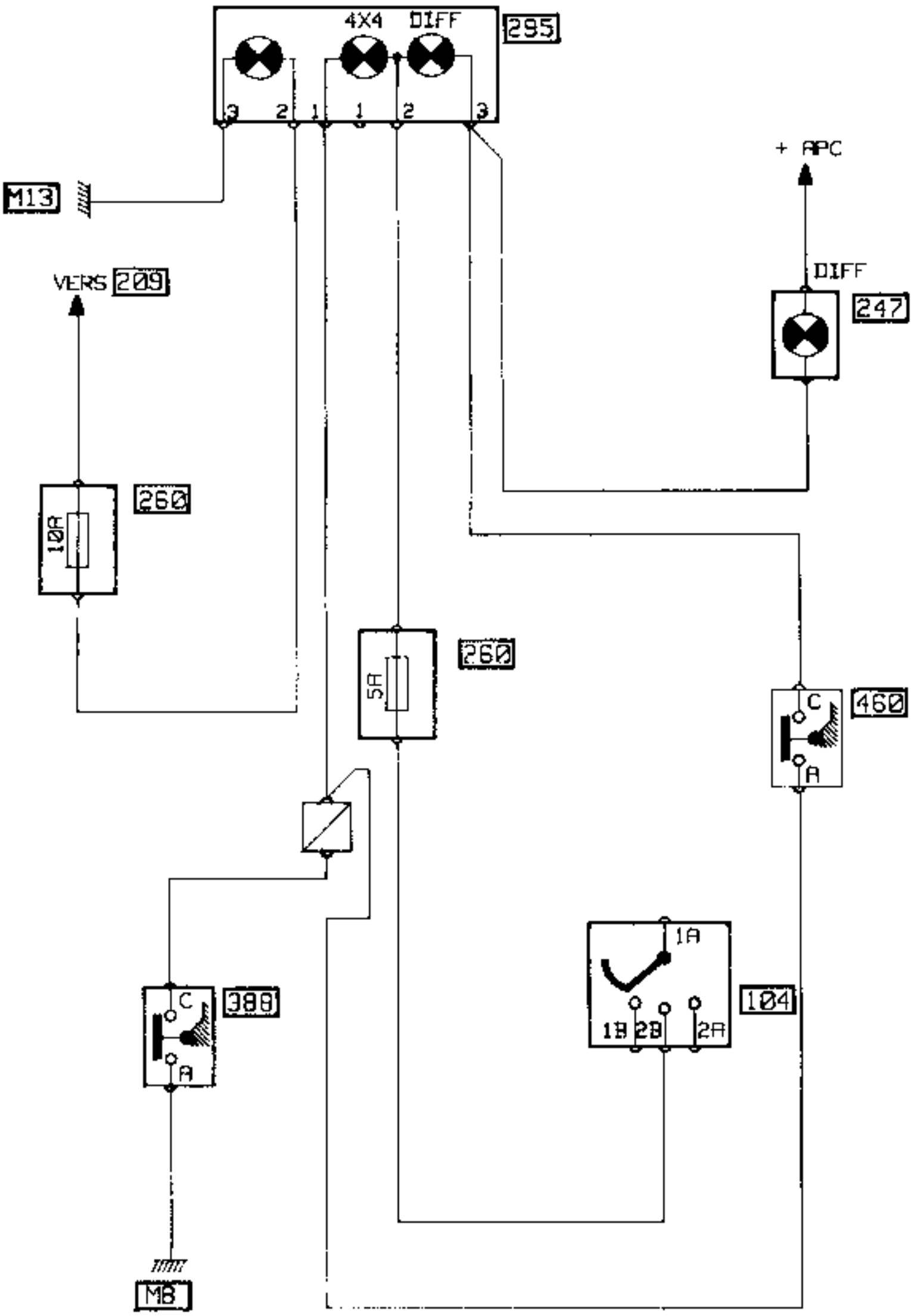
2 Grey 3-pin connector

1 Longitudinal transmission shaft engagement switch
2 Lighting
3 Earth

Key

104	Ignition switch
209	Switch stalk
247	Instrument panel
260	Fuse
295	Warning light unit
388	4 x 4 warning light switch
460	Rear final drive switch
M8	Injection earth
M13	Console earth
APC	After ignition

4 X 4 ENGAGEMENT WARNING LIGHTS



GENERAL

Description

The cruise control system allows the vehicle to be driven at a constant speed, without the need for the driver to keep his foot on the accelerator pedal.

The system has no limiting action.

The system is only operational from 25 mph (40 km/h).

The system has three parts:

1) A pneumatic part comprising:
   - a vacuum pump with its own regulation solenoid valve,
   - a safety breather solenoid valve,
   - a control valve acting by deforming a flexible diaphragm against the throttle control.

2) An electronic part comprising:
   - the cruise control computer which compares the actual vehicle speed with the speed required by the driver,
   - an engine over-revving relay which prevents the engine over-revving if the cruise control is used for intermediate gears.

3) A control and safety part comprising:
   - the cruise control on/off switch,
   - the switches on the steering wheel which allow the settings to be modified and system operation to be cancelled,
   - the stop and clutch switches which cancel the cruise control function at the slightest touch.

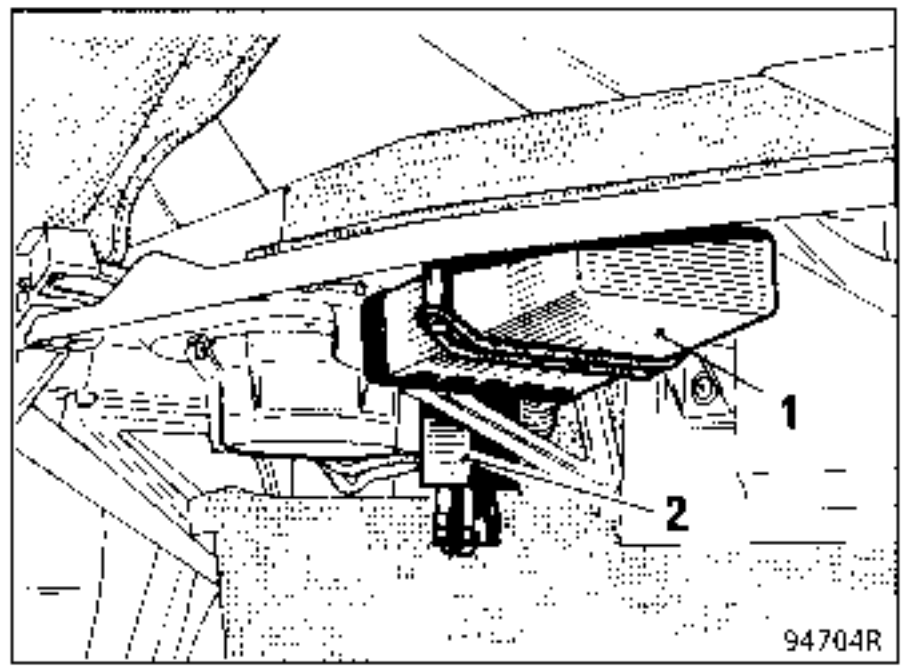
LOCATION OF COMPONENTS

Cruise control computer (1)

This is located in the boot, under the right hand side shelf behind the speaker (B 48).

This is located in the boot, behind the carpet trim on the right hand side of the rear floor (L 48).

On this model, the computer is strapped to a metal mounting.



Engine over-revving relay (2)

This is located in a vertical position between the speaker and the computer, on a metal bracket mounted by one of the speaker bolts (B48).

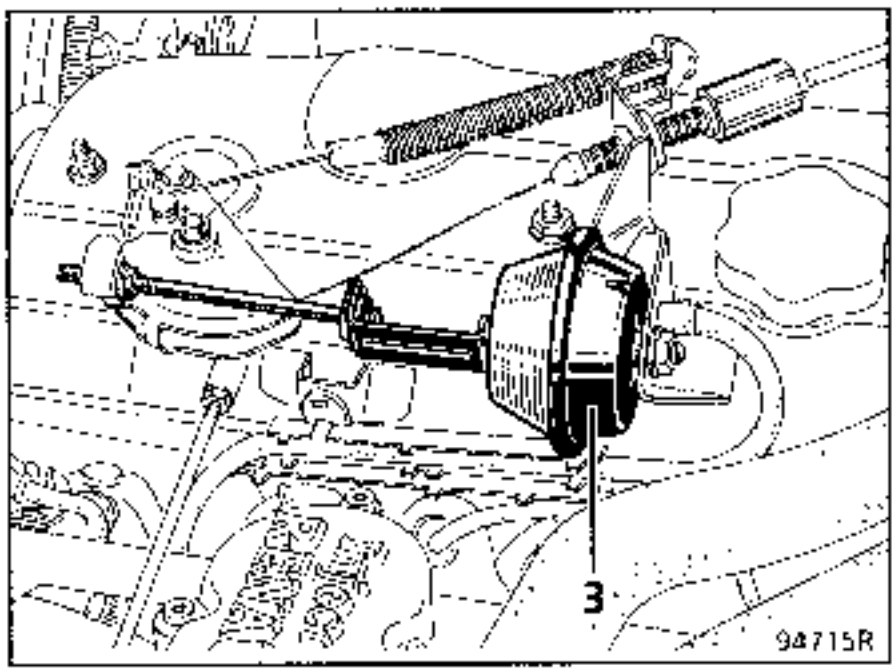
This is mounted by a metal bracket on the computer gaiter (L 48).

Vacuum pump and safety solenoid valve

These are located on the front right hand wheel arch, under a plastic protective cover which must be removed to reach the components, by removing its five mounting bolts.

Control valve (3)

This is located on the rocker box cover and acts on the accelerator control.

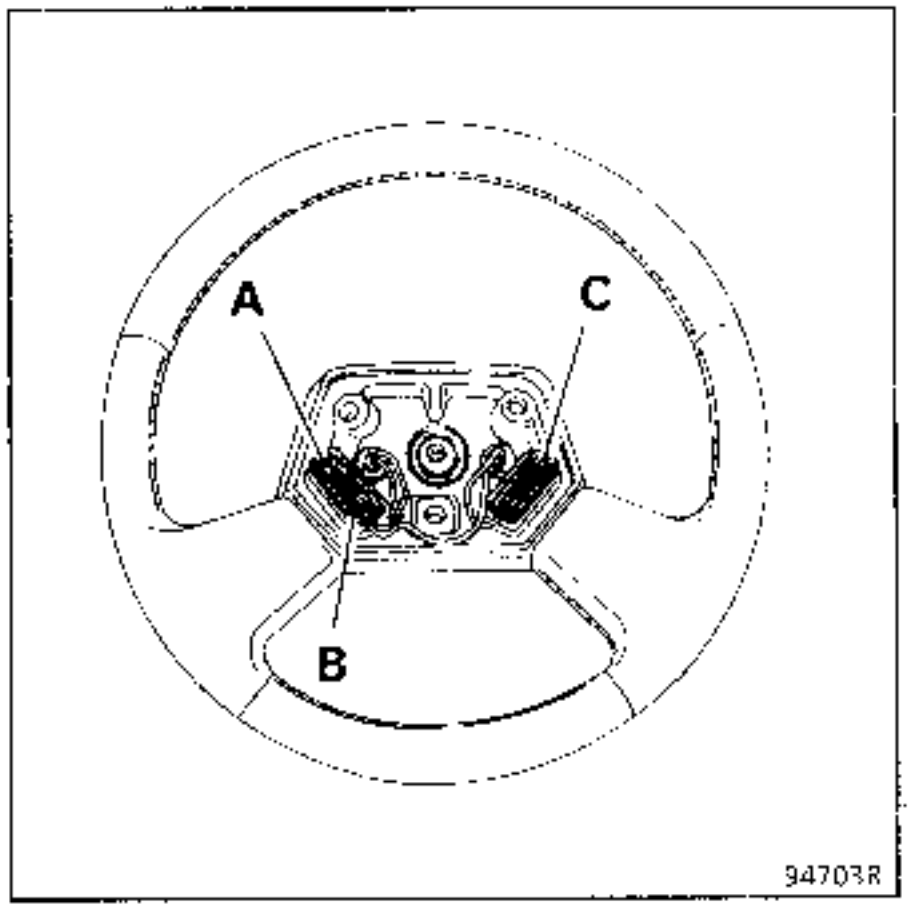


The valve acts on the throttle control in parallel with the pedal control.

The mounting does not impede control of the accelerator by foot, even during the regulation period.

The pedal follows the movements of the valve under its own weight. The driver may therefore accelerate the vehicle himself at any moment, should he so desire.

Switches on the steering wheel



Cruise control on/off switch

This is located on the centre console on the right hand side of the handbrake lever.

OPERATION

Ignition on, − after ignition feed is supplied to the cruise control switch.

Once the ignition has been turned on, + after ignition feed is supplied to the cruise control computer on track 5, and also to the over-revving relay.

The over-revving relay then supplies the cruise control regulator on track 7 via the stop and clutch switches, connected in series, and then the vacuum pump on track A and the safety solenoid valve on track 2.

The cruise control computer examines two parameters:

1) actual vehicle speed, on track 9 of the computer, from the speed sensor, or the electric speedometer if fitted to the vehicle.

2) memory of the required speed on track 3 of the cruise control computer.

These items of information are permanently compared, allowing the vacuum pump to be operated, which supplies a vacuum to the pneumatic valve which acts on the accelerator control.

Stability of the vehicle speed **(regulated speed)** is assured by alternate earth controlling of track 4 of the computer, supplying track B on the vacuum pump, and track 6 on the computer, supplying track C on the regulation solenoid valve incorporated in the vacuum pump.

NOTE : the safety solenoid valve allows the circuit to breathe when its earth is removed on track 1.

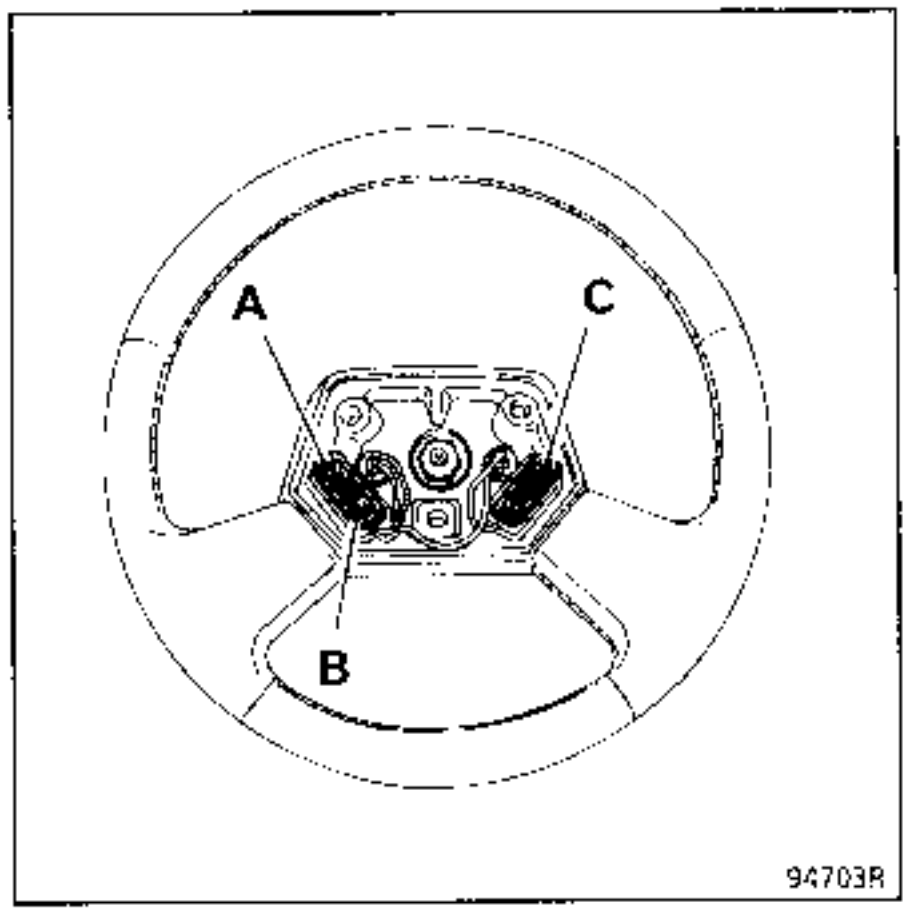
This earth on track 1, allowing the solenoid valve to operate, is only sent on track 1 of the cruise control computer if the vehicle speed is a minimum of 25 mph (40 km/h), information via track 9.

STARTING REGULATION

After pressing the cruise control button, with the vehicle moving at a stable speed (greater than 25 mph (40 km/h)), press the left hand side of switch **A ($\sqrt{\ }$ $\frac{-}{+}$) once.**

The voltage on track 3 of the unit (5 volts) passes via a 100 Ω resistor.

The regulation speed is memorised and the driver may remove his foot from the accelerator pedal.



From this moment, when the left hand side of switch A (V) is pressed, this increases the **regulated speed**. The driver may also accelerate using the pedal then press on the left hand side of switch **A**, when the desired speed is reached so that this new speed is memorised.

NOTE : the memorised speed may be exceeded at any moment by pressing the accelerator pedal. When the pedal is released, the vehicle returns to the memorised speed. Memorisation of regulated speeds is continuous from 25 mph (40 km/h).

SAFETY

Safety is ensured by :
- 1 engine over-revving relay,
- 2 stop connectors,
- 1 clutch switch, (manual gearbox only).

When the engine reaches 5 400 rpm, the over-revving relay receives this information from the rev-counter on track 3 and reaches its switching threshold.

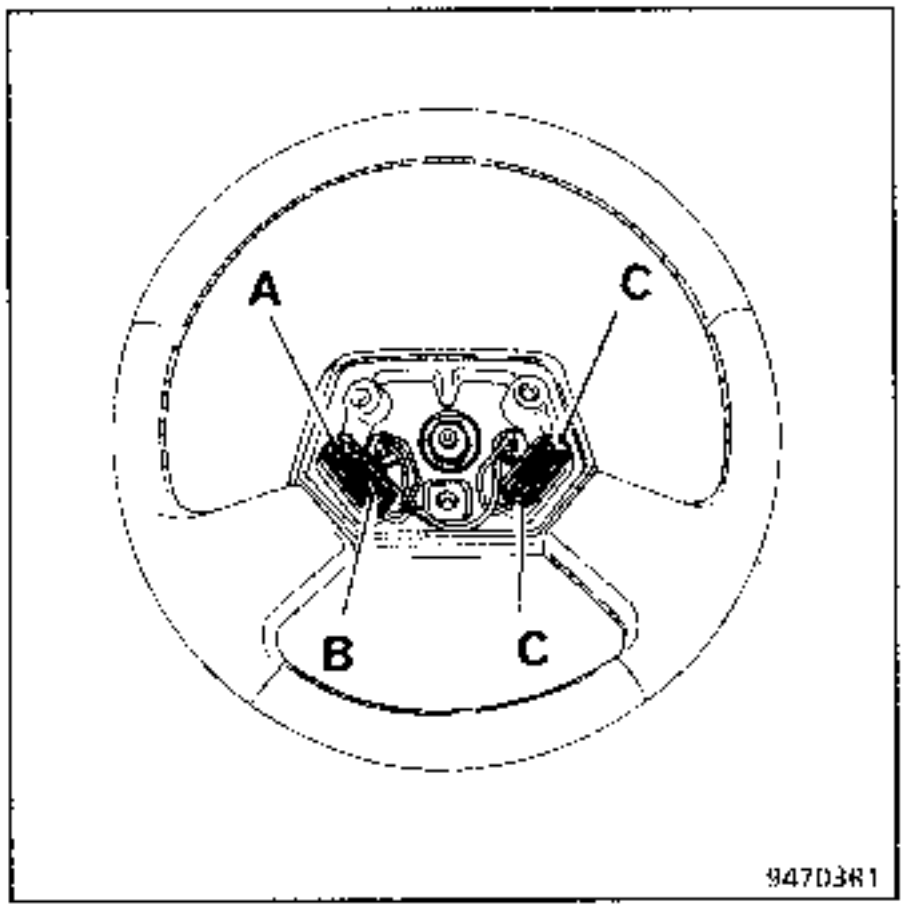
The feed to the cruise control computer safety circuit (which goes from track 5 to track 7) is cut, as is the feed on track 2 of the safety solenoid valve and track A of the vacuum pump.

The computer cuts the earth on track 1, which supplies track 1 of the safety solenoid valve, and the pneumatic circuit is allowed to breathe; the vehicle speed is no longer regulated. Pressing the brake pedal or the clutch pedal (manual gearbox) will have the same consequence. The stop switch also sends information (stop) to the computer on track 2, in addition to the first switch, to give a dual level of safety.

The right hand switch on the steering wheel (regardless of which side C), (O) cuts cruise control operation, by directly earthing track 3 on the computer.

The computer cuts the earth on track 1, supplying track 1 of the safety solenoid valve , and sends an earth on track 6, supplying track C on the vacuum pump.

The safety solenoid valve and the regulation solenoid valve allow the pneumatic circuit to breathe.



The regulated speed remains in the memory in all these safety cases.

To recall the speed memorised, press the left hand switch on the steering wheel on side B (R). The voltage on track 3 of the computer (5 volts) passes via a 330 Ω resistor

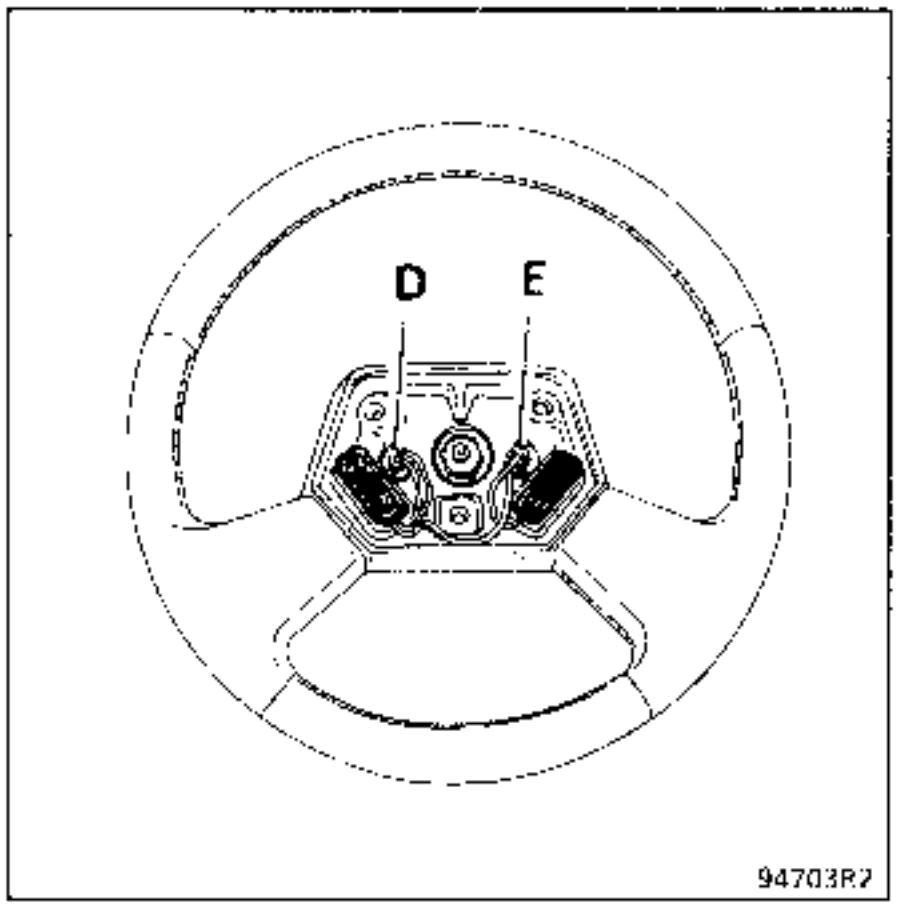
The computer will automatically return the vehicle to the speed memorised previously (as soon as the vehicle speed has reached 25 mph (40 km/h)).

NOTE : cutting the feed to the cruise control using the on/off switch or by turning the ignition off, cancels the regulated speed in the memory.

FAULT FINDING

If the system does not operate correctly, a series of measurements may be made on the steering wheel track terminals.

Remove the hub cover without disconnecting the wires.
Place a voltmeter between the two clips connected to the terminals for tracks (D) and (E) (see diagram).



With the engine running at idle speed, press the cruise control on/off switch. The voltage at the clips connected to the terminals for tracks (D) and (E) should be approximately 5 volts (from track 3 of the cruise control computer).

When the following switches on the steering wheel are pressed, the following voltages should be noted:

- pressing R = 2.5 volts approximately
- pressing √ = 1.3 volt approximately
- pressing 0 = 0 volt

Turn the ignition off, disconnect the two clips for the track terminals and connect an ohmmeter between the two wire clips. The values should be as follows:

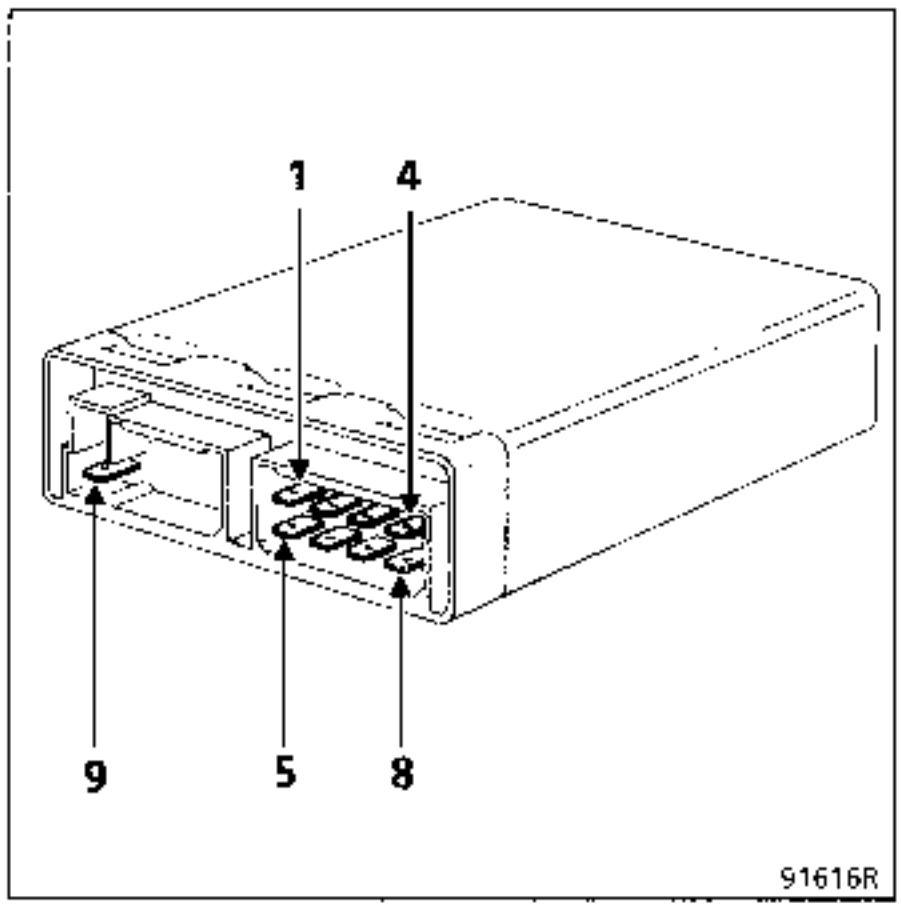
- pressing R = 330 Ω ± 15
- pressing √ = 100 Ω ± 5
- pressing 0 = 0 Ω

These measurements are used to check:

- the earth on track 8 of the cruise control computer,
- the 5 volts feed output on track 3,
- the 12 volts feed on track 5,
- the resistances of the steering wheel switches.

If the values are not correct, refer to the first fault chart (see following page).

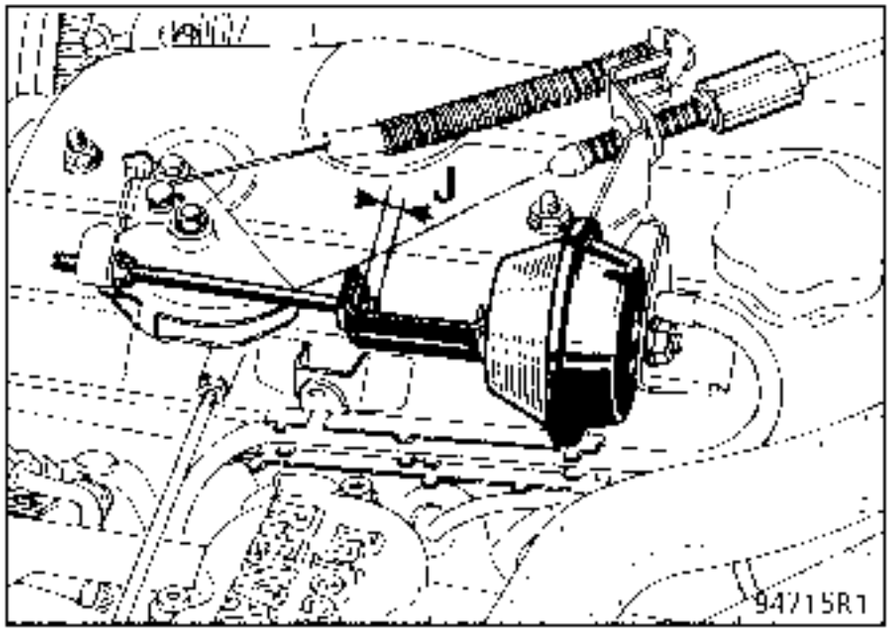
If the values are correct, refer to the fault chart for checking on track 2.



1 Solenoid valve control
2 Stop input
3 Steering wheel control
4 Pump control (accelerator)
5 Feed (+ 12 volts)
6 Deceleration control
7 Clutch - brake safety
8 Earth
9 Speed information

ADJUSTING THE MECHANICAL CONTROL

With the valve in the rest position and the throttle control in the idle speed position, a safety play of **1.5 mm** maximum should be noted.

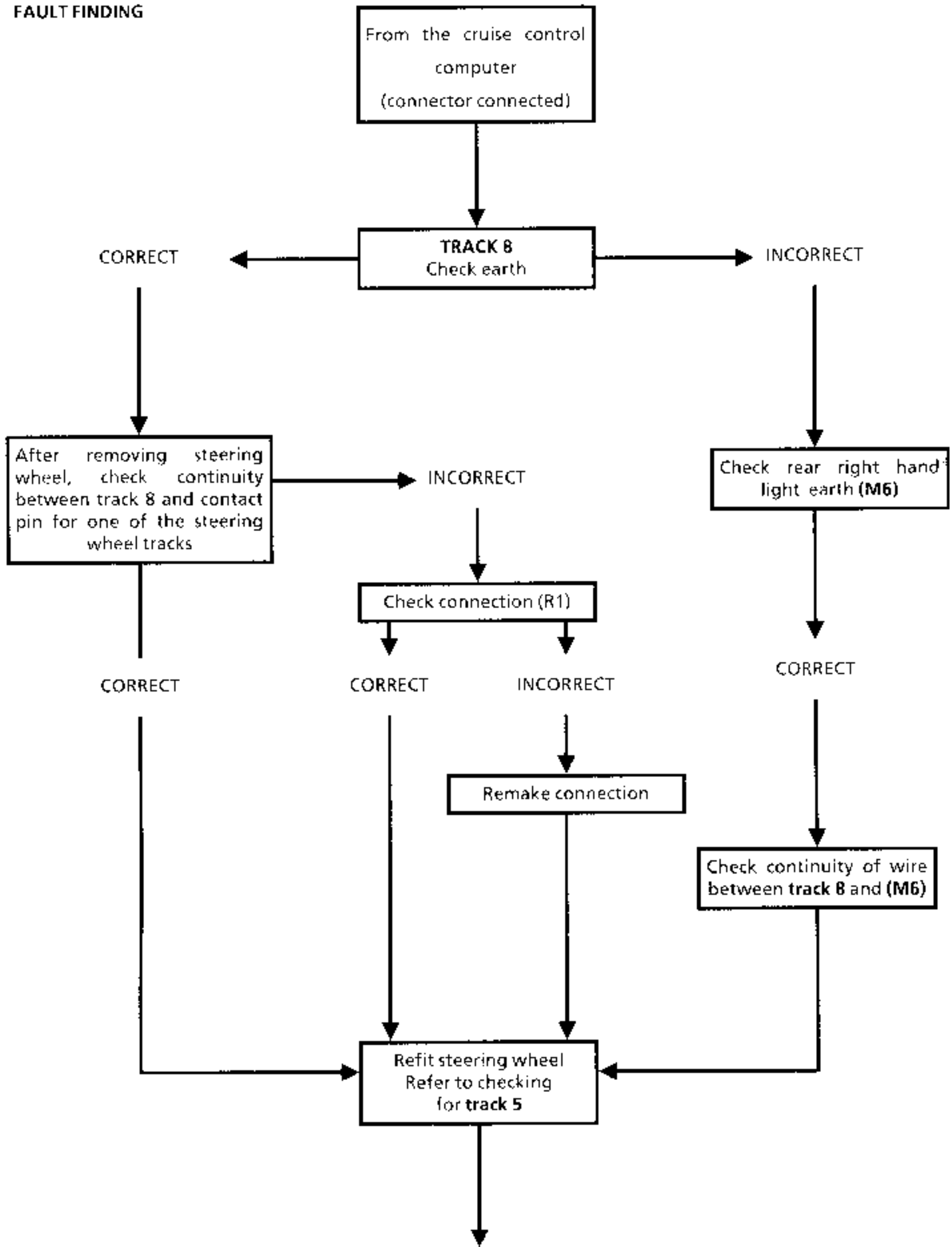


Slacken the lock nut.

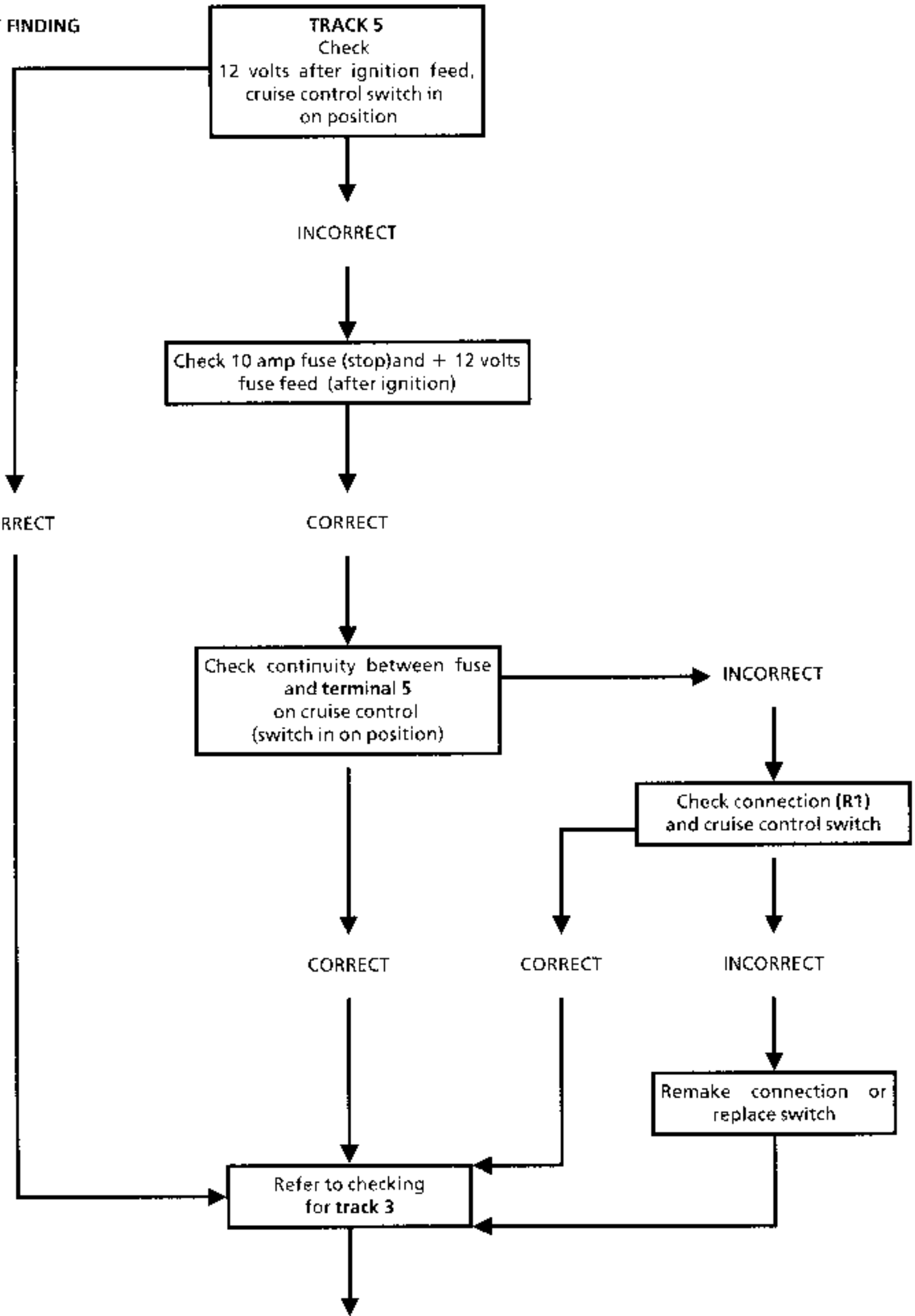
Adjust the play (J) adjusting the length of the rod by tightening or slackening it.

Tighten the lock nut again.

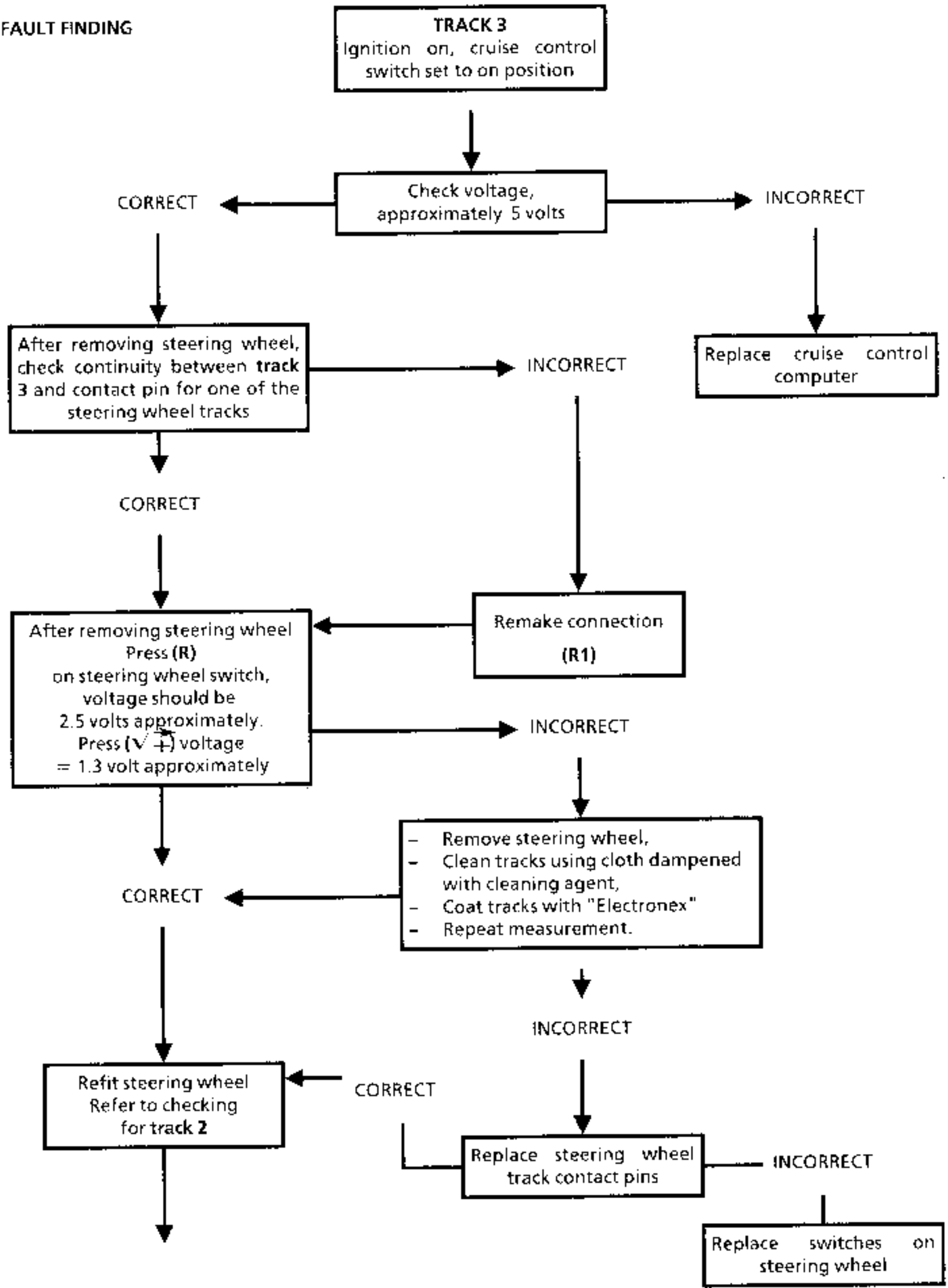
FAULT FINDING



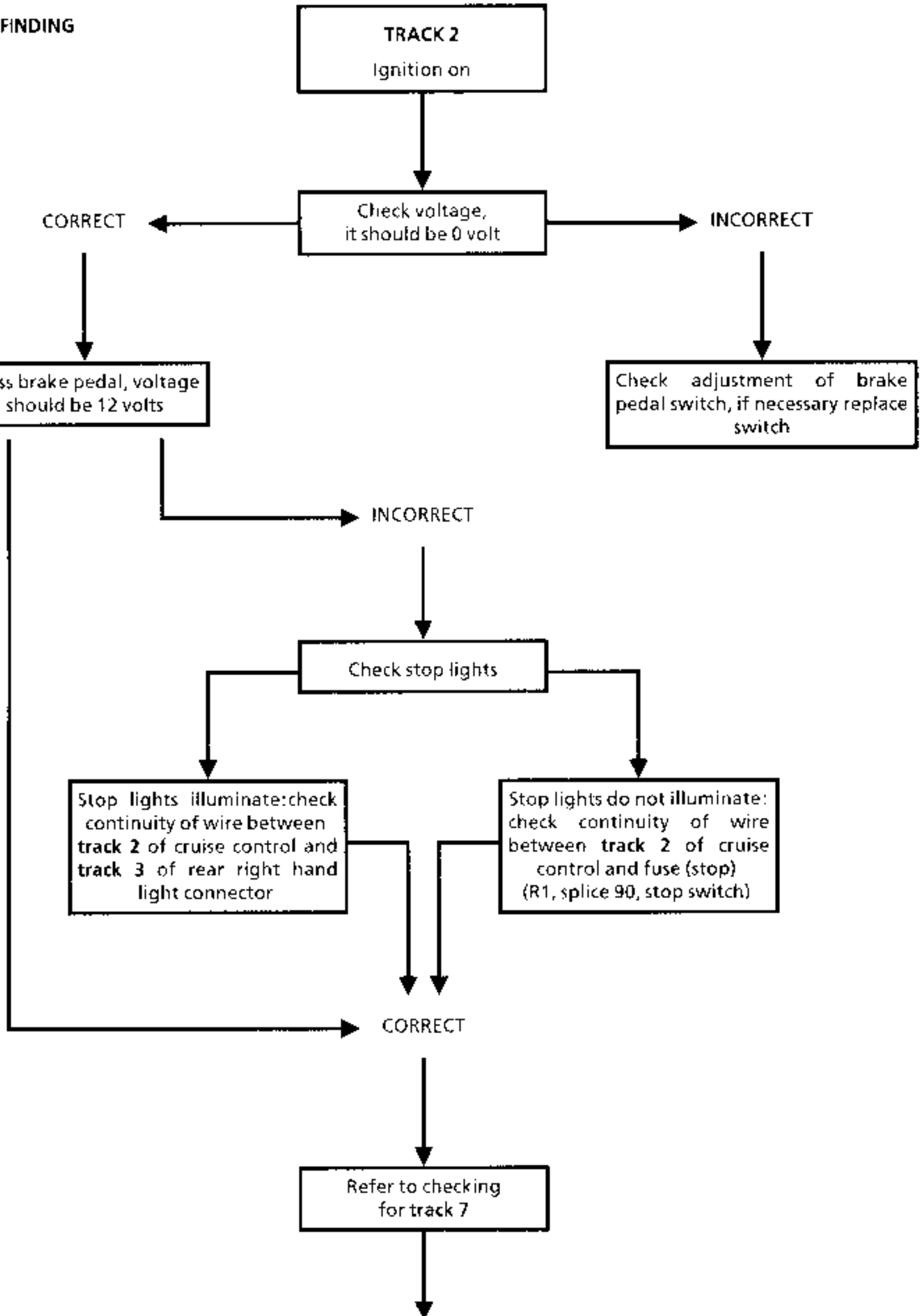
FAULT FINDING



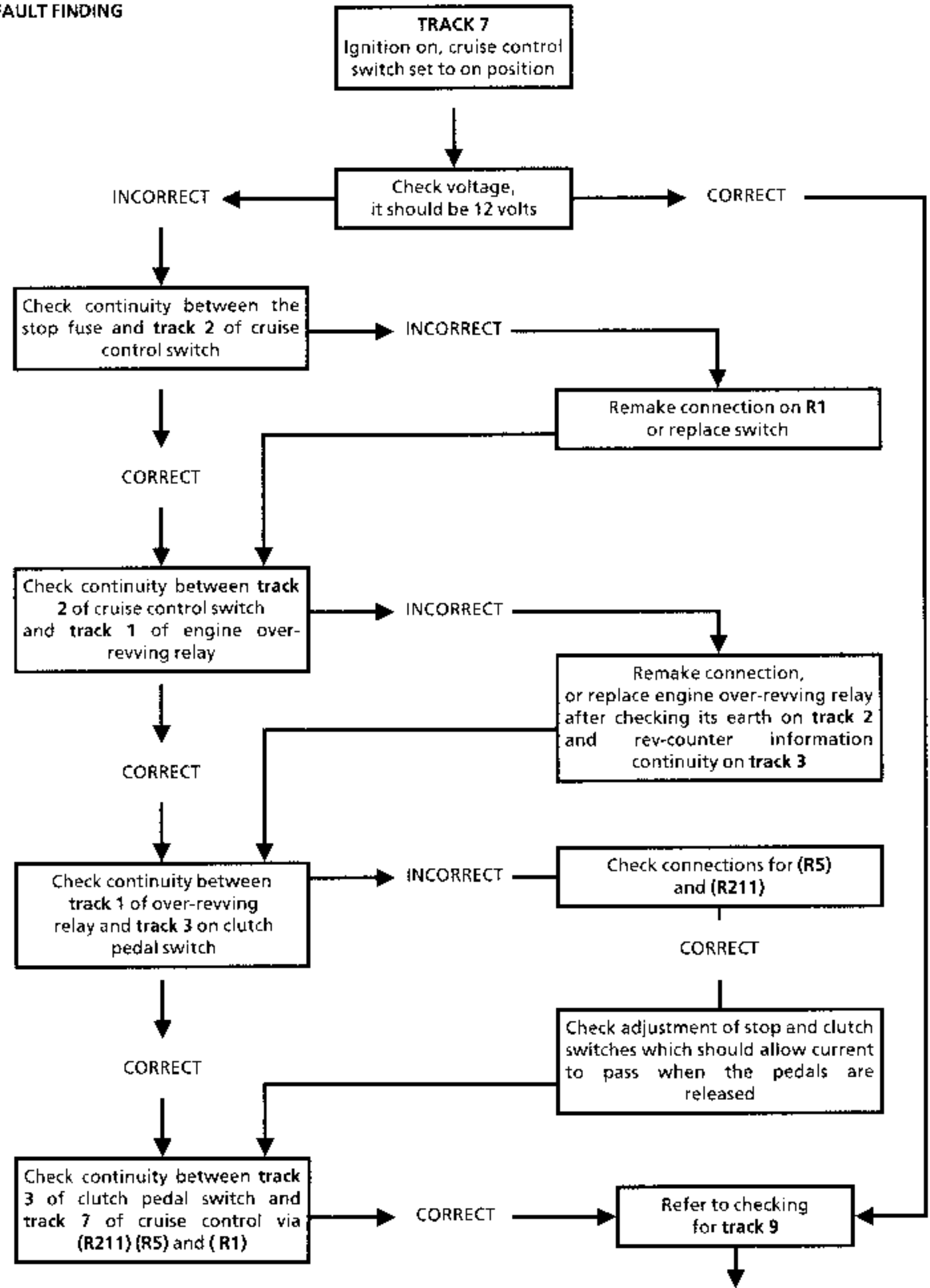
FAULT FINDING



FAULT FINDING



FAULT FINDING



FAULT FINDING

TRACK 9

To ensure speed information is being sent correctly by the speed sensor, set the on-board computer to fault finding sequence after disconnecting then reconnecting the battery, and check that when the vehicle is moving, the value is not zero (see Workshop Repair Manual for on-board computer) . To ensure that speed information is being correctly sent by the electric speedometer (if fitted to the vehicle) , operate the voice synthesiser, vehicle moving, for information of the type "*parking brake applied*" or "*front left hand door incorrectly closed*"

CORRECT

Replace the cruise control computer after checking the connection **(R1)** and continuity of the wire **track 9** are correct

INCORRECT

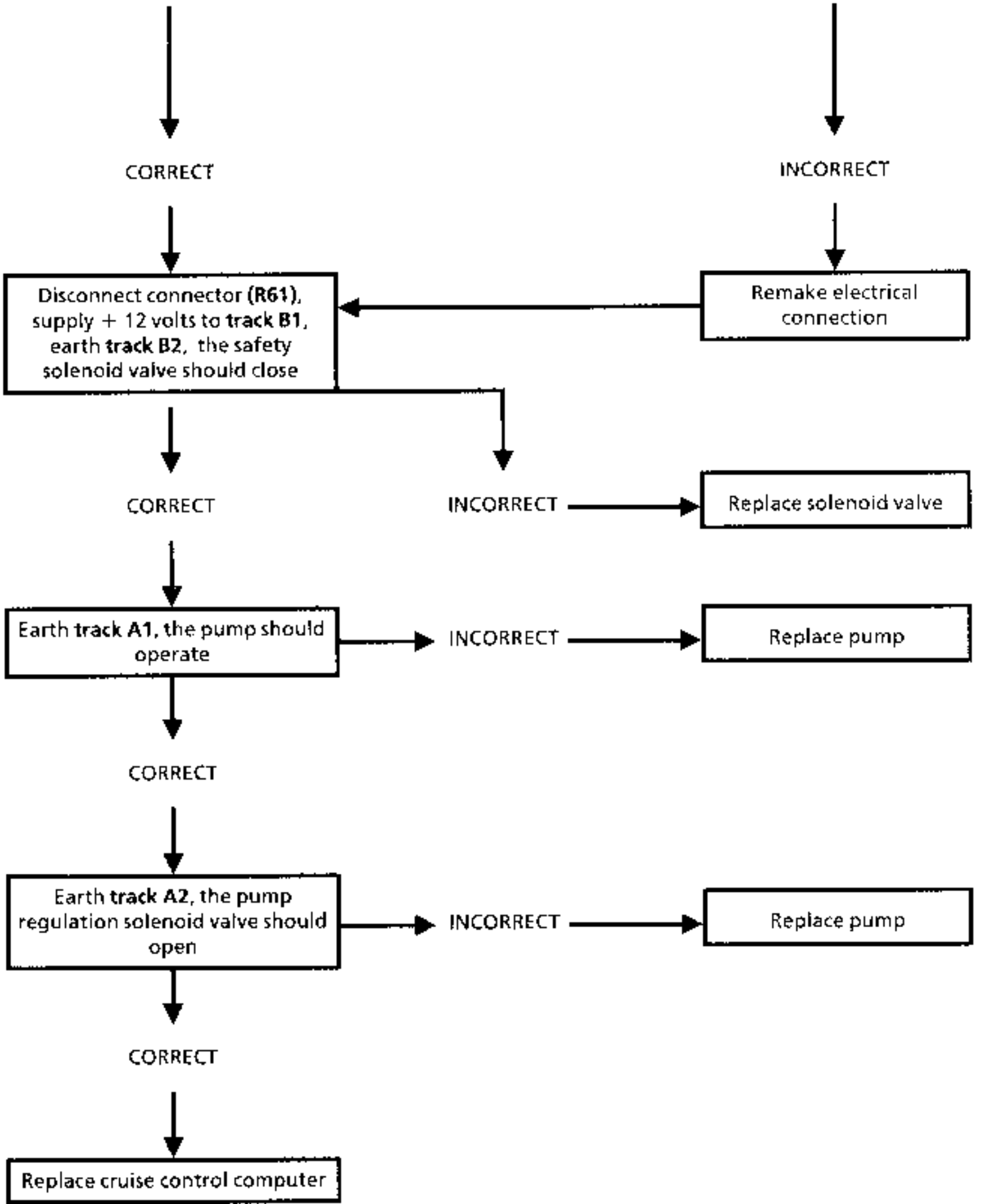
Replace speed sensor or electric speedometer if fitted to the vehicle

CHECKING THE PUMP AND SAFETY SOLENOID VALVE

Check the continuity between the following wires:

- **track 7** on cruise control computer and **track A** on pump
- **track 4** on cruise control computer and **track B** on pump,
- **track 6** on cruise control computer and **track C** on pump,
- then **track 7** on cruise control computer and **track 2** on safety solenoid valve,
- **track 1** on cruise control computer and **track 1** on safety solenoid valve.

FAULT FINDING



REMOVAL

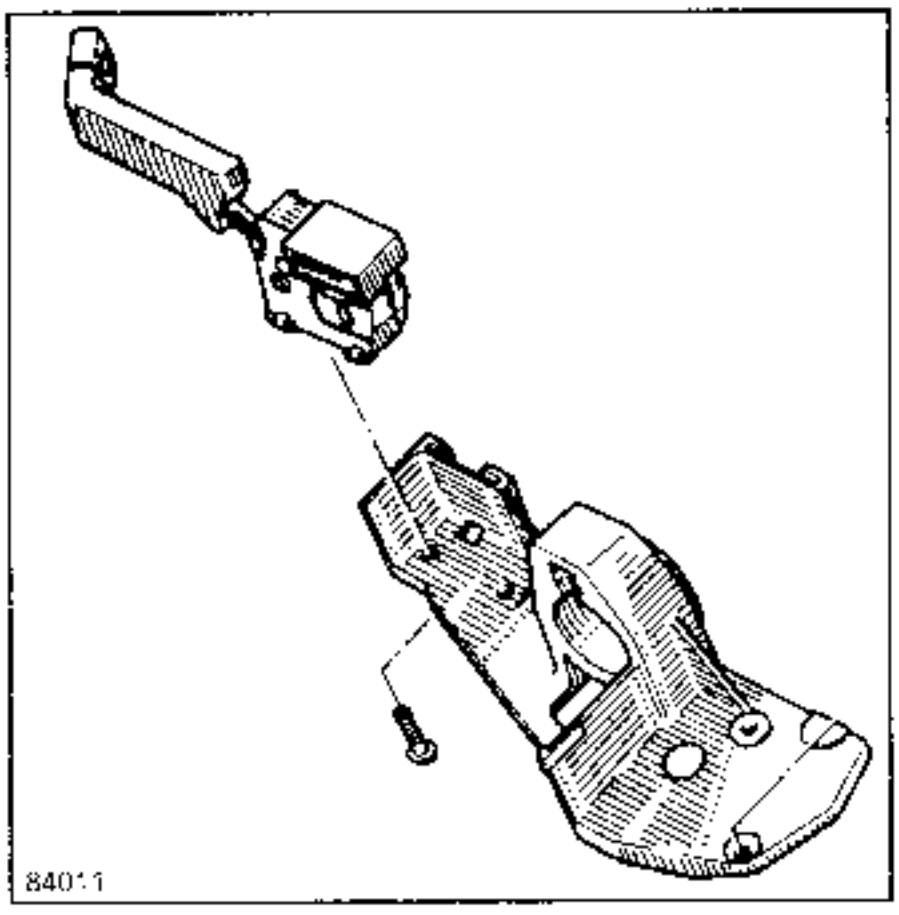
Disconnect the battery.

Remove :

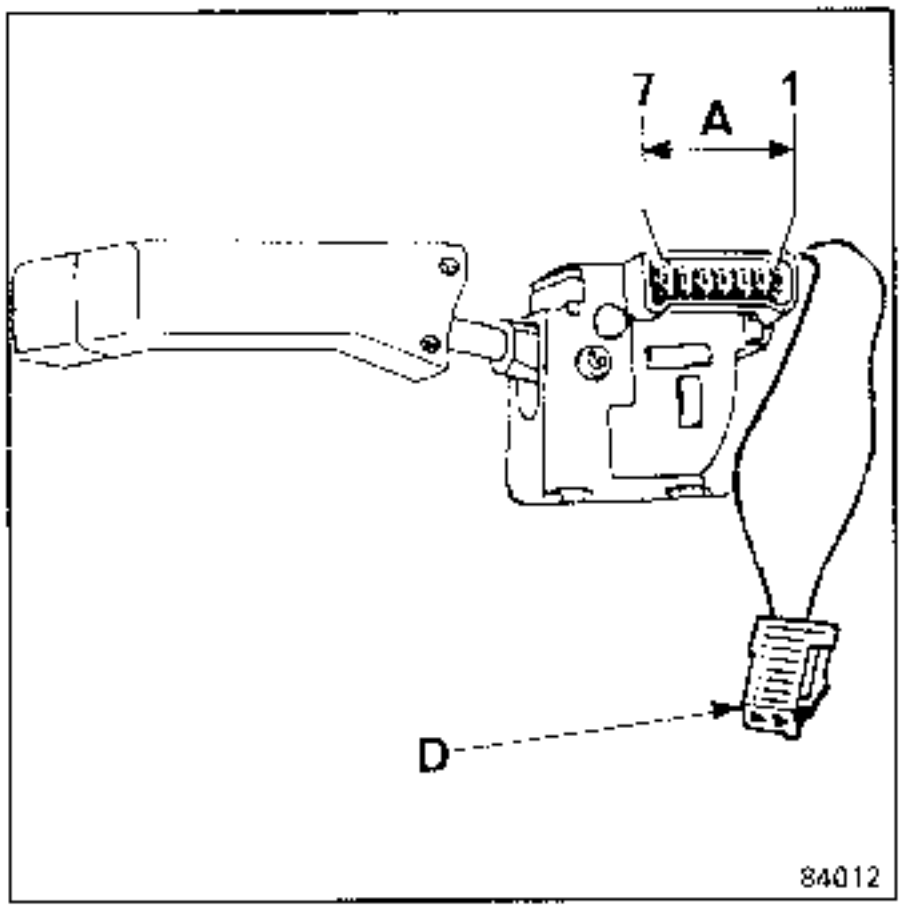
- the steering wheel,
- the two steering column half casings,
- the two screws,

Disconnect the connectors.

Remove the switch stalk assembly



CONNECTIONS



CONNECTIONS

(A) SCREEN WIPER CONNECTOR

1 Timed sweep input
2 + after ignition
3 High speed
4 Low speed
5 Park/Timer
6 − after ignition
7 Screen washer

(D) ON-BOARD COMPUTER SWITCH CONNECTOR

REMOVAL

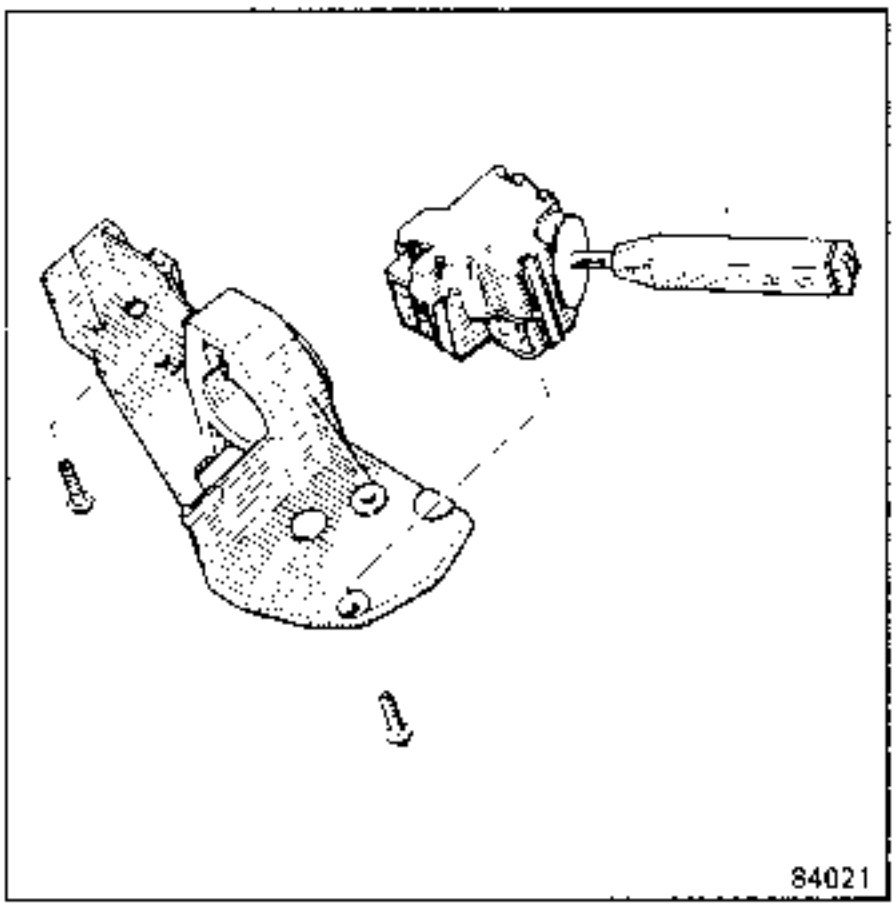
Disconnect the battery.

Remove :

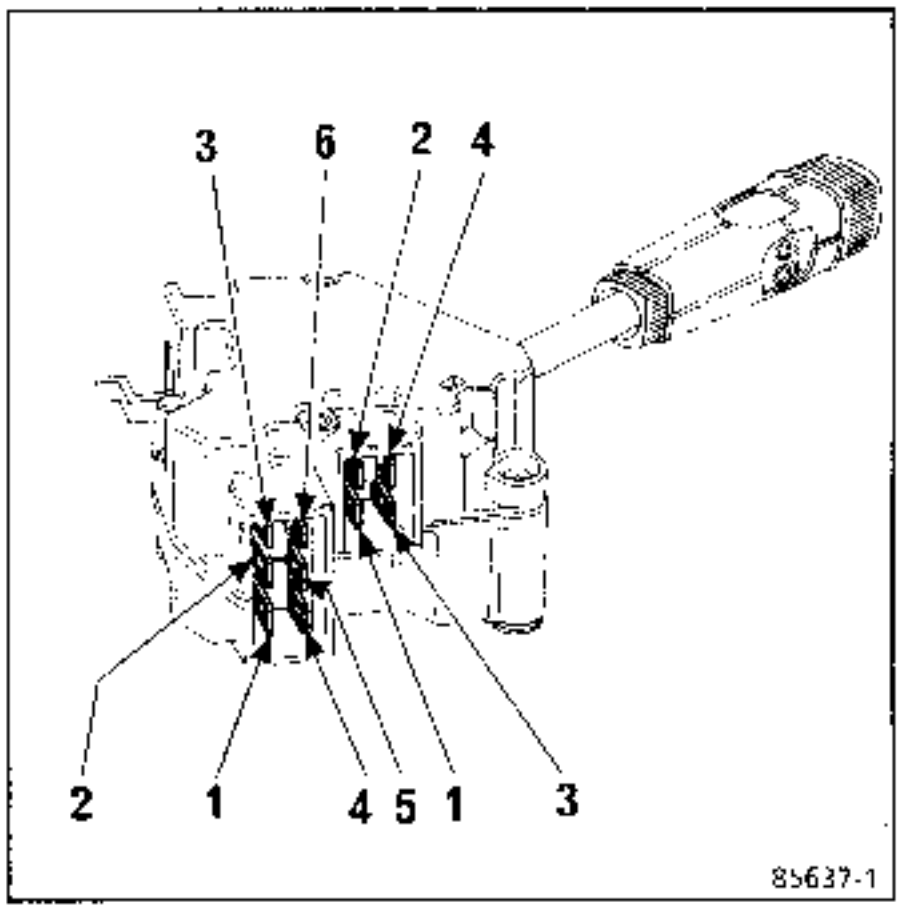
- the steering wheel,
- the two steering column half casings,
- the two screws,

Disconnect the connectors.

Remove the switch stalk assembly



CONNECTIONS



Lighting connector

Pin	Description
1	Main beam
2	Dipped beam
3	+ before ignition
4	Sidelights

Direction indicator - Horn Connector

Pin	Description
1	Horn
2	Rear fog light output
3	+ before ignition
4	RH direction indicator
5	Flasher unit
6	LH direction indicator

REMOVAL

Disconnect the battery.

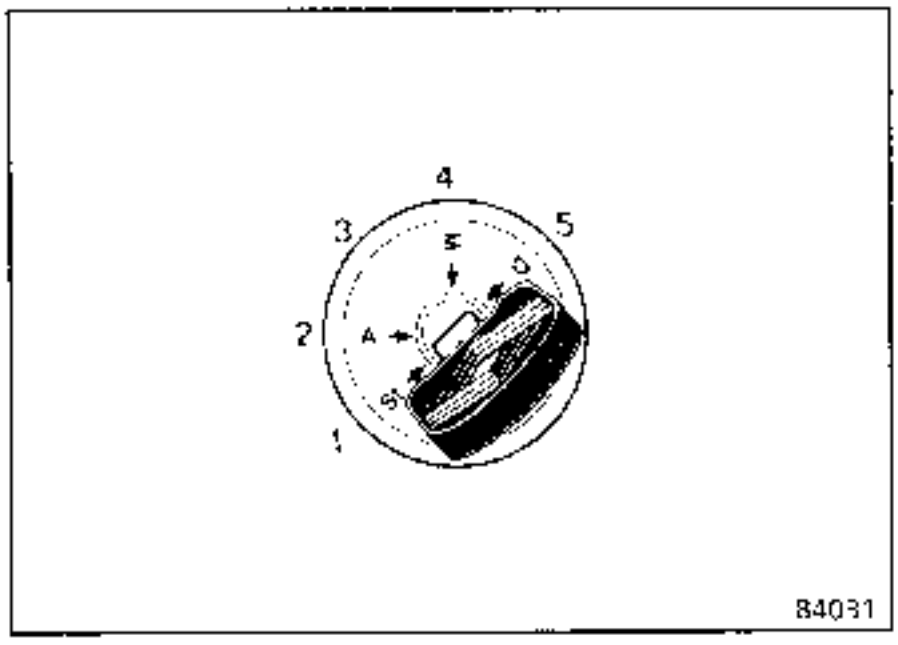
Remove:

- the steering column half casings,
- the switch cover.

Disconnect the black and the grey connectors.

Remove the switch securing screws using a cranked screwdriver.

Place the key in the "garage" position (3).

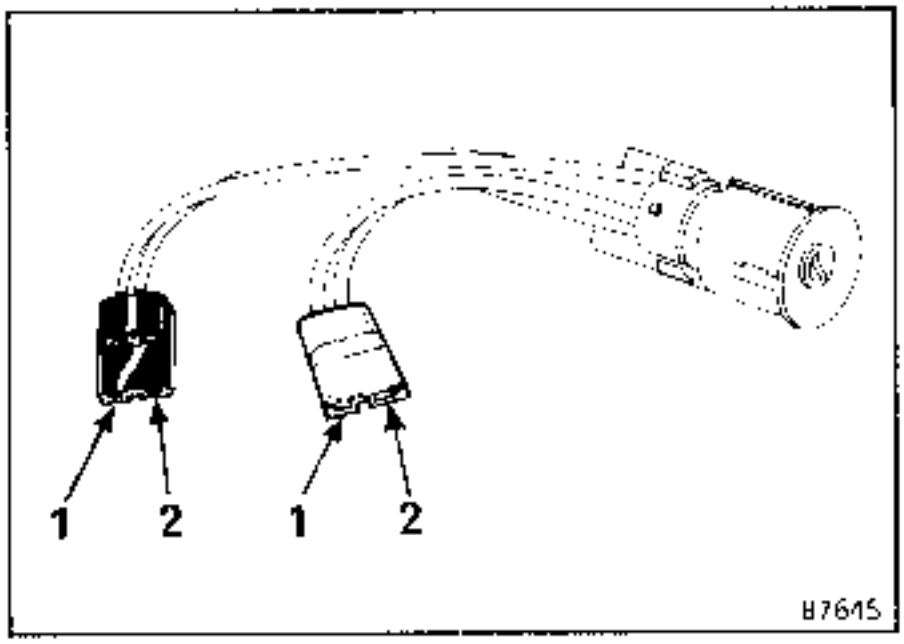


Press the retaining lugs and take out the switch.

REFITTING (special point)

Ensure that the wiring is correctly positioned.

CONNECTIONS



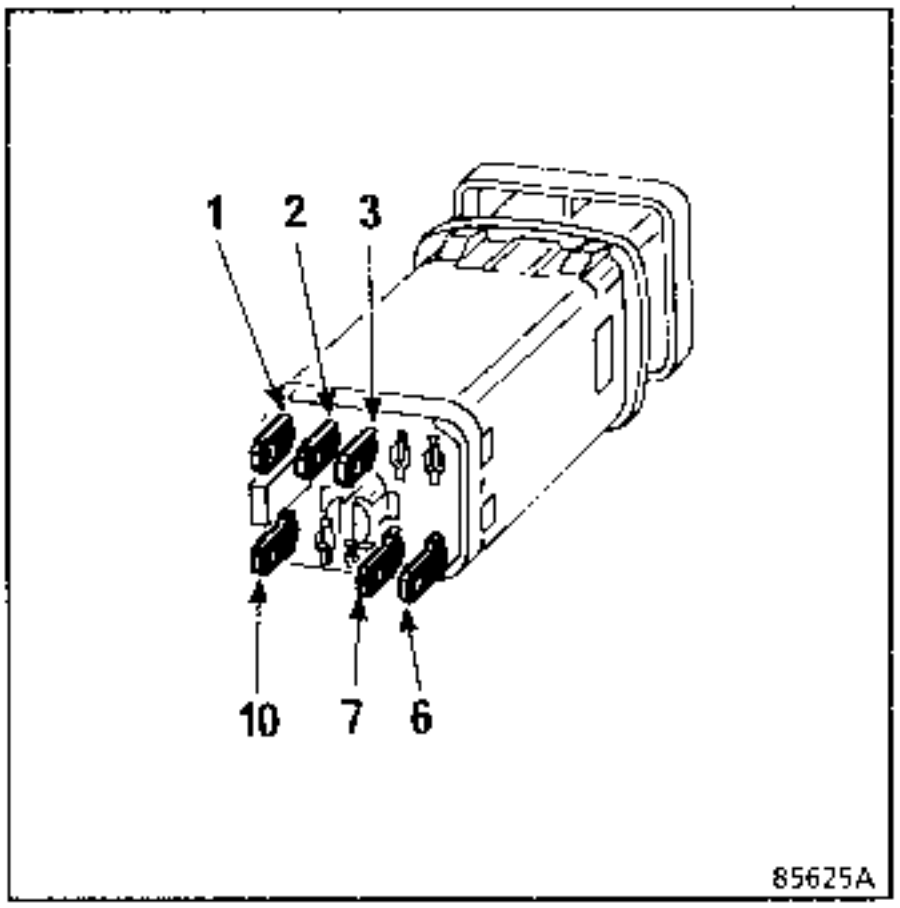
Black connector

Pin	Description
1	+ before ignition
2	Starter

Grey connector

Pin	Description
1	Accessories
2	+ after ignition

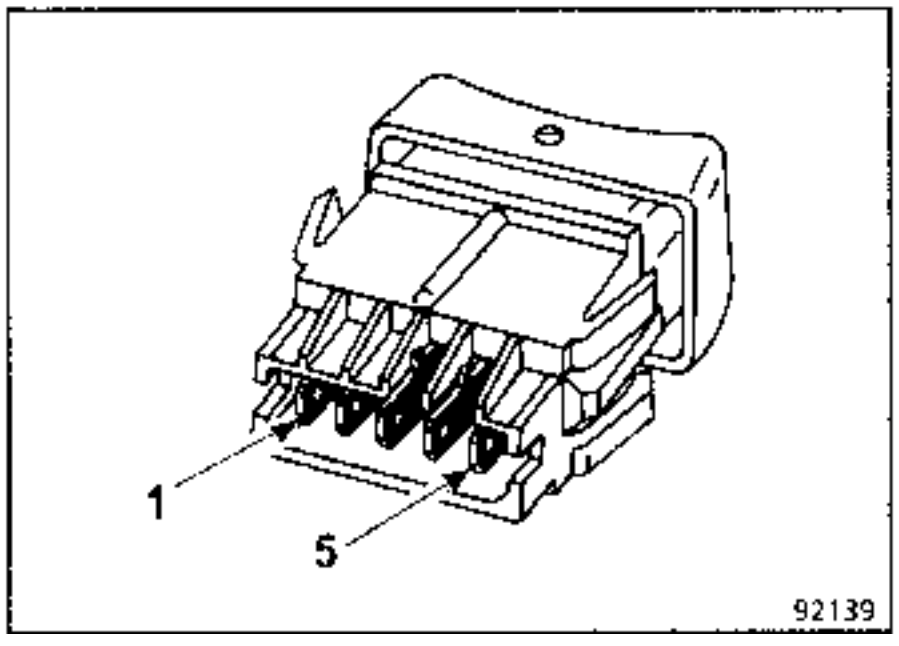
HEATED REAR SCREEN SWITCH
(1st arrangement)



CONNECTIONS

1 + after ignition
2 Relay control
3 Lighting +
6 Not used
7 Earth
10 Warning light

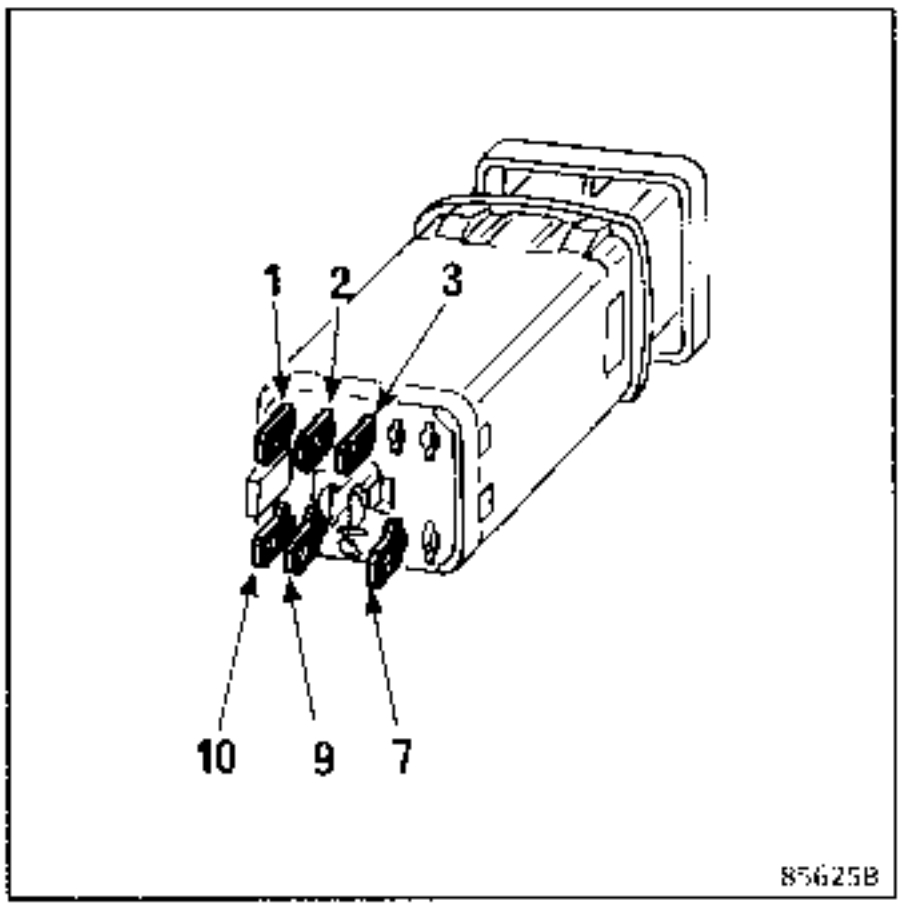
(2nd arrangement)



CONNECTIONS

1 Warning light
2 Screen relay –
3 + after ignition
4 Earth
5 Lighting +

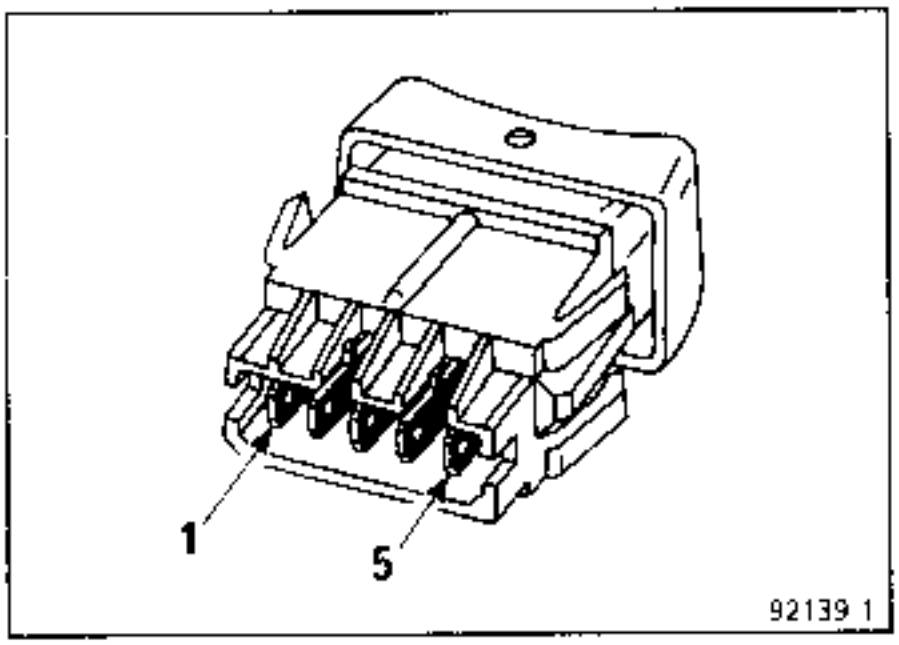
REAR FOG LIGHTS
(1st arrangement)



CONNECTIONS

1 To fog light fuse
2 Supply
3 Lighting
7 Earth
9 Not used
10 Warning light

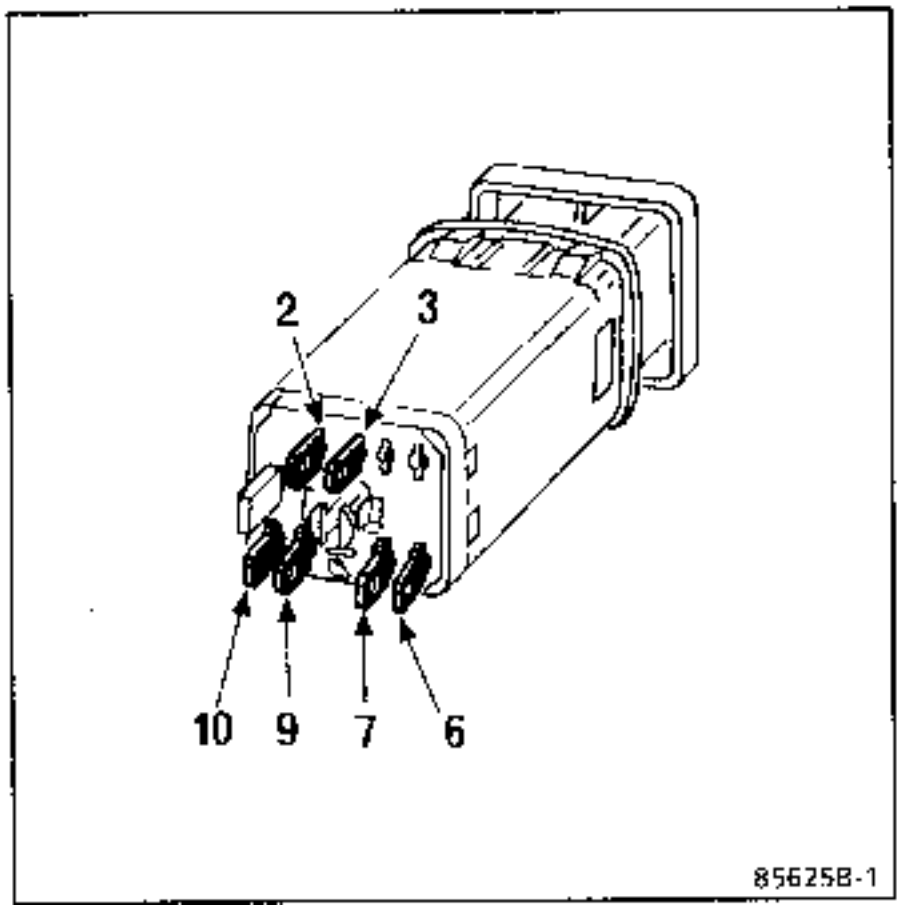
REAR FOG LIGHTS
(2nd arrangement)



CONNECTIONS

1 Warning light
2 Rear fog light -
3 Rear fog light +
4 Lighting +
5 Earth

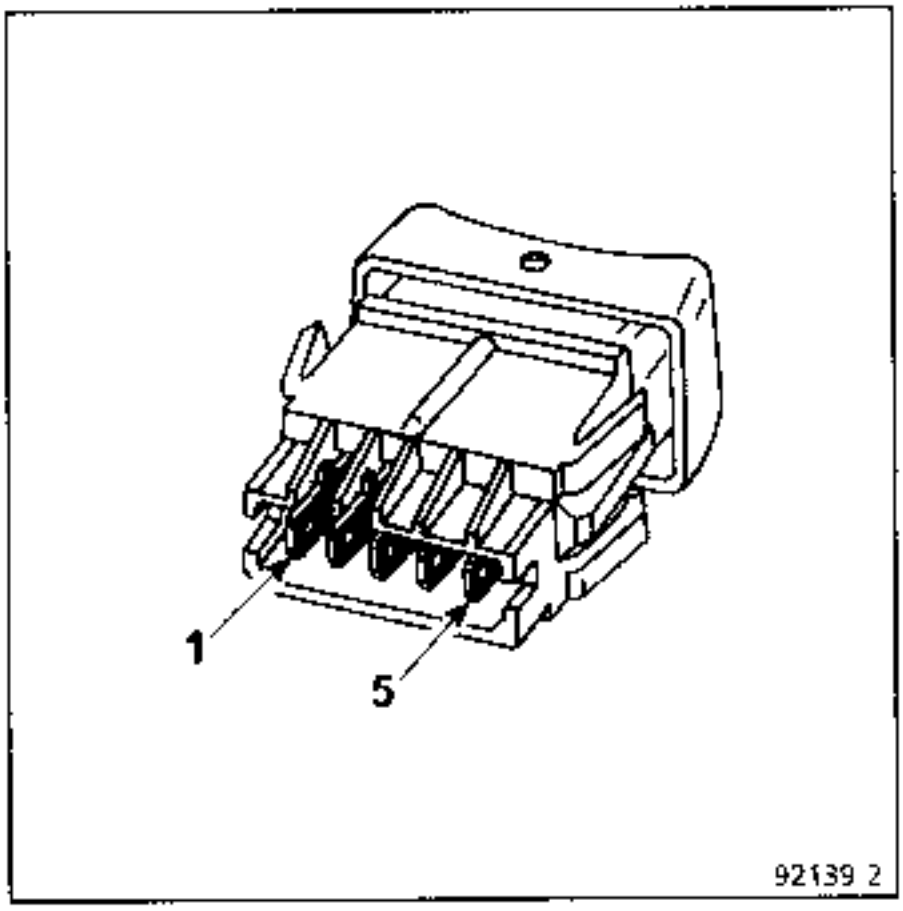
FRONT FOG LIGHTS
(1st arrangement)



CONNECTIONS

2 Supply
3 Lighting
6 Not used
7 Earth
9 Relay energising
10 Warning light

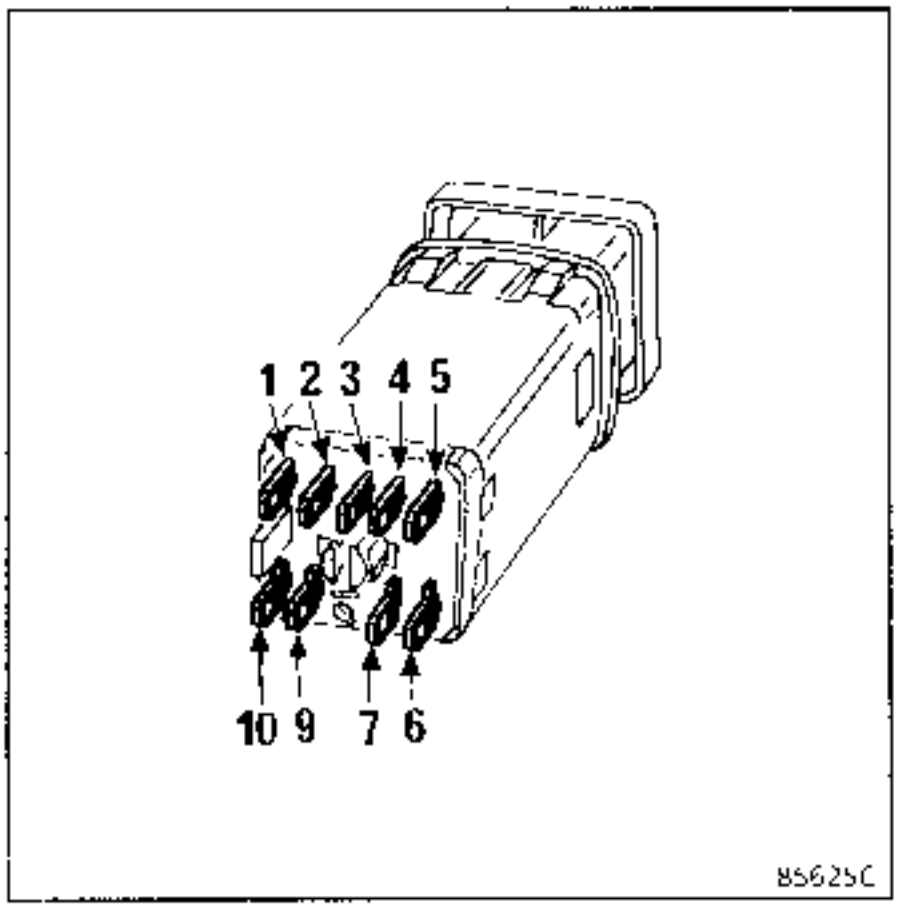
(2nd arrangement)



CONNECTIONS

1 Not used
2 Front fog light +
3 Lighting +
4 Lighting +
5 Earth

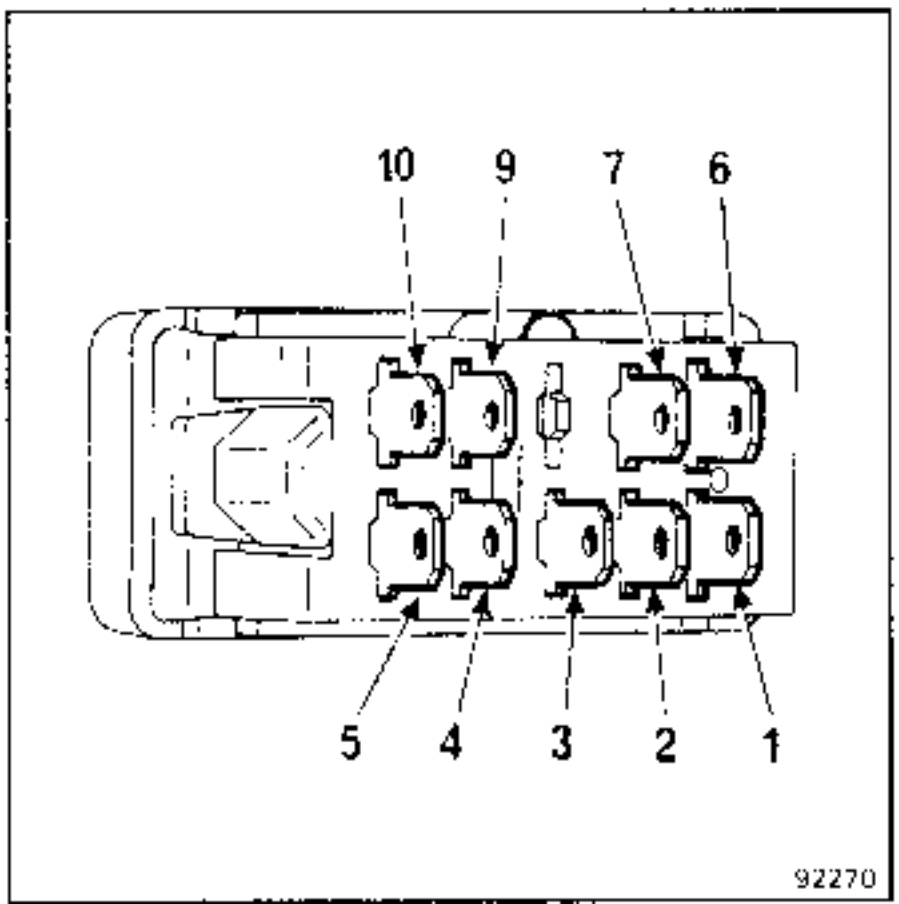
HAZARD WARNING LIGHTS
(1st arrangement)



CONNECTIONS

1 RH direction indicator
2 LH direction indicator
3 Lighting
4 + before ignition
5 + after ignition
6 Flasher unit + (fuse)
7 Earth
9 Direction indicator control switch
10 Warning light

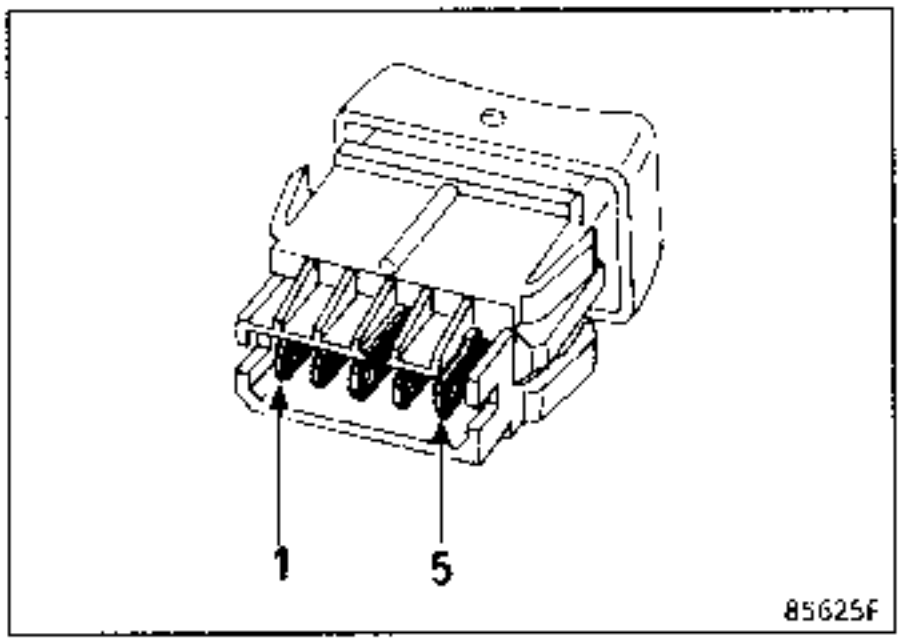
(2nd arrangement)



CONNECTIONS

1 Lighting +
2 + after ignition
3 + before ignition
4 Flasher unit
5 LH direction indicator
6 RH direction indicator
7 Hazard warning light repeater
9 Direction indicator fuse +
10 Earth

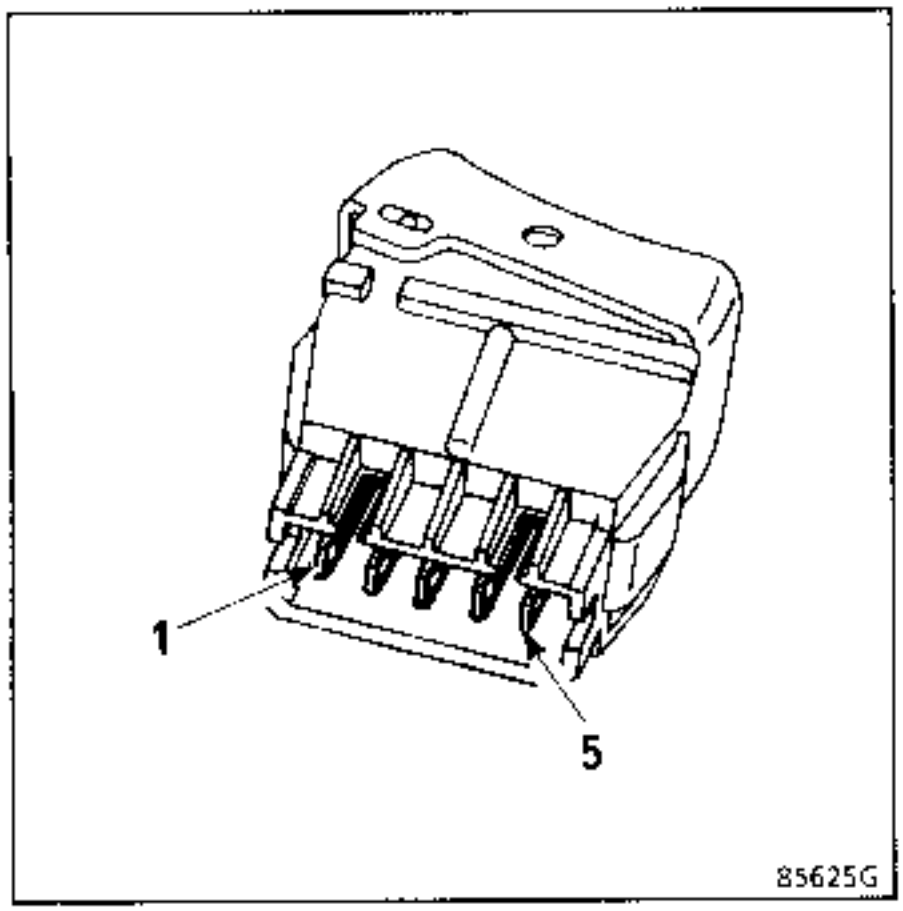
DOOR LOCKS
(1st and 2nd arrangements)



CONNECTIONS

1 Lock doors
2 Lighting +
3 + before ignition
4 Earth
5 Unlock doors

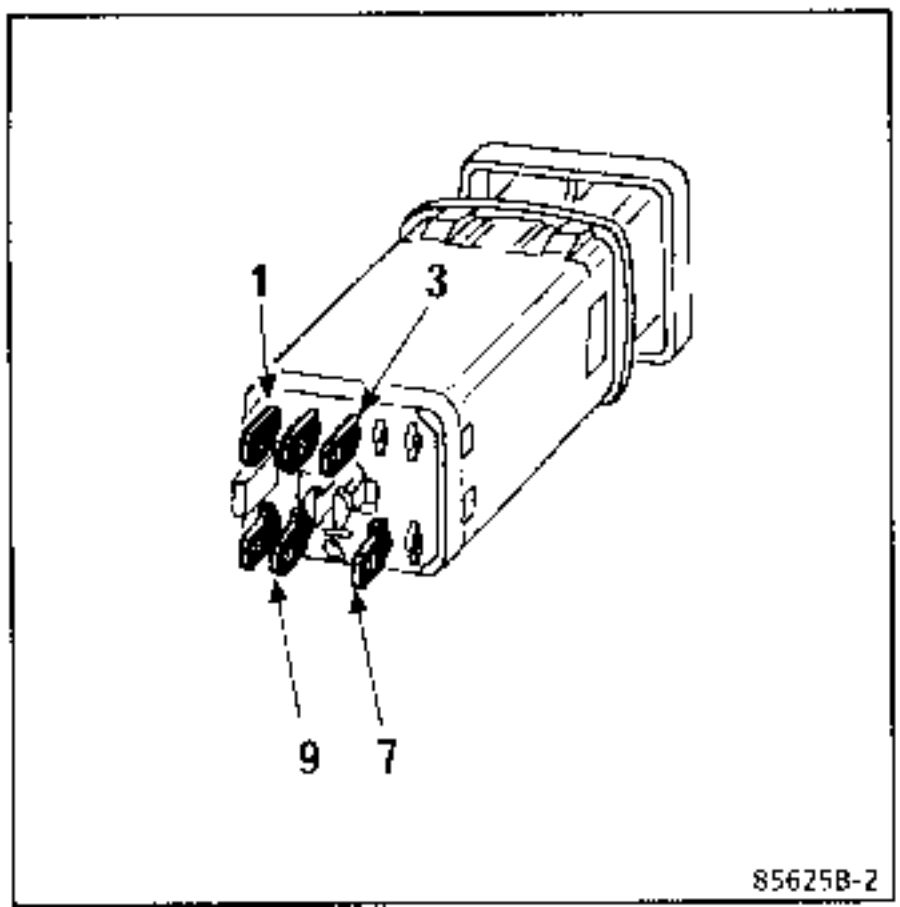
WINDOW RISER LOCKING SWITCH



CONNECTIONS

1 Not used
2 To passenger switch lock (earth)
3 Earth
4 Lighting earth
5 Lighting

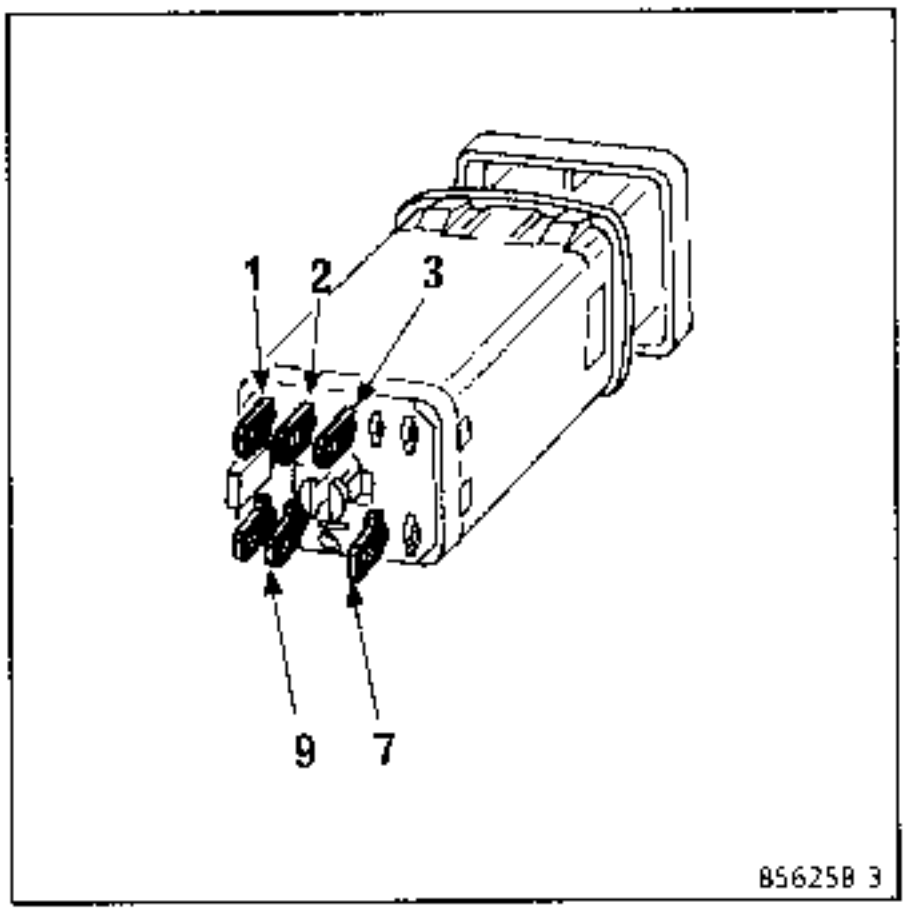
REAR SCREEN WIPER SWITCH
(1st arrangement)



CONNECTIONS

1 Timed sweep
3 Lighting
7 Earth
9 After ignition

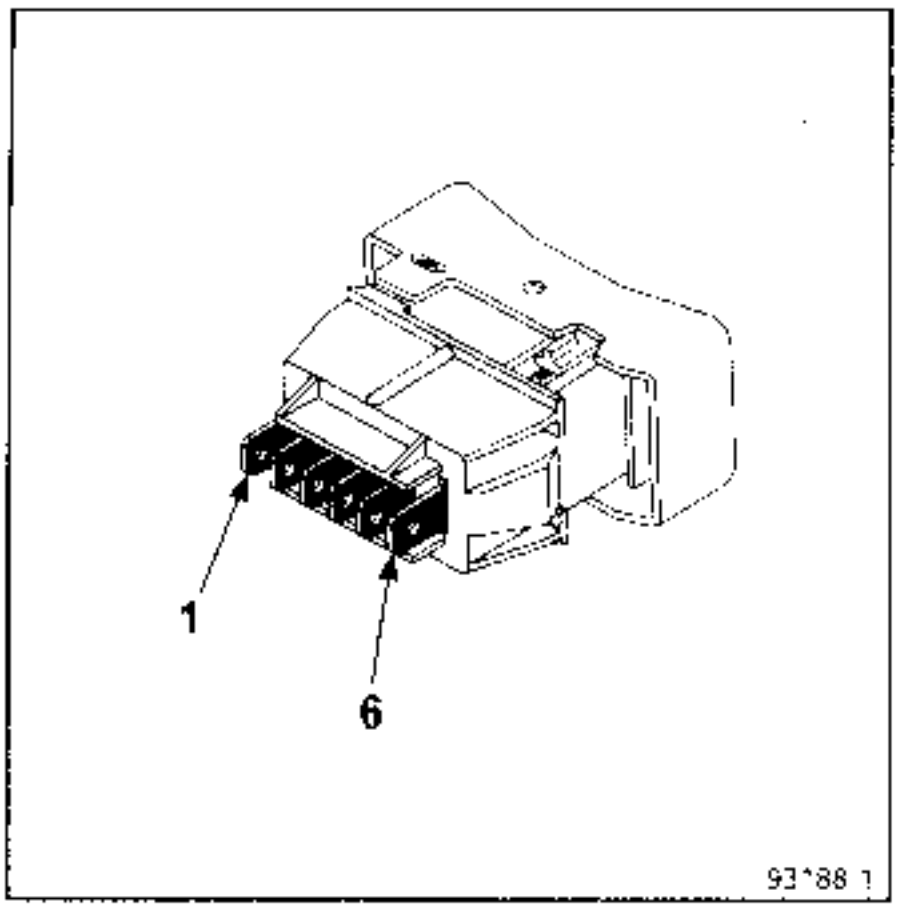
SCREEN WASHER SWITCH



CONNECTIONS

1 To pin 10 on screen wiper switches
2 Washer pump +
3 Lighting
7 Earth
9 + after ignition

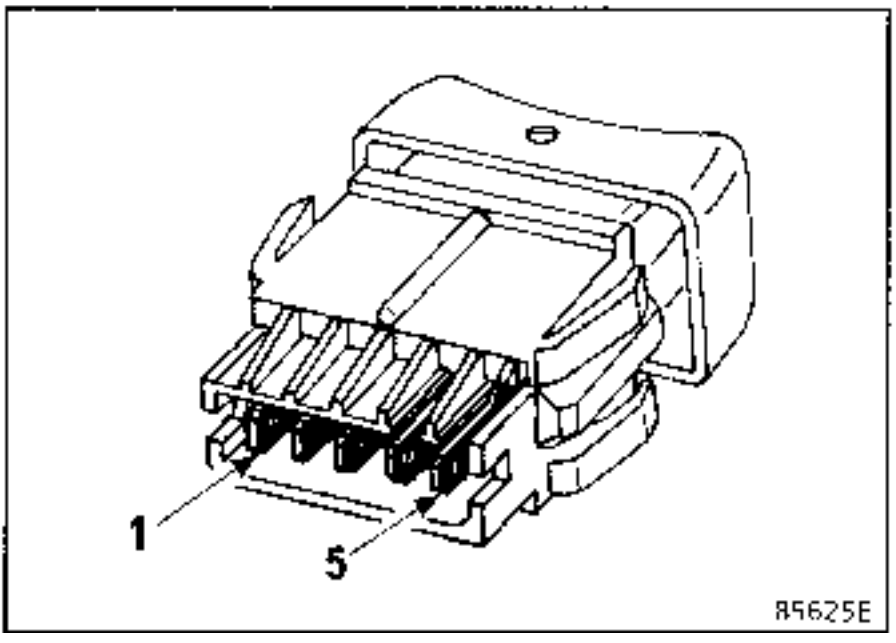
REAR SCREEN WASHER SWITCH
(2nd arrangement)



CONNECTIONS

1 Washer pump +
2 Wiper motor −
4 + after ignition
5 Lighting
6 Earth

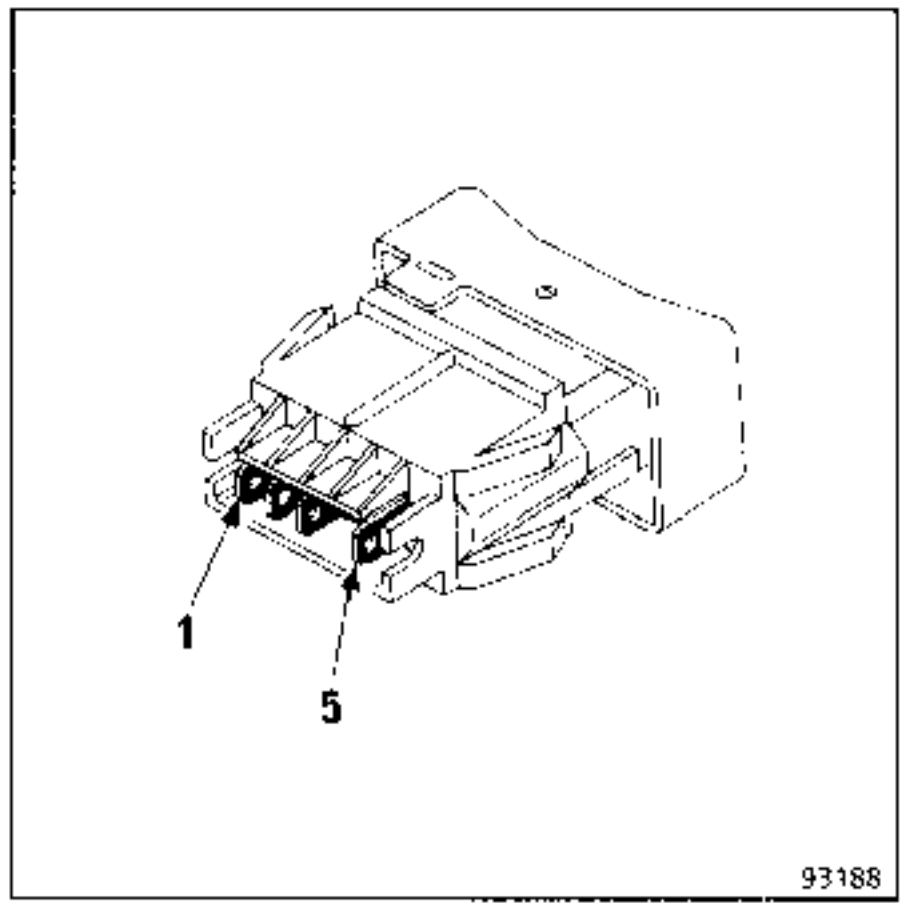
WINDOW RISER SWITCH
(1st arrangement)



CONNECTIONS

1 Motor
2 Earth
3 − after ignition
4 Lighting +
5 Motor

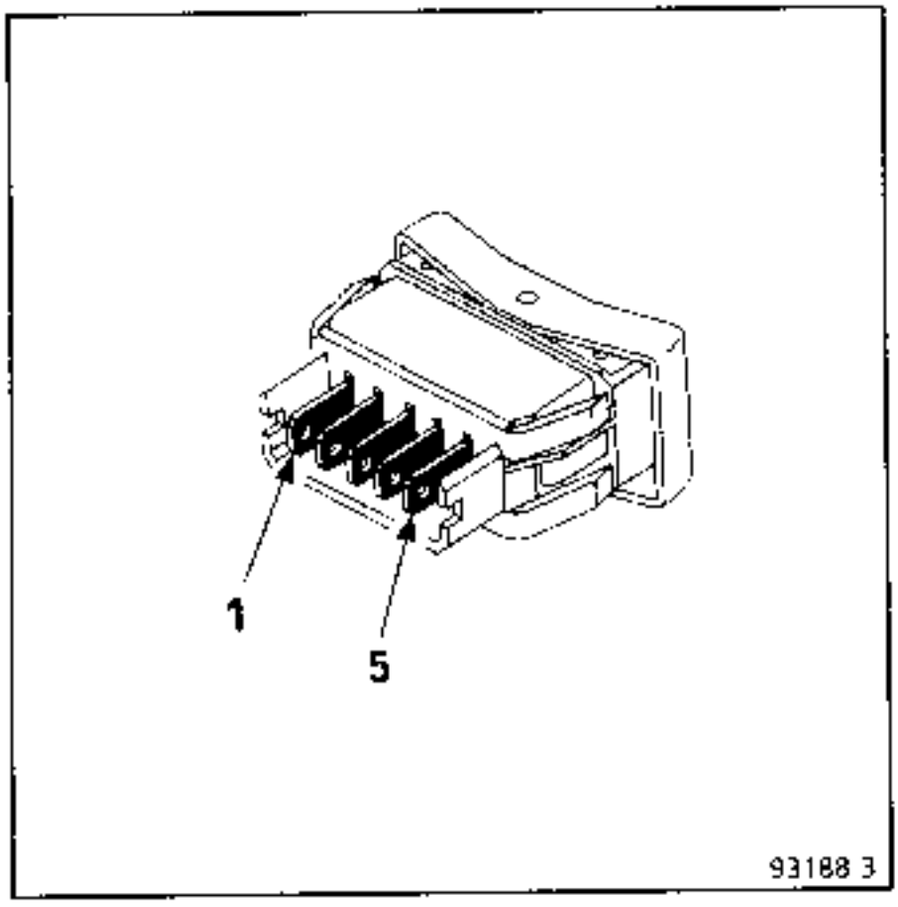
VOICE SYNTHESISER SWITCH



CONNECTIONS

1 Synthesiser
2 Lighting +
3 Synthesiser
5 Earth

REAR WINDOW RISER SWITCH

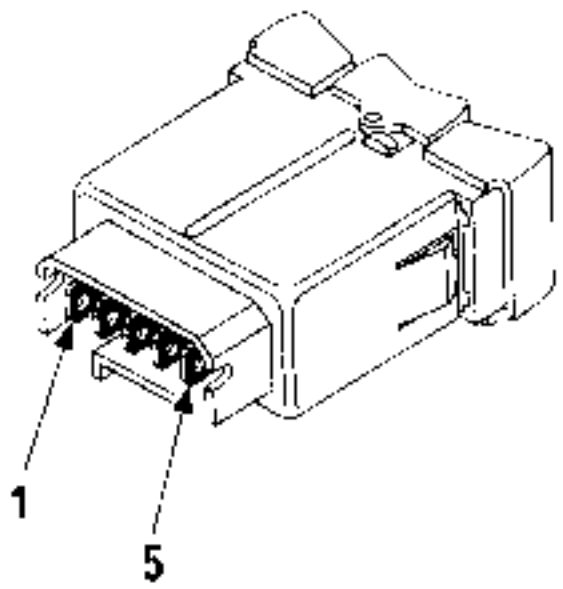


CONNECTIONS

1 Motor
2 Earth
3 + after ignition
4 Lighting +
5 Motor

WINDOW RISER (ONE-TOUCH) SWITCH
(2nd arrangement)

NOTE : The one-touch unit is an integral part of the switch.

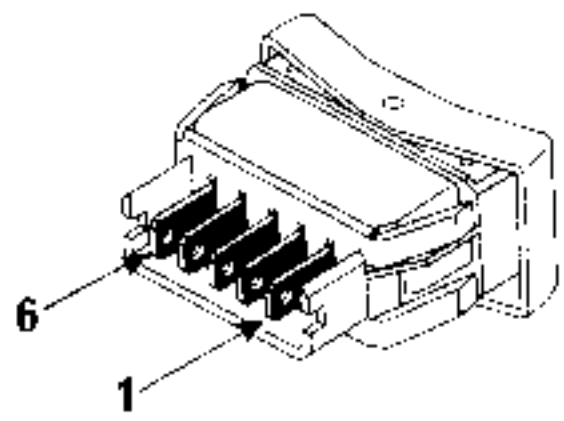


93188-7

CONNECTIONS

1 Motor
2 Earth
3 + after ignition
4 Lighting +
5 Motor

PASSENGER SIDE WINDOW RISER SWITCH
(2nd arrangement)



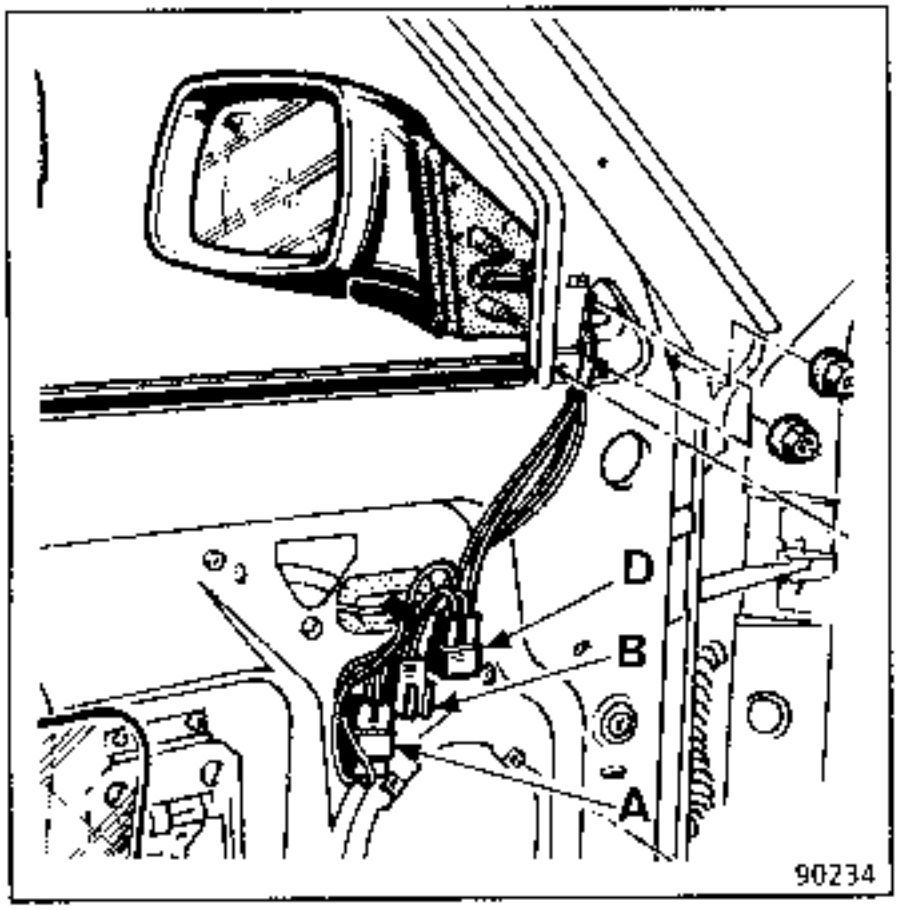
93188 4

CONNECTIONS

1 Lighting +
2 Motor
3 + after ignition or earth
4 + after ignition
5 + after ignition or earth
6 Motor

NOTE : It is possible to raise and lower the windows with the ignition off and the front doors open.

REAR VIEW MIRROR CONTROL



CONNECTIONS

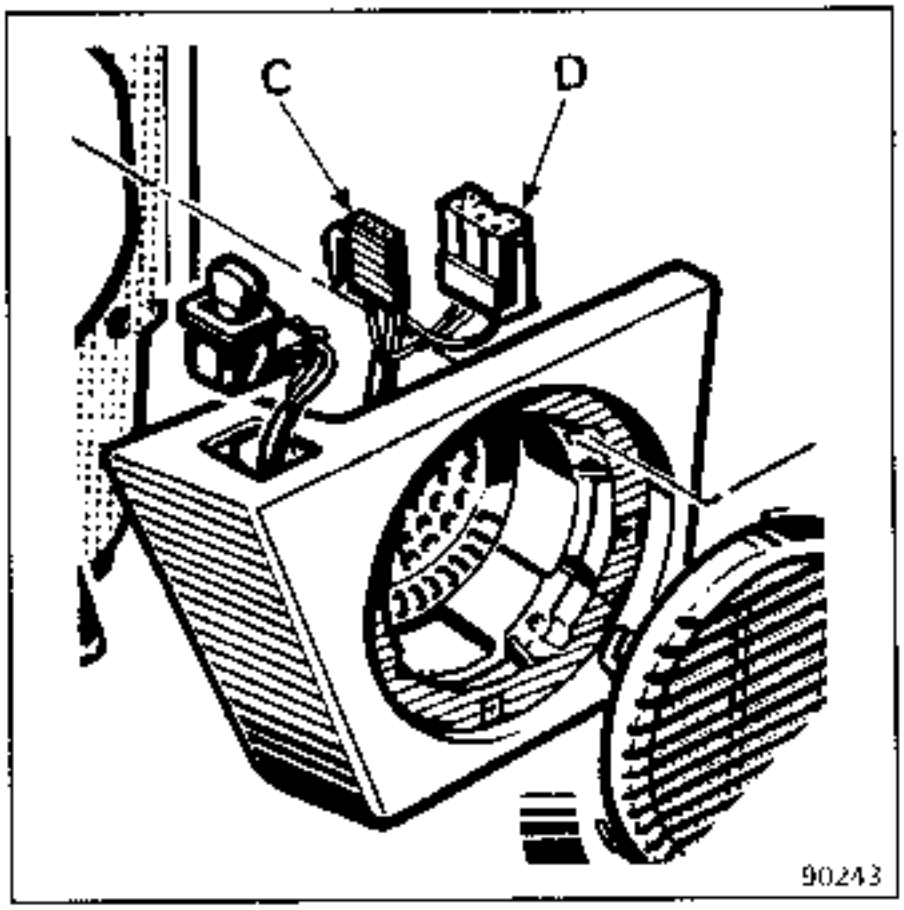
Connector **A** (white)

A1 Defrosting earth
A3 Temperature sensor

B2 + after ignition, defrosting
B3 Temperature sensor

Connector **B** (grey)

1 Rear view mirror common
2 Rear view mirror X
3 Rear view mirror Y



CONNECTIONS

Connector **C** (grey)

1 Rear view mirror, common
2 Rear view mirror adjustment, driver's side
3 Rear view mirror adjustment, passenger side

Connector **D** (black) 1st arrangement

A1 + before ignition
A3 Earth

B1 Passenger side rear view mirror, common
B2 Passenger side rear view mirror X
B3 Passenger side rear view mirror Y

Connector **D** (black) 2nd arrangement

A1 Passenger side rear view mirror adjustment
A2 + before ignition
A3 Passenger side rear view mirror adjustment

B1 Driver's side rear view mirror adjustment
B2 Driver's side rear view mirror adjustment
B3 Earth
B4 Rear view mirror, common

REMOVAL

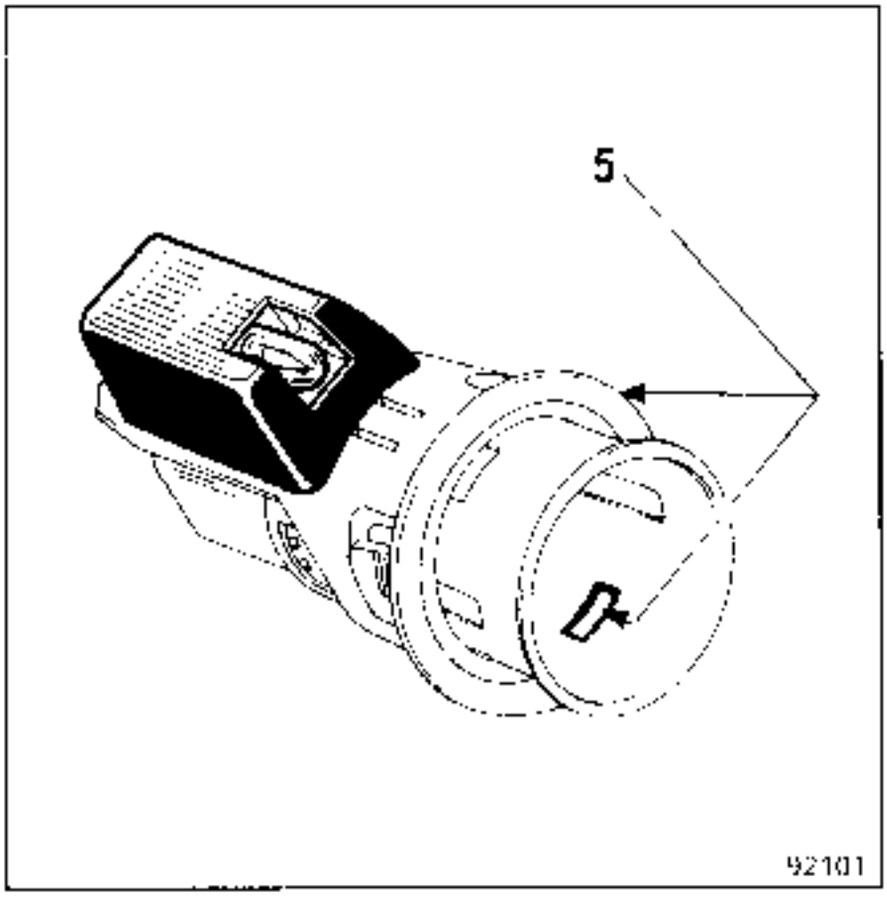
Disconnect the battery.

Remove the ash tray.

Remove the cigar lighter.

To remove the fixed part of the cigar lighter (metal section), push the back of its body whilst unclipping the two lugs (**5**).

Remove the connector.



Take out the plastic part by pushing the back of it

REMOVAL

Disconnect the battery.

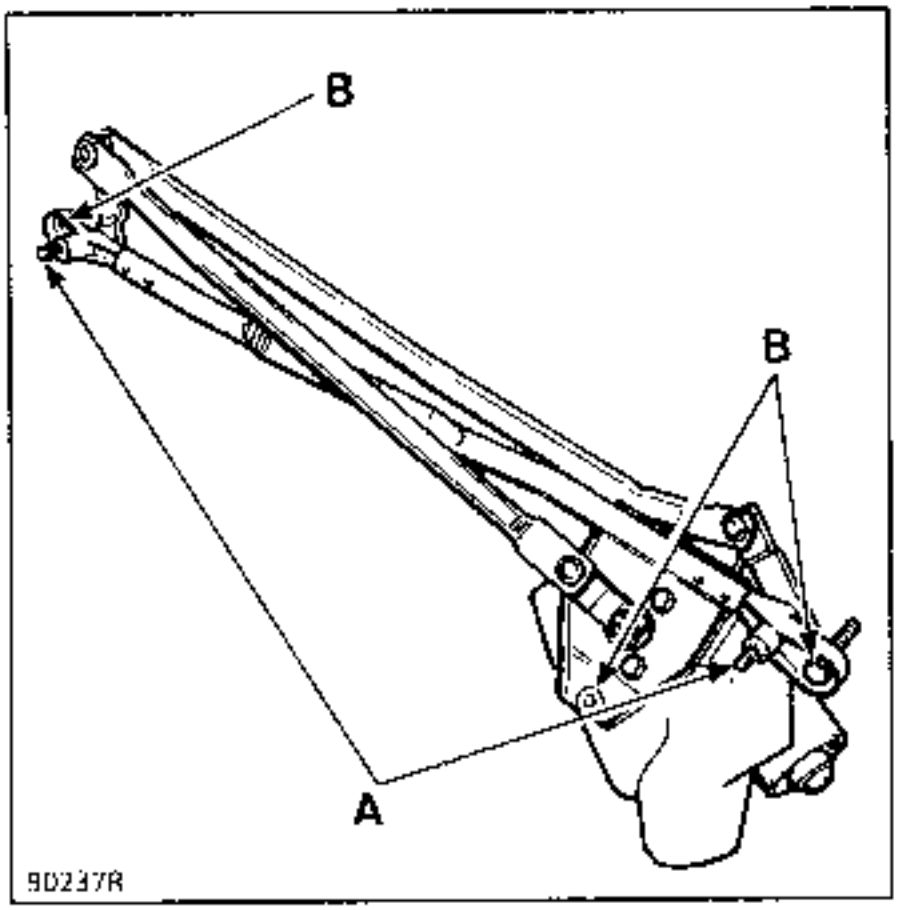
Remove the screws from the wiper arms.

Disengage the wiper arms from their shafts using tool **Elé. 1294-01** as mentioned in Technical Note number 1953.

Remove:
- the scuttle cross panel (7 screws),
- the three nuts (B) securing the mechanism.

Disconnect the connector.

Take out the mechanism.



REFITTING

Refit the mechanism and reconnect the connector.

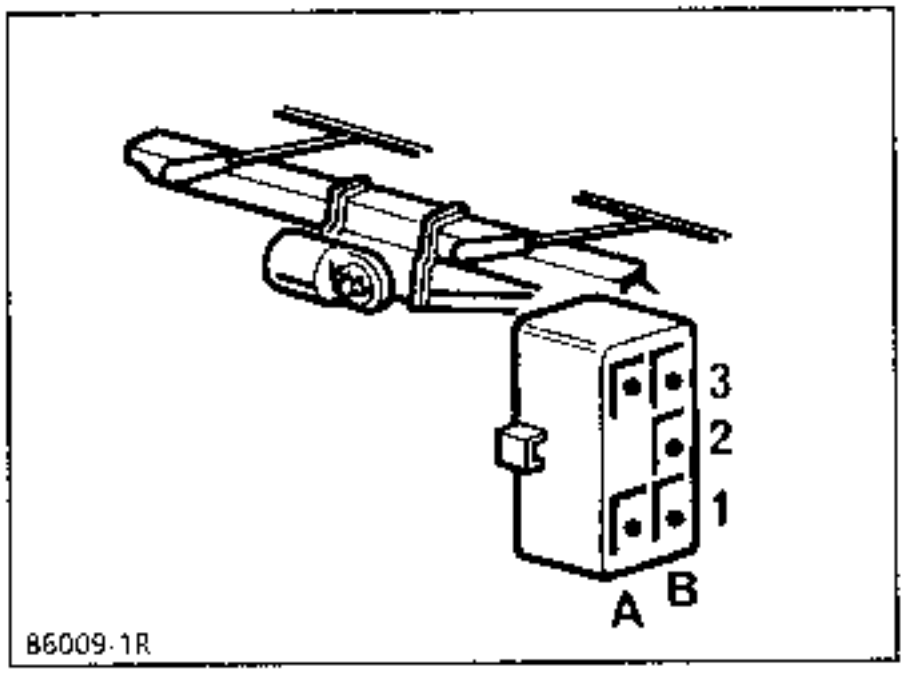
Check that the motor is correctly in the "park" position before refitting the wiper arms.

Clean the grooves on the wiper arm shafts using a metal brush.

Refit the wiper arms.

Fit the new screws and torque tighten them to 2 daN.m (± 15 %) using a torque wrench.

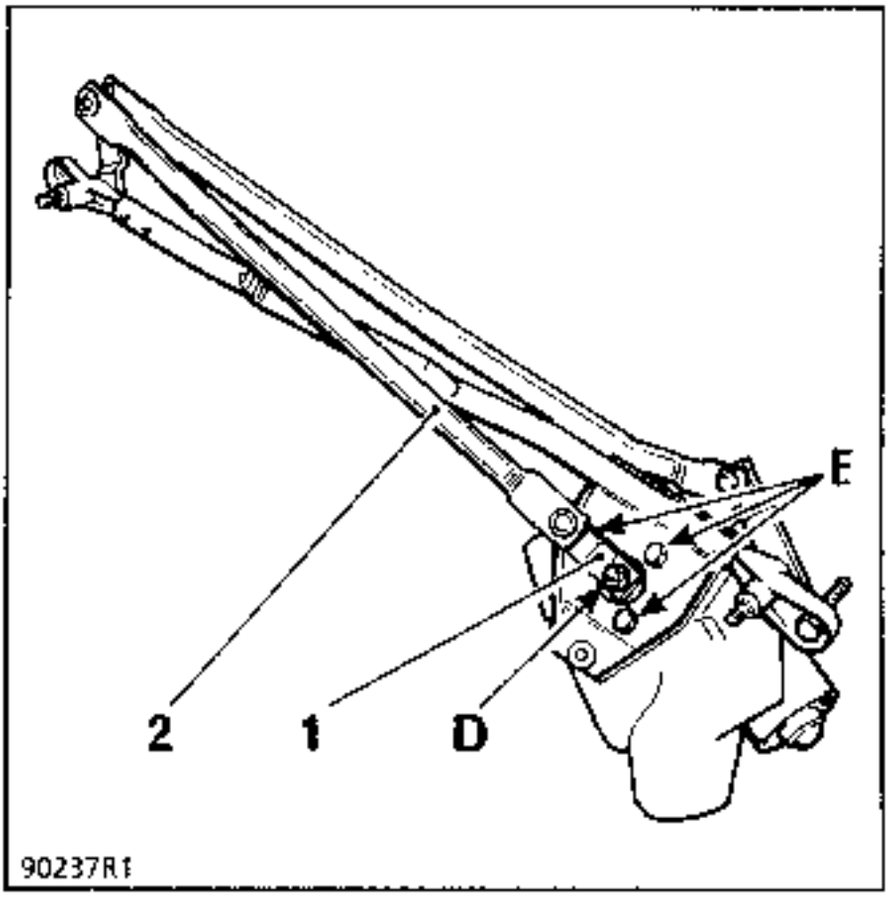
CONNECTIONS



A1 Fast speed
A3 Earth

B1 Low speed
B2 "Park" +
B3 "Park"

REMOVING THE MOTOR (mechanism removed)



Unscrew securing nut (D) which secures the drive link (1).

Remove the three screws (E) which secure the motor in place and remove the motor.

When refitting, ensure that links (1) and (2) are correctly aligned when the motor is in the park position.

REMOVAL

Disconnect the battery.

Remove:
- the wiper arm securing nut,
- the wiper arm from its shaft using special tool **Elé. 1294**.

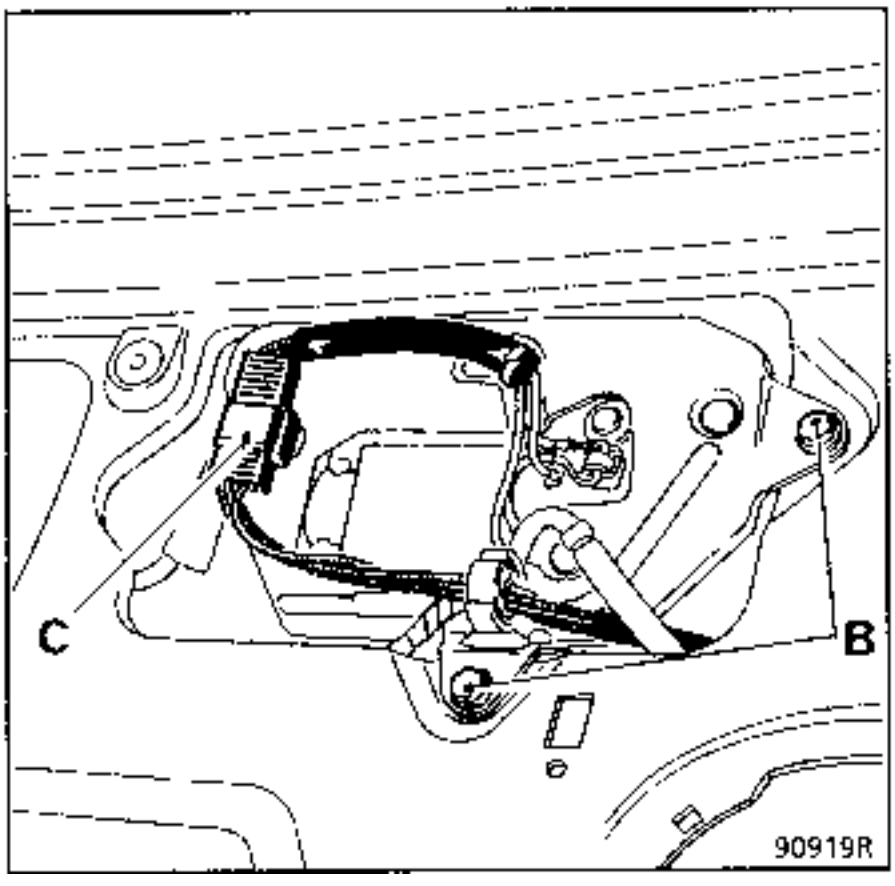
From the inside :

Remove the interior tailgate trim.

Remove the connector (locking tab C).

Take out the 2 screws (B).

Remove the motor.



REFITTING

When refitting, ensure that the motor is in the fixed park position before refitting the wiper arm.

Torque tighten the new nut to 2 daN.m (± 10 %).

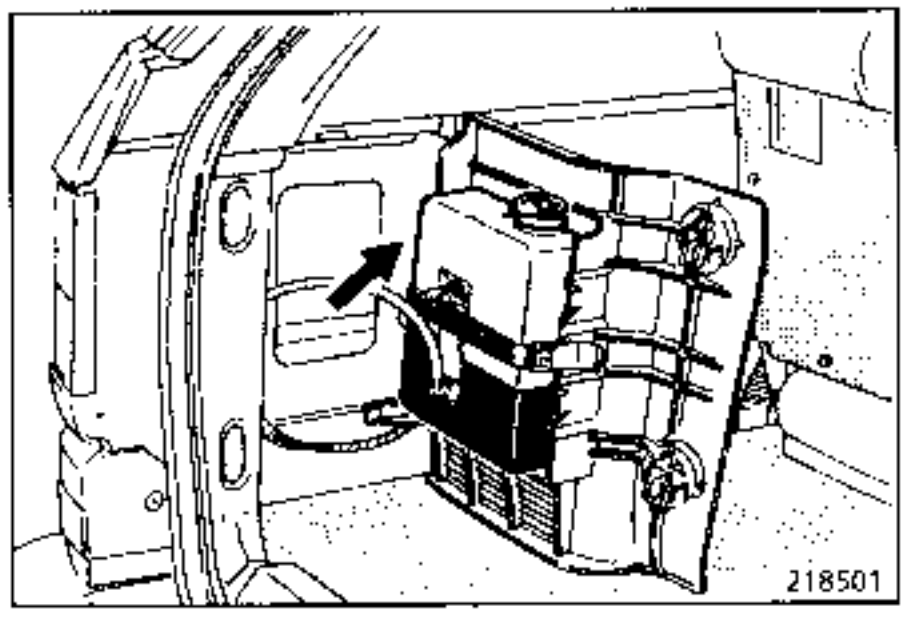
NOTE : The motor will only operate when the tailgate is closed.

CONNECTIONS

Pin	Description
1	Wiper +
2	Fixed park +
3	Earth

REAR SCREEN WIPER TIMER

The rear screen wiper timer is located behind the lefthand side panel trim, near the rear washer bottle.



REMOVAL

Disconnect the battery.

Remove:
- the wiper arm securing nut,
- the wiper arm from its shaft using special tool **Elé. 1294.**

From the inside :

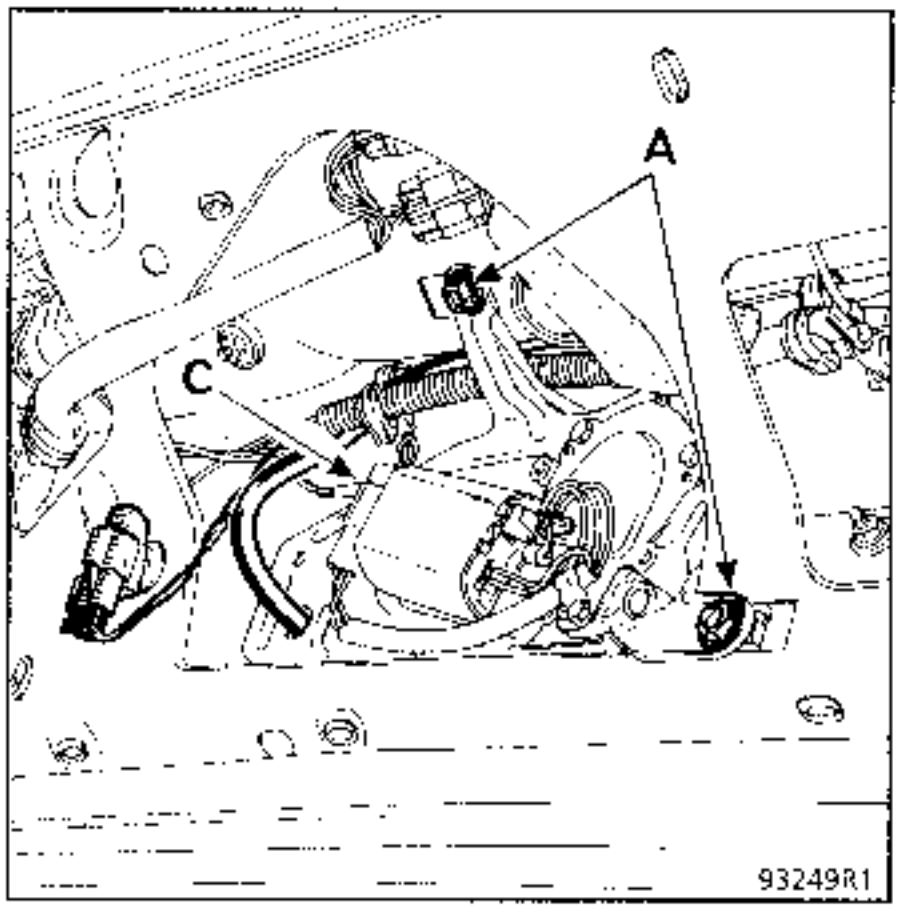
Remove the interior tailgate trim.

Remove the connector (locking tab C).

Take out the 2 screws (A).

Disconnect the washer jet pipe.

Remove the motor.



REFITTING

When refitting, ensure that the motor is in the fixed park position before refitting the wiper arm.

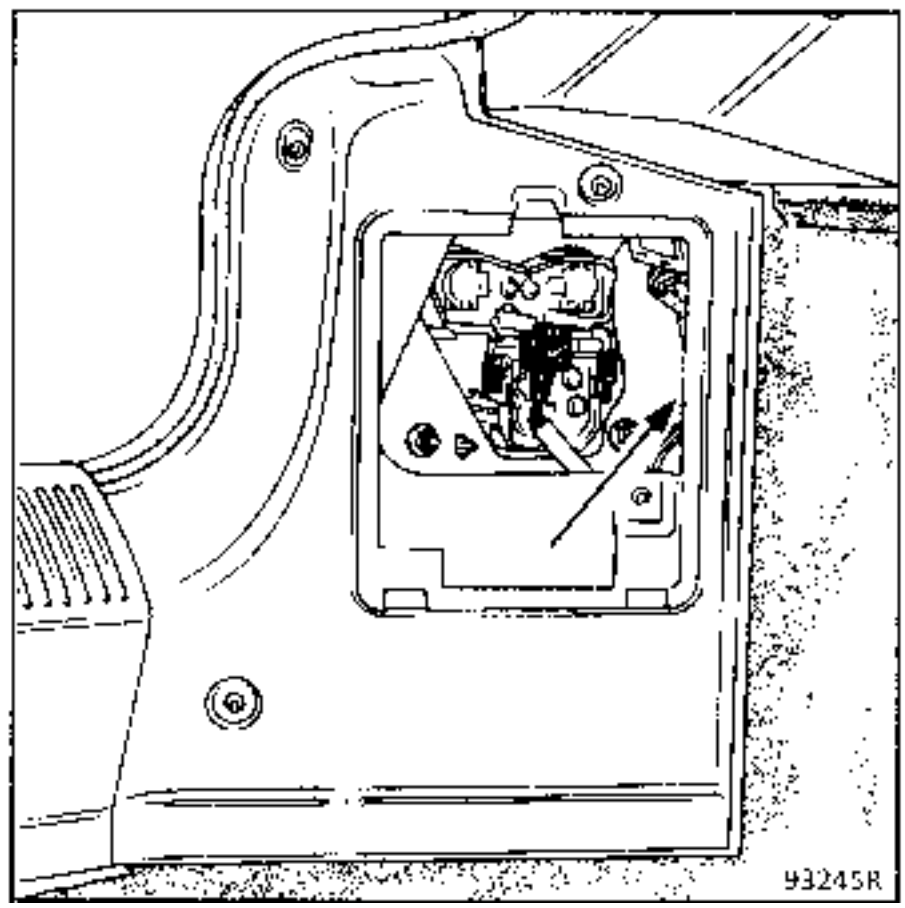
Torque tighten the new nut to 2 daN.m (± 10 %).

CONNECTIONS

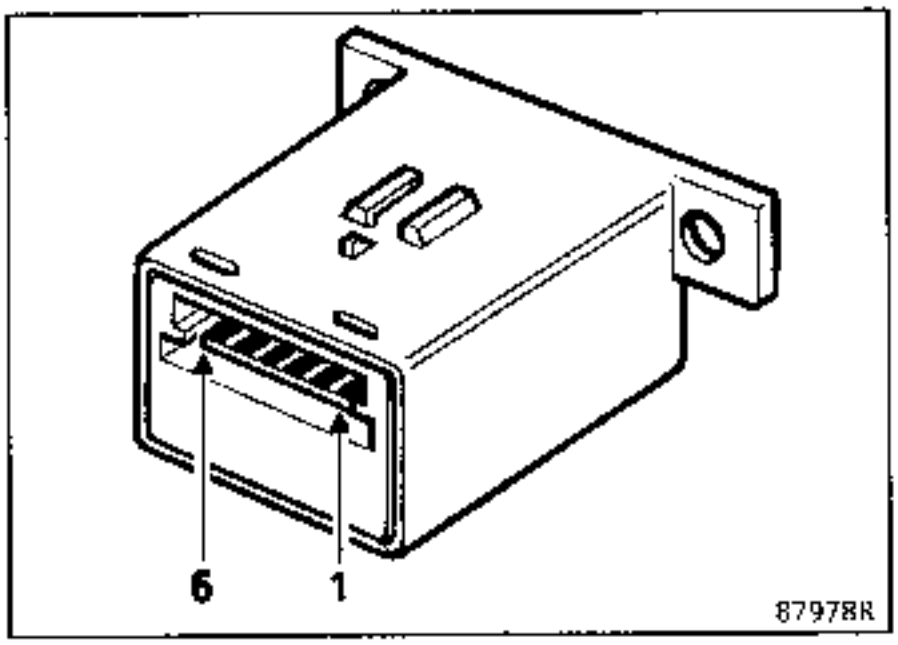
Pin	Description
1	Wiper +
2	Fixed park +
3	Earth

REAR SCREEN WIPER TIMER

The rear screen wiper timer is located behind the lefthand side panel trim, near the rear washer bottle.



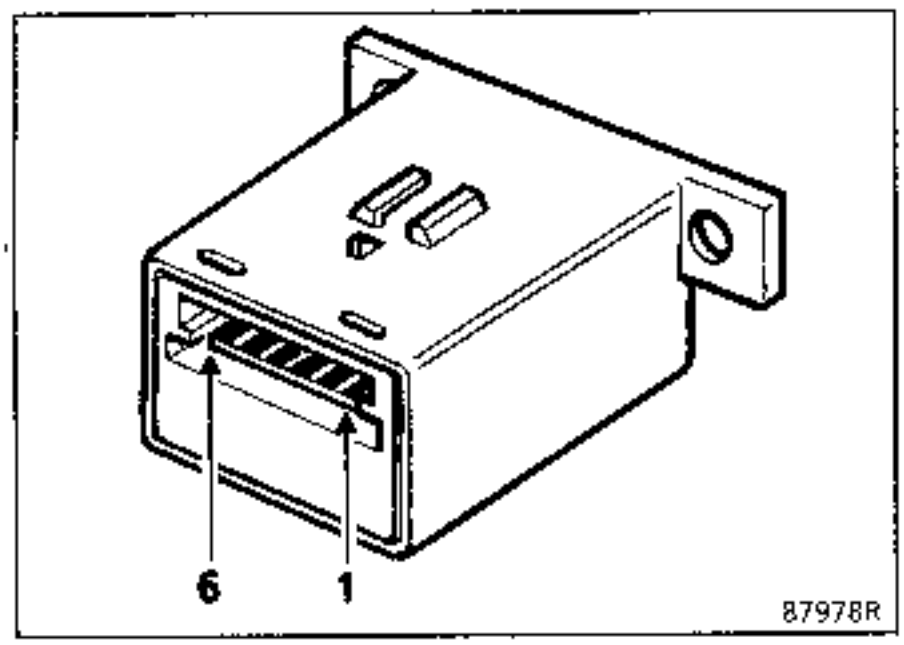
WINDSCREEN WIPER SWEEP TIMER



CONNECTIONS

Pin	Description
1	Earth
2	Washer pump +
3	Sweep timer control
4	Wiper fixed park
5	+ after ignition
6	Sweep timing signal to motor

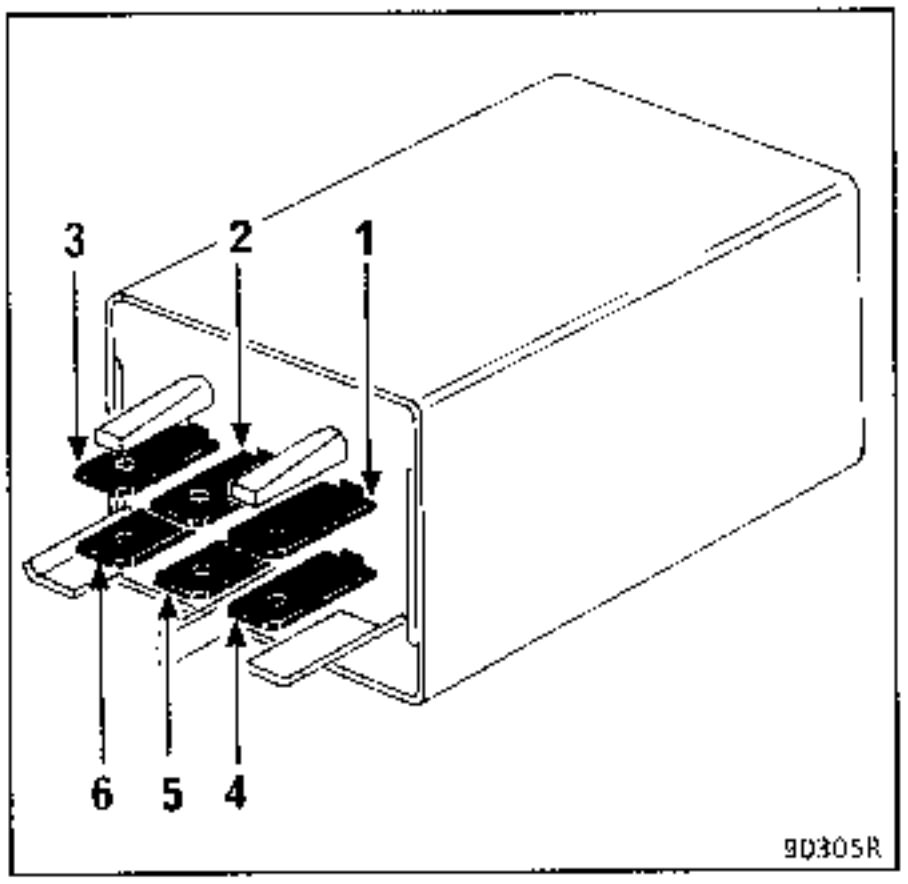
REAR SCREEN WIPER TIMER



CONNECTIONS

Pin	Description
1	Earth
2	Washer pump +
3	Sweep timer control
4	Earth
5	+ after ignition
6	Sweep timing signal to motor

DOOR LOCK RELAY TIMER



Timer delay : **3 seconds** ± 1

CONNECTIONS

Pin	Description
1	Doors locked control
2	Timer earth
3	Doors opened control
4	CPE* motor closed supply
5	+ before ignition
6	CPE* motor open supply

*CPE : ELECTRIC DOOR LOCKS

NOTE : On vehicles fitted with an engine immobiliser system, this timer is incorporated in the decoder unit.

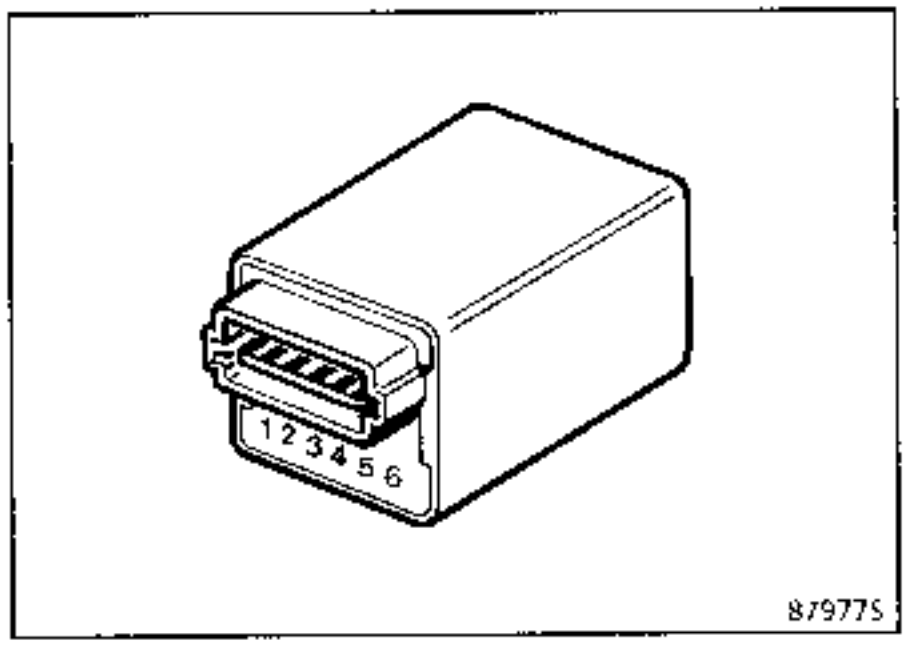
This timer is located :

B48
Near the lefthand rear light.

L48
Under the rear parcel shelf on the lefthand side.

K48
Behind the interior boot trim on the lefthand side.

INTERIOR LIGHTING TIMER



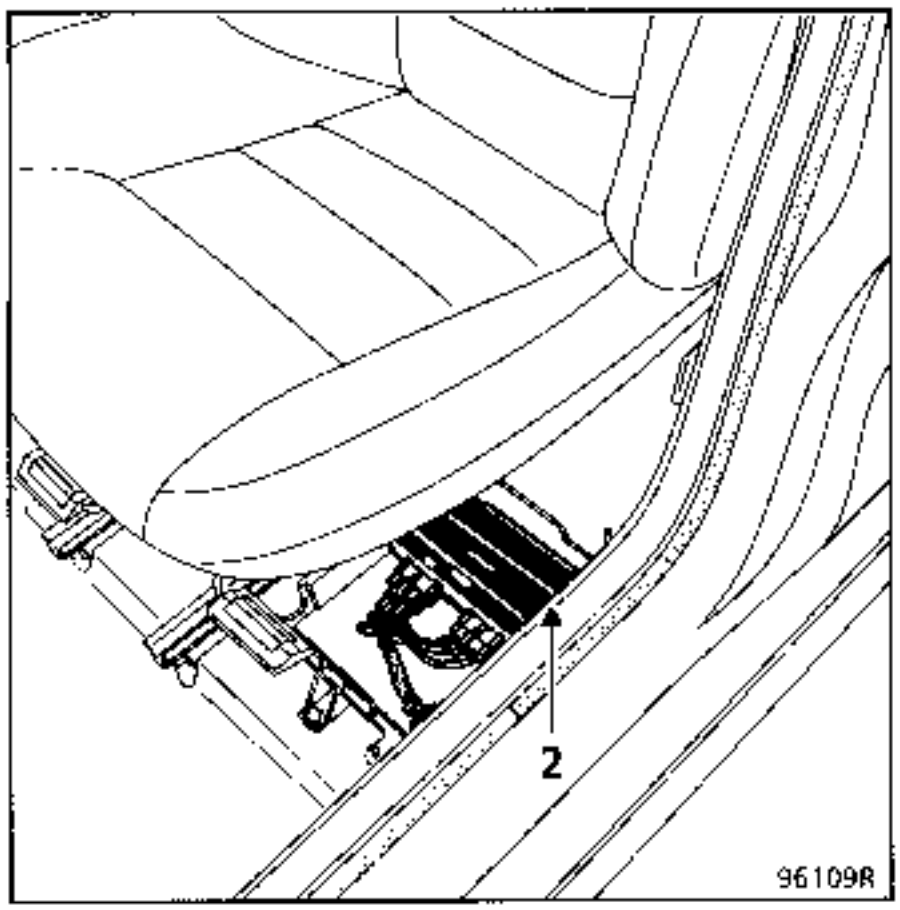
CONNECTIONS

Pin	Description
1	– before ignition
2	Interior lighting, common (earth)
3	Earth
4	Not used
5	Interior lighting switch
6	Infra-red remote control

NOTE : On vehicles fitted with an engine immobiliser system, the timer is incorporated in the decoder unit.

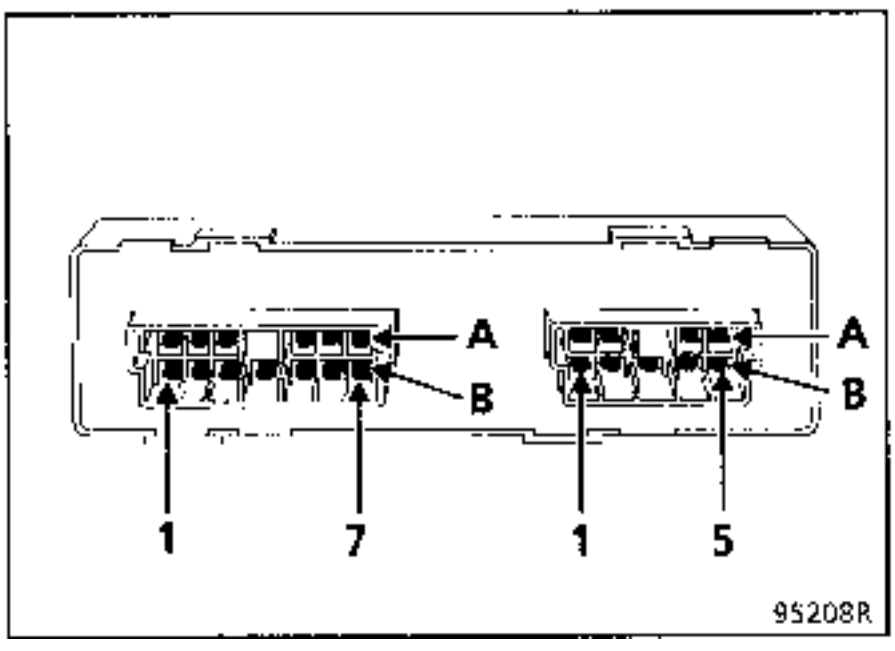
The following functions are integrate in the unit :
- door locking timer,
- infra-red code,
- interior lighting timer
- engine immobiliser system.

It is located underneath the driver's seat.



WARNING : For replacement of the decoder unit, refer to Section 82.

DECODER UNIT CONNECTIONS



13 pin connector

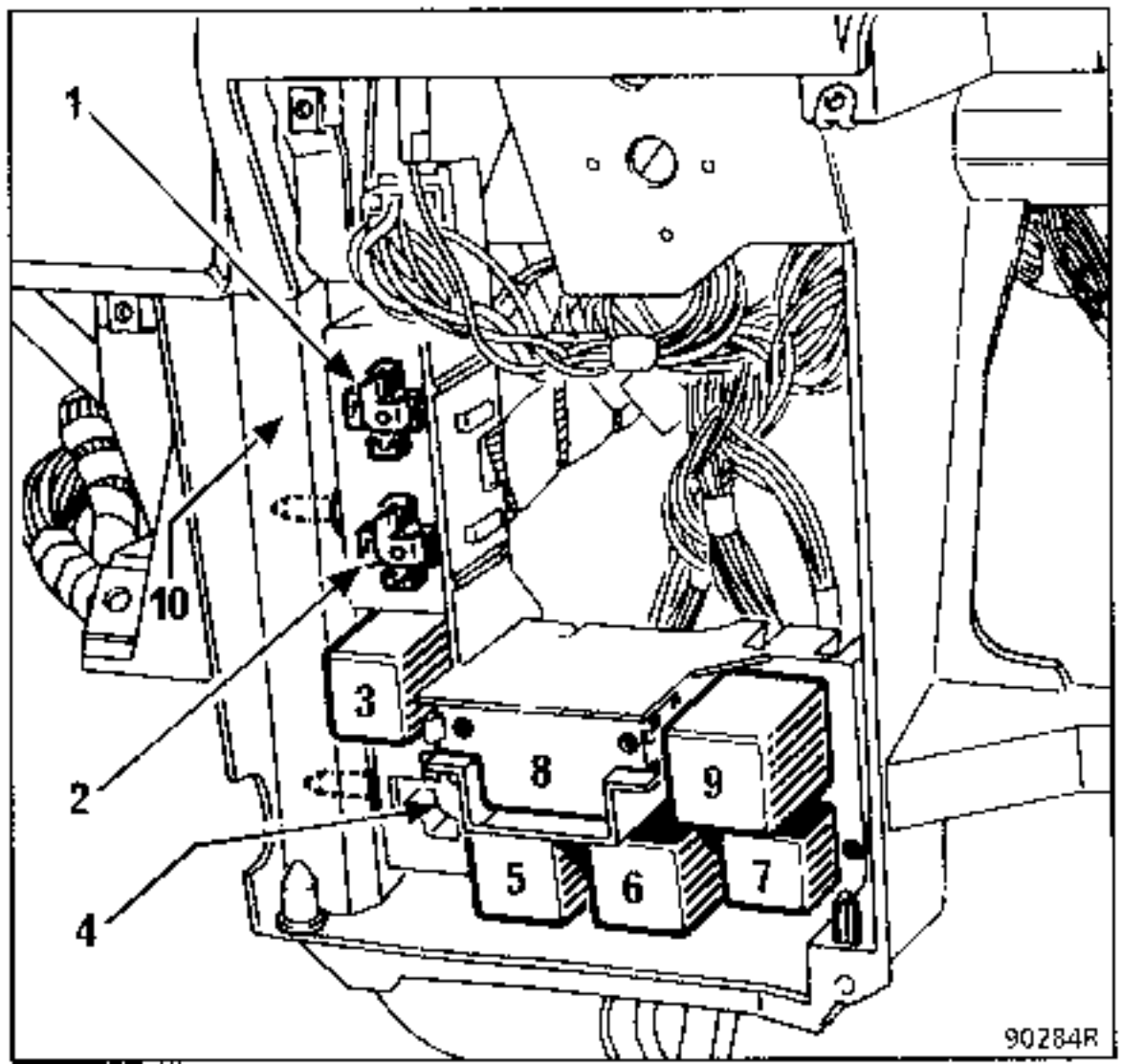
Pin	Description
A1	Infra-red entry
A2	Infra-red receiver supply
A3	Not used
A5	Coded signal to injection computer Unlocking signal to alarm
A6	Locking signal to alarm
A7	Door unlocking signal
B1	Door locking signal
B2	+ after ignition
B3	Front LH door switch
B4	Front RH door switch
B5	Rear LH door switch
B6	Rear RH door switch
B7	

9 pin connector

Pin	Description
A1	+ before ignition
A2	Fault-finding line K (not used)
A4	Fault-finding line L (not used)
A5	Earth
B1	Not used
B2	Doors locking
B3	Interior lighting timer
B4	Doors unlocking
B5	+ after ignition

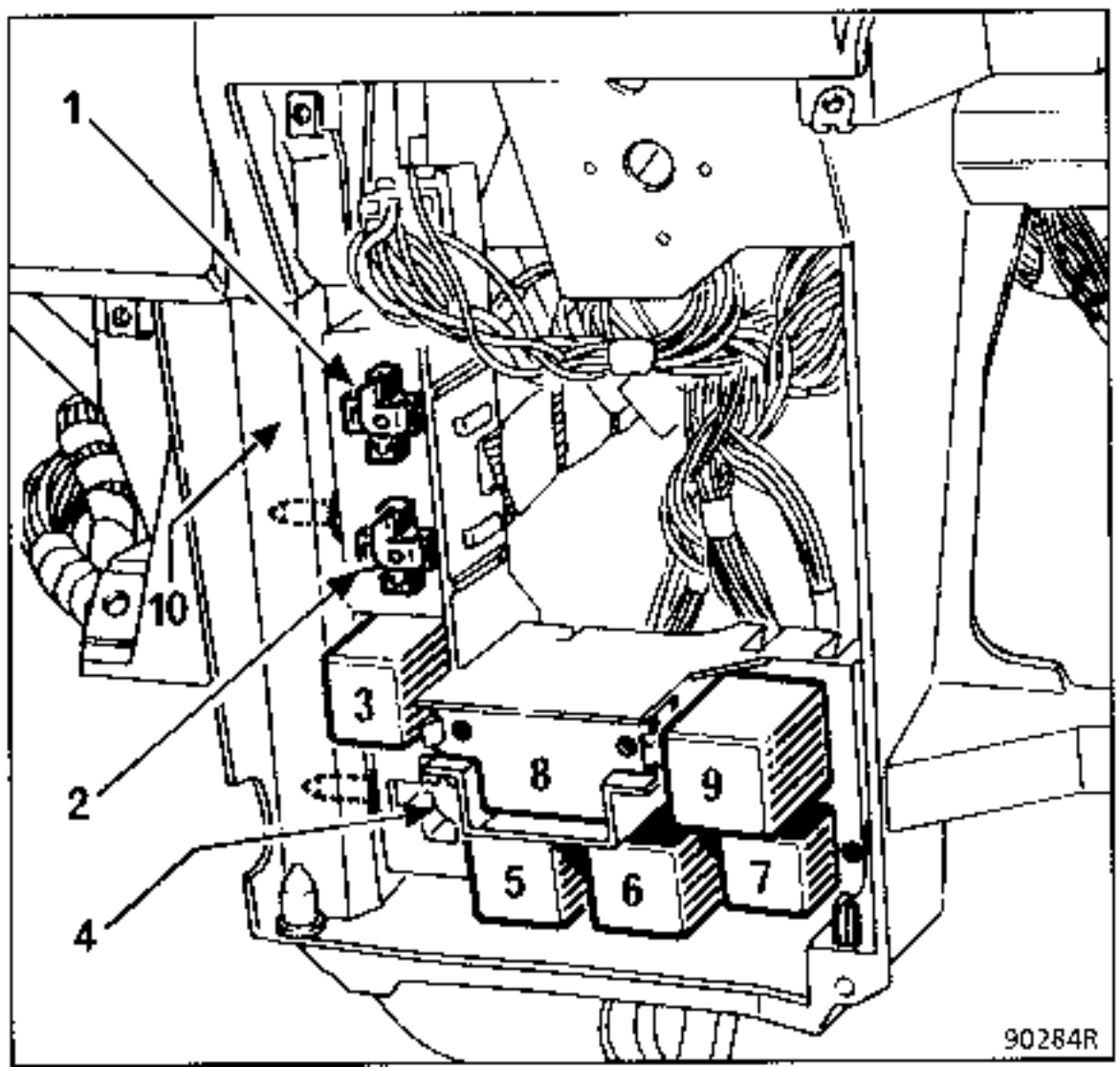
RELAY POSITIONS - 1st ARRANGEMENT

	Lefthand Drive	Righthand Drive	L485	Saudi Arabia
1	Rear fog light shunt	Rear fog light relay	Rear fog light shunt	Not used
2	Front fog light shunt	Not used	Front fog light shunt	Not used
3	Front fog light relay			Not used
4	Not used		Front righthand headlight relay	Heated rear screen relay
5	Flasher unit			
6	"Lights on" signal			
7	Heated rear screen relay			Over-speed relay
8	Screen wiper timer			
9	Electric door lock timer			



RELAY POSITIONS - 2nd ARRANGEMENT

	Lefthand Drive	Righthand Drive	Saudi Arabia
1	Front fog light shunt or electric window relay	Electric window relay	
2	Shunt or rear fog light relay	Rear fog light relay	Rear fog light shunt
3	Rear fog light relay		
4	Righthand headlight relay or heater control shunt	RH headlight relay	Over-speed relay
5	Flasher unit		
6	"Lights on" signal		
7	Heated rear screen relay		
8	Screen wiper timer		
9	Electric door lock timer		
10	Rheostat relay	-	



The rear screen element, which consists of a silk screen printed grid applied to the inside face of the glass, may be accidentally cut, and this renders the section concerned inoperative.

The exact point at which the break occurs can be determined using a voltmeter.

This type of damage can be repaired using heated rear screen repair varnish from SODICAM, Part n° 77 01 421 135 (2 g flask).

DETERMINING THE EXACT POINT OF THE BREAKAGE USING A VOLTMETER

Switch on the ignition.

Switch on the heated rear screen.

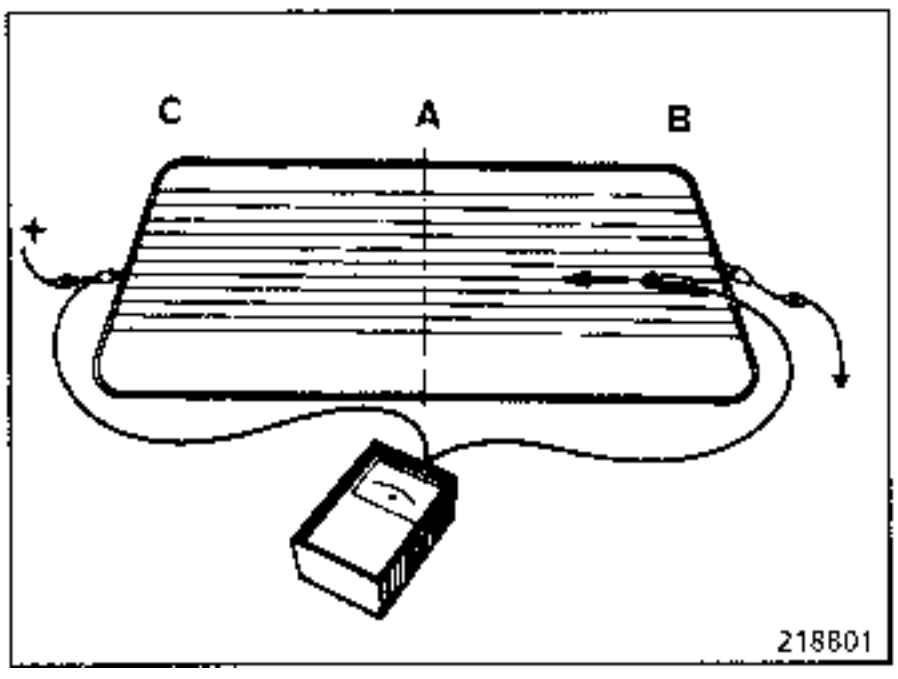
DETECTING BETWEEN LINES B AND A

Connect the + wire of the voltmeter to the + supply of the heated rear screen.

Apply the - probe of the voltmeter to one of the filaments on the - terminal side of the screen (line B). The voltage should be roughly the same as that at the battery terminals.

Move the - probe towards line A (see arrow) : the voltage should gradually fall.

If the voltage drops suddenly, the filament is broken at this point (carry out the check on each of the filaments).



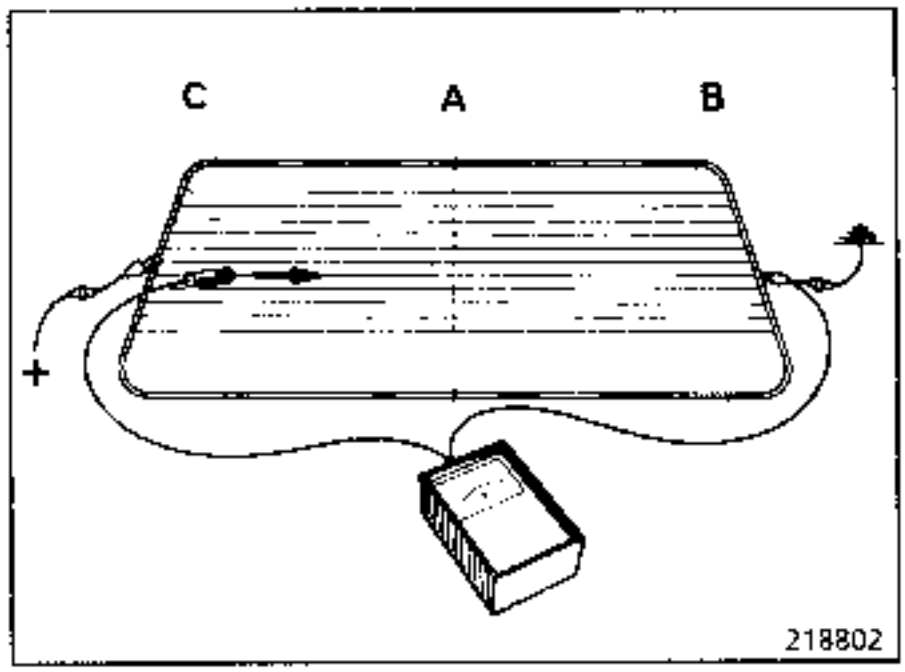
DETECTING BETWEEN LINES C AND A

Connect the - wire of the voltmeter to the - terminal of the heated rear screen.

Apply the − probe of the voltmeter to one of the filaments on the + side of the screen (line C). The voltage should be roughly the same as at the battery output.

Move the + probe towards line A (see arrow). The voltage should gradually fall.

If the voltage drops suddenly, the filament is broken at this point (carry out the check on each of the filaments).



REPAIRING A FILAMENT

Clean the area to be treated, locally, to remove all dust or grease, using, preferably alcohol or a glass cleaning product and wipe it with a clean, dry cloth.

To obtain an even repair, apply adhesive tape of the "Sellotape" type, either side of the section to be repaired, leaving the filament line uncovered.

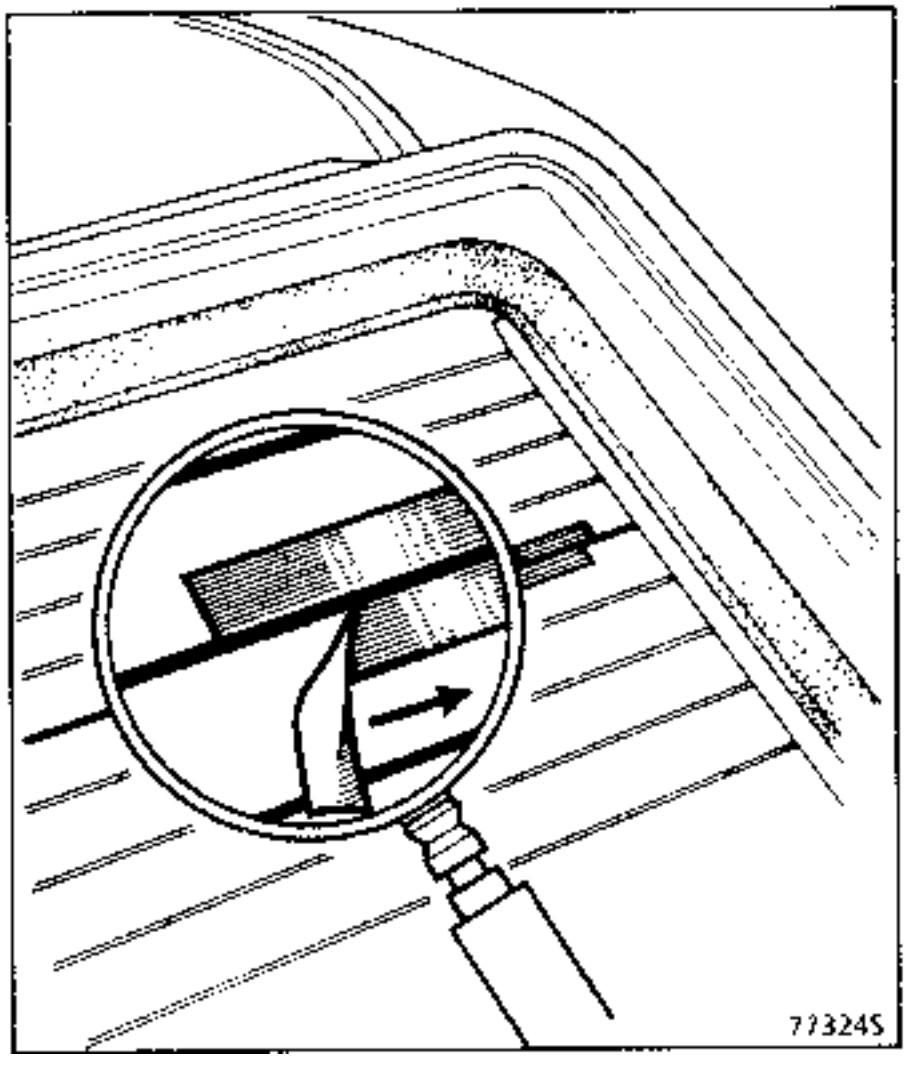
Before using the varnish, shake the flask to intermix any of the silver particles which may have settled to the bottom of the flask.

REPAIR (continued)

Using a small brush, apply a sufficient thickness of the varnish. If several coats have to be applied, leave the varnish to dry between each coat and do not apply more than three coats.

If, despite precautions, a run forms, it can be removed with a knife point or a razor blade, but only after having left the product for several hours to harden fully.

The adhesive tape used as a guide is not to be removed until approximately one hour after application. The tape is to be pulled off perpendicular to the filament, in the direction shown by the arrow. IF the varnish is applied at an ambient temperature of 20 °C , it will be fully dry in three hours. At temperatures lower than this, the drying time will be slightly longer.

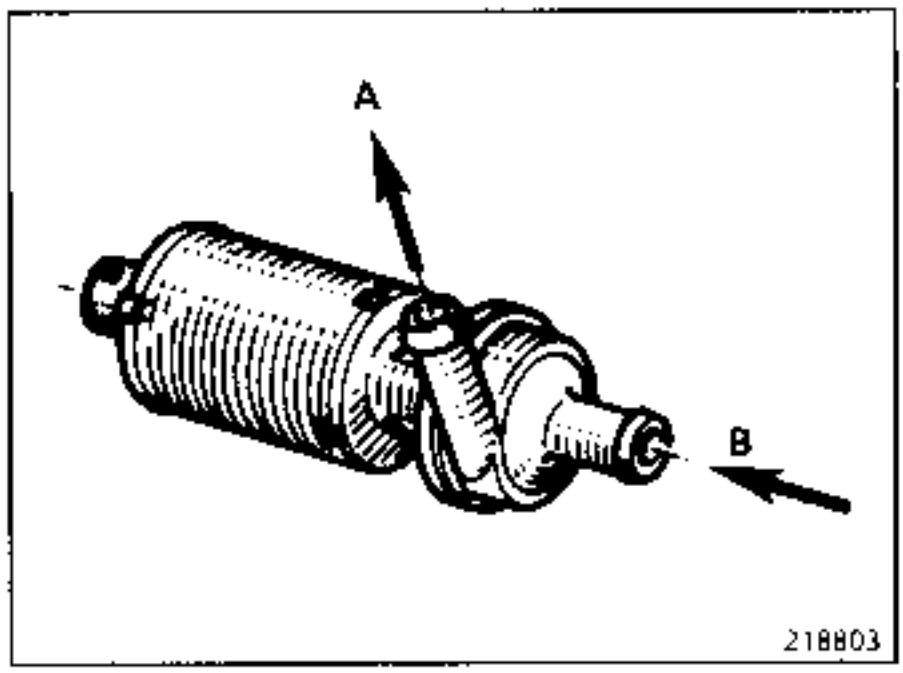


J7R turbocharged engines are fitted with a liquid cooled turbocharger.

Whilst the engine is running, the coolant is circulated by the engine driven main coolant pump. Whenever the engine is stopped, an auxiliary electric pump will take over. It is supplied by a timed relay (for approximately **12 minutes**), no matter what the engine temperature may be.

This coolant pump is mounted on the side of the front righthand shock absorber turret.

The pump suction entrance is on the pump-electric motor centre line and its output is perpendicular to this centre line.

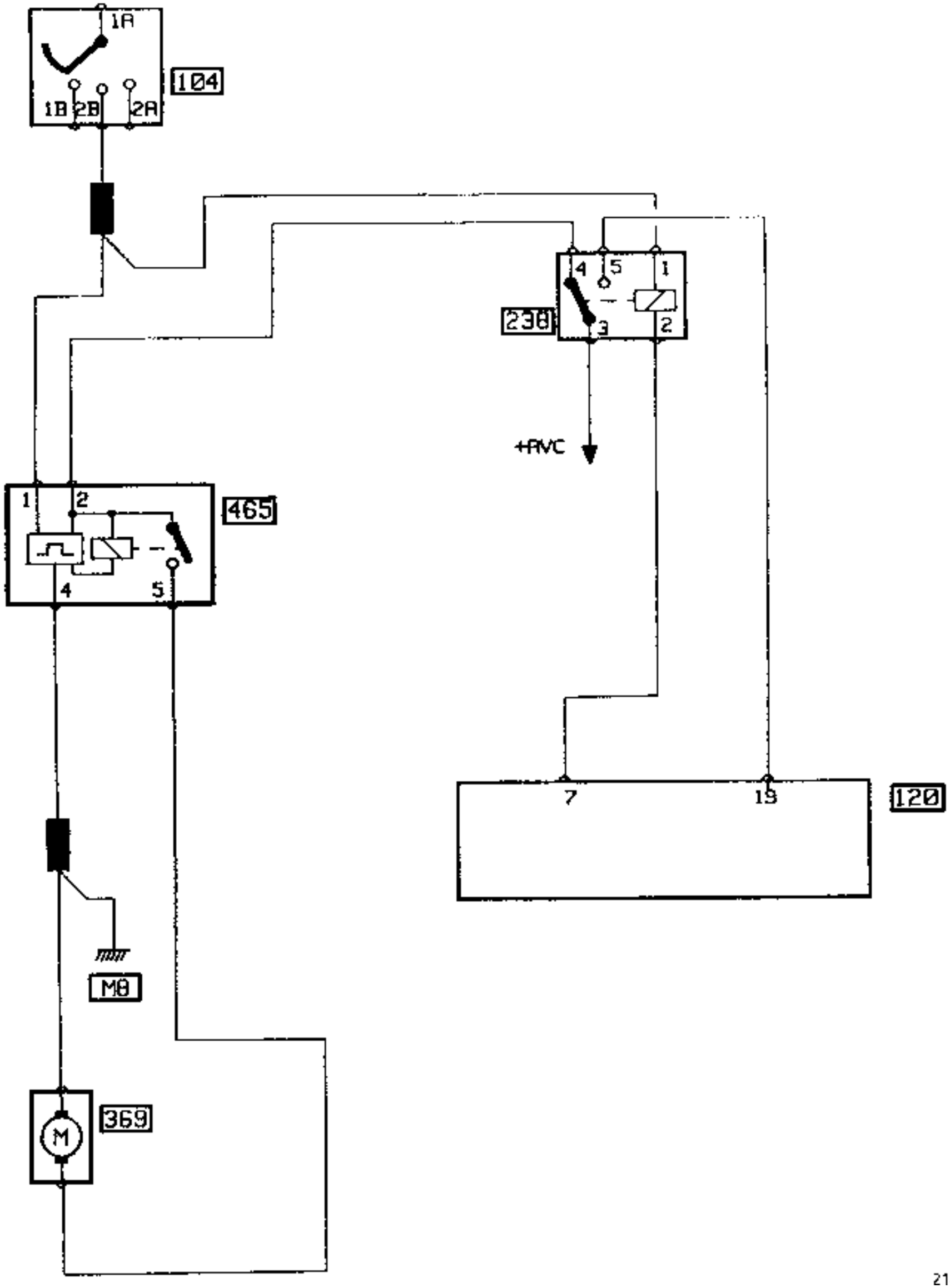


A Output
B Suction

KEY

104 Antitheft switch
120 Injection computer
238 Injection protection relay
369 Electric coolant pump
465 Coolant pump timer
M8 Injection system earth

Wiring diagram

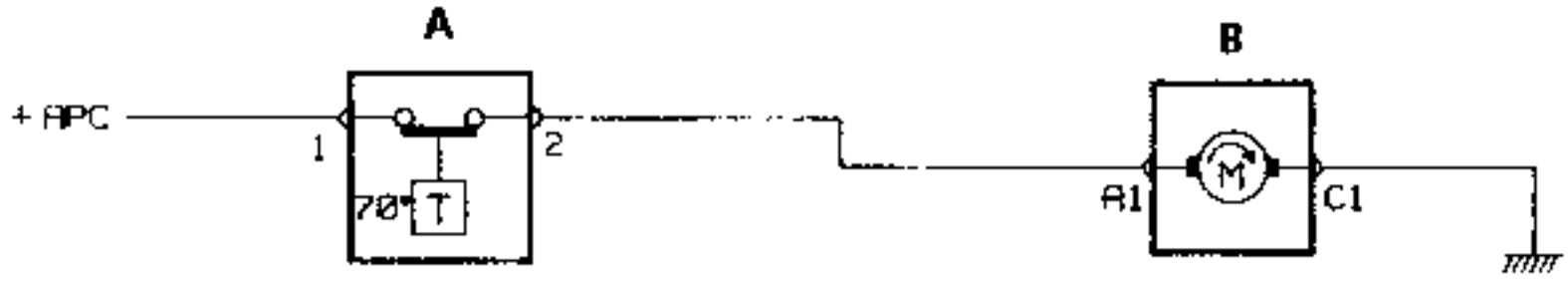


218804

Vehicles equipped with the **J8S** engine have an electric coolant pump which speeds up the increase in the heater radiator temperature.

1st ARRANGEMENT

The pump turns as soon as the ignition is switched on and cuts out as soon as the temperature exceeds approximately 70° C.



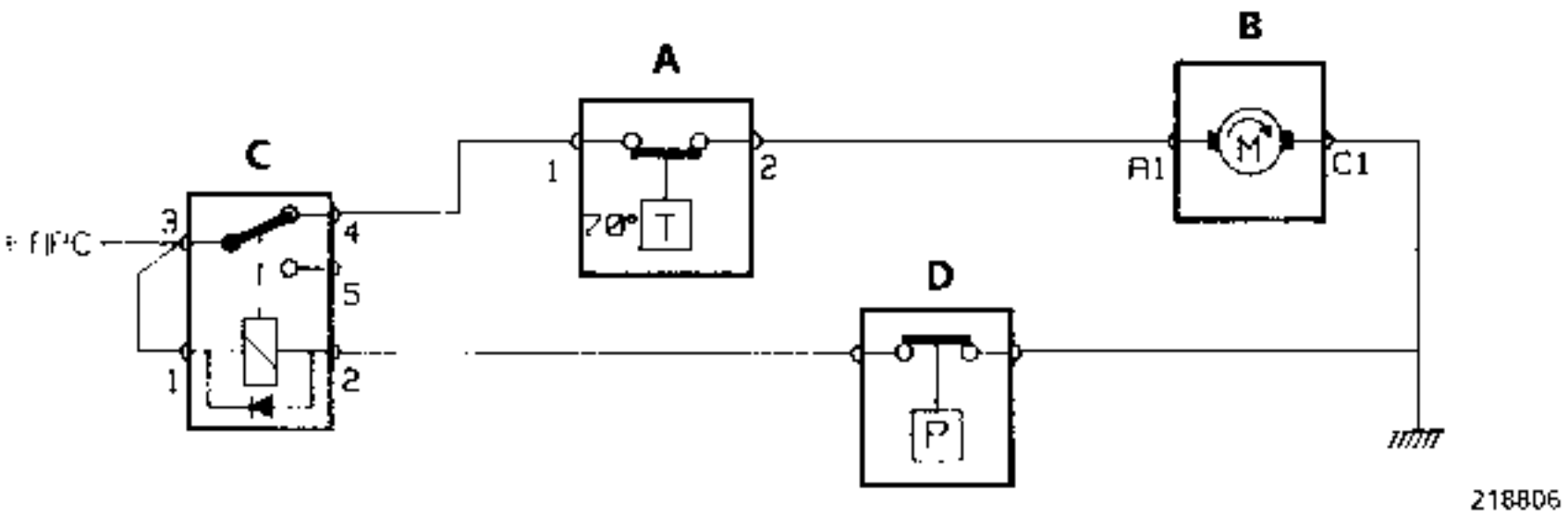
218805

2nd ARRANGEMENT

When the ignition is switched on, the relay is energised (relay earth via oil pressure switch) :

the pump does not operate

With the engine running (oil pressure established), the relay is no longer energised and supplies the electric pump which will stop operating as soon as the coolant temperature reaches approximately 70° C.



218806

A Thermocontact
B Electric coolant pump
C Relay
D Oil pressure switch

Vehicle types **X48E** (F3N engine with air conditioning) are equipped with an antipercolation system.

OPERATION

When the ignition is switched on :

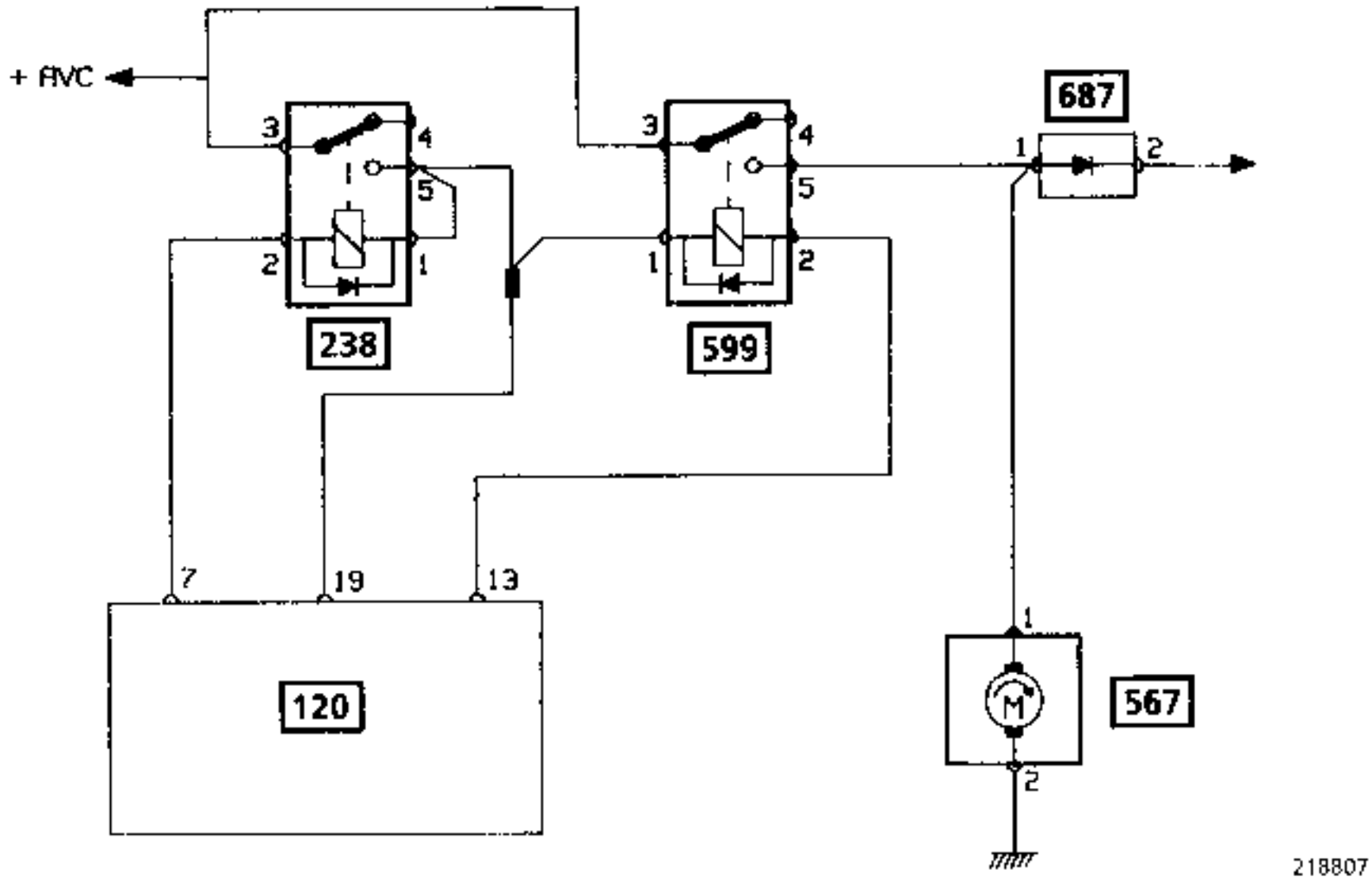
- the injection computer sends an earth via its track 7 to track 2 of the relay (238). This earth will be maintained for 30 seconds after each time the ignition is switched off or when the coolant temperature circuit reaches a temperature of more than 90° C.

- the injection computer sends a + for a few seconds via its track 19 to tracks 1 and 5 of the relay (238) to self-supply this (+ AVC at track 3).
  The relay (599) is therefore + supplied at track 1.

When the ignition is switched off, if the temperature of the coolant circuit is greater than 90°C, the injection computer sends an earth via its track 13 to track 2 of relay (599) and maintains that of relay (238).

The antipercolation coolant pump is then supplied as well as the cooling fans via the unit until the temperature drops back down to 90°C.

NOTE : The diode unit prevents the antipercolation pump being supplied when the cooling fans are operating and the engine is running.



+AVC	+ before ignition
120	Injection computer
238	Injection locking relay
567	Electric pump relay
599	Coolant pump support relay
687	Diode unit